



**HILLSBOROUGH**  
NURSERY & PRIMARY SCHOOL

# Hillsborough primary school

## Maths Content and progression

Number addition and subtraction

## Number: Addition and Subtraction

### Number bonds

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Represent and use number bonds and related subtraction facts within 20	Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100				

### Mental Calculation

<p>Add and subtract two single digit numbers.</p> <p><b>Count on or back</b> to find the answer.</p>	<p>Add and subtract one-digit and two-digit numbers to 20, including zero</p>	<p>Add and subtract numbers using concrete objects, pictorial representations, and mentally, including:</p> <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>	<p>Add and subtract numbers mentally, including:</p> <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>		<p>Add and subtract numbers mentally with increasingly large numbers</p>	<p>Perform mental calculations, including with mixed operations and large numbers</p>
	<p>Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs (appears also in Written Methods)</p>	<p>Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot</p>				<p>Use their knowledge of the order of operations to carry out calculations involving the four operations</p>

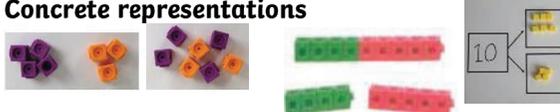
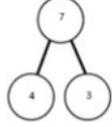
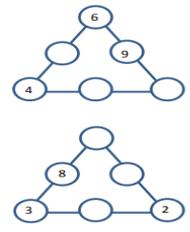
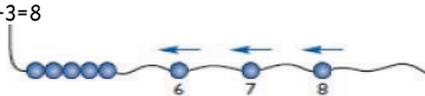
### Written Methods

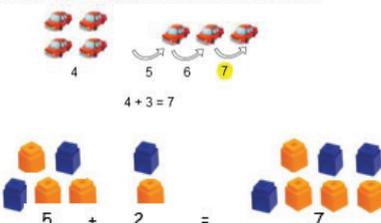
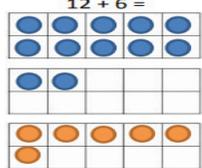
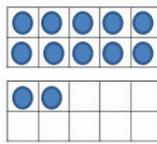
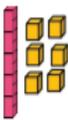
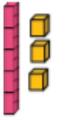
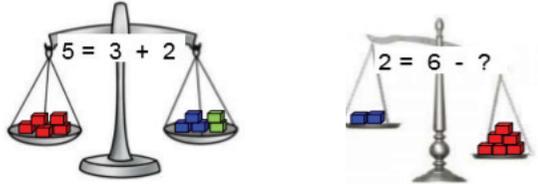
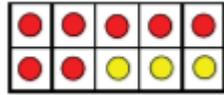
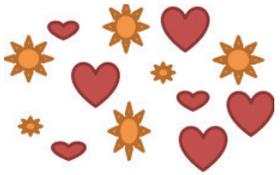
	<p>Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs (appears also in Mental Calculation)</p>		<p>Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction</p>	<p>Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate</p>	<p>Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)</p>	<p>Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs (appears also in Mental Calculation)</p>
--	--	--	--	---	---	--

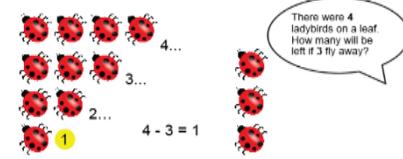
### Inverse operation, Estimating and Checking answers

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.	Estimate the answer to a calculation and use inverse operations to check answers	Estimate and use inverse operations to check answers to a calculation	Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy	Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.
<b>Problem Solving</b>						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = \square - 9$	Solve problems with addition and subtraction: * using concrete objects and pictorial representations, including those involving numbers, quantities and measures * applying their increasing knowledge of mental and written methods	Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction	Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why	Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why	Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
		<i>Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change (copied from Measurement)</i>				Solve problems involving addition, subtraction, multiplication and division

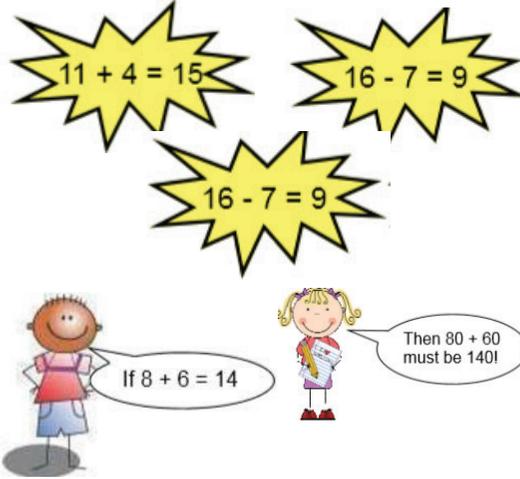
## Year 1.

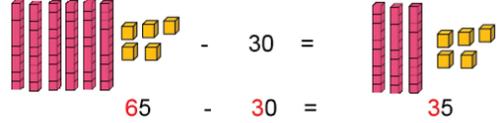
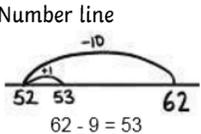
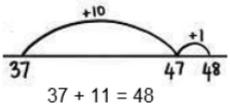
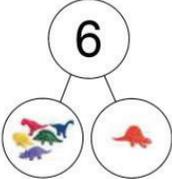
NC Objective	Learning Objectives	Pre-learning	Methods from Calculation Policy	Suggested Key Questions for GDS									
<p>represent and use number bonds and related subtraction facts within 20</p>	<p>Know addition number bonds to 5, 10 and 20. Know subtraction facts up to 5, 10 to 20.</p> <p style="color: green;"><u>Vocabulary:</u> addition number bonds add subtract</p>	<p>Children should be able to count to 5 and 10</p> <p>Identify and count a range of objects around them indoors and outdoors</p> <p><b>Can you add these together?</b></p> <p><b>Can you subtract? From ?</b></p>	<p><b>Concrete</b> _ Use cubes or any other resources (teddy bear, shells, beads) to add two numbers together as a group or in a bar.</p> <p><b>Concrete representations</b></p>  <p><b>Pictorial</b></p>   <p>Use pictures to add two numbers together as a group or in a bar.</p> <p><b>Abstract</b> <math>4 + 3 = 7</math> (4 is a part, 3 is a part, 7 is a whole) <math>10 = 6 + 4</math></p> <p>Use the part-part whole diagram as shown above to move into the abstract.</p> <p><math>2 + 3 = 5</math>      <math>3 + 2 = 5</math> <math>5 = 3 + 2</math>      <math>5 = 2 + 3</math> <math>\square + 3 = 5</math>      <math>2 + 3 = \square</math></p> 	<p>Fill in the <input type="text"/> so the sum of the numbers on each line is 20</p>  <p>Here is a magic square. Each row and column adds up to 20. Fill in the missing numbers.</p> <table border="1" data-bbox="1859 454 2038 598"> <tr> <td>12</td> <td></td> <td>5</td> </tr> <tr> <td></td> <td>7</td> <td></td> </tr> <tr> <td></td> <td></td> <td>4</td> </tr> </table> <p>Harry had 17 football cards. He wanted to give some to his friend Hamid. After giving them to Hamid, Harry had 3 more than Hamid. How many did each boy have?</p>	12		5		7				4
12		5											
	7												
		4											
<p>add and subtract one-digit and two-digit numbers to 20, including zero</p>	<p>Add two 1-digit numbers to 20. Add two numbers that equal any number up to 20, including zero. Subtract two 1-digit numbers. Subtract a 1-digit number from a 2-digit number up to 20. Subtract a 2-digit number from a 2-digit number up to 20.</p>	<p>Ensure children develop an understanding of add and take away.</p>	<p><math>4 - 2 = 6</math></p>  <p><math>5 + 3 = 8</math></p> 	<p>Children to develop an understanding of equality:</p> <p><math>6 + \square = 11</math> <math>6 + 5 = 5 + \square</math> <math>6 + 5 = \square + 4</math></p>									

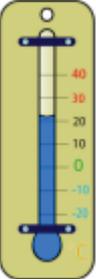
	<p><b>Vocabulary:</b>  Addition  Add subtract  take away  equals  more than  less than  number bonds</p>	<p>Use objects to add two single-digit numbers by counting on to find the answer.</p>  <p>Children will then utilise this strategy to solve simple subtractions:</p> 	<p><math>12 + 6 =</math></p>  <p><math>12 - 6 =</math></p>  <p>It will also be helpful, at this stage, to introduce the children to Base 10 resources and use them to partition 'teen' numbers into tens and units.</p> <p><math>16 =</math>  <math>13 =</math> </p>	
<p>read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs</p>	<p>Recognise the signs + - = appropriately in number sentences.</p> <p>Use + - = sign with concrete objects.</p> <p>Record statements using + - = in written form</p>	<p>Say which number is one more or one less than a given number.</p> 	<p>Many children develop the misconception that the answer to a calculation is on the right-hand side of the equals sign. Scales can be used to help children explore the idea that both sides of a calculation must balance.</p>  <p>Through all this, the children should start to see that addition and subtraction are related operations.</p> <p>For example: <math>7 + 3 = 10</math> is related to <math>7 = 10 - 3</math>.</p> 	<p>Finish these sequences  What comes next?  <math>12 + 2 = 14</math>  <math>13 + 3 = 16</math>  <math>14 + 4 = 18</math>  <math>-- + -- = ---</math></p>
	<p><b>Vocabulary:</b>  add, subtract, take away, equals, number sentence, more than, less than, the same as,</p>		<p>This understanding can be supported with a tens frame</p>	<p>Look at the picture and write addition or subtraction sentences.</p>  <p>a) By size b) By shape</p>

<p>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></p>	<p>Solve missing number problems.</p>	<p>See previous knowledge for add and subtract Children will then utilise this strategy to solve simple subtractions</p>	<p>Children must be able to complete missing number problems, where the 'missing number' can be placed in all possible positions. Use Base 10 to help you find the missing number.</p>	<p>Find the total</p>
	<p><u>Vocabulary:</u> addition, add, forwards, put together, more than, total, altogether, distance between, difference between, equals = same as, pattern, odd, even, digit, counting on, subtraction, subtract, take away, minus, less than, most, least.</p>	<p>Children will then utilise this strategy to solve simple subtractions:</p>  <p>There were 4 ladybirds on a leaf How many will be left if 3 fly away?</p>	 <p>Abstract Find the missing number to complete each calculation</p> <p><math>7 + \square = 9</math> <math>\square - 3 = 11</math> <math>\square = 8 + 5</math></p>	<p> +  = 10  +  = 12  +  =</p> <p>Sally has 15 grapes. She eats 7 of them. How many grapes does she have left?</p>

## Year 2.

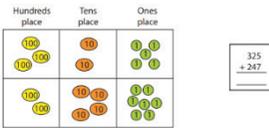
NC Objective	Learning Objectives	Pre-Learning	Methods from Calculation Policy	Key Questions for GDS
<p>recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100</p>	<p>Recall addition number facts to 20 fluently.</p> <p>Recall subtraction number facts to 20 fluently.</p> <p>Use these addition and subtraction facts to 20 to derive related facts to 100. Apply my knowledge of number bonds to 10 and 20 to add multiples of 10.</p> <p>Apply my knowledge of number bonds to 10 and 20 to find pairs of numbers that total 100.</p> <p>Mentally add pairs of numbers up to 100.</p> <p><u>Vocabulary</u> One, hundred more, one hundred, less, number /facts tens boundary</p>	<p>Recall addition facts to 10.</p> <p>Recall the subtraction facts to 10.</p>	<p>The expectation in Year 2 is that children should now be able to recall these number facts to 20 from memory, no longer requiring concrete resources to support them.</p> 	<p>Look at the following</p> <p><math>67 = 100 - 33</math>  <math>33 = 100 - 67</math>  <math>67 + 33 = 100</math>  <math>33 + 67 = 100</math></p> <p>Make a similar pattern using the numbers 74, 26 and 100.</p>
<p>add and subtract numbers using concrete objects, pictorial representations, and mentally, including:</p> <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> </ul> <p>adding three one-digit numbers</p>	<p>Add a 1-digit number to a 2-digit number.</p> <p>Subtract a 1-digit number from a 2-digit number.</p> <p>Add or subtract 10 from any given 2-digit number.</p> <p>Add or subtract any multiple of 10 from a 2-digit number.</p>	<p>Children should begin to understand subtraction as both taking away and finding the difference between.</p> <p>A simple bar model can help them get to grips with the latter:</p>  <p>The difference between 12 and 9 is 3.</p>	<p>Following on from Year 1, multiple ten-frames can be used as a starting point to add a single-digit number to a 2-digit number</p>  <p><math>36 + 5 = 41</math></p>	<p>Is this correct?</p> <p style="text-align: center;"> <math>56</math>  <math>+ 23</math>  <math>-----</math>  <math>97</math> </p> <p>Why or why not?</p>

	<p>Add two 2-digit numbers using a written method.</p> <p>Subtract one 2-digit number from another where there is no exchange between the tens and units column.</p> <p>Subtract one 2-digit number from another where there is exchange between the tens and units column.</p>	<p>or <math>12 - 9 = 3</math></p> <p>Add two 1-digit numbers together.</p> <p>Subtract a 1-digit number from another 1-digit number.</p> <p>Add three 1-digit numbers together,</p>	<p>Base 10:</p>  <p>Number line</p>  	
<p>show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot</p>	<p>Add that numbers can be set out in any order.</p> <p><u>Vocabulary</u></p>	 <p><math>5 + 1 = 6</math>  <math>6 - 1 = 5</math>  <math>6 - 5 = 1</math></p>	<p>Use this opportunity to secure understanding and clear up misconceptions before going deeper into their learning.</p> <p>When subtracting the order of the numbers is very important, e.g. <math>7 - 5</math> <b>cannot be set out as</b> <math>5 - 7</math> and give the same answer.  <math>41 + 22 = 63</math> is the same as <math>22 + 41 = 63</math> However, <math>55 - 18 = 37</math> is NOT the same as <math>18 - 55</math></p>	<p>What is wrong here?</p> <p><math>5 + 7 = 12</math>      <math>7 - 5 = 2</math></p> <p><math>7 + 5 = 12</math>      <math>5 - 7 = 2</math></p>
<p>recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.</p>	<p>Recognise relationship between additions.</p> <p>Recognise relationship between subtractions.</p> <p>Use the inverse to check calculations.</p> <p>Use the facts I know to work out a missing number.</p>	<p>Understand the concept of <b>adding</b> and <b>subtracting</b> using <b>concrete</b> objects, <b>pictorial</b> objects and <b>abstract</b> objects.</p>	<p>The inverse of <math>8 + 9 = 17</math> is <math>17 - 9 = 8</math> or <math>17 - 8 = 9</math> because subtraction is the reverse of addition</p> <p><math>64 - \square = 49</math>      <math>29 = \square - 24</math></p> <p><math>18 + 7 = 11 + \square</math>      <math>35 + \square + \square = 100</math></p>	<p><math>56 + ? = 60</math>  <math>60 = 20 + ?</math>  <math>22 - ? = 14</math>  <math>? - 7 = 29</math></p> <p>I think of a number. I take away 7 and add 2. My answer is 15. What is my number?</p>

	<p><u>Vocabulary</u> Addition                      Subtraction Inverse                      Missing number Calculate</p>			
<p>solve problems with addition and subtraction: * using concrete objects and pictorial representations, including those involving numbers, quantities and measures applying their increasing knowledge of mental and written methods</p>	<p><u>As above</u></p> <hr/> <p><u>Vocabulary</u> how many more to make...?, how many more is... than...?, how much more is...?, tens boundary</p>	<p>Children must be able to complete missing number problems, where the 'missing number' can be placed in all possible positions. Use Base 10 to help you find the missing number.</p>  <p>Find the missing number to complete each calculation</p> <p><math>7 + \square = 9</math> <math>\square - 3 = 11</math> <math>\square = 8 + 5</math></p>	<p><u>Covered above</u></p>	<p>At a paint shop they sell 3 different sizes of paint. Big tins cost 20p. Middle tins cost 15p. Small tins cost 10p. If I buy 2 big tins, 3 middles sized tins and 2 small tins, how much money will I spend?</p> <p>Look at the temperature on the thermometer. The temperature has dropped 8 degrees in 2 hours. What was the temperature 2 hours ago?</p> 

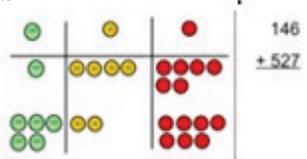
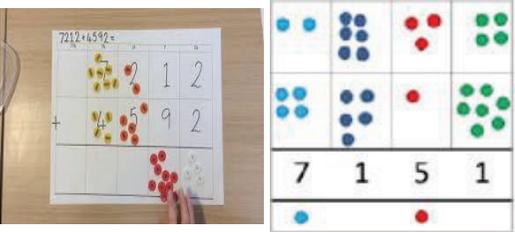
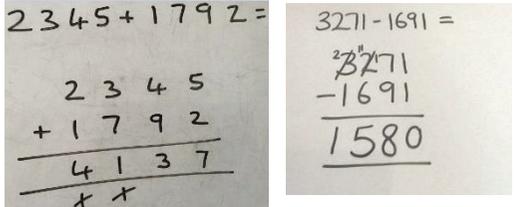
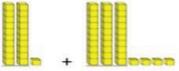
### Year 3.

NC Objective	Learning Objectives	Pre-Learning	Methods from Calculation Policy	Key Questions for GDS				
<p>add and subtract numbers mentally, including:</p> <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>	<p>Subtract any 1-digit number from a greater 1-digit number</p> <p>Add any 3-digit number to a 1-digit number</p> <p>Subtract a 1-digit number from a 3-digit number</p> <p>Add any 3-digit number to a 10s number</p> <p>Subtract a 10s number from any 3-digit number</p> <p>Add any 3-digit number to any 100s number.</p> <p>Subtract any 100s number from a 3-digit number</p> <p><u>Vocabulary</u> Add Subtract Tens ones hundreds hundreds boundary Exchanging Regrouping</p>	<p>Children should have</p> <p>Base 10:</p>  <p style="text-align: center;"><math>65 - 30 = 35</math></p>	<p>Children should be able to</p> <p>Calculate:</p> <p><math>153 + 6</math> <math>153 + 60</math> <math>153 + 600</math></p> <p>Calculate:</p> <p><math>356 - 9</math> <math>356 - 90</math> <math>356 - 200</math></p> <p>Teacher can use the bar model to teach e.g</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td colspan="2" style="text-align: center;">610</td> </tr> <tr> <td style="width: 50%;">310</td> <td style="width: 50%;">300</td> </tr> </table>	610		310	300	<p>Children could</p> <p>Each missing digit is either a 9 or a 1. Write in the missing digits. Can you find different ways of doing this?</p> <p style="text-align: center;">_____ + _____ + _____ = 201</p> <p>Three pandas ate 25 bamboo sticks. Each of them ate a different odd number of bamboo sticks.</p> <p>How many bamboo sticks did they each eat?</p> <p>Find as many ways as you can to do it.</p>
610								
310	300							
<p>add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction</p>	<p>Add two 2-digit numbers using columnar addition without exchanging.</p> <p>Subtract a 2-digit number from a 2-digit</p>	<p>None</p>		<p>The answer to the addition is 201. All the digits used are either 1 or 9. Fill in the boxes.</p> <p style="text-align: center;"><math>201 = \square\square + \square\square + \square\square</math></p>				

	<p>number without exchanging.</p> <p>Add two 3-digit numbers using columnar addition without exchanging.</p> <p>Subtract a 2 or 3-digit number from a 3-digit number without exchanging.</p> <p>Add two 2-digit numbers where the units make more than 10</p> <p>Add two 3-digit numbers where the units and/or tens make more than 10</p> <p>Subtract a 2-digit number from a 2-digit number where exchanging is required</p> <p>Subtract a 2-digit number from a 3-digit number where exchanging is required</p>		<p>Children should be able to Solve calculations using a place value grid and equipment alongside a column method to demonstrate understanding.</p>  <p><u>Quick reminder of adding and subtracting 2-digit numbers:</u></p> $\begin{array}{r} 36 \\ + 32 \\ \hline \end{array} \quad \begin{array}{r} 79 \\ - 17 \\ \hline \end{array}$ <p><u>Add 3-digit numbers with and without exchange e.g</u></p> $\begin{array}{r} 560 \\ + 239 \\ \hline \end{array} \quad \begin{array}{r} 358 \\ + 256 \\ \hline \end{array}$ <p><u>Subtract 2- or 3-digit numbers from a 3 digit</u></p> $\begin{array}{r} 349 \\ - 37 \\ \hline \end{array} \quad \begin{array}{r} 675 \\ - 254 \\ \hline \end{array}$ <p><u>Subtract with 0 in the tens column</u> Teach separately with subtraction where there is a 0 in the tens column of a 3-digit number.</p> $\begin{array}{r} 409 \\ - 174 \\ \hline \end{array}$	<p><b>Football Match</b> Use columnar addition or subtraction system to solve these problems:</p> <ul style="list-style-type: none"> <li>At a football match there were 695 spectators in the ground just before kick-off. 271 supported Rovers and the rest supported United. How many supported United?</li> <li>If 502 spectators were male, how many were female?</li> <li>Another 109 spectators came in late to the ground. How many spectators were in the ground by the end?</li> </ul>
<p>estimate the answer to a calculation and use inverse operations to check answers</p>	<p>Use estimation to check the reasonableness of an answer, e.g. Why can't <math>65+32 = 89</math>?</p> <p>Use inverse operations involving + and - to check answers.</p>	<p><b>Explain the principle that helps us to be able to estimate appropriately.</b></p> <p>The inverse of <math>8 + 9 = 17</math> is <math>17 - 9 = 8</math> or <math>17 - 8 = 9</math> because subtraction is the reverse of addition</p>	<p>Use oral examples of estimating how far certain things are or how long things will take.</p> <p>Pupils should understand that a good estimate will help them know if their calculations are likely to be correct.</p>	<p>Are these number sentences true or false? Give your reasons...</p> <p><math>597+7= 614</math> <math>804-70=744</math> <math>768+140 = 908</math></p>

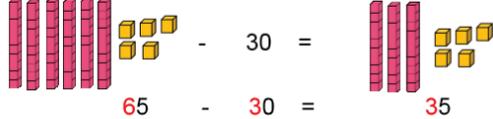
	<p>Vocabulary Estimate Explain Think of a number Prove your answer</p>	<p>64 - <input type="text"/> = 49      29 = <input type="text"/> - 24</p> <p>18 + 7 = 11 + <input type="text"/>      35 + <input type="text"/> + <input type="text"/> = 100</p>	<p>Re-introduce the term inverse to pupils so that can see the relationship between <b>addition and subtraction</b> and also multiplication and division.</p> <p>34 + 45 = 79 Use a subtraction to check the answer to the addition.</p>	
<p>solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction</p>	<p>Solve missing number problems.</p> <p>Solve word problems involving place value Solve problems with addition to 1000.</p> <p>Solve problems with subtraction to 1000</p> <p>Vocabulary Solve Inverse Calculate Estimate</p>	<p>Revisit place value, addition and subtraction</p>	<p>This is another revision unit but with problems of increasing difficulty. Pupils will need to be reminded of the key words associated with problems, ie, altogether, sum, difference, etc. Ensure pupils read the problem in the first instance and understand what is required. Some pupils may need to go through the process of explaining to their friend what it is they are asked to do, so as to give them more confidence. Ensure that there is a balance between additions and subtractions and remind pupils of the term 'inverse' which they met earlier in the year.</p> <p>As above</p>	<p><u>Try the following</u></p> <p>___ + ___ + ___ = 201</p> <p>Each missing number is a 2-digit number which ends with either a 9 or a 1. Write in the missing digits. Find different ways of doing this.</p> <p>Sophie has five coins in her pocket. How much money might she have? What is the greatest amount she can have? What is the least amount she can have? If all the coins are different: What is the greatest amount she can have? What is the least amount she can have?</p>

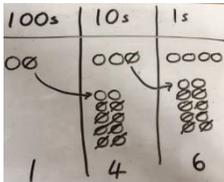
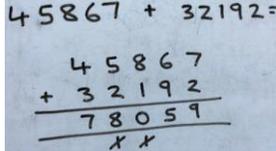
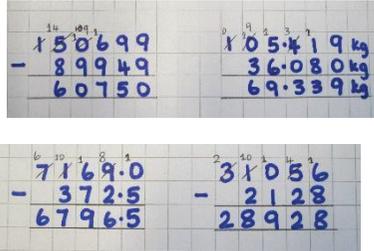
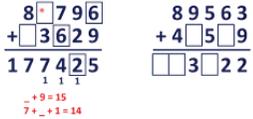
## Year 4.

<u>NC Objective</u>	<u>Learning Objectives</u>	<u>Pre-Learning</u>	<u>Methods from Calculation Policy</u>	<u>Key Questions for GDS</u>								
<p>add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate</p>	<p>Add 2 numbers with 4 digits together using column addition without exchange between units and tens.</p> <p>Add 3 numbers with 4 digits together using column addition where the units and tens, tens and hundreds or hundreds and thousands make more than ten.</p> <p>Subtract a 4-digit number from another using column subtraction without exchange between units and tens.</p> <p>Subtract a 4-digit number from another using column subtraction with exchange between units and tens.</p> <p>Use column subtraction when exchange numbers between columns.</p> <p>I know how to manage a '0' in a column subtraction.</p>	<p>Add 2 numbers with 2- 3 digits together using column addition without exchange between units and tens</p> <p>Add 2 numbers with 3 digits together using column addition where the units and tens make more than ten.</p> <p>Make both numbers on a place value grid.</p>  <p>Add 3 numbers with 3 digits together using column addition where the units and tens or tens and hundreds make more than ten.</p> <div style="border: 1px solid orange; padding: 5px; margin: 10px 0;"> <p style="text-align: center; color: cyan;">Column method</p> <math display="block">\begin{array}{r} 567 \\ + 199 \\ \hline 766 \end{array}</math> </div> <p>Subtract a 2-3 digit number from another using column subtraction without exchange between units and tens.</p>	<p><u>Secure pictorial representation</u></p>  <p>Add up the rest of the columns, exchanging the 10 counters from one column for the next place value column until every column has been added.</p> <p>This can also be done with Base 10 to help children clearly see that 10 ones equal 1 ten and 10 tens equal 100.</p> <p><u>Column addition and subtraction</u></p> 	<p>Write three calculations where you would use mental calculation strategies and three where you apply a column method.</p> <p>Explain the decision you made for each calculation.</p> <p>Grace says that <math>5129 - 3372 = 2257</math> because:  '5000-3000= 2000  300- 100=200  70-20 = 50  9-2 = 7  so 5129-3372 is 2257'  Do you agree with Grace? Use an addition calculation to justify your answer.</p> <p>Other ways to secure/deepen learning</p>  <p>Always use missing digit problems too:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 50px;">Tens</th> <th style="width: 50px;">Ones</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">●●●●</td> <td style="text-align: center;">●</td> </tr> <tr> <td style="text-align: center;">●●●●</td> <td style="text-align: center;">?</td> </tr> <tr> <td style="text-align: center;">?</td> <td style="text-align: center;">4</td> </tr> </tbody> </table>	Tens	Ones	●●●●	●	●●●●	?	?	4
Tens	Ones											
●●●●	●											
●●●●	?											
?	4											
	<u>Vocabulary</u>											

	<p>addition, increase, altogether, score, double, near double, how many more to make...? subtraction, take away, decrease, Leave, how many are left/left over? Difference between, half, halve, how many more/fewer is... than...? How much more/less is...? is the same as, equals, sign tens boundary, hundreds boundary, inverse</p>															
<p><b>estimate and use inverse operations to check answers to a calculation</b></p>	<p>Estimate the answer of any addition and subtraction involving 2-3 digits numbers to the nearest 10 and 100.</p> <p>Use similar numbers/calculation and make a sensible guess at the answer.</p> <p>Use the inverse to make sure my answer is correct.</p> <p><u>Vocabulary</u></p>	<p><b>Revisit</b></p> <p>Y2 Understand the concept of <b>adding</b> and <b>subtracting</b> using <b>concrete</b> objects, <b>pictorial</b> objects and <b>abstract</b> objects.</p> <p>Y3 <b>Explain the principle that helps us to be able to estimate appropriately.</b></p> <p>The inverse of <math>8 + 9 = 17</math> is <math>17 - 9 = 8</math> or <math>17 - 8 = 9</math></p> <p>because subtraction is the reverse of addition</p>	<p><b>Work with pupils on estimating addition and subtraction of 2 digit numbers by rounding (approximately) each 2-digit number to the nearest 10.</b></p> <p><b>Work with pupils on estimating addition and subtraction of 3 digit numbers by rounding (approximately) each 3-digit number to the nearest 100.</b></p> <p>Julie has 578 stamps, Heidi has 456 stamps. How many stamps do they have altogether? Show how you can check your answer using the inverse.</p> <p><math>580 + 460 = 1040</math>                      <math>1040 - 6 = 1034</math>  <math>1034 - 578 = 456</math></p> <p>Reinforce the column method here</p>	<p>Are these number sentences true or false? Give your reasons...</p> <p><math>597 + 7 = 614</math></p> <p><math>804 - 70 = 744</math></p> <p><math>768 + 140 = 908</math></p> <p>Jenny estimates the answer to <math>3568 + 509 \approx 4000</math>. Do you agree? Explain your answer.</p>												
<p>solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why</p>	<p><b>Solve two step word problems involving addition and subtraction with numbers up to 1000</b></p> <p><u>Vocabulary</u></p> <p>pattern, puzzle calculate, calculation mental calculation method jotting answer right, correct, wrong what could we try next? How did you work it out? number sentence sign, operation, symbol, equation</p>	<p><b>Revisit Y2</b></p> <p>Solving word problem using concrete , pictorial and abstract representations</p>	<p>There are 2452 people at a theme park. 538 are children, how many are adults? Sarah draws a diagram to help. Place a (✓) next to the correct diagram</p> <table border="1" style="margin-bottom: 10px;"> <tr><td>Adults</td><td></td></tr> <tr><td>2452</td><td>538</td></tr> </table> <table border="1" style="margin-bottom: 10px;"> <tr><td>2452</td><td></td></tr> <tr><td>Adults</td><td>538</td></tr> </table> <table border="1"> <tr><td>538</td><td></td></tr> <tr><td>2452</td><td>Adults</td></tr> </table> <p>Use the correct diagram to help you solve the problem.</p>	Adults		2452	538	2452		Adults	538	538		2452	Adults	<p>Harry thinks of a number, he multiplies it by 3, adds 7 and then divides it by 2. How could he get back to his original number?</p> <p>If Harry starts with the number 3, write out all the calculations he will do to get back to his original number.</p>
Adults																
2452	538															
2452																
Adults	538															
538																
2452	Adults															

## Year 5.

NC Objective	Learning Objectives	Pre-Learning	Methods from Calculation Policy	Key Questions for GDS
<p><b>add and subtract numbers mentally with increasingly large numbers</b></p>	<p>Mentally:            Add any two 2-digit numbers            Subtract any 2-digit number from any other greater 2-digit number            Subtract any 2-digit number from any 3-digit number            Subtract any 2-digit number from any 3-digit number            Add any 2-digit and any 3-digit number            Subtract any 2-digit number from any 4-digit number            Add together two 3-digit numbers            Subtract a 3-digit number from a greater 3-digit number            Add any 1000s number to any 4 or 5-digit number            Subtract any 1000s number from a greater 5-digit number</p> <p><u>Vocabulary</u>            ones boundary            tenths boundary</p>	<p><b>Assess chn to know where the starting point is</b></p> <p>Y1 add and subtract...</p> <p>Y2 add and subtract numbers using concrete objects, pictorial representations and mentally...</p> <p>Year 3 add and subtract numbers mentally...</p> <p>Base 10:</p>  <p>65 - 30 = 35</p>	<p>This unit is about improving pupils' rapid recall.            Much of the learning is about using a timer to see how pupils can improve their mental agility.</p> <p>Children follow a series of instructions to find a mystery number. Eg            Start with 100. Add 5000. Take away 400. Add 20. Subtract 750. <i>What number have you got?</i></p> <p>Work out this missing numbers:</p> $\underline{\quad} - 92 = 145$ $740 + \underline{\quad} = 1039$ $\underline{\quad} = 580 - 401$	<p>3450 + 7000 + 550            Which order would you add the numbers the most efficiently mentally? Choose and explain the order you have chosen.</p> <p>If 2,541 is the answer, what's the question?            Can you create three addition calculations? -            Can you create three subtraction calculations?            Did you use a strategy?</p> <p>Which of these numbers sentences have the answer that is between 0.5 and 0.6?            11.74 - 11.18            33.3-32.71</p>

<p>add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)</p>	<p>Add whole numbers with more than four digits, including using a formal written methods.</p> <p>Subtract whole numbers with more than four digits, including using a formal written methods.</p> <p>-subtract a 5 or 6-digit number from another using column subtraction without exchange between units and tens. -use column subtraction when I have to exchange numbers between columns. -I know how to manage a '0' in a column subtraction.</p>	<p>Represent the Base 10 pictorially, remembering to show the exchange. Draw the counters onto a place value grid and show what you have taken away by crossing the counters out as well as clearly showing the exchanges you make.</p>  <p>When confident, children can find their own way to record the exchange/regrouping.</p>	<p><u>Example of column addition</u></p>  <p><u>Example of column subtraction</u></p> 	<p>Find the missing digit for each calculation</p> <p>Explain your way of working out the answer</p>  <p>My answer is 5,398 What's the question? Create 3 addition calculations. Create 3 subtraction questions. Did you use a strategy? Explain it.</p>
<p><b>use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy</b></p>	<p>Use rounding to add and subtract any 2-digit numbers to check reasonableness of answer. Use rounding to add and subtract any 3-digit numbers to check</p>	<p><b>Work with pupils on estimating addition and subtraction of 2 digit numbers by rounding (approximately) each 2-digit number to the nearest 10.</b> <b>Work with pupils on estimating addition and subtraction of 3 digit numbers by rounding (approximately) each 3-digit number to the nearest 100.</b></p>	<p>Remind pupils of the rules related to rounding. Talk to pupils about the usefulness of rounding as a way of checking reasonableness of calculations.</p> <p><u>Round the following numbers as directed</u></p>	
<p>Vocabulary</p> <p>Addition Subtraction Inverse</p>				

	<p>reasonableness of answer. Use rounding to add and subtract any 4-digit numbers to check reasonableness of answer.</p> <p><u>Vocabulary</u> Estimate Accuracy Approximate Decimal round</p>	<p>Julie has 578 stamps, Heidi has 456 stamps. How many stamps do they have altogether? Show how you can check your answer using the inverse.</p> $580 + 460 = 1040 \qquad 1040 - 6 = 1034$ $\qquad\qquad\qquad 1034 - 578 = 456$ <p>Reinforce the column method here</p>	<table border="1" data-bbox="1216 196 1653 384"> <thead> <tr> <th></th> <th>Round to 100</th> <th></th> <th>Round to 1000</th> </tr> </thead> <tbody> <tr> <td>2391</td> <td></td> <td>23916</td> <td></td> </tr> <tr> <td>1672</td> <td></td> <td>37501</td> <td></td> </tr> <tr> <td>1775</td> <td></td> <td>78210</td> <td></td> </tr> <tr> <td>1750</td> <td></td> <td>91023</td> <td></td> </tr> <tr> <td>2309</td> <td></td> <td>92340</td> <td></td> </tr> </tbody> </table> <p><u>Working with money(decimal)</u> Round the following amounts to the nearest £1:</p> <table data-bbox="1216 523 1653 587"> <tr> <td>£23.90</td> <td>£78.91</td> <td>£57.23</td> </tr> <tr> <td>£25.95</td> <td>£76.91</td> <td>£17.92</td> </tr> </table> <p>A car showroom reduces the price of a car from £18750 to £14999. <b>By how much was the price of the car reduced?</b> Circle the most sensible answer: £3249, £4001, £3751</p>		Round to 100		Round to 1000	2391		23916		1672		37501		1775		78210		1750		91023		2309		92340		£23.90	£78.91	£57.23	£25.95	£76.91	£17.92	<p>True or False?</p> <ul style="list-style-type: none"> <li>■ 3999 – 2999 = 4000 – 3000</li> <li>■ 3999 – 2999 = 3000 – 2000</li> <li>■ 2741 – 1263 = 2742 – 1264</li> <li>■ 2741 + 1263 = 2742 + 1264</li> <li>■ 2741 – 1263 = 2731 – 1253</li> <li>■ 2741 – 1263 = 2742 – 1252</li> </ul> <p>Explain your reasoning. Using this number statement, <math>5222 - 3111 = 5223 - 3112</math> write three more pairs of equivalent calculations. <i>Pupils should not calculate the answer to these questions but should look at the structure and relationships between the numbers.</i></p> <p><u>True or false.</u> <math>4999 - 1999 = 5000 - 2000</math> Explain how you know using a written method.</p>
	Round to 100		Round to 1000																															
2391		23916																																
1672		37501																																
1775		78210																																
1750		91023																																
2309		92340																																
£23.90	£78.91	£57.23																																
£25.95	£76.91	£17.92																																
<p>solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why</p>	<p>Identify the number of steps in a problem Identify the operations to be used Solve problems and check accuracy using estimation and rounding to check reasonableness of answer</p> <p><u>Vocabulary</u> Solve calculate Explain Give reason...</p>	<p><u>Revisit the RUCSAC method</u></p>	<p><b>Work out and answer the following word problem</b></p> <p>A busy office wanted to get an idea of how busy they were so they counted all the e-mails they had received in one week. There were three different people in the office who regularly received e-mails. The first received 2,350; the second received 150 more than the first and the third received double the amount received by the first and second person. <b>How many emails were received in that week?</b></p> <p>Martin is measuring his room for a new carpet. It has a width of 2.3m and a length of 5.1m. He rounds his measurements to the nearest metre. Will he have the right amount of carpet? Explain your reasoning.</p>	<p>Sam and Tom have £67.80 between them.</p> <p>If Sam has £6.20 more than Tom, how much does Tom have? Explain your answer using a diagram Can you show your answer in a different way?</p> <p>The bar model can be use here</p>																														

## Year 6.

NC Objective	Learning Objectives	Pre-Learning	Methods from Calculation Policy	Key Questions for GDS
perform mental calculations, including with mixed operations and large numbers	<p>Mentally: Use all 4 operations</p> <p>Calculate a problem using at least 2 operations</p> <p>Calculate 2-step problems</p> <p>Explain the order to solve calculations</p> <p>Solve calculations in correct order</p> <hr/> <p><b>Vocabulary</b>  <span style="color: green;">Add</span>                      <span style="color: green;">Subtract</span>  <span style="color: green;">Multiply</span>                  <span style="color: green;">Divide</span>  <span style="color: green;">Equal</span></p>	<p>Know all times table</p> <p>Become more familiar with the four operations</p>	<p>Checking multiples of 10 and 100:  <math>7 \times 6</math>    <math>70 \times 6</math>    <math>700 \times 6</math>    <math>7000 \times 6</math>  <math>8 \times 5</math>    <math>80 \times 5</math>    <math>800 \times 5</math>    <math>8000 \times 5</math>  <math>9 \times 6</math>    <math>90 \times 6</math>    <math>900 \times 6</math>    <math>9000 \times 6</math></p> <p>Now make up some more to give to your friend.</p> <p><b>Complete these very rapidly without using pencil and paper:</b></p> <p><math>97 + 23</math>            <math>125 - 27</math>            <math>89 + 14</math>            <math>90 + 45</math>  <math>86 + 18</math></p> <p><b>Work out the missing number:</b>  <math>5419 + 2000 = 9836 - \underline{\hspace{1cm}}</math>  <math>200 \times \underline{\hspace{1cm}} = 750 + \underline{\hspace{1cm}}</math></p>	<p>Which calculation is the odd one out?  <math>753 \times 1.8</math>  <math>(75:3 \times 3) \times 6</math>  <math>753 + 753 \div 5 \times 4</math>  <math>7.53 \times 1800</math>  <math>753 \times 2 - 753 \times 0.2</math>  <math>750 \times 1.8 + 3 \times 1.8</math></p> <p>Explain your reasoning.</p> <p>Brian had 15 pennies. He divided them into 4 bags. He then knew he could pay any amount of money from 1p to 15p exact without opening them. <span style="color: green;">How much did he put in each bag?</span></p>
use their knowledge of the order of operations to carry out calculations involving the four operations	<p>To explain the order to solve calculations.</p> <p>To solve calculations in the correct order.</p> <hr/> <p><b>Vocabulary</b>  <span style="color: green;">BODMAS</span>  <span style="color: green;">Add</span>  <span style="color: green;">Subtract</span>  <span style="color: green;">Multiply</span>  <span style="color: green;">Divide</span></p>	<p>Children should understand the four operations</p> <p>Children should be able to add and subtract more than four digit numbers.</p> <p>Children should be able to multiply and divide</p>	<p>Talk to the pupils about the term BODMAS and take pupils through the preference order: brackets; of; divide; multiply; add and subtract.</p> <p>Show pupils how the order is very important and how different answers can be had if they do not attend to the order.</p> <p><math>(12 + 7) + (3-1) =</math>            <math>(56 - 7) \times 2 =</math>  <math>(9 - 6) + (19 + 6) =</math>            <math>(23 + 7) - (34 - 32) =</math>  <math>5 \times 4 + (99 + 34) =</math>            <math>(7 \times 7) - (8 \times 8) =</math>  <math>123 + 56 \times 2 =</math>                <math>152 \div 4 + 7 =</math>  <math>56 \times 4 + 8 =</math>                      <math>(23 + 56) \times 5 =</math></p>	<p><math>35 + \underline{\hspace{1cm}} - 12 \times 2 = 17</math>  <math>6 \times 3 + \underline{\hspace{1cm}} - 13 = 12</math></p> <p><span style="color: green;">Does it make a difference if you change the order of a mixed operation calculation?</span></p>

<p>use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.</p>	<p>Explain why an answer is or is not reasonable using estimation and rounding.</p> <p>Estimate an answer to a problem before calculating (being able to justify estimation).</p> <p><u>Vocabulary</u> Estimate/estimation Rounding accurate</p>	<p>Understand the term 'estimate'</p> <p>Children must know how to round before trying to give an estimated answer</p>	<p>If three runners run for 1000km are they likely to take: 1 minute; 5 minutes; 1 hour or 3 hours?</p> <p>A car transporter delivers between 8 and 10 cars to a showroom every day. Approximately how many cars will the transporter deliver in a year? How did you go about estimating? Now work out the maximum number of cars that could have been delivered.</p>	<p>Two numbers have a difference of 2.3. To the nearest 10, they are both 10. What could the numbers be?</p>
<p><b>solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why</b></p>	<p>Using all 4 operations Calculating a problem using at least 2 operations</p> <p>Calculating 2-step problems</p> <p>Explaining the order to solve calculations</p> <p>Solving calculations in correct order</p> <p><u>Vocabulary</u> Explain Calculate Solve</p>	<p>Recap the basic concept of solving a word problem. Revisit the RUCSAC method</p> <p>A new style vehicle can travel for 85,125Km but has to change its electrical system 5 times during the journey. How far does it travel with each electrical system?</p> <p>85 125 divided by 5 = 17 025 Prove it 17 025 <math>\begin{array}{r} \times 5 \\ 85\ 125 \end{array}</math></p> <p>The new style vehicle travels 17 025 with each electrical system.</p>	<p><b>The main focus in this unit is to ensure pupils are secure in their ability to tackle problems, looking for key words and also reading the problem carefully before attempting to solve it.</b></p> <p><b>Solve the following word problem</b></p> <p>Rosso's Pizza sells small, medium, and large pizzas. Last week, they sold 74 small pizzas. They sold 9 more medium pizzas than large pizzas. Altogether they sold 189 pizzas. How many large pizzas did they sell?</p> $\begin{array}{r} 189 \\ - 74 \\ \hline 115 \end{array} \qquad \begin{array}{r} 115 \\ - 9 \\ \hline 106 \end{array}$ <p>or</p> <p>74 + 9 = 83 then 189 - 83 = 106 106 large pizzas were sold</p>	<p>Jasmine and Kamal have been asked to work out 5748 + 893 and 5748 - 893. Jasmine says, '893 is 7 less than 900, and 900 is 100 less than 1000, so I can work out the addition by adding on 1000 and then taking away 100 and then taking away 7.' What answer does Jasmine get, and is she correct?</p> <p>Kamal says, '893 is 7 less than 900, and 900 is 100 less than 1000, so I can work out the subtraction by taking away 1000 and then taking away 100 and then taking away 7.' What answer does Kamal get, and is he correct? If you disagree with either Jasmine or Kamal, can you correct their reasoning?</p>
	<p>Read a question carefully and identify the key information.</p>			

<p><b>Solve problems involving addition, subtraction, multiplication and division.</b></p>	<p>Use bar models or other images to demonstrate my understanding of a problem.          Identify the calculation needed.          Decide on the most appropriate method of calculation.          Check my answer is sensible.          Answer my question in context.</p> <p>Identify the best way to check answers</p> <p>Justify the reasonableness of the answer within the context</p>	<p>As above</p>		<p>Two numbers have a difference of 2:38. The smaller number is 3:12.          What is the bigger number?          Two numbers have a difference of 2:3. They are both less than 10. What could the numbers be?</p>
	<p><u>Vocabulary</u></p>			