

# **Acorn Academy Trust**

## **Calculation Policy**

### **2016**





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## **Introduction**

This framework details the key written methods of mathematical calculation to be taught. Its purpose is to promote a consistent and progressive approach to the teaching of mathematical calculation skills, in line with the expectations of the 2014 Maths curriculum. Although the main focus of this policy is on the progression to pencil and paper procedures it is important to recognise that the ability to calculate mentally underpins all calculation. Written calculation methods are not a replacement for mental calculation but structures to enable more complex calculations to be carried out efficiently. In every written method there is an element of mental processing. Written recording both helps children to clarify their thinking and supports and extends the development of more fluent and sophisticated mental strategies.

A sound understanding of the number system is essential for children to carry out calculations efficiently and accurately. Written methods of calculations are based on mental strategies. Each of the four operations builds on mental skills, learned in working with a range of manipulative equipment, which provide the foundation for jottings and informal written methods of recording. These mental skills lead on to more formal written methods of calculation. Strategies for calculation need to be supported by familiar models and images to reinforce understanding. When introducing a new strategy it is important to start with numbers that the child can easily manipulate so that they can understand the concept then, as competence increases, larger and more complex numbers can be tackled. Previous stages may need to be revisited to consolidate understanding when introducing a new strategy. The transition between stages should not be hurried as not all children will be ready to move on to the next stage at the same time, therefore, whilst the progression in this document is outlined by year group, it is inevitable with a class children could be working at different stages. Progression should be based on attainment across the mathematics curriculum and not just in the calculation processes. Judgments of attainment should be based on evidence gathered in routine classroom assessments and tasks of the pupil's competence and accuracy in applying methods learned.

# Acorn Academy Trust

## Calculation Policy




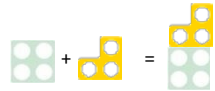




With this policy we aim to:




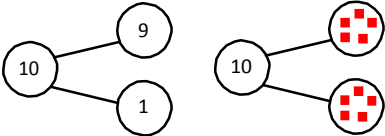
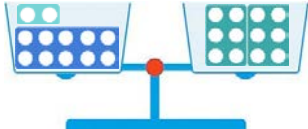
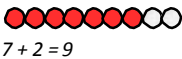
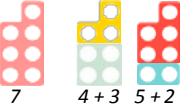

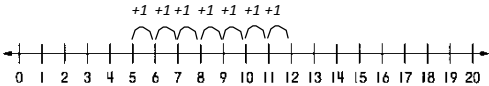


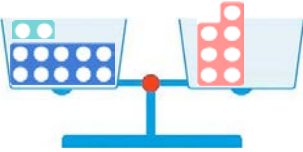

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| <ul style="list-style-type: none"><li>• <a href="#">Develop children's fluency in the use of written methods</a></li><li>• <a href="#">Develop children's understanding of the = symbol</a></li><li>• <a href="#">Teach inequality alongside teaching equality</a></li><li>• <a href="#">Don't count, calculate</a></li><li>• <a href="#">Look for pattern and make connections</a></li><li>• <a href="#">Use intelligent practice</a></li><li>• <a href="#">Use empty box problems</a></li></ul> | <ul style="list-style-type: none"><li>• <a href="#">Expose mathematical structure and work systematically</a></li><li>• <a href="#">Move between the concrete and the abstract</a></li><li>• <a href="#">Contextualise the mathematics</a></li><li>• <a href="#">Use questioning to develop mathematical reasoning</a></li><li>• <a href="#">Expect children to use correct mathematical terminology and speak in full sentences</a></li><li>• <a href="#">Identify difficult points</a></li></ul> |
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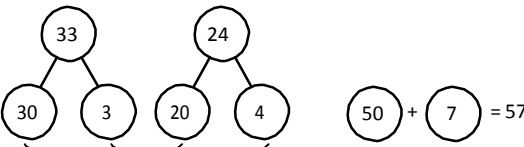

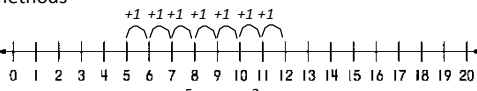
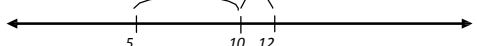
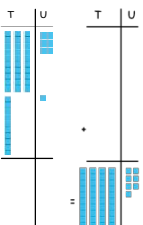

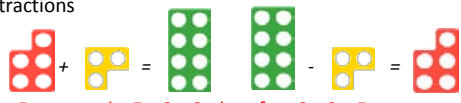
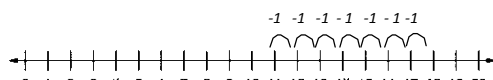

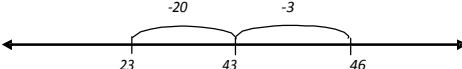
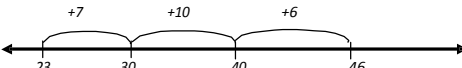


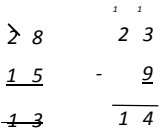
Addition & Subtraction

	Addition	Subtraction
<p><b>Year R</b></p>	<p>Children in EYFS should have a secure understanding of number names and values (conservation) before attempting to do any calculation work. The primary focus for all calculation work in the foundation stage centres around practical, concrete experiences to ensure that children have accurate model and images to secure understanding. Only then will children move onto visual models such as a numbered number line. Teaching will be focused upon single digits and move onto teen numbers and single digits as and when appropriate.</p> <p>One more of a number using apparatus such as Numicon and moving onto two more.</p>  <p>Combining small sets of numbers through physical apparatus and Numicon in a real life context. Practical in first instances with adults modelling number sentences and associated vocabulary.</p> <p><i>For example, „If there were five apples in one bag and three apples in another bag, how many apples would there be altogether?</i></p>  <p>Counting up all objects in the first instance before counting on from the largest group.</p> <p>Number lines - add one digit before moving onto adding one digit to two digit numbers. Learning of this alongside the concrete so that the children can make links between them.</p>   <p>Modelling of number sentences and vocabulary with children beginning to record themselves if appropriate.</p>	<p>One less, two less, before subtracting one digit numbers in practical contexts.</p>  <p>Games such as skittles and target based activities will form the cornerstone of concrete, experiential learning of subtraction concepts. Taking away from a group physically.</p> <p><i>For example, If I start with 7 skittles and I knock over three, how many will I have left?</i></p>  <p>Teacher modelling written number sentences and vocabulary.</p> <p><math>7 - 3 = 4</math>, with the 4 being physically moved away from the original set, leaving the four behind to count.</p>  <p>Moving onto number lines in the same way as addition, making sure that, initially, the link between the concrete and the visual remain.</p> <p><math>7 - 3 = 4</math></p> 



	Addition	Subtraction																																																																																
Year 1	<ul style="list-style-type: none"> <li>count to and across 100 forwards, beginning with 0 or 1, or from any given number</li> <li>given a number, identify one more                             <table border="1" data-bbox="290 387 557 497"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> <tr><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td></tr> <tr><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td></tr> <tr><td>31</td><td>32</td><td>33</td><td>34</td><td>35</td><td>36</td><td>37</td><td>38</td><td>39</td><td>40</td></tr> </table> <p><i>For example using a number square or concrete resources</i></p> </li> <li>represent and use number bonds within 20                             <ul style="list-style-type: none"> <li>represent number pairs to 10 using concrete resources, for example Numicon, bead strings, counters, Dienes etc                                      </li> <li>use number pairs to 10 to work out number pairs to 20</li> <li>represent doubles up to double 10    </li> </ul> </li> <li>use number pairs to 10 to work out number pairs to 20</li> <li>represent doubles up to double 10                                      <p><i>For example, double 6 is the same as 12, supported with concrete resources.</i></p> </li> <li>represent number bonds to make 3, 4, 5, 6, 7, 8, 9 in all ways using addition    <p><math>7 + 2 = 9</math></p> </li> <li>use number bonds to make 3, 4, 5, 6, 7, 8, 9, for example, 7 is the same as <math>4+3</math> and <math>5+2</math>  <p><math>7</math>      <math>4 + 3</math>      <math>5 + 2</math></p> </li> </ul> <li>add one-digit and two-digit numbers to 20, including zero</li> <li>read, write and interpret mathematical statements involving addition (+) and equals (=) signs                             <p><i>For example <math>5 + 7 =</math> (Supported by the use of concrete resources where appropriate).</i></p>  <p><i>Moving to a marked number line</i></p>  </li> <li>solve missing number problems (using numbers up to 20)</li>	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	<ul style="list-style-type: none"> <li>count to and across 100, backwards, beginning with 0 or 1, or from any given number</li> <li>given a number, identify one less                             <table border="1" data-bbox="922 387 1189 497"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> <tr><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td></tr> <tr><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td></tr> <tr><td>31</td><td>32</td><td>33</td><td>34</td><td>35</td><td>36</td><td>37</td><td>38</td><td>39</td><td>40</td></tr> </table> <p><i>For example using a number square or concrete resources</i></p> <p><math>4 - 1 = 3</math>      <math>36 - 1 = 35</math></p> </li> <li>read, write and interpret mathematical statements involving subtraction (-) and equals (=) signs                              <p><i>For example <math>7 - 2 = 5</math></i></p> </li> <li>represent and use number bonds and related subtraction facts within 20                              <p><i>For example, <math>10 - 8 = 2</math> and <math>10 - 2 = 8</math></i></p> </li> <li>subtract one-digit and two-digit numbers to 20, including zero                             <p><i>Children use a variety of resources to model subtraction. As well as real life objects, children could use Numicon, Dienes, multilink etc. A number line could be used to show calculations.</i></p> </li> <li>solve one-step problems that involve subtraction, using concrete objects and pictorial representations, and missing number problems such as <math>7 = ? - 9</math>.                              <p><i>Children use balance scales to find out what to take away from 12 to make 7, or solve as an inverse. What needs to be added to 7 to make 12?</i></p>  <p><i>The difference between 13 and 8 is 5</i></p> <p><i>Children explore the language of difference by comparing different amounts using physical resources such as Numicon and multilink.</i></p> </li> </ul>	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
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	Addition	Subtraction																														
<p><b>Year 2</b></p>	<ul style="list-style-type: none"> <li>- solve problems with addition</li> <li>- using concrete objects and pictorial representations, including those involving numbers, quantities and measures</li> </ul>  <p><math>33 + 24 = 57</math> (Using Dienes cubes or equivalent) <i>Children use Dienes or equivalent to model addition, including bridging through 60.</i></p> <ul style="list-style-type: none"> <li>- add numbers using concrete objects, pictorial representations, and mentally, including:             <ul style="list-style-type: none"> <li>- a two-digit number and ones</li> <li>- a two-digit number and tens</li> <li>- two two-digit numbers</li> </ul> </li> </ul>  <p><i>Adding two digit numbers mentally supported with jottings (leading to expanded column method)</i></p> <ul style="list-style-type: none"> <li>- adding three one-digit numbers</li> </ul>  <p><i>For example, 7 + 4 + 9 is the same as 7 + 3 and 9 + 1 = 20</i> <i>Adding three one-digit numbers looking for number patterns, supported with concrete resources and a number line.</i></p> <ul style="list-style-type: none"> <li>- applying their increasing knowledge of mental and written methods</li> </ul>   <p><i>Children begin to use written methods for calculation, for example the number line. Use of number should progress to become increasingly proficient, moving to a blank number line.</i></p>  <p><math display="block">\begin{array}{r} 36 \\ + 11 \\ \hline 47 \end{array}</math><i>Children record calculation using formal written methods</i> <i>Including bridging through 60 supported with concrete resources.</i></p> <ul style="list-style-type: none"> <li>- recall and use addition facts to 20 fluently, and derive and use related facts up to 100</li> <li>- show that addition of two numbers can be done in any order</li> </ul>  <p><math>10 + 7</math> is the same as <math>7 + 10</math></p> <ul style="list-style-type: none"> <li>- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.</li> </ul>	<ul style="list-style-type: none"> <li>- recall and use subtraction facts to 20 fluently, and derive and use related facts up to 100</li> <li>- use number bonds to make 3, 4, 5, 6, 7, 8, 9 to work out subtractions</li> </ul>  <p><i>For example, 5 + 3 = 8, therefore 8 - 3 = 5</i></p> <ul style="list-style-type: none"> <li>- recall halves of even numbers up to 20</li> <li>- subtract a two-digit number and ones</li> </ul>  <p><math>18 - 7</math> completed using a number line, no bridging of tens.</p> <ul style="list-style-type: none"> <li>- subtract a two-digit number and tens</li> </ul>  <p><math>67 - 20</math> completed counting back on a number line or by using a 100 square</p> <table border="1" data-bbox="933 896 1197 985"> <tr><td>41</td><td>42</td><td>43</td><td>44</td><td>45</td><td>46</td><td>47</td><td>48</td><td>49</td><td>50</td></tr> <tr><td>51</td><td>52</td><td>53</td><td>54</td><td>55</td><td>56</td><td>57</td><td>58</td><td>59</td><td>60</td></tr> <tr><td>61</td><td>62</td><td>63</td><td>64</td><td>65</td><td>66</td><td>67</td><td>68</td><td>69</td><td>70</td></tr> </table> <ul style="list-style-type: none"> <li>- subtract two two-digit numbers</li> </ul>  <p><math>46 - 13</math> using a number line. The language of take away supports the concept of counting back.</p>  <p><i>The same question can also be calculated counting forwards is the language of difference is introduced.</i></p> <ul style="list-style-type: none"> <li>- using concrete objects (including exchanging Tens &amp; Units)</li> </ul>  <p><math>46 - 24</math> completed using Dienes cubes (or equivalent), exchanging tens for units where necessary</p> <ul style="list-style-type: none"> <li>- using pictorial representations</li> </ul>  <p><math>54 - 27 = 27</math> (indicated by the 2 tens and 7 left over from the exchange)</p> <ul style="list-style-type: none"> <li>- subtract a two-digit number and ones</li> </ul>  <p><math display="block">\begin{array}{r} 82 \\ - 9 \\ \hline 73 \end{array}</math><i>Children begin to explore representing subtraction in a formal manner but should still carry out calculations using resources.</i></p> <ul style="list-style-type: none"> <li>- subtract a two-digit number and tens</li> <li>- subtract two two-digit numbers (no bridging the tens, bridging the tens)</li> </ul>	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
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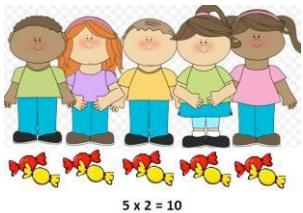


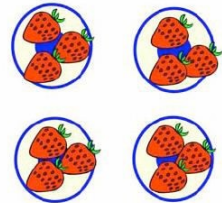
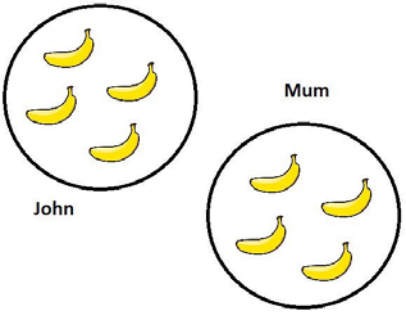
	Addition	Subtraction
Year 3	<p>- add numbers with up to three digits, using formal written methods of columnar addition</p> $\begin{array}{r} 45 \\ + 22 \\ \hline 67 \end{array}$ <p><i>Children continue to explore column addition, following a clear progression. Children should have access to Dienes or equivalent equipment.</i></p> $\begin{array}{r} 48 \\ + 13 \\ \hline 61 \end{array}$ <p><i>Exchanging units for 60's</i></p> $\begin{array}{r} 42 \\ + 93 \\ \hline 135 \end{array}$ <p><i>Exchanging tens for 100's</i></p> $\begin{array}{r} 748 \\ + 93 \\ \hline 841 \end{array}$ <p><i>Exchanging units and tens.</i></p> <p>- solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.</p> <p><i>Throughout year 3 and 4, children's use of formal addition and subtraction should be supported by the appropriate use of expanded methods.</i></p> $\begin{array}{r} 30 + 8 \\ + 40 + 3 \\ \hline 70 + 11 \end{array}$	<p>- subtract numbers mentally, including:</p> <ul style="list-style-type: none"> <li>- a three-digit number and ones</li> <li>- a three-digit number and tens</li> <li>- a three-digit number and hundreds</li> </ul> <p>- subtract numbers with up to three digits, using formal written methods of columnar subtraction</p> <p><i>Children continue to explore a range of subtraction calculations. Throughout the process they should have access to appropriate resources to support their learning but be encouraged to lay their work in formal columns. Questions should be progressive.</i></p> $\begin{array}{r} 46 \\ - 22 \\ \hline 24 \end{array}$ <p><i>No exchanging</i></p> $\begin{array}{r} 31 \\ \cancel{7}8 \\ - 9 \\ \hline 39 \end{array}$ <p><i>Exchanging tens to units.</i></p> $\begin{array}{r} 436 \\ - 214 \\ \hline 222 \end{array}$ <p><i>3 digits with no exchanging</i></p> $\begin{array}{r} 2131 \\ \cancel{3}6 \\ - 267 \\ \hline 079 \end{array}$ <p><i>Exchanging hundreds, tens and units.</i></p> <p>- solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.</p>
Year 4	<p>- find 1000 more or less than a given number</p> <p>For example, <math>1452 + 2000 = 3452</math> <i>Children begin to work with numbers up to 1000, being able to Double large numbers using place value knowledge.</i></p> <p>- add numbers with up to 4 digits using the formal written methods of columnar addition</p> $\begin{array}{r} 1748 \\ + 1293 \\ \hline 3041 \end{array}$ <p><i>Children are introduced to 4 digit column addition and apply carrying skills to the thousands column.</i></p> <p>- solve addition two-step problems in context</p> <p>- solve number and practical problems that involve all of the above and with increasingly large positive numbers</p>	<p>- find 1000 less than a given number</p> <p>For example, <math>2452 - 1000 = 1452</math> <i>Children apply their understanding of digit value to identify 1000 less with ease.</i></p> <p>- count backwards through zero to include negative numbers</p> <p>For example, <math>13 - 27</math>. <i>Children understand that a negative answer cannot be calculated using formal method and use jottings and mental strategies to calculate an answer</i></p> <p>- subtract numbers with up to 4 digits using the formal written methods of columnar subtraction</p> $\begin{array}{r} 3151 \\ \cancel{1}66 \\ - 918 \\ \hline 3248 \end{array}$ <p><i>Children introduced to calculations with up to 4 digits. Calculations should avoid exchanging through more than 1 column until a full conceptual understanding is grasped.</i></p> <p>- solve subtraction two-step problems in contexts</p>



	Addition	Subtraction
Year 5	<ul style="list-style-type: none"> <li>- add numbers mentally with increasingly large numbers <math>10573 + 3200 = 13773</math> <i>Children use knowledge of place value to add large numbers mentally.</i></li> <li>- add whole numbers with more than 4 digits, including using formal written methods (columnar addition) <math display="block">\begin{array}{r} 4636 \\ + 2548 \\ \hline 7184 \end{array}</math> <math display="block">\begin{array}{r} 66 \\ + 36 \\ \hline 102 \\ + 19 \\ \hline 121 \end{array}</math> <math display="block">\begin{array}{r} 6.96 \\ + 25.4 \\ \hline 32.36 \end{array}</math><i>Children use a formal written method to add more than two digits, carrying numbers above 1</i> <i>Children apply column addition to any numbers including decimals, carrying across the decimal place holder.</i></li> <li>- solve addition multi-step problems in contexts</li> </ul>	<ul style="list-style-type: none"> <li>- subtract numbers mentally with increasingly large numbers <math>64501 - 4300 = 60201</math> <i>Children continue to apply place value knowledge to subtract numbers with increasing large numbers. Mental calculations can be supported with jottings and informal methods of calculation, including a number line.</i></li> <li>- subtract whole numbers with more than 4 digits, including using formal written methods (columnar subtraction) <math display="block">\begin{array}{r} 5 \quad 23 \quad 1 \\ 64501 \\ - 4300 \\ \hline 60201 \end{array}</math><i>Children use a formal written method to subtract numbers with up to four digits, exchanging freely in all columns.</i> <math display="block">\begin{array}{r} 8 \quad 9 \quad 1 \\ 907 \\ - 688 \\ \hline 219 \end{array}</math><i>Children exchange through zero, in this case in the ten's exchange with the 100s.</i> <math display="block">\begin{array}{r} 1 \quad 1 \\ 1.77 \\ - 1.36 \\ \hline 0.41 \end{array}</math><i>Children apply formal written method to calculations involving decimals.</i></li> <li>- solve subtraction multi-step problems in contexts, deciding which operations and methods to use and why.</li> </ul>
Year 6	<ul style="list-style-type: none"> <li>- perform mental calculations, including with mixed operations and large numbers</li> <li>- solve addition multi-step problems in contexts, deciding which operations and methods to use and why <i>Children consolidate skills and apply them to a variety of problem solving contexts. For some children, revisiting strategies along the calculation journey will be necessary to secure conceptual understanding.</i> <i>Once the principles of standard column addition have been mastered, increasing the number of columns does not increase the difficulty.</i></li> </ul>	<ul style="list-style-type: none"> <li>- perform mental calculations, including with mixed operations and large numbers</li> <li>- solve problems involving subtraction <i>Children consolidate and apply the skills learnt in a variety of problem solving contexts. For some children, revisiting the strategies and resources used along the calculation journey will be necessary to secure conceptual understanding.</i> <i>Once the principles of standard column subtraction have been mastered, increasing the number of columns does not increase the difficulty.</i></li> </ul>




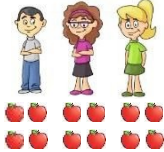
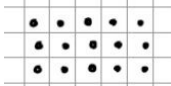



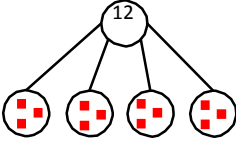


## Multiplication and Division

Multiplication	Division
<p>Children in EYFS should have a secure understanding of number names and values (conservation) before attempting to do any calculation work. The primary focus for all calculation work in the foundation stage centres around practical, concrete experiences to ensure that children have accurate models and images to secure understanding. Recording of multiplication and division sentences can be modelled, if appropriate, but children should not be.</p>	
<p><b>Year R</b></p> <p>Children to solve one step problems practically using a range of apparatus. Teacher should model the concept of equal groups.</p> <p><i>Children explore this in a range of numbers and contexts. For example: If 5 children had two sweets each, how many sweets do the children have altogether?</i></p>  <p style="text-align: center;"><math>5 \times 2 = 10</math></p> <p>Children can represent their working with sweets, cubes or any similar resource.</p>  <p>This could also be modelled using Numicon, if deemed appropriate.</p>  <p>Children will also be encouraged to group count in 2s, 5s and 10s when solving problems and will practice counting in these increments.</p>	<p>As with multiplication, children to solve simple, one-step problems using apparatus. Teacher should model the concept of sharing to the children and the idea of equal groups.</p> <p><i>Children explore this in a range of numbers and contexts. For example: If Tom had 12 strawberries and shared them between him and three friends, how many strawberries would they have each?</i></p>  <p>Children should be taught along the lines of the - one-for-you, one-for-you' principle so that all objects are shared equally among the groups.</p> <p>Children will also be taught to halve numbers up to 10 and then twenty. Children should be learn this using concrete examples in the first instance and share into two equal groups:</p> <p><i>Children explore this in a range of numbers and contexts. For example, John had 8 bananas. He gave half to his Mum. How many did his Mum get?</i></p> 



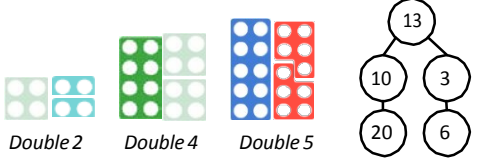
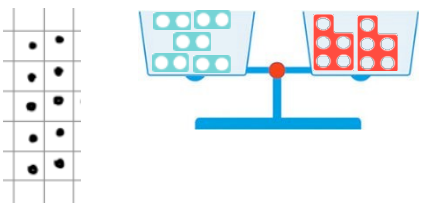

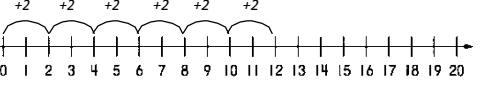
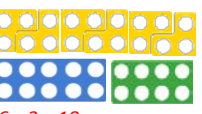
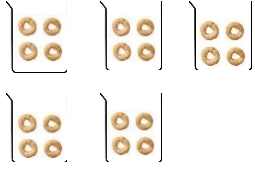
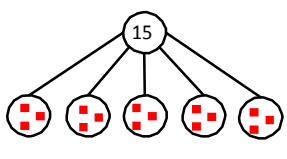
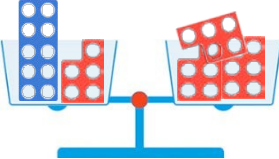
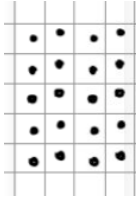
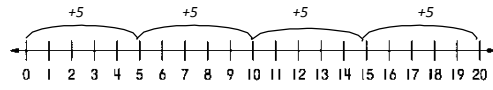


Multiplication	Division
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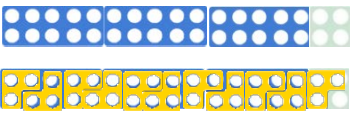

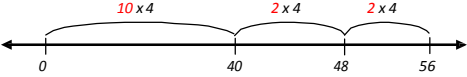

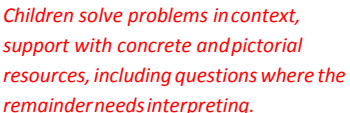
Children should be exposed to the close links between multiplication and division, understand that times table facts can be used to support division as well as multiplication. Many of the National Curriculum targets addressed here relate to both multiplication and division simultaneously and therefore prove difficult to address separately.

<p><b>Year 1</b></p> <ul style="list-style-type: none"> <li>- solve one-step problems involving multiplication, by calculating the answer using <b>concrete objects</b></li> </ul>  <p><i>Children exploring multiplication using physical resources: For example, counting out groups of 5 into hoops.</i></p> <ul style="list-style-type: none"> <li>- solve one-step problems involving multiplication, by calculating the answer using <b>pictorial representations and arrays</b> with the support of the teacher.</li> </ul>  <p><i>Children explore this in a range of numbers and contexts. For example, If 3 children each had 4 apples, how many apples are there altogether?</i></p> <p><math>3 \times 4</math></p>  <p><i>Children use arrays to represent multiplication, for example, 3 groups of 5 (<math>3 \times 5</math>).</i></p> <p><math>3 \times 5</math></p>  <p><math>3 \times 5</math>      3 groups of 5</p> <p><i>Children represent arrays using physical resources such as Cuisenaire rods. The same calculation can be represented using Numicon or other concrete resources.</i></p>  <p><math>3 \times 4</math></p> <p><i>Children represent number pictorially and begin to find the final outcome by counting with increasing efficiency. For example, counting in groups of 4 instead of units.</i></p>  <p><i>Children use a range of concrete resources as well as maths equipment to support their multiplication. Suggestions include:</i></p> <ul style="list-style-type: none"> <li>- Numicon</li> <li>- Cuisenaire</li> <li>- Dienes</li> <li>- Multilink</li> </ul> <p><i>*There are many other resources available.</i></p>	<ul style="list-style-type: none"> <li>- solve one-step problems involving <b>division</b>, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.</li> </ul> <p><i>Children use resources to represent division.</i></p>  <p><i>For example, If I had 12 sweets and divided them equally into 4 pots, how many sweets are in each pot?</i></p> <p><i>Children use pictorial representations to solve problems involving division; moving from actual pictures to representative jottings.</i></p>  <p><i>Share 8 apples between two children. How many do they each have? (Sharing real apples, moving to drawing apples, moving to jottings.)</i></p>  <p><i>16 children went to the park at the weekend, half that number went swimming. How many children went swimming?</i></p>
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	Multiplication	Division
Year 2	<p>- recall and use multiplication facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers</p> <p> Children begin to spot patterns. For example, all numbers in the 2 times table are also even. (Numicon show this really clearly).</p> <p> Children use mental jottings to work out multiplication tables. For example, <math>3 \times 5 = 15</math></p> <p>Children explore doubles up to <math>10 \times 2</math>, supported with the use of resources such as Numicon or equivalent.</p> <p> Double 2    Double 4    Double 5    <math>\begin{matrix} 13 \\ / \quad \backslash \\ 10 \quad 3 \\ / \quad \backslash \\ 20 \quad 6 \end{matrix}</math></p> <p>Children begin to use partitioning to support doubling.</p> <p>- calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (<math>\times</math>), division (<math>\div</math>) and equals (<math>=</math>) signs</p> <p>- show that multiplication of two numbers can be done in any order (commutative).</p> <p></p> <p>For example, 2 groups of 5 is worth the same as 5 groups of 2, represented using arrays, Numicon scales. This problem could also be represent using concrete resources and pictorial representations.</p> <p></p> <p>- solve problems involving multiplication, using materials, arrays, repeated addition, mental methods, and multiplication facts, including problems in contexts.</p> <p></p> <p>Repeated addition support through the use of a number line (<math>6 \times 2</math>)</p> <p></p> <p><math>6 \times 3 = 18</math></p> <p>Repeated addition supported with the use of Numicon (or equivalent). The final answer of 18 resolved by counting and comparison.</p>	<p>- recall and use division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers</p> <p>Children use resources to represent division. *Divisions link closely to 2, 5 and 10 times tables only as this is the year 2 focus.</p> <p> For example, If I had 20 cheerios and divided them equally into 5 pots, how many sweets are in each pot?</p> <p>- calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (<math>\times</math>), division (<math>\div</math>) and equals (<math>=</math>) signs</p> <p> Children use pictorial representations to solve problems involving division; moving from actual pictures to representative jottings.</p> <p>Although sharing forms the start of conceptual understanding, children also explore the concept of group.</p> <p> For example, <math>15 \div 5</math> is the same as asking how many groups of 5 are in 15. This understanding will help lead towards number line division. (In this case, supported with the use of Numicon scales)</p> <p> <math>20 \div 5 = 4</math> supported with the construction of an array.</p> <p>Progression should lead to repeated addition.</p> <p>5            10            15            20</p> <p>(Shown below on a number line)</p> <p></p> <p>Children begin to explore number families for 2's, 5's and 10's times tables, forming close links between multiplication and division.</p> <p><math>2 \times 7 = 14</math>  <math>7 \times 2 = 14</math>  <math>14 \div 2 = 7</math>  <math>14 \div 7 = 2</math></p>

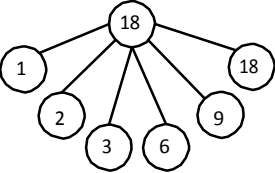
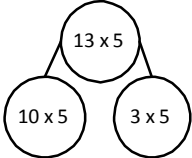






	Multiplication	Division																																																																												
Year 3	<p>- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables</p> <table border="1" data-bbox="284 344 496 434"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> <tr><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td></tr> <tr><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td></tr> <tr><td>31</td><td>32</td><td>33</td><td>34</td><td>35</td><td>36</td><td>37</td><td>38</td><td>39</td><td>40</td></tr> </table> <p><i>For example, circle all the numbers that are multiples of 4.</i></p> <p>- write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods (at this stage grid method as a bridging method to short multiplication)</p> <div style="display: flex; align-items: flex-start;"> <table border="1" data-bbox="295 629 592 786" style="margin-right: 10px;"> <tr><td>x</td><td>10</td><td>4</td></tr> <tr><td>3</td><td></td><td></td></tr> </table> <div data-bbox="614 658 837 801"> <p><i>Children begin to see that 14 x 3 is the same as (10 x 3) + (4 x 3) introducing a simple grid method to lay out work.</i></p> </div> </div> <div style="display: flex; align-items: flex-start; margin-top: 10px;"> <table border="1" data-bbox="295 824 592 981" style="margin-right: 10px;"> <tr><td>x</td><td>20</td><td>3</td></tr> <tr><td>4</td><td></td><td></td></tr> </table> <div data-bbox="614 831 837 920"> <p><i>Calculation supported by mental understanding by also physical resources.</i></p> </div> </div> <div style="display: flex; align-items: flex-start; margin-top: 10px;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: small; margin-right: 5px;">Progression</div> <table border="1" data-bbox="295 1010 555 1122" style="margin-right: 10px;"> <tr><td>x</td><td>10</td><td>4</td></tr> <tr><td>3</td><td></td><td></td></tr> </table> <div data-bbox="576 1016 847 1048"> <p><i>2d x 1d calculation progression.</i></p> </div> </div> <div style="display: flex; align-items: flex-start; margin-top: 10px;"> <table border="1" data-bbox="295 1144 512 1234" style="margin-right: 10px;"> <tr><td>x</td><td>10</td><td>4</td></tr> <tr><td>3</td><td>30</td><td>12</td></tr> </table> <div data-bbox="592 1066 847 1368" style="margin-left: 10px;"> <p><i>- Calculations to stay within the learnt times tables for year 3 (2, 3, 4, 5, 8, 10)</i></p> <p><i>- Place value counters make a good bridge between resources and written.</i></p> <p><i>- Children find place value patterns, for example, 3 x 8 = 24 therefore 30 x 8 = 240</i></p> </div> </div> <div style="display: flex; align-items: flex-start; margin-top: 10px;"> <table border="1" data-bbox="295 1272 512 1361" style="margin-right: 10px;"> <tr><td>x</td><td>10</td><td>3</td></tr> <tr><td>8</td><td>80</td><td>24</td></tr> </table> </div> <div style="display: flex; align-items: flex-start; margin-top: 10px;"> <table border="1" data-bbox="295 1397 512 1487" style="margin-right: 10px;"> <tr><td>x</td><td>30</td><td>5</td></tr> <tr><td>8</td><td>240</td><td>40</td></tr> </table> </div> <p>- solve problems, including missing number problems, involving multiplication, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.</p> <div style="display: flex; align-items: center; margin-top: 10px;">  <div data-bbox="432 1644 831 1794"> <p><i>Mark drives 18 miles to work every day and 19 miles back. He does this on Mondays, Tuesdays, Wednesdays, Thursdays and Fridays. How many miles does he travel to work and back in one week?</i></p> </div> </div> <div style="display: flex; align-items: center; margin-top: 10px;">  <div data-bbox="432 1823 831 1906"> <p><i>Miss West needs 28 paper cups. She has to buy them in packs of 6. How many packs should she buy?</i></p> </div> </div>	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	x	10	4	3			x	20	3	4			x	10	4	3			x	10	4	3	30	12	x	10	3	8	80	24	x	30	5	8	240	40	<p>- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables</p> <p><i>For example: At Christmas, there are 28 chocolates in a tin and Tim shares them between himself and 3 other members of the family. How many chocolates will each person get?</i></p> <p>- write and calculate mathematical statements for division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods</p> <p><i>Division moves away from sharing and instead begins to focus on the language of grouping. 39 ÷ 3 now reads, How many groups of 3 is there in 39? and not share 39 into 3 pots.</i></p> <p style="text-align: center;">3 6 9 12 15 18 21 24 27 30 33 36 39</p> <p><i>Children use repeated addition to solve problems using learnt times table facts. In this case they count 13 groups of 3.</i></p> <div style="display: flex; align-items: center; margin-top: 10px;">  <div data-bbox="1294 864 1337 887"> <p>11r1</p> </div> </div> <p><i>Children use Numicon to find how many groups of a number there are. Children lay out groups of 3 to reach the target number. Children identify simple remainders.</i></p> <div style="display: flex; align-items: center; margin-top: 10px;"> <div style="margin-right: 10px;"> <math>10 \times 4 = 40</math> </div>  </div> <p><i>Children become increasingly efficient. In this case, the child realises that to solve 56 ÷ 4 they can begin by showing that 10 groups of 4 is 40 finding the final answer of 16 without using Numicon to cover the whole number 56.</i></p> <div style="display: flex; align-items: center; margin-top: 10px;">  </div> <p><i>Children progress to represent division problems on a blank number line (marked if necessary), jumping in efficient groups to the target number.</i></p> <p>- solve problems, including missing number problems, involving division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.</p> <div style="display: flex; align-items: center; margin-top: 10px;">  <div data-bbox="1082 1621 1433 1704"> <p><i>Miss West needs 28 paper cups. She has to buy them in packs of 6. How many packs does she have to buy?</i></p> </div> </div> <div style="display: flex; align-items: center; margin-top: 10px;">  <div data-bbox="1082 1733 1433 1845"> <p><i>Children solve problems in context, support with concrete and pictorial resources, including questions where the remainder needs interpreting.</i></p> </div> </div>
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	Multiplication	Division												
Year 4	<ul style="list-style-type: none"> <li>- recall multiplication and division facts for multiplication tables up to <math>12 \times 12</math></li> <li>- use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers</li> </ul> <p>For example: <math>200 \times 3 = 600</math> can also be written <math>600 \div 3 = 200</math></p> <ul style="list-style-type: none"> <li>- recognise and use factor pairs and <b>commutativity</b> in mental calculations</li> </ul> <p><math>39 \times 7 = 30 \times 7 + 9 \times 7</math></p> <p><i>Using the commutative law to partition 39 into its parts in order to multiply by 7.</i></p> <p><math>2 \times 6 \times 5 = 10 \times 6</math></p> <p><i>Children recognise that three numbers multiplied together can be done in any order; using this to spot patterns in order to increase efficiency.</i></p> <ul style="list-style-type: none"> <li>- multiply two-digit and three-digit numbers by a one-digit number using formal written layout</li> </ul> <table border="1" style="display: inline-table; margin-right: 10px;"> <tr> <td>x</td> <td>300</td> <td>20</td> <td>6</td> </tr> <tr> <td>40</td> <td>12000</td> <td>800</td> <td>240</td> </tr> <tr> <td>1</td> <td>300</td> <td>20</td> <td>6</td> </tr> </table> <p><i>Grid method used for <math>3d \times 2d</math> calculations. At this stage a full conceptual understanding is evident.</i></p> <p><i>Children introduced to column multiplication as the next significant step from <math>3d \times 2d</math> grid multiplication. Short multiplication is less conceptual as the digit value is maintained by the place value holder.</i></p> <div style="display: flex; align-items: center;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); margin-right: 5px;">Progression</div> <div style="margin-right: 10px;"> <math display="block">\begin{array}{r} 12 \\ \times 3 \\ \hline 36 \end{array}</math> </div> <div> <p><i>2d x 1d – no carry</i></p> </div> </div> <div style="display: flex; align-items: center; margin-top: 10px;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); margin-right: 5px;">Progression</div> <div style="margin-right: 10px;"> <math display="block">\begin{array}{r} 13 \\ \times 7 \\ \hline 91 \\ 2 \end{array}</math> </div> <div> <p><i>2d x 1d – carry into the tens</i></p> </div> </div> <div style="display: flex; align-items: center; margin-top: 10px;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); margin-right: 5px;">Progression</div> <div style="margin-right: 10px;"> <math display="block">\begin{array}{r} 214 \\ \times 6 \\ \hline 1284 \\ 2 \end{array}</math> </div> <div> <p><i>3d x 1d – carrying freely across all columns</i></p> </div> </div> <ul style="list-style-type: none"> <li>- solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.</li> </ul>	x	300	20	6	40	12000	800	240	1	300	20	6	<ul style="list-style-type: none"> <li>- recall multiplication and division facts for multiplication tables up to <math>12 \times 12</math></li> </ul> <p><i>Children should continue to apply times table facts in order to solve problems mentally, recognising the relationship between larger numbers. For example <math>240 \div 3</math> can be answered using <math>24 \div 3</math> as a root question.</i></p> <p><i>There are no further statutory objectives relating to division which extend the learning of year 3. The non-statutory guidance implies a continued journey towards a conceptually understanding of division and fluency as a result of times table understanding. However, year 4 should be used to secure division on a number line and gain a deep mastery of division as a result of times table knowledge.</i></p>
x	300	20	6											
40	12000	800	240											
1	300	20	6											



	Multiplication	Division																																																												
Year 5	<p>- identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers</p> <table border="1" data-bbox="279 331 539 495"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> <tr><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td></tr> <tr><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td></tr> <tr><td>31</td><td>32</td><td>33</td><td>34</td><td>35</td><td>36</td><td>37</td><td>38</td><td>39</td><td>40</td></tr> <tr><td>41</td><td>42</td><td>43</td><td>44</td><td>45</td><td>46</td><td>47</td><td>48</td><td>49</td><td>50</td></tr> <tr><td>51</td><td>52</td><td>53</td><td>54</td><td>55</td><td>56</td><td>57</td><td>58</td><td>59</td><td>60</td></tr> </table> <p><i>Children can find multiples within a range. For example, what is the biggest multiple of 4 between 50 and 60?</i></p>  <p><i>Children identify factor pairs for numbers using times table facts and mental calculations.</i></p> <p>- multiply numbers mentally drawing upon known facts</p>  <p><i>For example, 13 x 5 can be calculated in two parts mentally. 10 x 5 added to 3 x 5.</i></p> <p>- multiply whole numbers and those involving decimals by 10, 100 and 1000</p> <p><i>For example, 3.68 x 10 supported with the use of a place value slider.</i></p>  <p>- multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers</p> <p><i>Children secure their previous understanding by moving to a 4d x 1d calculation.</i></p> $\begin{array}{r} 1214 \\ \times \quad 6 \\ \hline 7284 \end{array}$ <p><i>Multiplying by a 2 digit number is the next biggest conceptual jump. Questions should be simplified at first to allow children to understand the need to hold a zero in the units column.</i></p> $\begin{array}{r} 420 \\ \times \quad 32 \\ \hline 840 \\ 1260 \\ \hline 13380 \end{array}$ <p><i>3d x 2d calculation.</i></p> $\begin{array}{r} 327 \\ \times \quad 43 \\ \hline 981 \\ 13080 \\ \hline 14061 \end{array}$  <p><i>Children apply their understanding regularly. For example David brought boxes of can sin packs of 24. If he brought 9 boxes of baked beans, 3 pea and 17 carrots, how many tins would he have in total?</i></p>	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	<p>- divide numbers mentally drawing upon known facts</p> <p>- divide whole numbers and those involving decimals by 10, 100 and 1000</p>  <p><i>For example, 368 ÷ 10 supported with the use of a place value slider.</i></p> <p><i>Children work backwards to show that 36.8 x 10 = 368</i></p> <p>- divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context</p> <p>Progression</p> $5 \overline{) 15} \quad 2d \div 1d \text{ no remainder}$ $5 \overline{) 14} \text{ r}2 \quad 2d \div 1d \text{ including remainder}$ $4 \overline{) 178} \quad 3d \div 1d \text{ no remainder}$ $6 \overline{) 123} \text{ r}5 \quad 3d \div 1d \text{ including remainder}$ $3 \overline{) 2381} \quad 4d \div 1d \text{ no remainder}$ $7 \overline{) 0607} \text{ r}5 \quad 4d \div 1d \text{ including remainder}$ <p><i>Children practice these division skills progressive and in a variety of contexts, securing a deep understanding of the processes. Children solve problems in context, interpreting the remainder appropriately.</i></p>  <p><i>Egg boxes hold 6 eggs. A farmer collects 439 eggs. How many boxes can he fill?</i></p> <p><i>Egg boxes hold 6 eggs. How many boxes must a restaurant buy to have 200 eggs?</i></p>
1	2	3	4	5	6	7	8	9	10																																																					
11	12	13	14	15	16	17	18	19	20																																																					
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	Multiplication	Division																																																												
Year 6	<p>- perform mental calculations, including with mixed operations and large numbers</p> <p>Use mental strategies to calculate in their heads, using jottings and/or diagrams where appropriate. For example, to calculate <math>24 \times 15</math>, they multiply <math>24 \times 10</math> and then halve this to get <math>24 \times 5</math>, adding these two results together. They record their methods as <math>(24 \times 10) + (24 \times 5)</math>. Alternatively, they work out <math>24 \times 5 = 120</math> (half of <math>24 \times 10</math>), then multiply 120 by 3 to get 360.</p> <p>- identify common factors, common multiples and prime numbers</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> </div> <div style="text-align: center;"> </div> </div> <p><i>Recognising common factors using factor trees</i></p> <table border="1" style="display: inline-table; margin-right: 10px;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> <tr><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td></tr> <tr><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td><td></td></tr> <tr><td>31</td><td>32</td><td>33</td><td>34</td><td>35</td><td>36</td><td>37</td><td>38</td><td>39</td><td>40</td></tr> <tr><td>41</td><td>43</td><td>44</td><td>45</td><td>46</td><td>47</td><td>48</td><td>49</td><td>50</td><td></td></tr> <tr><td>51</td><td>52</td><td>53</td><td>54</td><td>55</td><td>56</td><td>57</td><td>58</td><td>59</td><td>60</td></tr> </table> <p><i>Children can find common multiples within a range. For example, what numbers are both multiples of 3 and 7?</i></p> <p>- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication</p> <div style="margin-bottom: 10px;"> <math display="block">\begin{array}{r} 21.4 \\ \times \quad 6 \\ \hline 128.4 \end{array}</math> <p><i>Children should continue to secure their understanding of column multiplication. Some children might explore decimal multiplication using a formal written method. This represents a substantial conceptual leap as the decimal numbers should not be lined up. The same pattern is followed and the decimal added after. In this question, children count 1 decimal place.</i></p> </div> <div> <math display="block">\begin{array}{r} 32.7 \\ \times \quad 2.4 \\ \hline 1308 \\ 6540 \\ \hline 78.48 \end{array}</math> <p><i>The same pattern continues. In this question, there are two decimal places, therefore the answer needs two decimal places.</i></p> </div>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	22	23	24	25	26	27	28	29	30		31	32	33	34	35	36	37	38	39	40	41	43	44	45	46	47	48	49	50		51	52	53	54	55	56	57	58	59	60	<p>- perform mental calculations, including with mixed operations and large numbers</p> <p>- divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context</p> <p>- divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context</p> <div style="margin-bottom: 10px;"> <math display="block">\begin{array}{r} 14.6 \\ 5 \overline{) 73.0} \\ \underline{35} \phantom{0} \\ 38 \phantom{0} \\ \underline{35} \phantom{0} \\ 30 \\ \underline{30} \\ 0 \end{array}</math> <p><i>Children taught to find a decimal answer where the decimal resolves after 1 or 2 decimal places.</i></p> </div> <div> <math display="block">\begin{array}{r} 123.5 \\ 6 \overline{) 741.0} \\ \underline{6} \phantom{0} \phantom{0} \\ 14 \phantom{0} \\ \underline{12} \phantom{0} \\ 23 \phantom{0} \\ \underline{18} \phantom{0} \\ 50 \\ \underline{48} \\ 20 \\ \underline{18} \\ 20 \\ \underline{18} \\ 20 \\ \underline{18} \\ 20 \end{array}</math> <p><i>Children introduced to long multiplication to solve division problems involving 2 digit divisions. The progression of steps is detailed below.</i></p> </div> <div style="margin-bottom: 10px;"> <p style="text-align: right;">Expanded Steps</p> <math display="block">\begin{array}{r} 0 \\ 15 \overline{) 432} \\ \underline{30} \\ 132 \\ \underline{120} \\ 12 \end{array}</math> <p><i>How many groups of 15 in 43? 2 (2 x 15 is added to the bottom of the sum)</i></p> </div> <div> <math display="block">\begin{array}{r} 028 \\ 15 \overline{) 432} \\ \underline{30} \\ 132 \\ \underline{120} \\ 12 \end{array}</math> <p><i>30 is subtracted from 43 to leave 13. The 2 units is dragged down to create 132. How many groups of 15 go into 132?</i></p> </div> <div> <math display="block">\begin{array}{r} 028 \\ 15 \overline{) 432} \\ \underline{30} \\ 132 \\ \underline{120} \\ 12 \end{array}</math> <p><i>8 groups of 15 go into 132 giving a total of 120. This is subtracted from 132 to leave 12.</i></p> </div> <div> <math display="block">\begin{array}{r} 0288 \\ 15 \overline{) 4320} \\ \underline{30} \\ 132 \\ \underline{120} \\ 120 \\ \underline{120} \\ 0 \end{array}</math> <p><i>In cases where a remainder is present on the last digit, zeros are added and the process repeated until the sum is resolved. No questions involving more than 2dp should be presented to the children.</i></p> </div>
1	2	3	4	5	6	7	8	9	10																																																					
11	12	13	14	15	16	17	18	19	20																																																					
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## Appendix 1

### RECEPTION

<p><b>COUNTING</b> number zero, one, two, three.. to twenty and beyond zero, ten, twenty... one hundred none how many...? count, count (up) to count on (from, to) count back (from, to) count in ones, twos... tens... more, less, many, few odd, even every other how many times? pattern, pair guess how many, estimate nearly, close to, about the same as just over, just under too many, too few, enough, not enough</p>	<p><b>COMPARING AND ORDERING NUMBERS</b> the same number as, as many as Of <b>two</b> objects/amounts: greater, more, larger, bigger less, fewer, smaller Of <b>three</b> or more objects/amounts: greatest, most, biggest, largest least, fewest, smallest one more, ten more one less, ten less compare order size first, second, third... tenth last, last but one before, after next between above, below</p>	<p><b>REASONING ABOUT NUMBERS OR SHAPES</b> pattern puzzle answer right, wrong what could we try next? how did you work it out? count, sort group, set match same, different list</p>
<p><b>ADDITION AND SUBTRACTION</b> add, more, and make, sum, total altogether score double one more, two more, ten more... how many more to make... ? how many more is... than...? take (away), leave how many are left/left over? how many have gone? one less, two less... ten less... how many fewer is... than...? difference between is the same as</p>	<p><b>'REAL LIFE' PROBLEMS / MONEY</b> compare double half, halve pair count out, share out left, left over money, coins penny, pence, pound price, cost buy / sell spend, spent, pay / change dear, costs more cheap, costs less, cheaper costs the same as how much...? how many...? total</p>	<p><b>General</b> same number/s different number/s missing number/s number facts number line, number track number square number cards counters, cubes, blocks, rods die, dice dominoes pegs, peg board same way, different way best way, another way in order, in a different order not all, every, each</p>



YEAR 1 & 2		
<p><b>COUNTING, PROPERTIES OF NUMBERS AND NUMBER SEQUENCES</b></p> <p>number zero, one, two, three... to twenty and beyond zero, ten, twenty... one hundred none how many...? count, count (up) to count on (from, to) count back (from, to) count in ones, twos... tens... more, less, many, few odd, even every other how many times? pattern, pair</p>	<p><b>PLACE VALUE AND ORDERING</b></p> <p>units, ones, tens exchange digit 'teens' number the same number as, as many as equal to Of <b>two</b> objects/amounts: greater, more, larger, bigger less, fewer, smaller Of <b>three</b> or more objects/amounts: greatest, most, biggest, largest least, fewest, smallest one more, ten more one less, ten less compare, order, size first, second, third... tenth, eleventh... twentieth last, last but one before, after, next between, half-way between above, below</p>	<p><b>ESTIMATING</b></p> <p>guess how many, estimate nearly, roughly, close to about the same as just over, just under too many, too few, enough, not enough</p>
<p><b>ADDITION AND SUBTRACTION</b></p> <p>+, add, more, plus make, sum, total altogether score double, near double one more, two more... ten more how many more to make...? how many more is... than...? how much more is...? -, subtract, take (away), minus leave how many are left/left over? how many have gone? one less, two less, ten less... how many fewer is... than...? how much less is...? difference between half, halve =, equals, sign, is the same as</p>	<p><b>MAKING DECISIONS AND REASONING</b></p> <p>pattern puzzle answer right, wrong what could we try next? how did you work it out? count out, share out, left, left over number sentence sign, operation</p>	<p><b>General</b></p> <p>same number/s different number/s missing number/s number facts number line, number track number square number cards abacus counters, cubes, blocks, rods die, dice dominoes pegs, peg board same way, different way best way, another way in order, in a different order not all, every, each</p>



## YEAR 3

### COUNTING, PROPERTIES OF NUMBERS AND NUMBER SEQUENCES

number  
zero, one, two, three... to twenty and beyond  
zero, ten, twenty... one hundred  
zero, one hundred, two hundred... one thousand  
none  
how many...?  
count, count (up) to  
count on (from, to)  
count back (from, to)  
count in ones, twos, threes, fours, fives...  
count in tens, **hundreds**  
more, less, many, few  
tally  
odd, even  
every other  
how many times?  
multiple of  
sequence  
continue  
predict  
pattern, pair, rule  
**relationship**

### PLACE VALUE AND ORDERING

units, ones, tens, hundreds  
digit  
one-, two- or three-digit number  
'teens' number  
place, place value  
stands for, represents  
exchange  
the same number as, as many as equal to  
Of **two** objects/amounts:  
greater, more, larger, bigger  
less, fewer, smaller  
Of **three** or more objects/amounts:  
greatest, most, biggest, largest  
least, fewest, smallest  
one more, ten more, **one hundred more**  
one less, ten less, **one hundred less**  
compare, order, size  
first, second, third... tenth... twentieth  
twenty-first, twenty-second...  
last, last but one  
before, after, next  
between, half-way between  
above, below

### ESTIMATING

guess how many, estimate  
nearly, roughly, close to  
**approximate, approximately**  
about the same as  
just over, just under  
exact, exactly  
too many, too few, enough, not enough  
round (**up or down**)  
nearest, round to the nearest ten

### MAKING DECISIONS AND REASONING

pattern, puzzle  
calculate, calculation  
mental calculation  
**method**  
jotting  
answer  
right, correct, wrong  
what could we try next?  
how did you work it out?  
number sentence  
sign, operation, symbol, **equation**

### ADDITION AND SUBTRACTION

+, add, addition, more, plus  
make, sum, total  
altogether  
score  
double, near double  
one more, two more... ten more...  
one hundred more  
how many more to make...?  
how many more is... than...?  
how much more is...?  
-, subtract, subtraction, take (away), minus  
leave, how many are left/left over?  
one less, two less... ten less... one hundred less  
how many fewer is... than...?  
how much less is...?  
difference between  
half, halve  
=, equals, sign, is the same as  
tens boundary, **hundreds boundary**

### MULTIPLICATION AND DIVISION

lots of, groups of  
×, times, multiply, **multiplication**, multiplied by  
multiple of, **product**  
once, twice, three times... ten times...  
times as (big, long, wide... and so on)  
repeated addition  
array  
row, column  
double, halve  
share, share equally  
one each, two each, three each...  
group in pairs, threes... tens  
equal groups of  
÷, divide, **division**, divided by, divided into  
left, left over, **remainder**

### General

same, different  
missing number/s  
number facts, number pairs, number bonds  
**greatest value, least value**  
number line, number track  
number square, hundred square  
number cards  
number grid  
abacus  
counters, cubes, blocks, rods  
die, dice  
dominoes  
pegs, peg board  
geo-strips  
same way, different way  
best way, another way  
in order, in a different order  
not  
all, every, each



# YEAR 4

## PROPERTIES OF NUMBERS AND NUMBER SEQUENCES

number, count, how many...?  
odd, even  
every other  
how many times?  
multiple of  
digit  
next, consecutive  
sequence  
continue  
predict  
pattern, pair, rule  
relationship  
sort, classify, property

## MAKING DECISIONS AND REASONING

pattern, puzzle  
calculate, calculation  
mental calculation  
method  
jotting  
answer  
right, correct, wrong  
what could we try next?  
how did you work it out?  
number sentence  
sign, operation, symbol,  
equation

## ADDITION AND SUBTRACTION

add, addition, more, plus,  
increase  
sum, total, altogether  
score  
double, near double  
how many more to make...?  
subtract, subtraction, take  
(away), minus, decrease  
leave, how many are left/left  
over?  
difference between  
half, halve  
how many more/fewer is...  
than...?  
how much more/less is...?  
equals, sign, is the same as  
tens boundary, hundreds  
boundary  
inverse

## PLACE VALUE, ORDERING AND ROUNDING

units, ones, tens, hundreds,  
thousands, ten thousand, hundred  
thousand, million  
digit, one-, two-, three- or four-digit  
number, numeral  
'teens' number  
place, place value  
stands for, represents  
exchange  
the same number as, as many as  
equal to  
Of two objects/amounts:  
>, greater than, more than, larger than,  
bigger than  
<, less than, fewer than, smaller than  
Of three or more objects/amounts:  
greatest, most, largest, biggest  
least, fewest, smallest  
one, ten, one hundred, one thousand

more/less  
compare, order, size  
first... tenth... twentieth  
last, last but one  
before, after, next  
between, half-way between  
guess how many, estimate  
nearly, roughly, close to, about the same  
as, approximate, approximately  
just over, just under, exact, exactly  
too many, too few, enough, not enough  
round (up or down), nearest  
round to the nearest ten  
round to the nearest hundred  
integer, positive, negative  
above/below zero, minus

## MULTIPLICATION AND DIVISION

lots of, groups of  
times, multiply, multiplication,  
multiplied by  
multiple of, product  
once, twice, three times... ten times...  
times as (big, long, wide... and so on)  
repeated addition  
array  
row, column  
double, halve  
share, share equally  
one each, two each, three each...  
group in pairs, threes... tens  
equal groups of  
divide, division, divided by, divided into  
remainder  
factor, quotient, divisible by  
inverse

## General

same, different  
missing number/s  
number facts, number pairs, number  
bonds  
greatest value, least value  
number line, number track  
number square, hundred square  
number cards, number grid  
abacus  
counters, cubes, blocks, rods  
die, dice  
dominoes  
pegs, peg board, pin board  
geo-strips  
same way, different way  
best way, another way  
in order, in a different order  
not  
all, every, each



## YEAR 5

<p><b>PROPERTIES OF NUMBERS AND NUMBER SEQUENCES</b> number, count, how many...? odd, even every other how many times? multiple of digit next, consecutive sequence continue predict pattern, pair, rule relationship sort, classify, property <b>formula</b> divisible (by), <b>divisibility</b>, factor <b>square number</b> <b>one squared, two squared...</b> (1<sup>2</sup>, 2<sup>2</sup>...)</p>	<p><b>PLACE VALUE, ORDERING AND ROUNDING</b></p>	
<p><b>MAKING DECISIONS AND REASONING</b> pattern, puzzle calculate, calculation mental calculation method, <b>strategy</b> jotting answer right, correct, wrong what could we try next? how did you work it out? number sentence sign, operation, symbol, equation</p>	<p>units, ones tens, hundreds, thousands ten thousand, hundred thousand, million digit, one-, two-, three- or four-digit number numeral 'teens' number place, place value stands for, represents exchange the same number as, as many as equal to Of <b>two</b> objects/amounts: &gt;, greater than, more than, larger than, bigger than &lt;, less than, fewer than, smaller than ≥, <b>greater than or equal to</b> ≦, <b>less than or equal to</b> Of <b>three</b> or more objects/amounts: greatest, most, largest, biggest least, fewest, smallest one... ten... one hundred... one thousand more/less compare, order, size <b>ascending/descending order</b></p>	<p>first... tenth... twentieth last, last but one before, after, next between, half-way between guess how many, estimate nearly, roughly, close to, about the same as approximate, approximately <b>⊕, is approximately equal to</b> just over, just under exact, exactly too many, too few, enough, not enough round (up or down), nearest round to the nearest ten/hundred <b>round to the nearest thousand</b> integer positive, negative above/below zero, minus</p>
<p><b>ADDITION AND SUBTRACTION</b> add, addition, more, plus, increase sum, total, altogether score double, near double how many more to make...? subtract, subtraction, take (away), minus, decrease leave, how many are left/left over? difference between half, halve how many more/fewer is... than...? how much more/less is...? equals, sign, is the same as tens boundary, hundreds boundary <b>units boundary</b>, <b>tenths boundary</b> inverse</p>	<p><b>MULTIPLICATION AND DIVISION</b> lots of, groups of times, multiply, multiplication, multiplied by multiple of, product once, twice, three times... ten times... times as (big, long, wide... and so on) repeated addition array row, column double, halve share, share equally</p>	<p><b>USING A CALCULATOR</b> <b>calculator</b> <b>display, key, enter, clear</b> <b>constant</b></p> <p><b>General</b> same, different missing number/s number facts, number pairs, number bonds greatest value, least value number line, number track number square, hundred square number cards, number grid abacus counters, cubes, blocks, rods die, dice, <b>spinner</b> dominoes pegs, peg board, pin board geo-strips same way, different way best way, another way in order, in a different order not all, every, each</p>



# YEAR 6

<p><b>PROPERTIES OF NUMBERS AND NUMBER SEQUENCES</b> number, count, how many...? odd, even every other how many times? multiple of digit next, consecutive sequence continue predict pattern, pair, rule relationship sort, classify, property formula divisible (by), divisibility, factor, <b>factorise</b> square number one squared, two squared... (1<sub>2</sub>, 2<sub>2</sub>...) <b>prime, prime factor</b></p>	<p><b>PLACE VALUE, ORDERING AND ROUNDING</b></p>	
<p><b>MAKING DECISIONS AND REASONING</b> pattern, puzzle calculate, calculation mental calculation method, strategy jotting answer right, correct, wrong what could we try next? how did you work it out? number sentence sign, operation, symbol, equation</p>	<p>units, ones tens, hundreds, thousands ten thousand, hundred thousand, million digit, one-, two-, three- or four-digit number numeral 'teens' number place, place value stands for, represents exchange the same number as, as many as equal to Of <b>two</b> objects/amounts: &gt;, greater than, more than, larger than, bigger than &lt;, less than, fewer than, smaller than ≥, greater than or equal to =, less than or equal to Of <b>three</b> or more objects/amounts: greatest, most, largest, biggest least, fewest, smallest one... ten... one hundred... one thousand more/less compare, order, size ascending/descending order</p>	<p>first... tenth... twentieth last, last but one before, after next between, half-way between guess how many, estimate nearly, roughly, close to, about the same as approximate, approximately ⊕, is approximately equal to just over, just under exact, exactly too many, too few, enough, not enough round (up or down), nearest round to the nearest ten/hundred/thousand integer, positive, negative above/below zero, minus</p>
<p><b>ADDITION AND SUBTRACTION</b> add, addition, more, plus, increase sum, total, altogether score double, near double how many more to make...? subtract, subtraction, take (away), minus, decrease leave, how many are left/left over? difference between half, halve how many more/fewer is... than...? how much more/less is...? equals, sign, is the same as tens boundary, hundreds boundary, inverse</p>	<p><b>MULTIPLICATION AND DIVISION</b> lots of, groups of times, multiply, multiplication, multiplied by multiple of, product once, twice, three times... ten times... times as (big, long, wide... and so on) repeated addition array, row, column double, halve share, share equally one each, two each, three each... group in pairs, threes... tens equal groups of divide, division, divided by, divided into remainder factor, quotient, divisible by inverse</p>	<p><b>General</b> same, <b>identical</b>, different missing number/s number facts, number pairs, number bonds greatest value, least value number line, number track number square, hundred square number cards, number grid abacus counters, cubes, blocks, rods die, dice, spinner dominoes pegs, peg board, pin board geo-strips same way, different way best way, another way in order, in a different order not all, every, each</p>