



# Addition and Subtraction Calculations Policy

Within the academies of the Blessed Edward Bamber Multi Academy Trust we teach calculation with understanding, and not just as a process that is to be remembered.

Our calculation policy outlines clear progression in calculation with examples that support the development of mathematical concepts. It should be used in conjunction with the Trust's maths scheme of learning and with all children from entering foundation stage to the end of Key stage 4 (for those pupils who need it)

The policy outlines agreed written methods of calculation; this is not to ignore the development of mental maths strategies. Teachers should model and pupils be encouraged to look for the most efficient strategy when tackling calculations either stand alone or within a problem solving context.

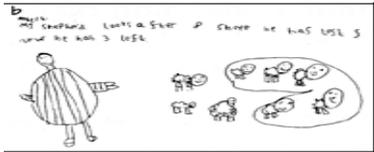
#### Documents used to support

National Curriculum

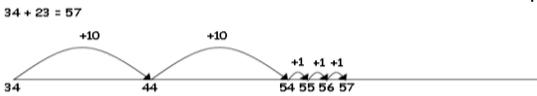
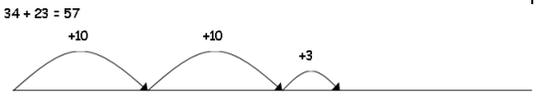
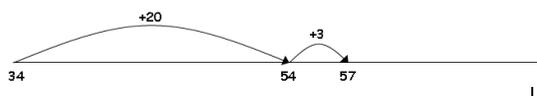
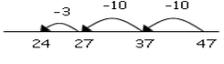
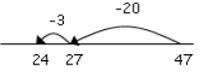
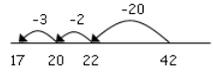
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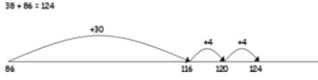
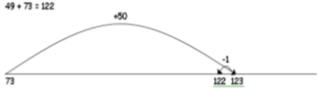
NCETM - <https://www.ncetm.org.uk/public/files/25120980/NCETM+Calculation+Guidance+October+2015.pdf>

Morning Maths Meetings are established within the first term to develop children's number sense

Statutory Requirements	<b>Foundation Stage</b>		Key Resources
	<b>Models and Images</b>		
	<b>Addition</b>	<b>Subtraction</b>	
<p><b>Development Matters Numbers - 22-36 Months</b>            Begins to make comparisons between quantities. Uses some language of quantities, such as 'more' and 'a lot'.            Knows that a group of things changes in quantity when something is added or taken away.            30-50 months            Separates a group of three or four objects in different ways, beginning to recognise that the total is still the same</p> <p><b>40-60mths</b>            Finds the total number of items in two groups by counting all of them.            Says the number that is one more than a given number. Finds one more or one less from a group of up to five objects, then ten objects.            In practical activities and discussion, beginning to use the vocabulary involved in adding and subtracting.            Records, using marks that they can interpret and explain. Begins to identify own mathematical problems based on own interests and fascinations.</p> <p><b>Early Learning Goal</b>            Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing.</p> <p><b>Exceeding</b>            Children estimate a number of objects and check quantities by counting up to 20. They solve practical problems that involve combining groups of 2, 5 or 10 or sharing into equal groups.</p>	<p>Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They develop ways of recording calculations using pictures, etc.</p> <p>Numicon is used to develop addition skills and rapid recall of addition facts.            Children to develop a sense of numbers to 10</p>  	<p>Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They develop ways of recording calculations using pictures etc.</p>  <p>Numicon is used to support children's ability to subtract.</p>  <div data-bbox="1111 1007 1648 1297" style="border: 1px solid black; padding: 5px;"> <p>Number stories bus model to be used as outlined in  <a href="https://www.ncetm.org.uk/public/files/25120980/NCETM+Calculation+Guidance+October+2015.pdf">https://www.ncetm.org.uk/public/files/25120980/NCETM+Calculation+Guidance+October+2015.pdf</a>            Pg 12 and 13</p> </div>	<ul style="list-style-type: none"> <li>• Numicon essential to develop children's understanding of number</li> <li>• Number tracks</li> <li>• Number lines</li> <li>• Cuisenaire Rods</li> <li>• Base 10</li> <li>• Tens frame</li> </ul> <p>A range of practical every day resources as well as opportunities to develop numeracy skills within the provision e.g. scales, numbers in the dough area.</p>  <p>Teacher to model number sentences but not essential for children to record them</p>

Statutory Requirements	<b>Year 1</b>		Key Resources
	<b>Models and Images</b>		
	<b>Addition</b>	<b>Subtraction</b>	
<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>• read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs</li> <li>• represent and use number bonds and related subtraction facts within 20</li> <li>• add and subtract one-digit and two-digit numbers to 20, including zero</li> <li>• solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as <math>7 = \square - 9</math>.</li> </ul>	<p>They use number lines and practical resources to support calculation and teachers <i>demonstrate</i> the use of the number line.</p> <p>Children then begin to use numbered lines to support their own calculations using a numbered line to count on in ones. Children to be encouraged to put the biggest number first but also to understand addition can be done in any order.</p> <p>Numicon is used to develop addition skills and rapid recall of addition facts.</p> <p>Children must have a solid knowledge of number bonds to 10 and addition facts to 10 before they bridge 10</p> <div data-bbox="654 805 862 1082" data-label="Image"> </div> <div data-bbox="1041 614 1232 877" data-label="Image"> </div> <div data-bbox="1070 906 1603 1190" data-label="Text" style="border: 1px solid black; padding: 5px;"> <p>Number stories bus model to be used as outlined in <a href="https://www.ncetm.org.uk/public/files/25120980/NCETM+Calculation+Guidance+October+2015.pdf">https://www.ncetm.org.uk/public/files/25120980/NCETM+Calculation+Guidance+October+2015.pdf</a></p> <p>Pg 12 and 13</p> </div> <div data-bbox="517 1190 1603 1426" data-label="Text" style="border: 1px solid black; padding: 5px;"> <p>Missing number problems must be included in teaching addition and subtraction</p> <p>e.g. <math>7 = \square - 9</math></p> <p> Use of bead string; show 7 beads tell the children 9 have been taken off. How many were there to start with?</p> </div>	<p>Children use pictures to record subtraction</p> <p>Children then begin to use numbered lines to support their own calculations - using a numbered line to count back in ones.</p> <p>The number line should also be used to show that 6 - 3 means the 'difference between 6 and 3' or 'the difference between 3 and 6' and how many jumps they are apart.</p> <p>Numicon is used to develop subtraction skills.</p>	<p>Numicon Multilink Bead strings 100 squares number lines Balance scales essential to develop children's understanding of equivalence. Coat hanger and pegs</p> <div data-bbox="1691 529 1998 762" data-label="Image"> </div>

<b>Year 2</b>			
<b>Statutory Requirements</b>	<b>Models and Images</b>		
	<b>Addition</b>	<b>Subtraction</b>	
<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>- solve problems with addition and subtraction:</li> <li>- using concrete objects and pictorial representations, including those involving numbers, quantities and measures</li> <li>- applying their increasing knowledge of mental and written methods</li> </ul> <ul style="list-style-type: none"> <li>• recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100</li> <li>• add and subtract 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> <li>- adding three one-digit numbers</li> </ul> </li> <li>• show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot</li> <li>• recognise and use the inverse relationship between addition and subtraction and use this to check calculations and missing number problems.</li> </ul>	<p>Children may need to start using numbered lines first. Encourage the children to put the biggest number first to make the calculation more efficient</p> <p>Children will begin to use 'empty number lines' themselves starting with the larger number and counting on.</p> <p>✓ First counting on in tens and ones</p> <p><math>34 + 23 = 57</math></p>  <p>✓ Then helping children to become more efficient by adding the units in one jump (by using the known fact <math>4 + 3 = 7</math>).</p> <p><math>34 + 23 = 57</math></p>  <p>✓ Followed by adding the tens in one jump and the units in one jump.</p> <p><math>34 + 23 = 57</math></p>  <p>✓ Bridging through ten can help children become more efficient.</p>	<p>Children will begin to use empty number lines to support calculations.</p> <p><b>Counting back:</b></p> <p>✓ First counting back in tens and ones.</p> <p><math>47 - 23 = 24</math></p>  <p>✓ Then helping children to become more efficient by subtracting the units in one jump (by using the known fact <math>7 - 3 = 4</math>).</p> <p><math>47 - 23 = 24</math></p>  <p>✓ Subtracting the tens in one jump and the units in one jump.</p> <p><math>47 - 23 = 24</math></p>  <p>✓ Bridging through ten can help children become more efficient.</p> <p><math>42 - 25 = 17</math></p>  <p><b>Counting on:</b> Where the numbers are involved in the calculation are close together counting on using a number line should be used – link to children finding the difference.</p>	<p>Numicon</p> <p>Multilink</p> <p>Bead strings</p> <p>100 squares</p> <p>number lines</p> <p>empty number lines</p> <p>Use of balance scales to promote understanding of equality sign.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Use of inverse to be promoted throughout inc missing number calculations</p> <p>Number stories bus model to be used as outlined in <a href="https://www.ncetm.org.uk/public/files/25120980/NCETM+Calculation+Guidance+October+2015.pdf">https://www.ncetm.org.uk/public/files/25120980/NCETM+Calculation+Guidance+October+2015.pdf</a></p> <p>Pg 12 and 13</p> </div>

		<b>Year 3</b>			
Statutory Requirements	Models and Images				Key Resources
	Addition		Subtraction		
<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>- add and subtract numbers mentally, including:               <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> </li> <li>• add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction</li> <li>• estimate the answer to a calculation and use inverse operations to check answers</li> <li>• solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.</li> </ul>	<p>Children will continue to use empty number lines with increasingly large numbers, including compensation where appropriate.</p> <p>✓ Count on from the largest number irrespective of the order of the calculation.</p>  <p>✓ Compensation</p>  <p>Children will begin to use informal pencil and paper methods (jottings) to support, record and explain partial mental methods building on existing mental strategies.</p> <p>Adding the least significant digits first</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right; padding-right: 20px;"> <math display="block">\begin{array}{r} 67 \\ + 24 \\ \hline 11 \text{ (7 + 4)} \\ 80 \text{ (60 + 20)} \\ \hline 91 \end{array}</math> </td> <td style="text-align: right;"> <math display="block">\begin{array}{r} 267 \\ + 85 \\ \hline 12 \text{ (7 + 5)} \\ 140 \text{ (60 + 80)} \\ \hline 200 \\ \hline 352 \end{array}</math> </td> </tr> </table>	$\begin{array}{r} 67 \\ + 24 \\ \hline 11 \text{ (7 + 4)} \\ 80 \text{ (60 + 20)} \\ \hline 91 \end{array}$	$\begin{array}{r} 267 \\ + 85 \\ \hline 12 \text{ (7 + 5)} \\ 140 \text{ (60 + 80)} \\ \hline 200 \\ \hline 352 \end{array}$	<p>Children will continue to use empty number lines with increasingly large numbers.</p> <p>Children will begin to use informal pencil and paper methods (jottings).</p> <p>✓ <b>Partitioning and decomposition</b></p> <ul style="list-style-type: none"> <li>• Partitioning – demonstrated using arrow cards</li> <li>• Decomposition - base 10 materials</li> </ul> <p><b>NOTE</b> When solving the calculation <math>89 - 57</math>, children should know that <b>57 does NOT EXIST AS A SEPERATE AMOUNT</b> it is what you are subtracting from the other number. Therefore, when using base 10 materials, children would need to count out only the 89.</p> $\begin{array}{r} 89 = 80 + 9 \\ - 57 = 50 + 7 \\ \hline 30 + 2 = 32 \end{array}$ <p>✓ <b>Begin to exchange.</b></p> $\begin{array}{r} 71 = \quad = \\ - 46 \end{array}$ <p>Step 1</p> $\begin{array}{r} 70 + 1 \\ - 40 + 6 \\ \hline \end{array}$ <p>Step 2</p> $\begin{array}{r} 60 + 11 \\ - 40 + 6 \\ \hline 20 + 5 = 25 \end{array}$ <p>This would be recorded by the children as</p> $\begin{array}{r} 60 + 11 \\ - 40 + 6 \\ \hline 20 + 5 = 25 \end{array}$ <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-top: 10px;"> <p>The calculation should be read as e.g. take 6 from 1.</p> </div> <div style="border: 1px solid black; padding: 10px; margin-top: 10px;"> <p>Children should be taught to estimate the answer to a calculation first and select the most efficient strategy; mentally, jottings or formal written.</p> </div>	<p>Numicon</p> <p>Multilink</p> <p>Base 10</p> <p>Number lines</p> <p>100 squares</p> <p>number lines</p> <p>empty number lines</p> <p>Use of balance scales to promote understanding of equality sign.</p> <p>Bundles of ten straws</p> <p>Cuisenaire rods</p>
$\begin{array}{r} 67 \\ + 24 \\ \hline 11 \text{ (7 + 4)} \\ 80 \text{ (60 + 20)} \\ \hline 91 \end{array}$	$\begin{array}{r} 267 \\ + 85 \\ \hline 12 \text{ (7 + 5)} \\ 140 \text{ (60 + 80)} \\ \hline 200 \\ \hline 352 \end{array}$				
		<p>Where the numbers are involved in the calculation are close together or near to multiples of 10, 100 etc counting on using a number line should be used.</p>			

<b>Year 4</b>			
<b>Statutory Requirements</b>	<b>Models and Images</b>		<b>Key Resources</b>
	<b>Addition</b>	<b>Subtraction</b>	
<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate</li> <li>estimate and use inverse operations to check answers to a calculation</li> <li>solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.</li> </ul>	<p>✓ Carry below the line.</p> $\begin{array}{r} 625 \\ + 48 \\ \hline 673 \\ 1 \end{array}$ $\begin{array}{r} 783 \\ + 42 \\ \hline 825 \\ 1 \end{array}$ $\begin{array}{r} 367 \\ + 85 \\ \hline 452 \\ \text{11} \end{array}$ <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> <div style="border: 1px solid black; padding: 5px; margin-top: 10px; width: fit-content;"> <p>Encourage children to label the columns. When teaching use correct vocab e.g. if adding tens column say 8 tens add 4 tens not 8 add 4.</p> </div>	<p>✓ <b>Decomposition</b></p> $\begin{array}{r} 6141 \\ \del{784} \\ - 86 \\ \hline 668 \end{array}$ <p>Children should:</p> <ul style="list-style-type: none"> <li>✓ be able to subtract numbers with different numbers of digits;</li> <li>✓ using this method, children should also begin to find the difference between two three-digit sums of money, with or without 'adjustment' from the pence to the pounds.</li> <li>✓ know that decimal points should line up under each other.</li> </ul>	<p>Base 10 to lay out calculations in columns</p> <p>Also see other year groups for children who need stage before.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px; width: fit-content;"> <p>Children should be taught to estimate the answer to a calculation first and select the most efficient strategy; mentally, jottings or formal written.</p> </div>

<b>Year 5</b>			
<b>Statutory Requirements</b>	<b>Models and Images</b>		<b>Key Resources</b>
	<b>Addition</b>	<b>Subtraction</b>	
<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>• add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)</li> <li>• add and subtract numbers mentally with increasingly large numbers</li> <li>• use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy</li> <li>• solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.</li> </ul>	<p>Children should extend the carrying method to numbers with more than four digits.</p> $\begin{array}{r} 587 \\ + 475 \\ \hline 1062 \\ 11 \end{array}$ $\begin{array}{r} 3587 \\ + 675 \\ \hline 4262 \\ 111 \end{array}$ <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 decimal fractions with up to three digits and the same number of decimal places;</li> <li>✓ know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. 3.2 m – 280 cm.</li> </ul>	<p><b>Decomposition</b></p> $\begin{array}{r} 6141 \\ \cancel{7}4 \\ - 286 \\ \hline 468 \end{array}$ <p>Children should:</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 decimal fractions with up to three digits and the same number of decimal places;</li> </ul> <p>know that decimal points should line up under each other</p> <p>Where the numbers are involved in the calculation are close together or multiples of 10, 100 counting mental strategies should be used.</p>	<p>If needed</p> <p>Base 10 to lay out calculations in columns</p> <p>Also see other year groups for children who need stage before.</p>
	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> <p>Encourage children to label the columns. When teaching use correct vocab e.g. if adding tens column say 8 tens add 4 tens not 8 add 4.</p> </div>		<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> <p>Children should be taught to estimate the answer to a calculation first and select the most efficient strategy; mentally, jottings or formal written.</p> </div>

<b>Year 6 and Key Stage 3</b>			
<b>Statutory Requirements</b>	<b>Models and Images</b>		<b>Key Resources</b>
	<b>Addition</b>	<b>Subtraction</b>	
<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication</li> <li>- 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</li> <li>▪ perform mental calculations, including with mixed operations and large numbers.</li> <li>▪ identify common factors, common multiples and prime numbers</li> <li>▪ use their knowledge of the order of operations to carry out calculations involving the four operations</li> <li>▪ solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why</li> <li>▪ solve problems involving addition, subtraction, multiplication and division</li> <li>▪ use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.</li> </ul>	<p>Children should extend the carrying method to number with any number of digits.</p> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <math display="block">\begin{array}{r} 7648 \\ + 1486 \\ \hline 9134 \\ 111 \end{array}</math> <math display="block">\begin{array}{r} 6584 \\ + 5848 \\ \hline 12432 \\ 111 \end{array}</math> <math display="block">\begin{array}{r} 42 \\ 6432 \\ 786 \\ 3 \\ + 4681 \\ \hline 11944 \\ 121 \end{array}</math> </div> <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 decimal fractions with up to four digits and either one or two decimal places;</li> <li>✓ know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. <math>401.2 + 26.85 + 0.71</math>.</li> </ul>	<p><b>Decomposition</b></p> <div style="margin-top: 10px;"> <math display="block">\begin{array}{r} 5131 \\ \cancel{6}467 \\ - 2684 \\ \hline 3783 \end{array}</math> </div> <p>Children should:</p> <ul style="list-style-type: none"> <li>✓ be able to subtract numbers with different numbers of digits;</li> <li>✓ be able to subtract two or more decimal fractions with up to three digits and either one or two decimal places;</li> <li>✓ know that decimal points should line up under each other.</li> </ul> <p>Where the numbers are involved in the calculation are close together or near to multiples of 10, 100 etc. counting on using a number line should be used.</p>	<p>If needed</p> <p>Base 10 to lay out calculations in columns</p> <p>Also see other year groups for children who need stage before.</p>
	<p>Encourage children to label the columns. When teaching use correct vocab e.g. if adding tens column say 8 tens add 4 tens not 8 add 4.</p>		<p>Children should be taught to estimate the answer to a calculation first and select the most efficient strategy; mentally, jottings or formal written.</p>