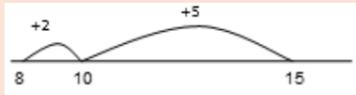
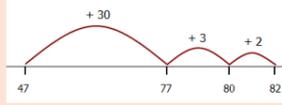
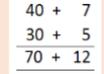
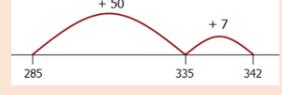
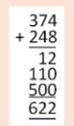
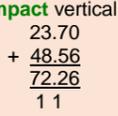
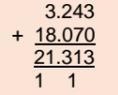
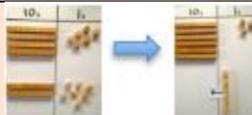
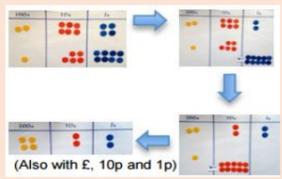


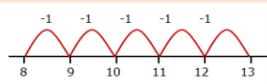
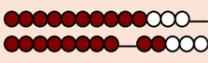
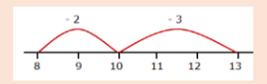
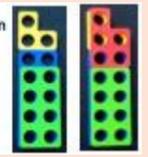
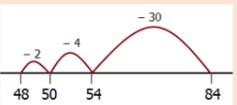
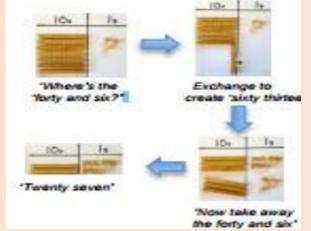
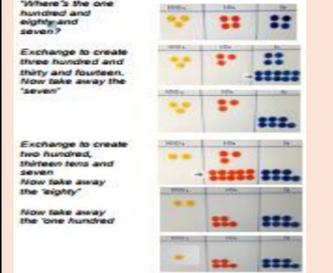
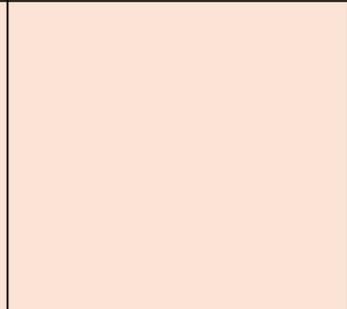
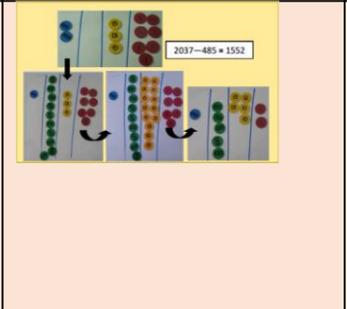
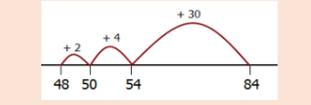
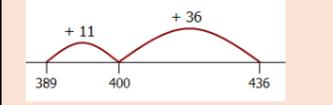
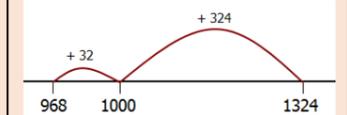
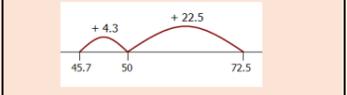
Bussage School Calculation Policy 2021



Addition and Subtraction.

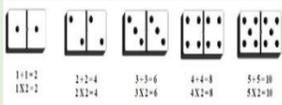
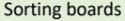
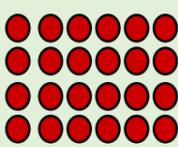
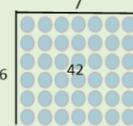
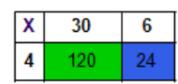
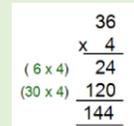
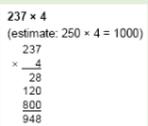
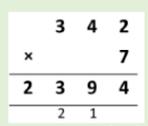
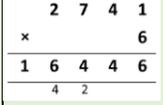
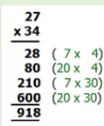
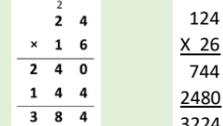
Year Group	YR	Y1	Y2	Y3	Y4	Y5	Y6
Statutory expectations	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> Count from 1-20 and say which number is one more than a given number. Using quantities, and objects, add two 1 digit numbers and count on to find the answer (expected) Estimate number of objects. Check quantities by counting up to 20. (exceeding) 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs represent and use number bonds and related subtraction facts within 20 add and subtract one-digit and two-digit numbers to 20, including zero solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = ? - 9$. 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> solve problems with addition and subtraction: <ul style="list-style-type: none"> using concrete objects and pictorial representations, including those involving numbers, quantities and measures applying their increasing knowledge of mental and written methods recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 add and subtract numbers using concrete objects, pictorial representations, and mentally, including: <ul style="list-style-type: none"> a two-digit number and ones a two-digit number and tens two two-digit numbers adding three one-digit numbers show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems. 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> add and subtract numbers mentally, including: <ul style="list-style-type: none"> a three-digit number and ones a three-digit number and tens a three-digit number and hundreds add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction estimate the answer to a calculation and use inverse operations to check answers solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction. 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate estimate and use inverse operations to check answers to a calculation solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why. 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) add and subtract numbers mentally with increasingly large numbers use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> perform mental calculations, including with mixed operations and large numbers use their knowledge of the order of operations to carry out calculations involving the four operations solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
Non-negotiables Addition		Know bonds to 10 by heart. Add and subtract 1 digit and 2 digit numbers to 20 including 0 Add three 1 digit numbers with a total to 20 Solve simple addition using apparatus and arrays	Recall and use addition and subtraction facts to 20 Derive and use related facts to 100 Add a 2-digit number and: ones/tens/ 2-digit numbers Add any three 1 digit numbers Recognise and use inverse for addition and subtraction	Add a 3-digit number and:ones/tens/ hundreds number Add/subtract numbers with up to 3 digits using efficient column method Use inverse operations to check answers	Add/subtract numbers with up to 4 digits using efficient column method.	Add/subtract numbers with more than 4 digits using formal column method	
Non-negotiables Subtraction		Use bonds and subtraction facts to 20 Add and subtract 1 digit and 2 digit numbers to 20 including 0 Solve simple subtraction using apparatus and arrays	Recall and use addition and subtraction facts to 20 Derive and use related facts to 100 Recognise and use inverse for addition and subtraction	Add/subtract numbers with up to 3 digits using efficient column method Use inverse operations to check answers			

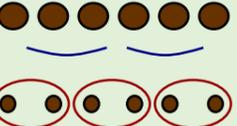
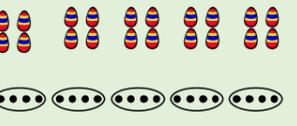
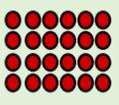
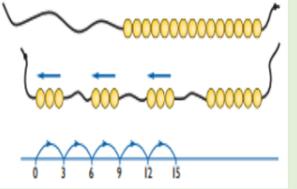
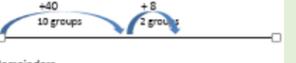
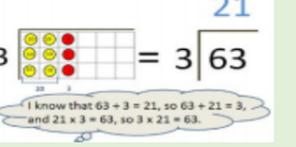
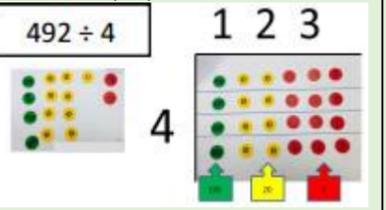
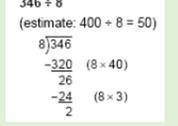
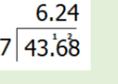
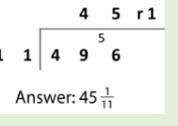
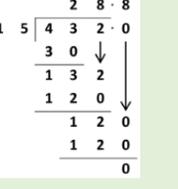
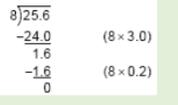
<p style="text-align: center;">Progression in Addition</p> <p style="text-align: center;">Methods are progressive and children will move on when ready. They are not strictly taught in Year groups.</p>								
<p>Written methods</p>	<p>Combining groups of objects</p> <p>Practical or recorded using ICT.</p> <p><i>Hannah ... listed how many girls and how many boys were outside. [She] was able to say that "There are 5 girls and 4 boys. That's 9 altogether".</i></p> <p><i>When playing in the shop Christopher used his shopping list to add 2 amounts. He said "the beans are 5 pence and the bananas are 3 pence, altogether that is 8 pence."</i></p> <p>Hops along a number line – backwards and forwards (up to 20)</p> <p>Pictorial representations: <i>I eat 2 cakes and my friend eats 3. How many cakes did we eat altogether?</i></p>  <p><i>8 people are on the bus. 5 more get on at the next stop. How many people are on the bus now?</i></p>  <p>Possibly leading to recording as number sentences: $2+3 = 5$ $8+5=13$ (adding two 1digit numbers and using 'add')</p>	<p>Blank number lines – drawing hops to count on in ones. Count on starting from the biggest number</p> <p>Modelled using bead string: $13+5=18$ (see developing conceptual understanding)</p> <p>Use and name + and = signs and different terms for addition.</p> <p>Using a number line, bridge to 10. $8+7=15$</p>  <p>Use known facts/partitioning.</p> <p>$7 + 9 = 16$ $7 + 3 = 10$ $10 + 6 = 16$</p> <p>Add 2-digit and 1-digit numbers and three one digit numbers as number sentence</p>	<p>Visual (efficient jumps) Number lines to add two 2-digit numbers. Use of number sentences. $35 + 47 = 82$</p>  <p>Partitioning of tens and units $35 + 47 = 82$</p> <p>$30 + 40 = 70$ $7 + 5 = 12$ $70 + 12 = 82$</p> <p>Recording addition in columns supports place value and prepares for formal written methods with larger numbers.</p> <p>$47 + 35 = 82$</p>  <p>Recognise/use inverse relationship between +/- and use to check calcs and missing number problems.</p> <p>Pupils use concrete objects, pictorial representations and mental strategies. (eg place value counters, Dienes)</p>	<p>Visual (efficient jumps) Number lines to add two 2-digit numbers, and a 3 digit number and a 2-digit number. Use of number sentences.</p>  <p>$57+285 = 342$</p> <p>Expanded column method</p>  <p>Estimate answers and use inverse to check.</p>	<p>Compact column addition for up to ThHTU + Th HTU</p> <p>Solve addition two-step problems in contexts, deciding which operations and methods to use & why.</p> <p>Solve simple measure and money problems involving fractions and decimals to 2dp</p>	<p>Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.</p> <p>Solve addition multi-step problems in contexts, deciding which operations and methods to use and why.</p> <p>Solve problems involving number up to 3dp.</p> <p>Solve problems involving converting between units of time. [Measurement]</p> <p>Use all four operations to solve problems involving measure [eg length, mass, volume, money] using decimal notation including scaling. [Measurement]</p> <p>Compact vertical</p>  <p><i>Pupils practise adding decimals, including a mix of whole numbers and decimals, decimals with different numbers of decimal places, and complements of 1.</i></p>	<p>Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.</p> <p>Use knowledge of the order of operations to carry out calculations involving subtraction.</p> <p>Solve problems which require answers to be rounded to specified degrees of accuracy. [Fractions]</p> <p>Solve problems involving the calculation and conversion of units of measure, using decimal notation to 3dp where appropriate. [Measurement]</p> <p>Compact vertical</p> 	
<p>Developing conceptual understanding</p>	<p>Use of concrete objects (counters/cubes etc) real life objects</p> <p>Numbered number lines</p>  <p>Numicon</p>  <p>Counting songs games</p>	 <p>Dienes $47 + 26 = 60 + 13 = 73$</p> <p>Bead strings</p> <p>Visual (modelled using bead strings) $13 + 5 = 18$</p>  <p>100 squares</p> <p>Pegs and peg boards</p>	<p>Place value cards</p>  <p>Place value mats</p>  <p>(Also with £, 10p and 1p)</p>	<p>Add and subtract numbers using concrete objects, pictorial representations, and mentally, including:</p> <ul style="list-style-type: none"> * a two-digit number and ones * a two-digit number and tens * two two-digit numbers * adding three one-digit numbers <p>Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100</p>	<p>Add and subtract numbers mentally, including: * a three-digit number and ones * a three-digit number and tens * a three-digit number and hundreds</p>	<p>Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why</p>	<p>Add and subtract numbers mentally with increasingly large numbers</p>	<p>Perform mental calculations, including with mixed operations and large numbers</p>
<p>Mental methods (with jottings)</p>	<p>Counting songs/rhymes</p>	<p>Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = - 9$</p> <p>Represent/use number bonds (and related subtraction facts) to 20.</p>	<p>Add and subtract numbers using concrete objects, pictorial representations, and mentally, including:</p> <ul style="list-style-type: none"> * a two-digit number and ones * a two-digit number and tens * two two-digit numbers * adding three one-digit numbers <p>Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100</p>	<p>Add and subtract numbers mentally, including: * a three-digit number and ones * a three-digit number and tens * a three-digit number and hundreds</p>	<p>Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why</p>	<p>Add and subtract numbers mentally with increasingly large numbers</p>	<p>Perform mental calculations, including with mixed operations and large numbers</p>	

Progression in Subtraction																																																																					
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<p>Written methods</p>	<p>Use of concrete objects – physically take objects away and count remaining. Practical or recorded using ICT. Chloe was playing in the maths area. “I need three more” she said as she added some cubes to the circle. She then realised she had more than her friend. “Oh, I have too many”. She removed one. “Now we have the same”.</p> <p>During a game of skittles outdoors Joseph knocked three numbered skittles down. He was able to calculate his score in his head.</p> <p>Object and pictures.</p> <p>Pictures/Objects I have five cakes. I eat two of them. How many do I have left? </p> <p>Might be recorded as: $5 - 2 = 3$</p> <p>Symbolic Mum baked 9 biscuits. I ate 5. How many were left? </p> <p>Might be recorded as: $9 - 5 = 4$</p> <p>Introducing – and = symbols</p>	<p>Subtract 1-digit and 2-digit numbers to 20, recording as number sentences using – and =</p> <p>Blank number lines/ bead strings – count back in ones</p>   <p>Taking away – jumps of 1 (modelled using bead strings)</p> <p>$13 - 5 = 8$</p> <p>Efficient jumps using number lines</p>  <p>Efficient jumps – no number lines</p> <p>$13 - 3 = 10$ $10 - 2 = 8$</p> <p>Finding differences using cube towers and Numicon.</p>  <p>Difference between 13 and 8 $13 - 8 = \underline{\quad}$ $8 + \underline{\quad} = 13$</p>	<p>TU – U; TU – Tens; TU – TU</p> <p>Pictorial representations using concrete objects. $95 - 60 = 35$</p>  <p>Use blank number lines to count back in tens and then ones – labelling hops with – sign Taking away $84 - 36 = 48$</p>  <p>Number sentences using partitions: $84 - 36 = 48$ $84 - 30 = 54$ $54 - 4 = 50$ $50 - 2 = 48$</p> <p>Recording as columns <i>Recording subtraction in columns supports place value and prepares for formal written methods with larger numbers.</i></p> <p>$98 - 35 = 63$</p> <table border="1" data-bbox="1113 997 1202 1071"> <tr><td>90 and 8</td></tr> <tr><td>30 and 5</td></tr> <tr><td>60 and 3</td></tr> </table> <p>Missing number problems (understanding inverse operations)</p>	90 and 8	30 and 5	60 and 3	<p>Compact method, no decomposition</p> <p>$874 - 523 = 351$</p> <table border="1" data-bbox="1454 357 1573 451"> <tr><td>8</td><td>7</td><td>4</td></tr> <tr><td>-</td><td>5</td><td>2</td><td>3</td></tr> <tr><td>3</td><td>5</td><td>1</td></tr> </table> <p>(no decomposition)</p> <p>Decomposition</p> <p>Decomposition</p> <p>$723 - 458 = 265$</p> <table border="1" data-bbox="1469 619 1573 724"> <tr><td>700</td><td>20</td><td>3</td></tr> <tr><td>-</td><td>400</td><td>50</td><td>8</td></tr> <tr><td>600</td><td>110</td><td>13</td></tr> <tr><td>-</td><td>400</td><td>50</td><td>8</td></tr> <tr><td>200</td><td>60</td><td>5</td></tr> </table> <p>Compact method decomposition HTU – HTU</p> <p>Decomposition</p> <p>$932 - 457 = 475$</p> <table border="1" data-bbox="1424 871 1528 976"> <tr><td>8</td><td>12</td><td>1</td></tr> <tr><td>-</td><td>4</td><td>5</td><td>7</td></tr> <tr><td>4</td><td>7</td><td>5</td></tr> </table>	8	7	4	-	5	2	3	3	5	1	700	20	3	-	400	50	8	600	110	13	-	400	50	8	200	60	5	8	12	1	-	4	5	7	4	7	5	<p>Compact method decomposition HTU – HTU</p> <p>$1374 - 968 = 406$</p> <table border="1" data-bbox="1765 388 1884 493"> <tr><td>6</td></tr> <tr><td>13</td><td>7</td><td>4</td></tr> <tr><td>-</td><td>9</td><td>6</td><td>8</td></tr> <tr><td>4</td><td>0</td><td>6</td></tr> </table> <p>Solve subtraction two-step problems in contexts, deciding which operations and methods to use and why.</p> <p>Solve simple measure and money problems involving fractions and decimals to 2dp.</p> <p>Estimate and use inverse operations to check.</p> <p>Estimate, compare and calculate different measures, including money in pounds and pence.</p>	6	13	7	4	-	9	6	8	4	0	6	<p>Compact method to include decimals:</p> <p>$72.5 - 45.7 = 26.8$</p> <table border="1" data-bbox="2181 388 2329 493"> <tr><td>6</td><td>7</td><td>2</td><td>5</td></tr> <tr><td>-</td><td>4</td><td>5</td><td>7</td></tr> <tr><td>2</td><td>6</td><td>8</td></tr> </table> <p>Conversion of units of measurement</p> <p>Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.</p> <p>Solve multi-step problems in contexts, deciding which operations/methods to use and why.</p> <p>Solve problems involving number up to 3dp. [Fractions]</p> <p>Solve problems involving converting betw. units of time. [Measurement]</p> <p>Solve problems involving measure [eg length, mass, volume, money] using decimal notation including scaling. [Measurement]</p>	6	7	2	5	-	4	5	7	2	6	8	<p>Use knowledge of the order of operations to carry out calculations involving subtraction.</p> <p>Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.</p> <p>Solve problems which require answers to be rounded to specified degrees of accuracy. [Fractions]</p> <p>Solve problems involving the calculation and conversion of units of measure, using decimal notation to 3dp where appropriate. [Measurement]</p>
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<p>Developing conceptual understanding</p>	<p>Concrete objects/real life objects Numbered number lines Numicon Counting songs Games</p>	<p>Diennes Bead strings 100 squares Peg and peg board Squared paper</p>	<p>Place value cards Place value mats</p> <p>Taking away and exchanging. $73 - 46$</p> 	<p>Taking away and exchanging. $344 - 167$ Place value counters</p> <p>“Where’s the one hundred and eight and seven?”</p> <p>Exchange to create three hundred and thirty and sixteen. Now take away the “seven”</p> <p>Exchange to create two hundred, thirteen tens and seven. Now take away the “eighty”</p> <p>Now take away the “one hundred”</p> 			<p>Perform mental calculations, including with mixed operations and large numbers</p>																																																														
<p>Mental methods (with jottings)</p>	<p>Counting songs and rhymes</p>	<p>Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = \square - 9$</p> <p>Represent and use number bonds and related subtraction facts within 20</p> <p>Add and subtract one-digit and two-digit numbers to 20, including zero</p> <p>Counting on (missing number calculations) $11 - 8 = 3$</p>	<p>Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: * a two-digit number and ones * a two-digit number and tens * two two-digit numbers * adding three one-digit numbers</p> <p>Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100</p> <p>Counting on: $84 - 48 = 36$ [Also jumps can be in 10s/1s]</p> 	<p>Add and subtract numbers mentally, including: * a three-digit number and ones * a three-digit number and tens * a three-digit number and hundreds</p> <p>Counting on:</p> <p>$436 - 389 = 47$</p> 	<p>Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.</p> <p>Counting on: $1324 - 968 = 356$</p> 	<p>Add and subtract numbers mentally with increasingly large numbers</p> <p>Counting on: $72.5 - 45.7 = 26.8$</p> 	<p>Perform mental calculations, including with mixed operations and large numbers</p>																																																														

Multiplication and division

Year Group	YR	Y1	Y2	Y3	Y4	Y5	Y6
Statutory expectations	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • solve problems, including doubling, halving and sharing (expected) • Solve practical problems that involve combining groups of 2/5/10. (exceeding) 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers • calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (\times), division (\div) and equals (=) signs • show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot. • solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts. 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables • write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods. • solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects. 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • recall multiplication and division facts for multiplication tables up to 12×12 • use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers • recognise and use factor pairs and commutativity in mental calculations • multiply two-digit and three-digit numbers by a one-digit number using formal written layout. • solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects. 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers • Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers • establish whether a number up to 100 is prime and recall prime numbers up to 19 • multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers • multiply and divide numbers mentally drawing upon known facts • divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context • multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 • recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3) • solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes • solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign. • solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates. 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication • 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 • divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context • perform mental calculations, including with mixed operations and large numbers • identify common factors, common multiples and prime numbers • use their knowledge of the order of operations to carry out calculations involving the four operations
Non-negotiables Multiplication			<p>Recall and use multiplication and division facts for the 2,5 and 10 times table Calculate and write multiplication and division calculations using multiplication tables. (using \times, \div and = symbols</p>	<p>Recall and use multiplication and division facts for the 3, 4 and 8 times table Multiply a 2-digit number by a 1-digit number</p>	<p>Recall and use multiplication and division facts up to 12×12 Multiply 2-digit and 3-digit numbers by a 1-digit number.</p>	<p>Multiply 4 digit number by 1 or 2-digit numbers Multiply whole numbers and decimals by 10,100 and 1000. Identify all multiples and factors, including finding all factor pairs. Use known tables to derive other number facts. Recall all prime numbers to 19</p>	<p>Multiply 4-digits by 1 or 2-digit numbers Identify common factors and common multiples Recall prime numbers</p>
Non-negotiables Division					<p>Recall and use multiplication and division facts up to 12×12 Divide 2 digit and 3-digit by 1-digit</p>	<p>Divide 4-digit by 1-digit and interpret the remainders appropriately for context Divide whole numbers and decimals by 10, 100 and 1000</p>	<p>Divide 4-digits by 1 or 2-digit numbers</p>

Progression in Multiplication							
Methods are progressive and children will move on when ready. They are not strictly taught in Year groups.							
<p>Written methods</p> <p>Children ... solve problems, including doubling, halving and sharing. [Expected] Solve practical problems that involve combining groups of 2/5/10. [Exceeding]</p>	<p>Solve one-step problems using concrete objects, pictorial representations and arrays (with the support of the teacher)</p>	<p>Calculate statements for multiplication within the multiplication tables and write them using the multiplication and equals signs.</p> <p>[Show multiplication of two numbers can be done in any order.]</p>	<p>Write/calculate statements using the multiplication tables that they know (progressing to formal written methods). TU x U (multiplier is 2/3/4/5/8/10) Pupils develop reliable written methods for multiplication, starting with calculations of TU by U (progressing to formal written methods of short multiplication).</p>	<p>Use formal written layout: TU x U HTU x U</p> <p>Convert between different units of measure [eg km to m; hr to mi]</p>	<p>Use a formal written method (including long x for TU nos) TU x TU HTU x U / HTU x TU ThHTU x U</p> <p>Convert between units of measure (eg km/m; m/cm; cm/mm; kg/g; litre and ml)</p>	<p>Multi-digit numbers (up to 4 digits) x TU whole number using the formal method of long multiplication.</p> <p>Multiply one-digit numbers with up to two decimal places by whole numbers</p>	
<p>Developing conceptual understanding</p> <p>Use of concrete and real life objects.</p> <p>Dominoes </p> <p>Sorting boards </p> <p>Hoops </p> <p>Numicon </p> <p>2 groups of 5 (5 x 2) using Numicon</p> <p>Doubling/combining groups</p> <p>Saying and writing a number sentence. "4 and 4 make/ 2 lots of 4 makes?"</p> <p>Grouping in 2/5/10</p>	<p>Cubes/counters to make number sentences. Moving from pictorial/concrete to symbolic representations. 2 and 2 and 2 is 6 2 + 2 + 2 = 6 3 x 2 = 6</p> <p></p> <p>Peg boards to make arrays.</p> <p>Money 2p/5p/10p</p>	<p>Pupils use a variety of language to describe multiplication.</p> <p>Repeated addition on number lines 5 x 3 or 3 x 5  </p> <p>Arrays 6 x 4 or 4 x 6 </p>	<p>Arrays leading to grid method </p> <p>Grid method TU x U 36 x 4 = 144 </p> <p>Informal written: TU x U 30 x 4 = 120 6 x 4 = 24</p> <p>Expanded column: TU x U </p>	<p>Compact column TU x U </p> <p>HTU x U</p> <p>Expanded: </p> <p>Compact: </p> <p>ThHTU compact method: </p>	<p>TU x TU expanded: 27 x 34 = 918 (Est 30 x 30 = 900) </p> <p>Compact: 24 x 16 = 384 (estimate 25 x 15 = 375) leading to HTU x TU </p> <p>Pupils connect multiplication by a fraction to using fractions as operators (fractions of), and to division. This relates to scaling by simple fractions, including those > 1. Find fractions of numbers and quantities, writing remainders as a fraction.</p>	<p>4.7 x 8 = 37.6 </p> <p>Use a variety of images to support understanding of x with fractions. Use understanding of relationship between unit fractions and ÷ to work backwards by x a quantity that represents a unit fraction to find the whole quantity (eg if 1/4 of a length is 36cm, whole length 36 x 4 = 144cm). x numbers with up to 2dp by U/TU whole nos (starting with simplest cases eg 0.4 x 2 = 0.8, and in practical contexts).</p>	
<p>Mental methods (with jottings)</p>	<p>Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher</p> <p>Count in multiples of twos, fives and tens</p>	<p>Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot</p> <p>Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts</p> <p>Recall and use x and ÷ facts for the 2, 5 and 10 x tables, including recognising odd and even numbers.</p>	<p>Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental methods</p> <p>Recall and use x and ÷ facts for the 3, 4 and 8 times tables.</p>	<p>Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers Recognise and use factor pairs and commutativity in mental calculations</p> <p>Recall x and ÷ facts for x tables up to 12 x 12.</p>	<p>Multiply and divide numbers mentally drawing upon known facts Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers establish whether a number up to 100 is prime</p> <p>Recall prime numbers up to 19 know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers Recognise and use square numbers and cube numbers, and the notation for squared (²) and cubed (³)</p>	<p>Perform mental calculations, including with mixed operations and large numbers</p>	

<p style="text-align: center;">Progression in Division</p> <p style="text-align: center;">Methods are progressive and children will move on when ready. They are not strictly taught in Year groups.</p>							
<p>Written methods</p>	<p>Children ... solve problems, including doubling, halving and sharing. [Expected] They solve practical problems that involve sharing into equal groups. [Exceeding]</p>	<p>Solve one-step problems using concrete objects, pictorial representations and arrays (with the support of the teacher)</p>	<p>Calculate statements within the multiplication tables and write them using the division and equals signs. [Show division of two numbers cannot be done in any order.] Find $\frac{1}{2}$, $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$ of a length/objects/quantity. Write simple fractions eg $\frac{1}{2}$ of 6 = 3</p>	<p>Write/calculate statements using the tables that they know (progressing to formal written methods). TU ÷ U (divisor is 2/3/4/5/8/10)</p>	<p>Pupils practise to become fluent in the formal written method of short division with exact answers [NS] TU ÷ U; HTU ÷ U</p>	<p>Use the formal written method of short division (interpret remainders appropriately for the context). HTU ÷ U ThHTU ÷ U</p> <p>Convert between units of measure (eg km/m; m/cm; cm/mm; kg/g; litre and ml)</p>	<p>Divide numbers (up to 4 digits) by TU whole number using the formal method of short/long division (interpret as approp. for the context). Use written division methods in cases where the ans has up to 2dp. [Divide numbers up to 2dp by U/TU whole numbers.]</p>
<p>Developing conceptual understanding</p>	<p>Practical / recorded using ICT (eg digital photos/pictures on IWB)</p> <p>Pictures/objects: 6 cakes shared between 2</p>  <p>6 cakes put into groups of 2:</p>  <p>Moving onto symbolic:</p>  <p>There are 8 raisins. Take half of them. How many do you have? Share the 10 grapes between 2 people.</p> <p>Language: Equal, same, left over, share.</p>	<p>Practical/recorded using ICT</p> <p>There are 14 people on the bus. Half of them get off. How many remain on the bus? There are 20 people in the class. One quarter are boys. How many boys are there? Pictures/Symbolic</p> <p>Group AND share small quantities- understanding the difference between the two concepts. Sharing Develops importance of one-to-one correspondence. Children should be taught to share using concrete apparatus.</p>  <p>How many 2s?</p> <p>Arrays: $15 \div 3 = 5$ $15 \div 5 = 3$</p> 	<p>Pictures/Symbolic</p> <p>Four eggs fit in a box. How many boxes would you need to pack 20 eggs?</p>  <p>Arrays: Find $\frac{1}{4}$ of 24 $24 \div 4 = 6$</p>  <p>Visual: (modelled using bead strings)</p>  <p>Partitioning</p> <p>$32 \div 2 = 16$ $20 \div 2 = 10$ $12 \div 2 = 6$</p>	<p>Grouping How many 6's are in 30? 30 ÷ 6 can be modelled as:</p>  <p>Becoming more efficient using a numberline</p> <p>Children need to be able to partition the dividend in different ways. $48 \div 4 = 12$</p>  <p>Remainders $49 \div 4 = 12 \text{ r}1$</p>  <p>Sharing - 49 shared between 4. How many left over? Grouping - How many 4s make 49. How many are left over?</p> <p>Place value counters to help with progression to formal written methods:</p>  <p>Leading to formal written method of short division:</p> 	<p>Expanded short division using place value counters to help explain remainders:</p>  <p>Formal written method of short division.</p> 	<p>Formal written method of short division:</p>  <p>Long division:</p> <p>$346 \div 8 = 43 \text{ r}2$ (estimate >40, <50)</p>  <p>Pupils connect x by a fraction to using fractions as operators (fractions of), and to ÷. This relates to scaling by simple fractions, incl. those > 1. Find fractions of numbers and quantities, writing remainders as a fraction.</p>	<p>Short division: ThHTU ÷ TU and TU.t ÷ U =</p>  <p>$496 \div 11 =$ (estimate $500 \div 10 = 50$)</p>  <p>Long division</p>  <p>$25.6 \div 8$ (estimate: $24 \div 8 = 3$)</p> 
<p>Mental methods (with jottings)</p>		<p>Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.</p> <p>Count in multiples of twos, fives and tens.</p>	<p>Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot. Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.</p> <p>Recall and use x and ÷ facts for the 2, 5 and 10 x tables, including recognising odd and even numbers.</p>	<p>Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental methods.</p> <p>Recall and use x and ÷ facts for the 3, 4 and 8 times tables.</p>	<p>Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers. Recognise and use factor pairs and commutativity in mental calculations.</p> <p>Recall x and ÷ facts for x tables up to 12 x 12.</p>	<p>Multiply and divide numbers mentally drawing upon known facts. Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.</p> <p>Recall prime numbers up to 19 know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers.</p>	<p>Perform mental calculations, including with mixed operations and large numbers.</p>

Bussage C of E Primary School Calculation Policy - 2021

Pictures and some wording in this document have been used from the following publications:

- Wandsworth LA calculation policy 2014 and 2016: <https://fluencycontent2-schoolwebsite.netdna-ssl.com/FileCluster/HoneywellInfantJunior/Mainfolder/2016-Wandsworth-Calculation-Policy.pdf>
- Kangaroo Maths Calculation Policy and Practice: <http://www.kangaroomaths.com/kenny1.php>
- Discovery Schools Academy trust - Affinity teaching school Alliance <http://www.affinitytsa.co.uk/training/maths-calculation-policy>
- GlosEd Maths Team – Calculation Policy 2014