












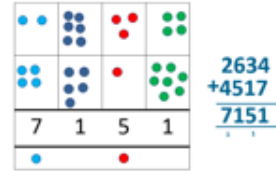
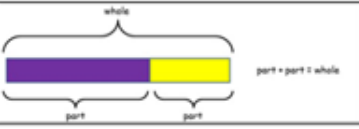


# Preston Primary School Adacemy – Calculation methods

## Addition

Obj  Gui  <b>Year 4</b>  Ex 	Obj  Gui  <b>Year 5</b>  Ex 	Obj  Gui  <b>Year 6</b>  Ex 
<p>Missing number/digit problems:</p> <p><b>Mental methods</b> should continue to develop, supported by a range of models and images, including the number line.</p> <ul style="list-style-type: none"> <li>Add numbers with up to 4 digits using <b>columnar addition</b> where appropriate.</li> </ul> <p><b>Written methods (progressing to 4-digits)</b> Expanded column addition modelled with place value counters, progressing to calculations with 4-digit numbers.</p>  <p><b>Compact written method</b> Extend to numbers with at least four digits.</p>  <p>Children should be able to make the choice of reverting to expanded methods if experiencing any difficulty.</p>	<p>Missing number/digit problems:</p> <p><b>Mental methods</b> should continue to develop, supported by a range of models and images, including the number line. Children should practise with increasingly large numbers to aid fluency e.g. <math>12462 + 2300 = 14762</math></p> <ul style="list-style-type: none"> <li>Add whole numbers with more than 4 digits using <b>columnar addition</b>.</li> </ul> <p><b>Written methods (progressing to more than 4-digits)</b> As year 4, progressing when understanding of the expanded method is secure, children will move on to the formal columnar method for whole numbers and decimal numbers as an efficient written algorithm.</p> $\begin{array}{r} 172.83 \\ + 54.68 \\ \hline 227.51 \\ 111 \end{array}$ <p>Place value counters can be used alongside the columnar method to develop understanding of addition with decimal numbers.</p>	<p>Missing number/digit problems:</p> <p><b>Mental methods</b> should continue to develop, supported by a range of models and images, including the number line.</p> <p><b>Written methods</b> As year 5, progressing to larger numbers, aiming for both conceptual understanding and procedural fluency with columnar method to be secured. Continue calculating with decimals, including those with different numbers of decimal places</p> <p><b>Problem Solving</b> Teachers should ensure that pupils have the opportunity to apply their knowledge in a variety of contexts and problems (exploring cross curricular links) to deepen their understanding.</p>

<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>
<p>Extend to up to two places of decimals (same number of decimals places) and adding several numbers (with different numbers of digits).</p> $\begin{array}{r} 72.8 \\ + 54.6 \\ \hline 127.4 \\ 11 \end{array}$ <p>Children should continue to use the Singapore bar for addition. The bar model should continue to be used to help with problem solving.</p> <p><b>Singapore Bar Method</b></p> 	<p>The Singapore bar model should continue to be used to help with problem solving.</p>	<p>The Singapore bar model should continue to be used to help with problem solving.</p>

Addition		
Year 4	Year 5	Year 6
<p><b>Mental Strategies</b></p> <ul style="list-style-type: none"> <li>Children should continue to count on regularly, now including multiples of 6, 7, 9, 25 and 1000, and steps of 1/100.</li> <li>The number line should continue to be used as an important image to support thinking, and the use of informal jottings should be encouraged where appropriate.</li> <li>Children should continue to partition numbers in different ways.</li> </ul> <p>They should be encouraged to choose from a range of strategies:</p> <ul style="list-style-type: none"> <li>Counting forwards: <math>124 + 47</math>, count on 40 from 124, then 6 to 170, then 1 to 171</li> <li>Reordering: <math>28 + 75</math>, <math>75 + 28</math> (thinking of 28 as <math>25 + 3</math>)</li> <li>Partitioning: counting on: <math>5.6 + 3.7</math>, <math>5.6 + 3.0 + 0.7 = 8.6 + 0.7</math></li> <li>Partitioning: bridging through multiples of 10: <math>6070 - 4987</math>, <math>4987 + 13 + 1000 + 70</math></li> <li>Partitioning: compensating – <math>138 + 69</math>, <math>138 + 70 - 1</math></li> <li>Partitioning: using 'near' doubles - <math>160 + 170</math> is double 150, then add 10, then add 20, or double 160 and add 10, or double 170 and subtract 10</li> <li>Partitioning: bridging through 60 to calculate a time interval – What was the time 33 minutes after 2.45pm?</li> <li>Using known facts and place value to find related facts.</li> </ul> <p><b>Vocabulary</b> add, addition, sum, more, plus, increase, sum, total, altogether, double, near double, how many more to make...? how much more? ones boundary, tens boundary, hundreds boundary, thousands boundary, tenths boundary, hundredths boundary, inverse, how many more/fewer? Equals sign, is the same as.</p>	<p><b>Mental Strategies</b></p> <ul style="list-style-type: none"> <li>Children should continue to count regularly, on and back, now including steps of powers of 10.</li> <li>The number line should continue to be used as an important image to support thinking, and the use of informal jottings should be encouraged where appropriate.</li> <li>Children should continue to partition numbers in different ways.</li> </ul> <p>They should be encouraged to choose from a range of strategies:</p> <ul style="list-style-type: none"> <li>Counting forwards and backwards in tenths and hundredths: <math>1.7 + 0.55</math></li> <li>Reordering: <math>3.3 + 4.7 = 0.7 + 0.3 + 4.0 + 3.0</math></li> <li>Partitioning: counting on - <math>540 + 280</math>, <math>540 + 200 + 80</math></li> <li>Partitioning: bridging through multiples of 10:</li> <li>Partitioning: compensating: <math>5.7 + 3.9</math>, <math>5.7 + 4.0 - 0.1</math></li> <li>Partitioning: using 'near' double: <math>2.5 + 2.6</math> is double 2.5 and add 0.1 or double 2.6 and subtract 0.1</li> <li>Partitioning: bridging through 60 to calculate a time interval: It is 11.45. How many hours and minutes is it to 15.20?</li> <li>Using known facts and place value to find related facts.</li> </ul> <p><b>Vocabulary</b> tens of thousands boundary, Also see previous years</p> <p><b>Generalisation</b> Sometimes, always or never true? The difference between a number and its reverse will be a multiple of 9. What do you notice about the differences between consecutive square numbers? <a href="#">Investigate <math>a - b = (a-1) - (b-1)</math> represented visually.</a></p> <p><b>Some Key Questions</b> What do you notice? What's the same? What's different?</p>	<p><b>Mental Strategies</b></p> <ul style="list-style-type: none"> <li>Consolidate previous years.</li> <li>Children should experiment with order of operations, investigating the effect of positioning the brackets in different places, e.g. <math>20 - 5 \times 3 = 5</math>; <math>(20 - 5) \times 3 = 45</math></li> </ul> <p><b>Vocabulary</b> See previous years</p> <p><b>Generalisations</b> Order of operations: brackets first, then multiplication and division (left to right) before addition and subtraction (left to right). Children could learn an acronym such as PEMDAS, or could be encouraged to design their own ways of remembering. Sometimes, always or never true? Subtracting numbers makes them smaller.</p> <p><b>Some Key Questions</b> What do you notice? What's the same? What's different? Can you convince me? How do you know?</p>
<p><b>Generalisations</b> Investigate when re-ordering works as a strategy for subtraction. Eg. <math>20 - 3 - 10 = 20 - 10 - 3</math>, but <math>3 - 20 - 10</math> would give a different answer.</p> <p><b>Some Key Questions</b> What do you notice? What's the same? What's different? Can you convince me? How do you know?</p>	<p>Can you convince me? How do you know?</p>	

<p><b>Generalisations</b> Investigate when re-ordering works as a strategy for subtraction. Eg. <math>20 - 3 - 10 = 20 - 10 - 3</math>, but <math>3 - 20 - 10</math> would give a different answer.</p> <p><b>Some Key Questions</b> What do you notice? What's the same? What's different? Can you convince me? How do you know?</p>	<p>Can you convince me? How do you know?</p>	
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