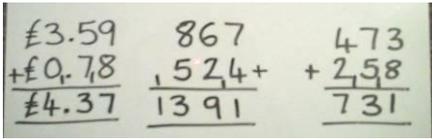
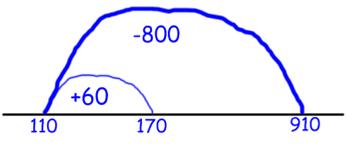
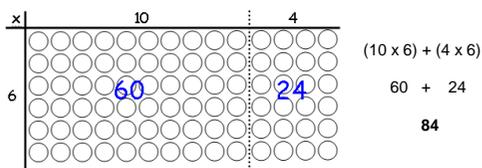
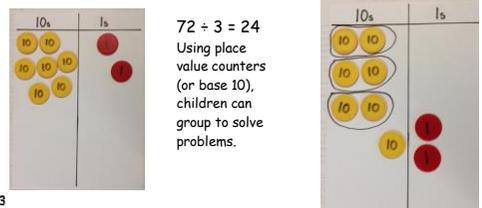
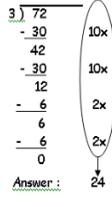
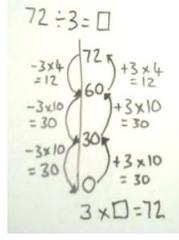
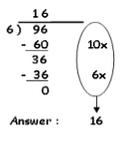
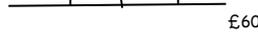


In order to encourage children to work mentally, calculations should always be presented horizontally so children can make decisions about how to tackle them. Encourage children to choose to use the most efficient method for the numbers and the context. Teach operations together to emphasise the importance of inverse.

	National Curriculum	Guidance	Addition <b>To be taught alongside each other</b> Subtraction	Vocabulary																																												
Y4	<p>Pupils will be taught to:</p> <p>add and subtract numbers with up to 4 digits using the efficient written methods of columnar addition and subtraction where appropriate</p> <p>estimate and use inverse operations to check answers to a calculation</p> <p>solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.</p> <p>solve simple measure and money problems involving fractions and decimals to two decimal places.</p>	<p>Pupils will continue to practise both mental methods and columnar addition and subtraction with increasingly large numbers to aid fluency.</p>	<p><b>Expanded informal method</b></p> $67 = 60 + 7$ $2000 + 300 + 20 + 7$ $+24 \quad 20 + 4$ $91 = 80 + 11$ $\frac{+500 + 40 + 2}{2000 + 800 + 60 + 9} = 2869$ <p><b>Model expanded horizontal partitioning with Base 10 leading to compact vertical method working from left to right, then from right to left.</b></p> <table border="1"> <tr> <td>67</td> <td>67</td> </tr> <tr> <td>+24</td> <td>+24</td> </tr> <tr> <td>80</td> <td>11</td> </tr> <tr> <td><u>11</u></td> <td><u>80</u></td> </tr> <tr> <td><u>91</u></td> <td><u>91</u></td> </tr> </table> <p>Moving quickly into 3 or 4 digit numbers for calculations that are hard to solve mentally.</p> <table border="1"> <tr> <td>625</td> <td>625</td> <td>2327</td> <td>2327</td> </tr> <tr> <td>+ 324</td> <td>+ 324</td> <td>+ 542</td> <td>+ 542</td> </tr> <tr> <td>900</td> <td>9</td> <td>2000</td> <td>9</td> </tr> <tr> <td>40</td> <td>40</td> <td>800</td> <td>60</td> </tr> <tr> <td><u>9</u></td> <td><u>900</u></td> <td><u>9</u></td> <td><u>2000</u></td> </tr> <tr> <td>949</td> <td>949</td> <td>2869</td> <td>2869</td> </tr> </table> <p><b>Model how solving an addition on an empty number line increasingly becomes less efficient as the complexity and size of numbers increases.</b></p> <p><b>Moving into compact method</b></p>  <p><b>Compensation</b> Continue to teach compensation method where children round and adjust to the nearest 10 / 100, especially in the context of money.</p> <p>£4.99 + £6.99 = £5.00 - 1p + £7.00 - 1p = £12.00 - 2p = £11.98</p> <p>Using similar methods, children will:</p> <ul style="list-style-type: none"> <li>✓ add several numbers with different numbers of digits;</li> <li>✓ begin to add two or more three-digit sums of money, with or without adjustment from the pence to the pounds;</li> <li>✓ know that the decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. £3.59 + 78p.</li> </ul>	67	67	+24	+24	80	11	<u>11</u>	<u>80</u>	<u>91</u>	<u>91</u>	625	625	2327	2327	+ 324	+ 324	+ 542	+ 542	900	9	2000	9	40	40	800	60	<u>9</u>	<u>900</u>	<u>9</u>	<u>2000</u>	949	949	2869	2869	<p><b>Difference by counting on (See Y3) For numbers close together</b> E.g. 102 - 89 = 13</p>  <p>Including measures e.g. 754ml - 690ml or 1275g - 786g or £3.00 - £2.68</p> <p><b>Counting back and Compensation</b> When appropriate (using number lines) bridging through 10, 100 and 1000 and rounding and adjusting (compensating) e.g. 42p - 5p or 193 litres - 18 litres or £823 - £32 or 706mins - 28mins or 307cm - 111cm or 1006km - 9km</p> <p><b>910 - 740</b></p>  <p>Expanded horizontal (including 4 digit numbers) using <b>base 10</b></p> <p>Step 1 <math>754 = 700 + 50 + 4</math> <math>- 286 = -200 + 80 + 6</math></p> <p>Step 2 <math>700 + 40 + 14</math> (adjust from T to U) <math>- 200 + 80 + 6</math></p> <p>Step 3 <math>600 + 140 + 14</math> (adjust from H to T) <math>- 200 + 80 + 6 = 468</math></p>  <p><math>754 = 700 + 50 + 4 = 700 + 40 + 14 = 600 + 140 + 14</math></p> <table border="1"> <tr> <td>600</td> <td>140</td> <td>14</td> </tr> <tr> <td>- 200</td> <td>80</td> <td>6</td> </tr> <tr> <td><u>400</u></td> <td><u>60</u></td> <td><u>8</u></td> </tr> </table> <p><b>Children should:</b></p> <ul style="list-style-type: none"> <li>✓ be able to subtract numbers with different numbers of digits;</li> <li>✓ begin to find the difference between two three-digit sums of money, with or without 'adjustment' from the pence to the pounds;</li> <li>✓ solve with increasing efficiency using only two steps</li> </ul>	600	140	14	- 200	80	6	<u>400</u>	<u>60</u>	<u>8</u>	<p>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>
67	67																																															
+24	+24																																															
80	11																																															
<u>11</u>	<u>80</u>																																															
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Encourage children to check results by using the inverse, using a different method e.g. equivalent calculation and by estimation where appropriate.

In order to encourage children to work mentally, calculations should always be presented horizontally so children can make decisions about how to tackle them. Encourage children to choose to use the most efficient method for the numbers and the context. Teach operations together to emphasise the importance of inverse.

	National Curriculum	Guidance	Multiplication To be taught alongside each other	Division	Vocabulary
Y4	<p>Pupils should be taught to:</p> <p>Recall multiplication and division facts for multiplication tables up to <math>12 \times 12</math></p> <p>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</p> <p>Recognise and use factor pairs and commutativity in mental calculations</p> <p>Multiply two-digit and three-digit numbers by a one-digit number using formal written layout</p> <p>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</p> <p>Solve simple measure and money problems involving fractions and decimals to two decimal places.</p>	<p>Pupils should continue to practise recalling and using multiplication tables and related division facts to aid fluency.</p> <p>Pupils should practise mental methods and extend this to three-digit numbers to derive facts, for example <math>200 \times 3 = 600</math> into <math>600 \div 3 = 200</math>, to become fluent.</p> <p>Pupils should practise to become fluent in the efficient written method of short multiplication for multiplying using multi-digit numbers, and short division with exact answers when dividing by a one-digit number.</p> <p>Pupils should write statements about the equality of expressions (e.g. use the distributive law <math>39 \times 7 = 30 \times 7 + 9 \times 7</math> and associative law <math>(2 \times 3) \times 4 = 2 \times (3 \times 4)</math>).</p> <p>Pupils should solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers. This should include correspondence questions such as three cakes shared equally between 10 children.</p>	<p>2 and 3 digit <math>\times</math> 1 digit numbers. Include <math>\times 0</math> and <math>\times 1</math> (Continue setting calculations in a range of contexts-see above)</p> <p><u>Partitioning using place value and the distributive law</u> (continuing from Y3) <math>38 \times 5 = (30 \times 5) + (8 \times 5)</math> <math>= 150 + 40</math> <math>= 190</math></p> <p>Children will continue to use arrays where appropriate leading into the grid method of multiplication.</p>  <p><u>Grid method</u> (Short multiplication - multiplication by a single digit) <math>23 \times 8</math> Children will approximate first <math>23 \times 8</math> is approximately <math>25 \times 8 = 200</math>, encouraging to use known facts to 100 e.g. <math>25 \times 4 = 100</math></p> $\begin{array}{r} 23 \\ \times 8 \\ \hline 24 \quad (3 \times 8) \text{ (record in expanded format first)} \\ + 160 \quad (20 \times 8) \\ \hline 184 \end{array}$ <p><u>Recognise and use factor pairs.</u> <math>21 \times 8 = 7 \times 3 \times 2 \times 4 = 168</math></p> <p>Encourage children to multiply 3 single digits together e.g. <math>3 \times 4 \times 5</math> and link to contexts such as volume. e.g. using 3 dice is it always, sometimes, never true that if you multiply all 3 dice numbers together you get the biggest total?</p> 	<p>2 and 3 digit <math>\div</math> 1 digit numbers. Include <math>\div 0</math> and <math>\div 1</math> (Continue setting calculations in a range of contexts)</p> <p><u>Number lines and known multiplication facts to solve division</u> Children will continue to develop their use of number lines and known multiplication facts to solve division (using known multiples of the divisor). Initially, these should be multiples of 10s, 5s, 2s and 1s - numbers with which the children are more familiar.</p> <p><u>Short division (2 digit <math>\div</math> 1 digit numbers)</u> Illustrate using horizontal and vertical bead bar and number line to make link between vertical column method and chunking using knowledge of multiples of the divisor. (if a child struggles subtracting, just encourage to count forwards from zero in multiples of the divisor to reach the dividend)</p>  <p>Using place value counters (or base 10), children can group to solve problems.</p> <p><math>72 \div 3 = 24</math></p>  <p><math>72 \div 3 = \square</math> <math>3 \times \square = 72</math></p>  <p><math>96 \div 6</math></p>  <p><u>Continue relating division to fractions and scaling</u> A pair of jeans originally cost £60. In a sale they were reduced by a quarter. How much do they cost now?</p>  <p>£60</p> <p>Begin to model divisions as fractions and use knowledge of factors to simplify divisions by representing as equivalent ratios E.G. £360 lottery win shared between 6 friends. Each gets a sixth. This is the same as £120 being shared between 2. <math>\pounds 360 \div 6 = \pounds 120 \div 2</math></p> <p>NB Children need to make sensible decisions about rounding up or down after division problems accordingly. Any remainders should be shown as integers, e.g. <math>44 \div 12 = 3 \text{ r } 8</math> but in context, e.g. 'How many dozen boxes of eggs will I need for 44 eggs?' 4</p>	<p>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>

Encourage children to check results by using the inverse, using a different method e.g. equivalent calculation and by estimation where appropriate.