



**Uplands Junior School**

Uplands Junior School  
Written Calculation Policy  
2018

## Progression towards a standard written method of calculation

### INTRODUCTION

This calculation policy has been written in line with the programmes of study taken from the revised National Curriculum for Mathematics (2014). It provides guidance on appropriate calculation methods and progression. The content is set out in yearly blocks under the following headings: addition, subtraction, multiplication and division.

Children will use mental methods as their first port of call when appropriate, but for calculations that they cannot do in their heads, they will need to use an efficient written method accurately and with confidence.

### AIMS OF THE POLICY



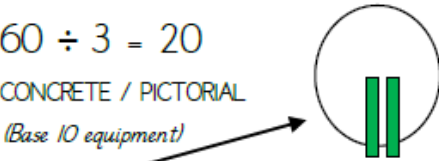
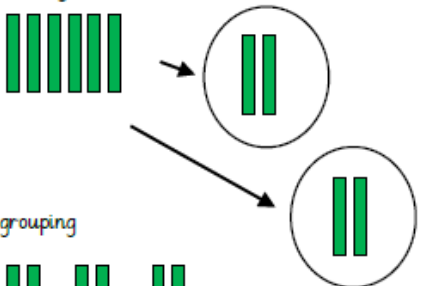
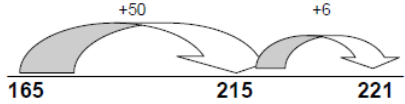
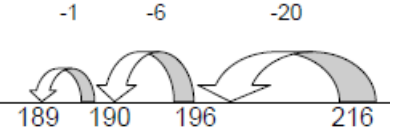
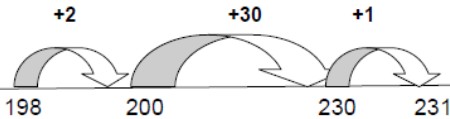
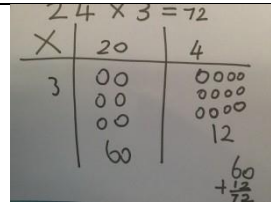
- To ensure consistency and progression in our approach to calculation
- To ensure that children develop an efficient, reliable, formal written method of calculation for all operations
- To ensure that children can use these methods accurately with confidence and understanding




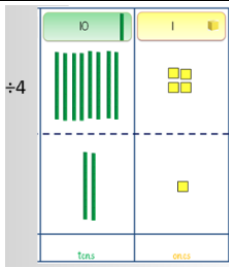
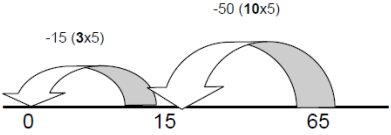
### HOW TO USE THIS POLICY

- Use the policy as the basis of your planning but ensure you use previous or following years' guidance to allow for personalised learning
- Always use your own assessment to identify suitable next steps in calculation for groups of children
- If, at any time, children are making significant errors, return to the previous stage in calculation
- Always use suitable resources, models and images to support children's understanding of calculation and place value, as appropriate
- Encourage children to make sensible choices about the methods they use when solving problems

This policy has been written in line with the UN Convention on the Rights of the Child article 28 (right to education)

| Year      | Addition  | Subtraction  | Multiplication   | Division   |
|-----------|---|--|--|--|
| 2         | <p><b>two two-digit numbers</b></p> $34 + 23 = 57$ <p>(Base 10 equipment)</p> | <p><b>subtract two two-digit numbers</b></p> $47 - 23 = 24$ <p>(Base 10 equipment)</p> | <p><b>calculate multiplication statements within the 2, 5 and 10 multiplication tables</b></p> $3 \times 5 = 15$ <p>(Cubes)</p> <p>(Bead Strings)</p>            | <p><b>calculate division statements within the 2, 5 and 10 multiplication tables</b></p> <p>Share 10 into 2 equal groups</p> <p>How many 2s in 10?</p> |
| Pictorial | <p>When confident,</p>  | <p>When confident,</p>   | <p>(Arrays and equal groups)</p> <p>(Number line)</p>  | <p>Share 10 into 2 equal groups</p> <p>How many 2s in 10?</p> <p>Develop division as repeated subtraction on a number line.</p>                        |
| Abstract  | $34 + 23 = 57$ $30 + 20 = 50$ $4 + 3 = 7$ $50 + 7 = 57$                       | $47 - 23 = 24$ $47 - 20 = 27$ $27 - 3 = 24$  | <p>Count in multiples<br/>2, 4, 6 or 10, 20, 30</p> <p>Introduce <math>\times</math> sign and record as number sentence</p> $7 \times 10 = 70$ $4 \times 5 = 20$ | $10 \div 2 = 5$  |

| Year      | Addition  | Subtraction  | Multiplication  | Division   |    |   |   |    |    |  |    |   |   |    |   |   |    |   |   |
|-----------|---|--|---|--|----|---|---|----|----|--|----|---|---|----|---|---|----|---|---|
| 3         | add numbers with up to three digits, using columnar addition  | subtract a 3-digit number from a 3 digit number using a formal written method  | multiply two-digit numbers times one-digit numbers  | divide two-digit numbers divided by one-digit numbers, using mental methods. |    |   |   |    |    |  |    |   |   |    |   |   |    |   |   |
| Concrete  |    |    | <table border="1" data-bbox="1176 191 1545 375"> <tr> <td>X</td> <td>T</td> <td>U</td> </tr> <tr> <td></td> <td>10</td> <td>3</td> </tr> <tr> <td></td> <td>10</td> <td>3</td> </tr> <tr> <td></td> <td>10</td> <td>3</td> </tr> <tr> <td></td> <td>10</td> <td>3</td> </tr> </table> <p><math>13 \times 4 = (10 \times 4) + (3 \times 4)</math><br/> <math>= 40 + 12</math><br/> <math>= 52</math></p> | X  | T  | U |   | 10 | 3  |  | 10 | 3 |   | 10 | 3 |   | 10 | 3 | <p><math>60 \div 3 = 20</math></p> <p>CONCRETE / PICTORIAL<br/> <i>(Base 10 equipment)</i></p> <p>sharing </p> <p>grouping </p> <p><math>6 \text{ tens} \div 3 = 2 \text{ tens} = 20</math></p> |
| X         | T   | U  |   |  |    |   |   |    |    |  |    |   |   |    |   |   |    |   |   |
|           | 10  | 3  |   |  |    |   |   |    |    |  |    |   |   |    |   |   |    |   |   |
|           | 10  | 3  |   |  |    |   |   |    |    |  |    |   |   |    |   |   |    |   |   |
|           | 10  | 3  |   |  |    |   |   |    |    |  |    |   |   |    |   |   |    |   |   |
|           | 10  | 3  |   |  |    |   |   |    |    |  |    |   |   |    |   |   |    |   |   |
| Pictorial | Develop the use of empty number line with calculations that bridge 100:<br>  | Develop the use of empty number line with calculations that bridge 100:<br><br>Count on to find small differences:<br> |  <p><b>Place value counters:</b> Draw counters, using colours to show different amounts in the different columns to show their thinking.</p>   |  |    |   |   |    |    |  |    |   |   |    |   |   |    |   |   |
| Abstract  | <p><i>(Partitioning)</i></p> $\begin{array}{r} 200 + 60 + 3 \\ + 100 + 10 + 9 \\ \hline 300 + 70 + 12 \\ \hline 300 + 80 + 2 \end{array}$ <p><i>(Column method)</i></p> $\begin{array}{r} 263 \\ + 119 \\ \hline 382 \end{array}$ | <p>Use base 10 material to support understanding:<br/> <i>(Partitioning)</i></p> $\begin{array}{r} 200 + 50 + 13 \\ - 100 + 60 + 3 \\ \hline 100 + 40 + 4 \end{array}$ <p><i>(Column method)</i></p> $\begin{array}{r} 51 \\ 23 \\ - 119 \\ \hline 144 \end{array}$                        | <table border="1" data-bbox="1153 885 1433 1045"> <tr> <td>X</td> <td>10</td> <td>3</td> </tr> <tr> <td>8</td> <td>80</td> <td>24</td> </tr> </table> <p><math>80 + 24 = 104</math></p>   | X  | 10 | 3 | 8 | 80 | 24 | <table border="1" data-bbox="1668 885 1926 1045"> <tr> <td></td> <td>2</td> <td>1</td> </tr> <tr> <td>4</td> <td>8</td> <td>4</td> </tr> </table> <p>Dividing by 2,3,4, and 5</p> <p>If children are confident, introduce concept of remainders. <b>Use concrete apparatus to support/visualise.</b></p> |    | 2 | 1 | 4  | 8 | 4 |    |   |   |
| X         | 10  | 3  |   |  |    |   |   |    |    |  |    |   |   |    |   |   |    |   |   |
| 8         | 80  | 24   |   |  |    |   |   |    |    |  |    |   |   |    |   |   |    |   |   |
|           | 2   | 1  |   |  |    |   |   |    |    |  |    |   |   |    |   |   |    |   |   |
| 4         | 8   | 4  |   |  |    |   |   |    |    |  |    |   |   |    |   |   |    |   |   |

| Year      | Addition  | Subtraction  | Multiplication   | Division  |    |   |   |     |    |   |  |   |   |   |   |   |  |   |   |   |   |   |    |    |
|-----------|---|--|--|---|----|---|---|-----|----|---|--|---|---|---|---|---|--|---|---|---|---|---|----|----|
| 4         | add numbers with up to 4 digits or 1 decimal place, using formal written methods (columnar addition)  | subtract numbers with up to 4 digits or 1 decimal place, using formal written methods (columnar subtraction)   | multiply three-digit numbers by a one-digit number or multiply three-digit numbers with 1 decimal place by a one-digit number  | divide numbers up to 3 digits by a 1 digit number using the formal written method (introduce remainders)  |    |   |   |     |    |   |  |   |   |   |   |   |  |   |   |   |   |   |    |    |
| Concrete  |    |    |   |    |    |   |   |     |    |   |  |   |   |   |   |   |  |   |   |   |   |   |    |    |
| pictorial | Continue to teach the use of empty number lines for 3 or 4 digit numbers as appropriate (see Year 3 guidance)   | Continue to teach the use of empty number lines for 3 or 4 digit numbers as appropriate (see Year 3 guidance)  | Continue to use empty number lines as appropriate (see Year 3 guidance)  | Continue to use blank number lines as appropriate, using multiples of the divisor.<br>$65 \div 5 = 13$<br> |    |   |   |     |    |   |  |   |   |   |   |   |  |   |   |   |   |   |    |    |
| Abstract  | Continue to develop the formal method of addition, with 3 to 4-digit numbers, by revisiting the expanded method, if necessary<br>$\begin{array}{r} 176 \\ + 147 \\ + 110 \\ \hline 200 \\ \hline 323 \end{array} \quad \rightarrow \quad \begin{array}{r} 147 \\ + 176 \\ \hline 323 \end{array}$<br>$\begin{array}{r} 4478 \\ + 3762 \\ \hline 8240 \end{array}$ | Continue to develop the formal method of subtraction by revisiting the expanded method, if necessary<br>$\begin{array}{r} 5131 \\ - 2684 \\ \hline 3783 \end{array}$<br>Use the language of place value to ensure understanding. In this example we have <b>exchanged</b> one hundred for 10 tens. | <b>Grid method</b><br><table border="1" data-bbox="1151 785 1433 935"> <tr><td>X</td><td>30</td><td>6</td></tr> <tr><td>4</td><td>120</td><td>24</td></tr> </table><br>Leading to expanded method<br>$\begin{array}{r} 36 \\ \times 4 \\ \hline 120 \\ \hline 144 \end{array} \quad \rightarrow \quad \begin{array}{r} 36 \\ \times 4 \\ \hline 144 \\ 2 \end{array}$<br>Extend to 3-digit numbers multiplied by 1-digit number. | X   | 30 | 6 | 4 | 120 | 24 | <table border="1" data-bbox="1666 753 1926 903"> <tr><td></td><td>2</td><td>1</td></tr> <tr><td>4</td><td>8</td><td>4</td></tr> </table><br>Leading onto the use of exchange:<br><table border="1" data-bbox="1666 999 2011 1181"> <tr><td></td><td>1</td><td>2</td><td>2</td></tr> <tr><td>8</td><td>9</td><td>17</td><td>16</td></tr> </table><br>Continue using the formal written layout for division using multiplication tables that they know - introduce remainders as whole numbers. |  | 2 | 1 | 4 | 8 | 4 |  | 1 | 2 | 2 | 8 | 9 | 17 | 16 |
| X         | 30  | 6  |  |   |    |   |   |     |    |   |  |   |   |   |   |   |  |   |   |   |   |   |    |    |
| 4         | 120   | 24   |  |   |    |   |   |     |    |   |  |   |   |   |   |   |  |   |   |   |   |   |    |    |
|           | 2   | 1  |  |   |    |   |   |     |    |   |  |   |   |   |   |   |  |   |   |   |   |   |    |    |
| 4         | 8   | 4  |  |   |    |   |   |     |    |   |  |   |   |   |   |   |  |   |   |   |   |   |    |    |
|           | 1   | 2  | 2  |   |    |   |   |     |    |   |  |   |   |   |   |   |  |   |   |   |   |   |    |    |
| 8         | 9   | 17   | 16   |   |    |   |   |     |    |   |  |   |   |   |   |   |  |   |   |   |   |   |    |    |

| Year | Addition   | Subtraction   | Multiplication   | Division  |
|------|--|---|--|---|
| 5    | add whole numbers with more than 4 digits and with up to 3 decimal places, using formal written methods. | subtract whole numbers with more than 4 digits and with up to 3 decimal places, using formal written methods. | multiply numbers up to 4 digits by a 1-digit number<br>multiply numbers up to 4 digits by 2-digit number | divide numbers up to 4 digits by a one-digit number and interpret remainders<br>divide numbers up to 4 digits with up to 3 decimal places by a one-digit number |

Concrete Pictorial

Please note: Concrete apparatus and pictorial representations should still be used to support children who may be struggling with abstract concepts. Concrete apparatus should be readily available for lower achieving children and these with SEND.

|          |  |   |  |   |   |   |   |   |   |   |   |   |    |    |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|----------|--|---|--|---|---|---|---|---|---|---|---|---|----|----|--|--|--|--|---|---|---|---|---|---|---|---|---|---|--|--|---|---|---|---|---|---|---|---|---|---|---|---|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Abstract | <p>5 digit + 5 digit</p> $\begin{array}{r} 44783 \\ + 37625 \\ \hline 82408 \\ \hline 111 \end{array}$ <p>Numbers with 3 decimal place</p> $\begin{array}{r} 379.173 \\ + 203.116 \\ \hline 582.289 \\ \hline 1 \end{array}$ | <p>5 digit - 5 digit</p> $\begin{array}{r} 5131 \\ \cancel{6} \cancel{4} 697 \\ - 26854 \\ \hline 37843 \end{array}$ <p>Numbers with 3 decimal place</p> $\begin{array}{r} 31 \\ 7 \cancel{4} 3.798 \\ - 216.273 \\ \hline 527.525 \end{array}$ | <p>Multiplication of a four-digit numbers by a one-digit numbers.</p> $\begin{array}{r} 3721 \\ \times \quad \quad \quad 7 \\ \hline 26047 \\ \hline 251 \end{array}$ $\begin{array}{r} 4725 \\ \times \quad \quad \quad 9 \\ \hline 42525 \\ \hline 4624 \end{array}$ <p>(If necessary, return to the grid method and/or expanded method first - see year 4)</p> <p>When children are secure with multiplying by single digits: Compact multiplication of two-digit numbers by a two-digit number</p> $\begin{array}{r} 23 \\ \times 13 \\ \hline + 69 \quad (3 \times 23) \\ 230 \quad (10 \times 23) \\ \hline 299 \end{array}$ <p>Children may wish to use 2 separate calculations to support their understanding. Reinforce language of place value when multiplying by multiples of 10. Extend to 3 or 4-digit numbers multiplied by a 2-digit number.</p> | <p>Division of numbers with up to four digits by a one-digit number.</p> <p>... with remainders</p> $852 \div 7 = 121 \text{ r } 5$ <p>Round up or down given the context of the problem.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td></td><td>1</td><td>2</td><td>1</td><td>r</td><td>5</td></tr> <tr><td>7</td><td>8</td><td>15</td><td>12</td><td></td><td></td></tr> </table> <p>Up to 4 digits with up to 3 decimal places by a one-digit number</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td></td><td></td><td>2</td><td>4</td><td>•</td><td>9</td></tr> <tr><td>7</td><td>1</td><td>7</td><td>4</td><td>•</td><td>3</td></tr> </table> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td></td><td></td><td>2</td><td>3</td><td>•</td><td>2</td><td>9</td></tr> <tr><td>8</td><td>1</td><td>8</td><td>6</td><td>•</td><td>3</td><td>2</td></tr> </table> <p>4 digit number divided by 1 digit number - with remainders</p> $6497 \div 8 = 812.125$ <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td></td><td>0</td><td>8</td><td>1</td><td>2</td><td>.</td><td>1</td><td>2</td><td>5</td></tr> <tr><td>8</td><td>6</td><td>4</td><td>9</td><td>7</td><td>.</td><td>0</td><td>0</td><td>0</td></tr> </table> |   | 1 | 2 | 1 | r | 5 | 7 | 8 | 15 | 12 |  |  |  |  | 2 | 4 | • | 9 | 7 | 1 | 7 | 4 | • | 3 |  |  | 2 | 3 | • | 2 | 9 | 8 | 1 | 8 | 6 | • | 3 | 2 |  | 0 | 8 | 1 | 2 | . | 1 | 2 | 5 | 8 | 6 | 4 | 9 | 7 | . | 0 | 0 | 0 |
|          |  | 1   | 2  | 1   | r | 5 |   |   |   |   |   |   |    |    |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 7        | 8  | 15  | 12   |   |   |   |   |   |   |   |   |   |    |    |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|          |  | 2   | 4  | •   | 9 |   |   |   |   |   |   |   |    |    |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 7        | 1  | 7   | 4  | •   | 3 |   |   |   |   |   |   |   |    |    |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|          |  | 2   | 3  | •   | 2 | 9 |   |   |   |   |   |   |    |    |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 8        | 1  | 8   | 6  | •   | 3 | 2 |   |   |   |   |   |   |    |    |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|          | 0  | 8   | 1  | 2   | . | 1 | 2 | 5 |   |   |   |   |    |    |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 8        | 6  | 4   | 9  | 7   | . | 0 | 0 | 0 |   |   |   |   |    |    |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

| Year | Addition   | Subtraction   | Multiplication  | Division   |
|------|--|---|---|--|
| 6    | add multi-digit numbers with more than 4 digits and with up to 3 decimal places, using formal written methods. | subtract multi-digit numbers with more than 4 digits and with up to 3 decimal places, using formal written methods. | multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written methods. | divide numbers up to 4 digits (with up to 3 decimal places) by a two-digit whole number using the formal written methods and interpret remainders as whole number remainders, fractions, or by rounding. |

Concrete pictorial

Please note: Concrete apparatus and pictorial representations should still be used to support children who may be struggling with abstract concepts. Concrete apparatus should be readily available for lower achieving children and these with SEND.

|          |  |   |  |  |
|----------|--|---|--|--|
| Abstract | <p>6 digit + 6 digit</p> $\begin{array}{r} 447813 \\ + 376245 \\ \hline 824058 \\ \hline 111 \end{array}$ <p>Numbers with 3 decimal place</p> $\begin{array}{r} 379.173 \\ + 203.116 \\ \hline 582.289 \\ \hline 1 \end{array}$ <p>Numbers with a different number of decimal places</p> $4.525 + 8.5 + 3.247$ $\begin{array}{r} 45250 \\ + 8500 \\ \hline 3247 \\ \hline 56997 \end{array}$ | <p>6 digit - 6 digit</p> $\begin{array}{r} 5131 \\ \cancel{6} \cancel{4} 6937 \\ - 268514 \\ \hline 378423 \end{array}$ <p>Numbers with 3 decimal place</p> $\begin{array}{r} 31 \\ 7 \cancel{3} 3.798 \\ - 216.273 \\ \hline 527.525 \end{array}$ <p>Numbers with a different number of decimal places</p> $69.2 - 27.54$ $\begin{array}{r} 811 \\ 6 \cancel{9} \cancel{2} 0 \\ - 2754 \\ \hline 4166 \end{array}$ | <p>Multiplication of a one-digit number with up to three decimal places by a one-digit number.</p> $\begin{array}{r} 1.43 \\ \times 6 \\ \hline 8.58 \\ \hline 21 \end{array}$ <p>Multiplication of a four-digit number by a two-digit number.</p> $\begin{array}{r} 3701 \\ \times 37 \\ \hline 25907 \\ + 111030 \\ \hline 136937 \end{array}$ | <p>4 digit number divided by 1 digit number - with remainders</p> $6497 \div 8 = 812.125$ $\begin{array}{r} 0812.125 \\ 8 \overline{)6497.000} \end{array}$ <p>Or <math>812 \frac{1}{8}</math> or 812 (to the nearest whole number). Round up or down given the context of a problem.</p> <p>Long Division</p> $\begin{array}{r} 12r2 \\ 22 \overline{)286} \\ \underline{-22} \phantom{0} \\ 46 \\ \underline{-44} \\ 2 \end{array}$ <p>Chunking: Using repeated subtraction using multiples of the divisor.</p> <p>Chunking</p> $\begin{array}{r} 47 \\ 21 \overline{)987} \\ \underline{-840} \phantom{0} \quad (21 \times 40) \\ 147 \\ \underline{-147} \phantom{0} \quad (21 \times 7) \\ 0 \end{array}$ |
|----------|--|---|--|--|