

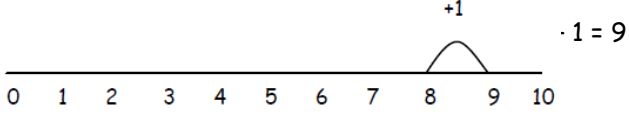
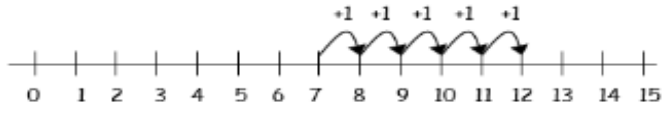
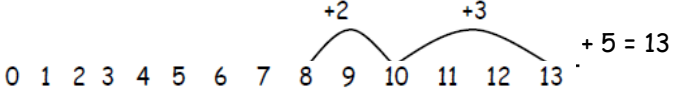
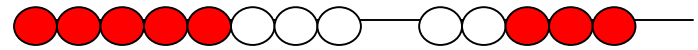




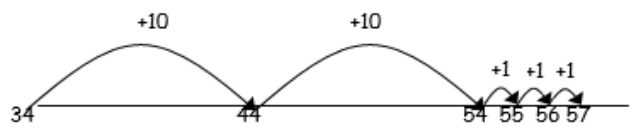
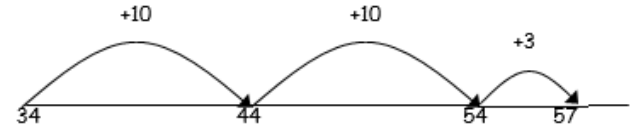
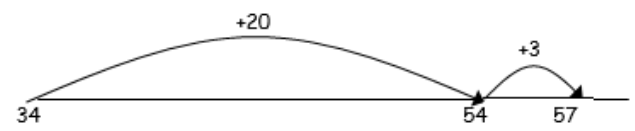
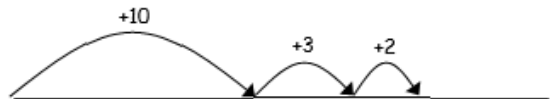
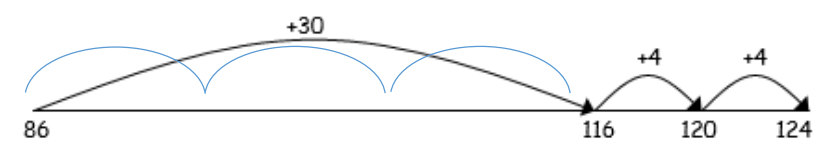
Mickleover Primary School
Calculation Policy
ADDITION

	<i>Learning Objectives</i>	<i>Success criteria</i>	<i>Method</i>
EYFS	Children find the total of objects in 2 groups by counting all of them.	They will begin to relate addition to combining two groups of objects	<ul style="list-style-type: none"> In practical activities and use of fingers and through discussion they will begin to use the vocabulary involved in addition. <div style="text-align: center;">  </div> <p>'You have five apples and I have three apples. How many apples altogether?'</p> <ul style="list-style-type: none"> They will record pictorially then numerically $5+3=8$ apples
	Children to add 2 single digit numbers by counting on.	They will begin to relate addition by counting on from the largest number.	Through practical activities, always encourage children to begin counting from the largest number. Using objects and pictures, can add together two single digit numbers and count on to find the answer but encourage starting with the larger number.. <div style="text-align: center;">  </div> <ul style="list-style-type: none"> Using a number line counting from the biggest number.
	Children will find one more than a given number.	Children will find one more from up to 5 progressing to 10 and 20	<ul style="list-style-type: none"> Through songs and practical activities. Children will engage in a wide variety of songs and rhymes, games and activities to develop number sense. http://minimaths.club/special-songs/ http://www.topmarks.co.uk/Flash.aspx?f=CountingOnInOnes Children will use number line to point to a number and find one more..


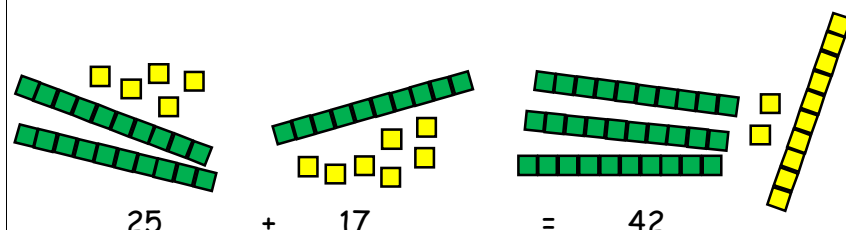
Year 1

	<i>Learning Objectives</i>	<i>Success Criteria</i>	<i>Method</i>									
	<p>Read, write and interpret mathematical statements involving addition (+) and the equals (=) sign</p> <p>Add one- digit and two-digit numbers within 20, including zero</p> <ul style="list-style-type: none"> • Represent and use number bonds and related addition facts within 20 <p>Solve missing number problems eg $10 + \underline{\quad} = 16$ <i>Vocab: more than, most, add, count on, altogether, put together, plus, add, total.</i></p> <ul style="list-style-type: none"> • Solve one-step problems that involve addition and subtraction, using concrete objects & pictorial representations, and missing number problems such as $7 = [] - 9$. 	<p>Begin to understand place value in numbers to 20.</p> <p>Children will be able to add numbers to 20 including the effect of adding zero.</p> <p>Understand and use the symbols + and =</p>	<p>Continue methods learnt in EYFS Supported by rods/dienes, unifix, everyday objects, number tracks and numbered number lines, number beads (http://www.mathlearningcenter.org/web-apps/number-rack/)</p> <p>Using a number line to add two numbers together. (show addition above the line)</p>  <p style="text-align: center;">$8 + 1 = 9$</p>  <p style="text-align: center;">$8 + 5 = 13$</p> <p>Splitting numbers to bridge through 10.</p>  <p style="text-align: center;">$8 + 5 = 13$</p> <p>3) $5 + \underline{\quad} = 8$</p>  <p>4) Using a 100 square to add in steps of 1 or 10.</p> <p>$12 + 13 + 14 + 15 + 2 = 15$ $46 + 20 = 66$</p> <table border="1" style="float: right; margin-top: 10px;"> <tr><td>45</td><td>46</td><td>47</td></tr> <tr><td>55</td><td>56</td><td>57</td></tr> <tr><td>65</td><td>66</td><td>67</td></tr> </table> <p>Mentally add numbers beginning with the biggest number and counting on.</p>	45	46	47	55	56	57	65	66	67
45	46	47										
55	56	57										
65	66	67										

	<i>Learning Objectives</i>	<i>Success Criteria</i>	<i>Method</i>									
Year 2	<p>Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100.</p> <p>Solve problems with addition: using concrete objects and pictorial representations, including those involving numbers, quantities and measures applying their increasing knowledge of mental and written method</p> <ul style="list-style-type: none"> • A two digit number and ones • A two digit number and tens • Two two-digit numbers • Three one-digit numbers 	<p>Children will have instant recall of number bonds to 20 and be able to use this understanding to solve</p> <p>Understand place value in two-digit numbers and how zero is a place holder.</p> <p>Understand that addition is commutative e.g. $48 + 36 = 36 + 48$</p> <p>Understand that subtraction is the inverse of addition. e.g. $48 + 36 = 84$, $36 + 48 = 84$, $84 - 36 = 48$, $84 - 48 = 36$</p>	<p>$68 + \square = 80$</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="border-right: 1px solid black; padding: 0 5px;">T</td> <td style="padding: 0 5px;">U</td> <td style="padding: 0 10px;">$13 = 10 + 3$</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 0 5px;">1</td> <td style="padding: 0 5px;">3</td> <td>$31 = 30 + 1$</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 0 5px;">3</td> <td style="padding: 0 5px;">1</td> <td></td> </tr> </table> <p>$3+4=7$ $4+3=7$ Encouraging children to see that it does not matter with addition whether we start with the larger number, the answer will always be the same using concrete apparatus.</p> <p>$9+4=13$ $4+9=13$ $13-4=9$ $13-9=4$</p>	T	U	$13 = 10 + 3$	1	3	$31 = 30 + 1$	3	1	
T	U	$13 = 10 + 3$										
1	3	$31 = 30 + 1$										
3	1											

	<i>Learning Objectives</i>	<i>Success Criteria</i>	<i>Method</i>
		<p>Children will begin to use 'empty number lines' themselves starting with the larger number and counting on.</p> <ul style="list-style-type: none"> • First counting on in tens and ones. • Then helping children to become more efficient by adding the units in one jump (by using the known fact $4 + 3 = 7$). • Followed by adding the tens in one jump and the units in one jump. <p>Children will continue to use empty number lines with increasingly large numbers</p>	<p>http://mathsframe.co.uk/en/resources/resource/113/add_and_subtract_on_a_number_line#</p> <p>1) Using an empty number line to add two-digit numbers.</p> <p>$34 + 23 = 57$</p>  <p>$34 + 23 = 57$</p>  <p>$34 + 23 = 57$</p>  <p>$37 + 15 = 52$</p>  <p>$38 + 86 = 124$</p> 

	<i>Learning Objectives</i>	<i>Success Criteria</i>	<i>Method</i>
		<ul style="list-style-type: none"> Add 9 or 11 by adding and adjusting (compensation) <p>Leading to use of dienes to model addition leading to the regrouping /exchange of units for tens in preparation for written addition</p> <p>Children will partition to add two digit numbers, adding most significant digits first using the partitioning method</p>	<p>Count on from the largest number irrespective of the order of the calculation.</p> <p>$49 + 73 = 122$</p> <p>(Show compensation below the line)</p> <p>2) Using rods http://www.topmarks.co.uk/Flash.aspx?f=diennesandcoinsv3</p> <p>25 + 17 = 42</p> <p>Using rods (exchanging ten ones for a ten)</p> <p>60+20 =80 7= 4+3</p> <p>80 +7</p> <p>87</p> <p>or using place value cards. http://www.topmarks.co.uk/Flash.aspx?f=AddHorizontalPVcardsv3</p>

	<i>Learning Objectives</i>	<i>Success criteria</i>	<i>Method</i>
	<p>□ Add numbers mentally, including informal jottings to support:</p> <p>Add numbers with up to three digits, using formal written method of columnar addition</p>	<p>Children will use known mental strategies to add</p> <p><i>a three-digit number and ones</i> <i>a three-digit number and tens</i> <i>a three-digit number and hundreds</i></p> <p>i)Using rods</p> <p>ii)Use expanded horizontal method</p>	<p>Partitioning Number bonds 100 squares Empty number lines</p> <p>http://www.topmarks.co.uk/Flash.aspx?f=diennesandcoinsv3</p> <p>Addition with no exchange Record in books as:</p> <div style="display: flex; align-items: center; justify-content: space-around;">  <div style="text-align: right;"> $\begin{array}{r} 21 \\ 17 \\ \hline 38 \end{array}$ </div> </div> <p>Using rods (exchanging ten ones for a ten)</p> <div style="display: flex; align-items: center; justify-content: center;">  </div> <p>In books:</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> $\begin{array}{r} 25 \\ + 17 \\ \hline 42 \end{array}$ </div> <div style="text-align: center;"> $\begin{array}{r} 20 + 5 \\ 10 + 7 \\ \hline 30 + 12 = 42 \end{array}$ </div> </div>

	<i>Learning Objectives</i>	<i>Success criteria</i>	<i>Method</i>
Year 3		<p>Leading to expanded vertical method, begin to develop formal written methods</p> <p>Moving to adding the least significant digits first in preparation for 'carrying'.</p>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> $\begin{array}{r} 67 \text{ (60 + 7)} \\ + 24 \text{ (20 + 4)} \\ \hline 80 + 11 = 91 \end{array}$ <p>Step 1</p> </div> <div style="text-align: center;"> $\begin{array}{r} 67 \\ + 24 \\ \hline 11 \text{ (7+4)} \\ 80 \text{ (60+20)} \\ \hline 91 \end{array}$ <p>Step2 http://www.topmarks.co.uk/Flash.aspx?f=AddExpandv2</p> </div> </div> <p>Also children need experience of adding more than two numbers.</p> <div style="text-align: center;"> $\begin{array}{r} 24 \\ 67 \\ + 12 \\ \hline 13 \text{ (4+7+2)} \\ 90 \text{ (20+60+10)} \\ 103 \text{ (90+13)} \end{array}$ </div> <p>If children are ready, introduce step 3, the Formal written method, where it is necessary to 'carry' ten from the units to the tens column. Carrying will be made below the line and crossed off when it is added into the calculation .</p> <div style="text-align: center;"> $\begin{array}{r} 67 \\ + 24 \\ \hline 91 \\ \hline \end{array}$ <p>Step 3</p> </div>
	Add fractions with the same denominator within one whole	Children can add fractions of same denominator	$\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$



	<i>Learning Objectives</i>	<i>Success criteria</i>	<i>Method</i>																																													
Year 4	<p>Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition</p> <p>• Estimate and use inverse operations to check answers to a calculation.</p>	<p>Children will begin to carry <u>below</u> the calculation on an additional line.</p> <p>Children will cross off the carried digit when added in the calculation</p>	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> $\begin{array}{r} 625 \\ + 48 \\ \hline 673 \\ 1 \end{array}$ <table border="1" style="margin: 5px auto; border-collapse: collapse;"> <tr><td></td><td>2</td><td>5</td><td>6</td></tr> <tr><td>+</td><td>1</td><td>2</td><td>7</td></tr> <tr><td colspan="4"><hr/></td></tr> <tr><td></td><td>3</td><td>8</td><td>3</td></tr> <tr><td></td><td></td><td style="text-align: center;">↙</td><td></td></tr> </table> </div> <div style="text-align: center;"> $\begin{array}{r} 783 \\ 42 \\ \hline 825 \\ 1 \end{array}$ <table border="1" style="margin: 5px auto; border-collapse: collapse;"> <tr><td></td><td>5</td><td>2</td><td>0</td><td>9</td></tr> <tr><td>+</td><td>3</td><td>1</td><td>9</td><td>2</td></tr> <tr><td colspan="5"><hr/></td></tr> <tr><td></td><td>8</td><td>4</td><td>0</td><td>1</td></tr> <tr><td></td><td></td><td style="text-align: center;">↙</td><td style="text-align: center;">↙</td><td></td></tr> </table> </div> <div style="text-align: center;"> $\begin{array}{r} 367 \\ + 85 \\ \hline 452 \\ 11 \end{array}$ </div> </div>		2	5	6	+	1	2	7	<hr/>					3	8	3			↙			5	2	0	9	+	3	1	9	2	<hr/>						8	4	0	1			↙	↙	
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<ul style="list-style-type: none"> • <i>add several numbers with different numbers of digits;</i> • <i>begin to add up to 4 digit numbers using money, with or without adjustment from the pence to the pounds;</i> • <i>know that the decimal points should line up under each other, particularly when adding mixed amounts, e.g. £3.59 + 78p.</i> 																																																
	Add fractions of the same denominators	Children will add fractions of the same denominator	$1\frac{1}{6} + \frac{4}{6} = 1\frac{5}{6}$																																													

Year 5


	<i>Learning Objectives</i>	<i>Success Criteria</i>	<i>Method</i>																																																						
	<p>Add whole numbers with more than 4 digits, including using formal methods (columnar)</p> <ul style="list-style-type: none"> • Add and subtract numbers mentally with increasingly large numbers. • Use rounding to check answers and determine, in the context of a problem, levels of accuracy. • Solve addition multi-step problems in contexts, deciding which operations and methods to use & why. 	<p>Children should extend the carrying method to numbers with at least 4 digits</p> <p>Children will round to nearest significant number and calculate</p>	$\begin{array}{r} 23587 \\ + 1475 \\ \hline 25062 \\ \hline 50124 \\ \hline \end{array}$ <div style="display: flex; align-items: center; justify-content: center;"> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td>5</td><td>2</td><td>0</td><td>9</td></tr> <tr><td>+</td><td>3</td><td>1</td><td>9</td><td>2</td></tr> <tr><td></td><td>8</td><td>4</td><td>0</td><td>1</td></tr> <tr><td></td><td></td><td>↑</td><td>↑</td><td></td></tr> </table> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td>3</td><td>8</td><td>.</td><td>3</td><td>6</td></tr> <tr><td>+</td><td>2</td><td>7</td><td>.</td><td>9</td><td>5</td></tr> <tr><td></td><td>6</td><td>6</td><td>.</td><td>3</td><td>1</td></tr> <tr><td></td><td>↓</td><td>↑</td><td></td><td>↓</td><td></td></tr> </table> </div> <p>ie 24000 1500 <u>25000</u> <u>50000</u> approx</p>							5	2	0	9	+	3	1	9	2		8	4	0	1			↑	↑								3	8	.	3	6	+	2	7	.	9	5		6	6	.	3	1		↓	↑		↓	
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	<ul style="list-style-type: none"> • <i>add several numbers with different numbers of digits (with more than 4 digits);</i> • <i>begin to add two or more decimal fractions with up to three digits and the same number of decimal places;</i> • <i>know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. 3.2 m - 280 cm.</i> • <i>when working with decimals, always make each number have the same amount of digits to the right of the decimal point (see example)</i> <p>eg 3.7 + 2.35</p>		$\begin{array}{r} 3.70 \\ + 2.35 \\ \hline 6.05 \\ \hline \end{array}$																																																						
	<p>Add fractions with same denominators and multiples of the same number</p>	<p>Children will add fractions with same denominators</p>	$\frac{1}{6} + \frac{4}{6} = \frac{5}{6}$ $\frac{1}{4} + \frac{1}{8} = \frac{2}{8} + \frac{1}{8} = \frac{3}{8}$																																																						


	<i>Learning Objectives</i>	<i>Success Criteria</i>	<i>Method</i>
Year 6	<p>Other than addition of fractions there are no objectives included in the programmes of study explicitly related to written methods for addition in Y6. However, there is an expectation that children will continue to practise and use the formal written method for larger numbers and decimals and use these methods when solving problems, when appropriate (see previous year's guidance for methods).</p> <p>Our aim is that by the end of Y6, children use mental methods (with jottings) when appropriate, but for calculations that they cannot do in their heads, they use an efficient formal written method accurately and with confidence.</p>	<p><i>Using similar methods, children will</i></p> <ul style="list-style-type: none"> ✓ <i>add several numbers with different numbers of digits;</i> ✓ <i>begin to add two or more decimal fractions with up to four digits and one or two decimal places;</i> <p><i>know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts,</i></p> <p style="padding-left: 40px;"><i>e.g. 401.2 + 26.85 + 0.71.</i></p>	$\begin{array}{r} 42 \\ 6432 \\ 786 \\ 3 \\ \hline 4681 \\ \hline 11944 \\ \hline -1121 \end{array}$ $\begin{array}{r} 76.48 \\ + 14.86 \\ \hline 91.34 \\ \hline -111 \end{array}$ $\begin{array}{r} 6584 \\ + 5848 \\ \hline 12432 \\ \hline 1111 \end{array}$
	<p>Pupils should add fractions with different denominators and mixed numbers using the concept of equivalent fractions.</p>	<p>Children will be able to add fractions of the same denominator including mixed numbers.</p> <p>Children will be able to add fractions of different denominators using equivalent fractions.</p>	$2\frac{1}{4} + 1\frac{1}{6} = 2\frac{3}{12} + 1\frac{2}{12} = 3\frac{5}{12}$




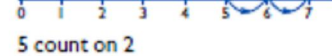
Models and images for understanding addition and subtraction


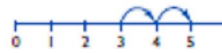
 $5 = 3 + 2$

 $3 + 2 = 5$

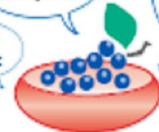
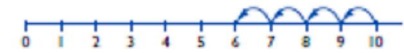

 $20 = 12 + 8$


 $10 = 5 + 5$

 $10 = 1 + 9$

 $10 = 2 + 8$

 $2 + 5 = 7$ 2 count on 5

 $5 + 2 = 7$ 5 count on 2



 How many more forks do we need?
 $3 + \square = 5$



 10 grapes, eat two. How many left?
 9, 8, 8 left
 10 grapes, eat one, how many left? 9. And another? 8. Another, 7...


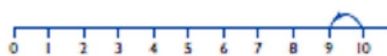



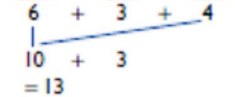
9 and 1 more is 10
 9 add 1 equals 10
 $9 + 1 = 10$


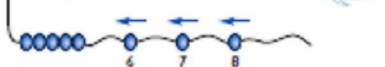



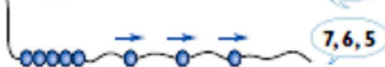


1 less than 10 is 9
 10 subtract 1 equals 9
 $10 - 1 = 9$



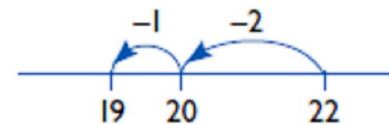

 $6 + 3 + 4 = 13$


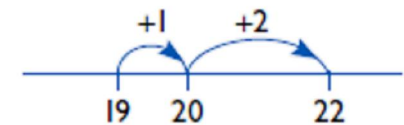

 5 and 1 more is? 6
 5 and 2 more is? 6, 7
 5 and 3 more is? 6, 7, 8

 count on one, two or three


 1 less than 8 is? 7
 2 less than 8 is? 7, 6
 3 less than 8 is? 7, 6, 5

 count back one, two or three


 $5 - \square = 3$ $\square - 2 = 3$





$22 - 3$


$22 - 19 = 3$




The difference is?

The difference between 11 and 14 is 3.
 $14 - 11 = 3$
 $11 + \square = 14$


 Which line has most money?
 How much more?


 6 and how many more make 10?
 $6 + \square = 10$