

# Calculation Policy:

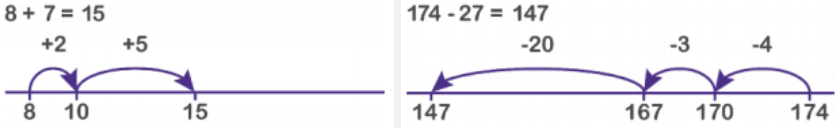
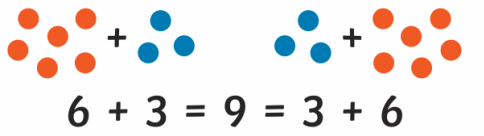
## Mental Maths

Rapid Recall and Mental Calculation


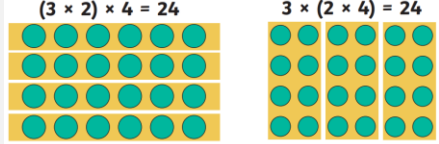
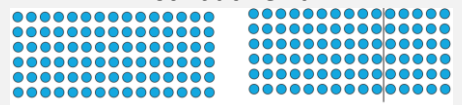
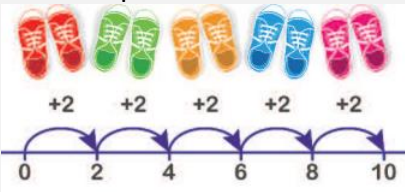
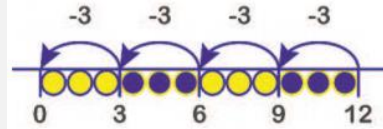


|                     | Year 1   | Year 2  | Year 3  | Year 4  | Year 5   | Year 6 |
|---------------------|--|---|---|---|--|--------|
| <b>Rapid Recall</b> | Count to and across 100 forwards and backwards from 0, 1 and any given number,<br><br>Count in multiples of 2, 5 and 10. | Count in steps of 2, 3, 5 from 0.<br><br>Count in steps of 10 from any given number.<br><br>Recall and use addition and subtraction facts to 20 fluently.<br><br>Recall multiplication facts for 2, 5 and 10. | Count in multiples of 4, 8, 50 and 100.<br><br>Recall multiplication and vision facts for 3, 4 and 8. | Count in multiples of 6, 7, 9, 25 and 100.<br><br>Recall all multiplication and division up to 12x12. | Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.<br><br>Establish whether a number up to 100 is prime and recall prime numbers up to 19. |        |

| <b>Strategies</b>  | <p>Partitioning</p>  |  | Songs/chanting   |  | Games<br><br>TTRockstars<br><br>Multiplication war<br><br>100 square on playground<br><br>Times table daily exercise battle | <p>Patterns</p> <p>multiplication hints &amp; tricks journal page</p> <table border="1"> <thead> <tr> <th>facts</th> <th>strategy</th> <th>example</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Any number times zero equals zero.</td> <td><math>0 \times 8 = 0</math></td> </tr> <tr> <td>1</td> <td>Any number times one equals the other number.</td> <td><math>1 \times 3 = 3</math></td> </tr> <tr> <td>2</td> <td>Just add the number to itself.</td> <td><math>2 \times 4 = 4 + 4 = 8</math></td> </tr> <tr> <td>3</td> <td>Double the other factor &amp; then add it in one more time.</td> <td><math>3 \times 7 = 7 + 7 = 14, 14 + 7 = 21</math></td> </tr> <tr> <td>4</td> <td>Double it then double the result.</td> <td><math>4 \times 7 = 7 + 7 = 14, 14 + 14 = 28</math></td> </tr> <tr> <td>5</td> <td>Count by 5's.</td> <td><math>5 \times 3 = 5 + 5 + 5 = 15</math></td> </tr> <tr> <td>6</td> <td>If multiplied by even #, it will end in even digit. The # in that place will be half of the # in the ones place.</td> <td><math>6 \times 4 = 24</math></td> </tr> <tr> <td>7</td> <td>Multiples of 7.</td> <td>7, 14, 21, 28, 35, 42, 49, 56, 63, 70</td> </tr> <tr> <td>8</td> <td>Double, double and double again.</td> <td><math>8 \times 9 = 9 + 9 = 18, 18 + 18 = 36, 36 + 36 = 72</math></td> </tr> <tr> <td>9</td> <td>Use your hand trick.</td> <td></td> </tr> <tr> <td>10</td> <td>Count by 10's.</td> <td><math>10 \times 3 = 10 + 10 + 10 = 30</math></td> </tr> <tr> <td>11</td> <td>For 1 to 9: Repeat the other factor for the product.</td> <td><math>11 \times 3 = 33</math></td> </tr> <tr> <td>12</td> <td>Use repeated addition.</td> <td><math>12 \times 3 = 12 + 12 + 12 = 36</math></td> </tr> </tbody> </table> | facts     | strategy  | example   | 0                 | Any number times zero equals zero. | $0 \times 8 = 0$ | 1  | Any number times one equals the other number. | $1 \times 3 = 3$ | 2         | Just add the number to itself. | $2 \times 4 = 4 + 4 = 8$ | 3    | Double the other factor & then add it in one more time. | $3 \times 7 = 7 + 7 = 14, 14 + 7 = 21$ | 4                 | Double it then double the result. | $4 \times 7 = 7 + 7 = 14, 14 + 14 = 28$ | 5  | Count by 5's.     | $5 \times 3 = 5 + 5 + 5 = 15$ | 6         | If multiplied by even #, it will end in even digit. The # in that place will be half of the # in the ones place. | $6 \times 4 = 24$ | 7    | Multiples of 7. | 7, 14, 21, 28, 35, 42, 49, 56, 63, 70 | 8                 | Double, double and double again. | $8 \times 9 = 9 + 9 = 18, 18 + 18 = 36, 36 + 36 = 72$ | 9  | Use your hand trick. |      | 10        | Count by 10's. | $10 \times 3 = 10 + 10 + 10 = 30$ | 11   | For 1 to 9: Repeat the other factor for the product. | $11 \times 3 = 33$ | 12                 | Use repeated addition. | $12 \times 3 = 12 + 12 + 12 = 36$ |    |
|--|--|--|------------------|--|---|--|-----------|-----------|-----------|-------------------|------------------------------------|------------------|----|---|------------------|-----------|--------------------------------|--------------------------|------|---|--|-------------------|-----------------------------------|---|----|-------------------|-------------------------------|-----------|--|-------------------|------|-----------------|---------------------------------------|-------------------|----------------------------------|---|----|----------------------|------|-----------|----------------|-----------------------------------|------|--|--------------------|--------------------|------------------------|-----------------------------------|----|
|  | facts  | strategy   | example          |  |   |  |           |           |           |                   |                                    |                  |    |   |                  |           |                                |                          |      |   |  |                   |                                   |   |    |                   |                               |           |  |                   |      |                 |                                       |                   |                                  |   |    |                      |      |           |                |                                   |      |  |                    |                    |                        |                                   |    |
|  | 0  | Any number times zero equals zero.   | $0 \times 8 = 0$ |  |   |  |           |           |           |                   |                                    |                  |    |   |                  |           |                                |                          |      |   |  |                   |                                   |   |    |                   |                               |           |  |                   |      |                 |                                       |                   |                                  |   |    |                      |      |           |                |                                   |      |  |                    |                    |                        |                                   |    |
| 1  | Any number times one equals the other number.  | $1 \times 3 = 3$   |                  |  |   |  |           |           |           |                   |                                    |                  |    |   |                  |           |                                |                          |      |   |  |                   |                                   |   |    |                   |                               |           |  |                   |      |                 |                                       |                   |                                  |   |    |                      |      |           |                |                                   |      |  |                    |                    |                        |                                   |    |
| 2  | Just add the number to itself.   | $2 \times 4 = 4 + 4 = 8$   |                  |  |   |  |           |           |           |                   |                                    |                  |    |   |                  |           |                                |                          |      |   |  |                   |                                   |   |    |                   |                               |           |  |                   |      |                 |                                       |                   |                                  |   |    |                      |      |           |                |                                   |      |  |                    |                    |                        |                                   |    |
| 3  | Double the other factor & then add it in one more time.  | $3 \times 7 = 7 + 7 = 14, 14 + 7 = 21$   |                  |  |   |  |           |           |           |                   |                                    |                  |    |   |                  |           |                                |                          |      |   |  |                   |                                   |   |    |                   |                               |           |  |                   |      |                 |                                       |                   |                                  |   |    |                      |      |           |                |                                   |      |  |                    |                    |                        |                                   |    |
| 4  | Double it then double the result.  | $4 \times 7 = 7 + 7 = 14, 14 + 14 = 28$  |                  |  |   |  |           |           |           |                   |                                    |                  |    |   |                  |           |                                |                          |      |   |  |                   |                                   |   |    |                   |                               |           |  |                   |      |                 |                                       |                   |                                  |   |    |                      |      |           |                |                                   |      |  |                    |                    |                        |                                   |    |
| 5  | Count by 5's.  | $5 \times 3 = 5 + 5 + 5 = 15$  |                  |  |   |  |           |           |           |                   |                                    |                  |    |   |                  |           |                                |                          |      |   |  |                   |                                   |   |    |                   |                               |           |  |                   |      |                 |                                       |                   |                                  |   |    |                      |      |           |                |                                   |      |  |                    |                    |                        |                                   |    |
| 6  | If multiplied by even #, it will end in even digit. The # in that place will be half of the # in the ones place. | $6 \times 4 = 24$  |                  |  |   |  |           |           |           |                   |                                    |                  |    |   |                  |           |                                |                          |      |   |  |                   |                                   |   |    |                   |                               |           |  |                   |      |                 |                                       |                   |                                  |   |    |                      |      |           |                |                                   |      |  |                    |                    |                        |                                   |    |
| 7  | Multiples of 7.  | 7, 14, 21, 28, 35, 42, 49, 56, 63, 70  |                  |  |   |  |           |           |           |                   |                                    |                  |    |   |                  |           |                                |                          |      |   |  |                   |                                   |   |    |                   |                               |           |  |                   |      |                 |                                       |                   |                                  |   |    |                      |      |           |                |                                   |      |  |                    |                    |                        |                                   |    |
| 8  | Double, double and double again.   | $8 \times 9 = 9 + 9 = 18, 18 + 18 = 36, 36 + 36 = 72$  |                  |  |   |  |           |           |           |                   |                                    |                  |    |   |                  |           |                                |                          |      |   |  |                   |                                   |   |    |                   |                               |           |  |                   |      |                 |                                       |                   |                                  |   |    |                      |      |           |                |                                   |      |  |                    |                    |                        |                                   |    |
| 9  | Use your hand trick.   |  |                  |  |   |  |           |           |           |                   |                                    |                  |    |   |                  |           |                                |                          |      |   |  |                   |                                   |   |    |                   |                               |           |  |                   |      |                 |                                       |                   |                                  |   |    |                      |      |           |                |                                   |      |  |                    |                    |                        |                                   |    |
| 10   | Count by 10's.   | $10 \times 3 = 10 + 10 + 10 = 30$  |                  |  |   |  |           |           |           |                   |                                    |                  |    |   |                  |           |                                |                          |      |   |  |                   |                                   |   |    |                   |                               |           |  |                   |      |                 |                                       |                   |                                  |   |    |                      |      |           |                |                                   |      |  |                    |                    |                        |                                   |    |
| 11   | For 1 to 9: Repeat the other factor for the product.   | $11 \times 3 = 33$   |                  |  |   |  |           |           |           |                   |                                    |                  |    |   |                  |           |                                |                          |      |   |  |                   |                                   |   |    |                   |                               |           |  |                   |      |                 |                                       |                   |                                  |   |    |                      |      |           |                |                                   |      |  |                    |                    |                        |                                   |    |
| 12   | Use repeated addition.   | $12 \times 3 = 12 + 12 + 12 = 36$  |                  |  |   |  |           |           |           |                   |                                    |                  |    |   |                  |           |                                |                          |      |   |  |                   |                                   |   |    |                   |                               |           |  |                   |      |                 |                                       |                   |                                  |   |    |                      |      |           |                |                                   |      |  |                    |                    |                        |                                   |    |
| <p>Repeated addition</p> <p><math>5 \times 3</math> 1→<br/>2→<br/>3→<br/>4→<br/>5→</p> <p>"5 lots of 3"<br/>"5 equal groups of 3"</p> <p><math>3 + 3 + 3 + 3 + 3</math></p>  |  | <p>Commutative Law</p> <p><b>Multiplication</b></p> <p>You can multiply in any order.</p> <p><math>a \times b = b \times a</math><br/><math>2 \times 6 = 6 \times 2</math></p> |                  | <p>Number Families</p> <p><b>Multiplication Division Fact Families</b></p> <p>Fact Family is a set of four related multiplication and division facts that use the same three numbers.</p> <p><math>21 \div 3 = 7</math>   <math>7 \times 3 = 21</math>   <math>32 \div 4 = 8</math>   <math>4 \times 8 = 32</math><br/> <math>7 \times 3 = 21</math>   <math>3 \times 7 = 21</math>   <math>4 \times 8 = 32</math>   <math>8 \times 4 = 32</math><br/> <math>21 \div 3 = 7</math>   <math>21 \div 7 = 3</math>   <math>32 \div 4 = 8</math>   <math>32 \div 8 = 4</math></p> |   |  |           |           |           |                   |                                    |                  |    |   |                  |           |                                |                          |      |   |  |                   |                                   |   |    |                   |                               |           |  |                   |      |                 |                                       |                   |                                  |   |    |                      |      |           |                |                                   |      |  |                    |                    |                        |                                   |    |
| <p>Patterns/tricks</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 20%;"> <p>multiplication hints &amp; tricks</p> <p><b>six's rule!</b></p> <p>If you multiply six by an even number, it will end in the same digit.</p> <p><math>6 \times 4 = 24</math></p> <p>the number in the tens place will be half of the number in the ones place.</p> </div> <div style="width: 20%;"> <p><math>8 \times 1 = 8 \rightarrow 8</math><br/> <math>8 \times 2 = 16</math>   6<br/> <math>8 \times 3 = 24</math>   4<br/> <math>8 \times 4 = 32</math>   2<br/> <math>8 \times 5 = 40</math>   0</p> </div> <div style="width: 20%;"> <p>9 Times Table trick</p> <p>3x9</p> <p>1. Hold your hands out as shown.<br/>2. Put down the finger you are multiplying by.<br/>3. Count the fingers on either side and you have the answer!</p> </div> <div style="width: 30%;"> <table border="1"> <thead> <tr> <th></th> <th>1st Trick</th> <th>2nd Trick</th> <th>3rd Trick</th> </tr> </thead> <tbody> <tr><td><math>9 \times 1 = 09</math></td><td>1 09</td><td>0 + 9 = 9</td><td>09</td></tr> <tr><td><math>9 \times 2 = 18</math></td><td>1 18</td><td>1 + 8 = 9</td><td>18</td></tr> <tr><td><math>9 \times 3 = 27</math></td><td>2 27</td><td>2 + 7 = 9</td><td>27</td></tr> <tr><td><math>9 \times 4 = 36</math></td><td>3 36</td><td>3 + 6 = 9</td><td>36</td></tr> <tr><td><math>9 \times 5 = 45</math></td><td>4 45</td><td>4 + 5 = 9</td><td>45</td></tr> <tr><td><math>9 \times 6 = 54</math></td><td>5 54</td><td>5 + 4 = 9</td><td>54</td></tr> <tr><td><math>9 \times 7 = 63</math></td><td>6 63</td><td>6 + 3 = 9</td><td>63</td></tr> <tr><td><math>9 \times 8 = 72</math></td><td>7 72</td><td>7 + 2 = 9</td><td>72</td></tr> <tr><td><math>9 \times 9 = 81</math></td><td>8 81</td><td>8 + 1 = 9</td><td>81</td></tr> <tr><td><math>9 \times 10 = 90</math></td><td>9 90</td><td>9 + 0 = 9</td><td>90</td></tr> </tbody> </table> </div> </div> |  |  |                  |  |   |  | 1st Trick | 2nd Trick | 3rd Trick | $9 \times 1 = 09$ | 1 09                               | 0 + 9 = 9        | 09 | $9 \times 2 = 18$                             | 1 18             | 1 + 8 = 9 | 18                             | $9 \times 3 = 27$        | 2 27 | 2 + 7 = 9   | 27                                     | $9 \times 4 = 36$ | 3 36                              | 3 + 6 = 9                               | 36 | $9 \times 5 = 45$ | 4 45                          | 4 + 5 = 9 | 45   | $9 \times 6 = 54$ | 5 54 | 5 + 4 = 9       | 54                                    | $9 \times 7 = 63$ | 6 63                             | 6 + 3 = 9   | 63 | $9 \times 8 = 72$    | 7 72 | 7 + 2 = 9 | 72             | $9 \times 9 = 81$                 | 8 81 | 8 + 1 = 9  | 81                 | $9 \times 10 = 90$ | 9 90                   | 9 + 0 = 9                         | 90 |
|  | 1st Trick  | 2nd Trick  | 3rd Trick        |  |   |  |           |           |           |                   |                                    |                  |    |   |                  |           |                                |                          |      |   |  |                   |                                   |   |    |                   |                               |           |  |                   |      |                 |                                       |                   |                                  |   |    |                      |      |           |                |                                   |      |  |                    |                    |                        |                                   |    |
| $9 \times 1 = 09$  | 1 09   | 0 + 9 = 9  | 09               |  |   |  |           |           |           |                   |                                    |                  |    |   |                  |           |                                |                          |      |   |  |                   |                                   |   |    |                   |                               |           |  |                   |      |                 |                                       |                   |                                  |   |    |                      |      |           |                |                                   |      |  |                    |                    |                        |                                   |    |
| $9 \times 2 = 18$  | 1 18   | 1 + 8 = 9  | 18               |  |   |  |           |           |           |                   |                                    |                  |    |   |                  |           |                                |                          |      |   |  |                   |                                   |   |    |                   |                               |           |  |                   |      |                 |                                       |                   |                                  |   |    |                      |      |           |                |                                   |      |  |                    |                    |                        |                                   |    |
| $9 \times 3 = 27$  | 2 27   | 2 + 7 = 9  | 27               |  |   |  |           |           |           |                   |                                    |                  |    |   |                  |           |                                |                          |      |   |  |                   |                                   |   |    |                   |                               |           |  |                   |      |                 |                                       |                   |                                  |   |    |                      |      |           |                |                                   |      |  |                    |                    |                        |                                   |    |
| $9 \times 4 = 36$  | 3 36   | 3 + 6 = 9  | 36               |  |   |  |           |           |           |                   |                                    |                  |    |   |                  |           |                                |                          |      |   |  |                   |                                   |   |    |                   |                               |           |  |                   |      |                 |                                       |                   |                                  |   |    |                      |      |           |                |                                   |      |  |                    |                    |                        |                                   |    |
| $9 \times 5 = 45$  | 4 45   | 4 + 5 = 9  | 45               |  |   |  |           |           |           |                   |                                    |                  |    |   |                  |           |                                |                          |      |   |  |                   |                                   |   |    |                   |                               |           |  |                   |      |                 |                                       |                   |                                  |   |    |                      |      |           |                |                                   |      |  |                    |                    |                        |                                   |    |
| $9 \times 6 = 54$  | 5 54   | 5 + 4 = 9  | 54               |  |   |  |           |           |           |                   |                                    |                  |    |   |                  |           |                                |                          |      |   |  |                   |                                   |   |    |                   |                               |           |  |                   |      |                 |                                       |                   |                                  |   |    |                      |      |           |                |                                   |      |  |                    |                    |                        |                                   |    |
| $9 \times 7 = 63$  | 6 63   | 6 + 3 = 9  | 63               |  |   |  |           |           |           |                   |                                    |                  |    |   |                  |           |                                |                          |      |   |  |                   |                                   |   |    |                   |                               |           |  |                   |      |                 |                                       |                   |                                  |   |    |                      |      |           |                |                                   |      |  |                    |                    |                        |                                   |    |
| $9 \times 8 = 72$  | 7 72   | 7 + 2 = 9  | 72               |  |   |  |           |           |           |                   |                                    |                  |    |   |                  |           |                                |                          |      |   |  |                   |                                   |   |    |                   |                               |           |  |                   |      |                 |                                       |                   |                                  |   |    |                      |      |           |                |                                   |      |  |                    |                    |                        |                                   |    |
| $9 \times 9 = 81$  | 8 81   | 8 + 1 = 9  | 81               |  |   |  |           |           |           |                   |                                    |                  |    |   |                  |           |                                |                          |      |   |  |                   |                                   |   |    |                   |                               |           |  |                   |      |                 |                                       |                   |                                  |   |    |                      |      |           |                |                                   |      |  |                    |                    |                        |                                   |    |
| $9 \times 10 = 90$   | 9 90   | 9 + 0 = 9  | 90               |  |   |  |           |           |           |                   |                                    |                  |    |   |                  |           |                                |                          |      |   |  |                   |                                   |   |    |                   |                               |           |  |                   |      |                 |                                       |                   |                                  |   |    |                      |      |           |                |                                   |      |  |                    |                    |                        |                                   |    |

|  | Year 1   | Year 2   | Year 3   | Year 4  | Year 5   | Year 6   |
|--|--|--|--|---|--|--|
| <p><b>Mental Calculations</b></p> <p><b>Addition and subtraction</b></p> |  | <p>Derive and use related facts up to 100.</p> <p>Solve problems with addition and subtraction applying their increasing knowledge of mental methods, including:</p> <p>Two-digit numbers and ones.</p> <p>Two-digit numbers and tens.</p> <p>Two two-digit numbers.</p> <p>Three one-digit numbers.</p> | <p>Add and subtract mentally:</p> <p>Three-digit numbers and ones.</p> <p>Three-digit numbers and tens.</p> <p>Three-digit numbers and hundreds.</p> | <p>Pupils continue to practise both mental methods and columnar addition and subtraction with increasingly large numbers to aid fluency.</p>  | <p>Add and subtract numbers mentally with increasingly large numbers</p> <p>They practise mental calculations with increasingly large numbers to aid fluency (for example, <math>12\,462 - 2300 = 10\,162</math>).</p> | <p>Perform mental calculations, including with mixed operations and large numbers.</p> <p>Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.</p> |
| <p><b>Strategies</b></p>   | <p>Partitioning</p>  <p>The first diagram shows a number line from 8 to 15. An arrow from 8 to 10 is labeled '+2', and an arrow from 10 to 15 is labeled '+5'. The second diagram shows a number line from 174 to 147. An arrow from 174 to 167 is labeled '-20', an arrow from 167 to 170 is labeled '-3', and an arrow from 170 to 174 is labeled '-4'.</p> |  |  | <p>Spotting patterns:</p> <p>Adding 0 – the number does not change.</p> <p>Number bonds to 10 beyond 10.</p> <p>Using near doubles.</p> <p>Uses patterns of similar calculations e.g. <math>12 + 7 = 19</math>, <math>120 + 70 = 190</math></p> |  |  |
|  | <p>Commutative Law</p>  <p>The diagram shows two groups of dots: 6 red dots and 3 blue dots. This is followed by a plus sign and another group of 3 blue dots and 6 red dots. Below this is the equation <math>6 + 3 = 9 = 3 + 6</math>.</p>  |  | <p>Add or subtract 9, 19, 11 or 21 by rounding and compensating i.e. <math>37 + 9 = 37 + 10 - 1 = 46</math></p>                                      | <p>Jottings</p> <p>This will look different for each person. The jottings are used to support the steps they are working their way through in their head.</p>   |  |  |

|  | Year 1 | Year 2  | Year 3   | Year 4  | Year 5   | Year 6  |
|--|--------|---|--|---|--|---|
| <b>Mental Calculations</b><br><br><b>Multiplication and division</b> |        | Derive and use related facts up to 100.<br><br>Use multiplication and division facts for 2, 5 and 10. | Use multiplication and division facts for 3, 4 and 8.<br><br>Multiply two-digit number by one-digit. | Use place value, known and derived facts to multiply and divide mentally, including:<br>multiplying by 0 and 1; dividing by 1; multiplying together three numbers<br><br>Recognise and use factor pairs and commutativity in mental calculations. | Multiply and divide numbers mentally drawing upon known facts of factors, multiples, squares and cubes.<br><br>Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000. | Perform mental calculations, including with mixed operations and large numbers.<br><br>Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy. |

|                   |   |   |   |   |   |  |
|-------------------|---|---|---|---|---|--|
| <b>Strategies</b> | Commutative Law<br><br>$4 \times 2 = 8 = 2 \times 4$                         |   | Associative Law<br><br>$(3 \times 2) \times 4 = 24$ $3 \times (2 \times 4) = 24$<br>$(3 \times 2) \times 4 = 3 \times (2 \times 4)$ |   | Distributive Law<br><br>$15 \times 6 = 90$<br>$10 \times 6 = 60$<br>$5 \times 6 = 30$<br>$60 + 30 = 90$<br>$(10 \times 6) + (5 \times 6) = 90$ |  |
|                   | When multiplying any number by 1, the number stays the same.  | Multiplying any number by 0 equals 0.   |   | Use the compensate strategy. Adjust one number, then adjust the product.                                      |   | Jottings   |
|                   | Pupils practise mental methods and extend this to three-digit numbers to derive facts, (for example $600 \div 3 = 200$ can be derived from $2 \times 3 = 6$ ) | Repeated addition<br> |   | Repeated subtraction<br> |   | This will look different for each person. The jottings are used to support the steps they are working their way through in their head. |

