



Rhodes Avenue Primary School Calculation Policy for addition Year 6

Informal methods to support mental Calculations	<ul style="list-style-type: none"> • Perform mental calculations, including with mixed operations and large numbers (<i>more complex calculations</i>) <p>Children use representation of choice Consolidate partitioning and re-partitioning Use compensation for adding too much/little and adjusting Refer back to pictorial and physical representations when needed.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Common mental calculation strategies: Partitioning and recombining Doubles and near doubles Use number pairs to 10 and 100 Adding near multiples of ten and adjusting Using patterns of similar calculations Using known number facts Bridging though ten, hundred, tenth Complementary addition</p> </div>
Written Calculations	<p>Add larger numbers using the formal written (columnar) method</p> <p>Add three digit numbers using columnar method and then move onto 4 digits. Include decimal addition for money</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="border: 1px solid black; padding: 5px;"> $\begin{array}{r} \pounds 563.14 \\ + \pounds 207.88 \\ \hline \pounds 771.02 \\ \hline 111 \end{array}$ </div> <div style="border: 1px solid black; padding: 5px;"> <p>789 + 642 becomes</p> $\begin{array}{r} 789 \\ + 642 \\ \hline 1431 \\ \hline \end{array}$ <p>Answer: 1431</p> </div> </div> <div style="background-color: orange; text-align: center; padding: 5px; margin-top: 5px;"> Revert to expanded methods if children find formal calculation method difficult (see Y3) </div>
Representations to support mental and written calculations.	<p>Use physical/pictorial representations alongside columnar methods where needed. Ask what is the same and what is different?</p> <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="border: 1px solid black; padding: 5px; width: 20%;"> $\begin{aligned} 12\,462 + 2\,300 \\ = 12\,462 + 2\,000 + 300 \\ = 14\,462 + 300 \\ = 14\,762 \end{aligned}$ </div> <div style="text-align: center;"> </div> <div style="border: 1px solid black; padding: 5px; width: 20%;"> $234\text{ kg} + 49\text{ kg} = 273\text{ kg}$ $\begin{array}{r} 200 + 30 + 4 \\ 40 + 9 \\ \hline 200 + 70 + 13 \end{array}$ </div> <div style="border: 1px solid black; border-radius: 50%; padding: 10px; width: 20%; text-align: center;"> <p>I can explain my method using place value counters</p> </div> </div> <div style="text-align: center; margin-top: 20px;"> <div style="border: 1px solid black; border-radius: 50%; padding: 10px; display: inline-block;"> What is the same and what is different about all these methods? </div> </div> <div style="text-align: right; margin-top: 20px;"> <div style="border: 1px solid black; padding: 5px;"> <p>Place Value counters to support column addition</p> </div> </div>
Fractions	<ul style="list-style-type: none"> • Add fractions with different denominators and mixed numbers, using the concept of equivalent fractions • Start with fractions where the denominator of one fraction is a multiple of the other (e.g. $\frac{1}{2} + \frac{1}{8} = \frac{5}{8}$) and progress to varied and increasingly complex problems • Practise calculations with simple fractions and decimal equivalents to aid fluency <div style="text-align: right; margin-top: 10px;"> </div>
Links from other strands	<ul style="list-style-type: none"> • Use their knowledge of the order of operations to carry out calculations involving the four operations (BIDMAS) • Solve problems involving all four operations • Algebra: use symbols and letters to represent variable and unknowns e.g. $a + b = b + a$ • Solve problems involving the calculation and conversions of units of measure, using decimal notation of up to three decimal places where appropriate • <i>Using the number line, pupils use, add and subtract positive and negative integers for measures such as temperature</i> • Calculate and interpret the mean as an average • Interpret and construct pie charts and line graphs and use these to solve problems • Find missing angles, and express geometry relationships algebraically (e.g. $d=2xr$)



hodes Avenue Primary School Calculation Policy for subtraction Year 6

Mental Calculations	<p>Children:</p> <ul style="list-style-type: none"> • Perform mental calculations, including with mixed operations and large numbers. • Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy. • <i>They undertake mental calculations with increasingly large numbers and more complex calculations.</i> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Children draw on basic, Mental subtraction Strategies, (See Year 5.) Children use, or visualise, representation of choice. Refer back to physical representations as required.</p> </div> <div style="text-align: right; margin-top: 10px;"> </div>																																																																						
Written Calculations	<p>Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction). Solve problems involving the calculation and conversions of units of measure, using decimal notation of up to three decimal places where appropriate. (MEASURES)</p> <div style="background-color: #f96; padding: 5px; margin-top: 10px;"> <p>Move towards consolidation of formal, columnar method. For more complex calculations, with increasingly larger or smaller numbers, compare representations and expanded algorithms alongside columnar methods. Ask: What is the same? What's different? Compare and discuss the suitability of different methods, (mental or written), in context. Revert to expanded methods whenever difficulties arise</p> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="border: 1px solid black; padding: 5px; width: 30%;"> <p>932 - 457 becomes</p> <table style="margin-left: 20px;"> <tr><td>8</td><td>12</td><td>1</td></tr> <tr><td>9</td><td>3</td><td>2</td></tr> <tr><td>-</td><td>4</td><td>5</td><td>7</td></tr> <tr><td colspan="4"> </td></tr> <tr><td></td><td>4</td><td>7</td><td>5</td></tr> </table> </div> <div style="width: 35%;"> <p>Consolidate columnar methods, paying particular attention to the occurrence of zeros as place holders.</p> </div> <div style="border: 1px solid black; padding: 5px; width: 20%;"> <table style="margin-left: 20px;"> <tr><td>1</td><td>8</td><td>6</td><td>7</td><td>1</td><td>1</td></tr> <tr><td>-</td><td>5</td><td>4</td><td>5</td><td>6</td><td></td></tr> <tr><td colspan="6"> </td></tr> <tr><td>1</td><td>3</td><td>2</td><td>5</td><td>5</td><td></td></tr> </table> </div> <div style="border: 1px solid black; padding: 5px; width: 20%;"> <table style="margin-left: 20px;"> <tr><td>1</td><td>7</td><td>8</td><td>9</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>-</td><td>5</td><td>4</td><td>5</td><td>6</td><td></td><td></td></tr> <tr><td colspan="7"> </td></tr> <tr><td>1</td><td>2</td><td>5</td><td>5</td><td>5</td><td></td><td></td></tr> </table> </div> </div>	8	12	1	9	3	2	-	4	5	7						4	7	5	1	8	6	7	1	1	-	5	4	5	6								1	3	2	5	5		1	7	8	9	0	1	1	-	5	4	5	6										1	2	5	5	5		
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Links from other strands	<p>Use their knowledge of the order of operations to carry out calculations involving the four operations (BIDMAS) Solve problems involving all four operations Algebra: use symbols and letters to represent variable and unknowns e.g. $a + b = b + a$ Using the number line, pupils use, add and subtract positive and negative integers for measures such as temperature.</p>																																																																						

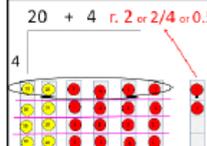
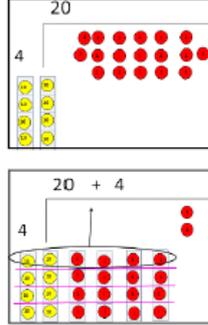
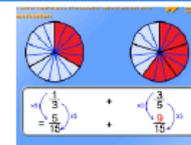
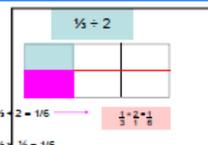
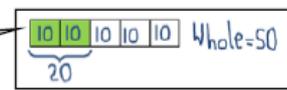


Rhodes Avenue Primary School Calculation Policy for multiplication Year 6

Informal methods to support mental Calculations	<ul style="list-style-type: none"> perform mental calculations, including with mixed operations and large numbers (<i>increasingly large numbers & more complex calculations</i>) use all the multiplication tables to calculate mathematical statements in order to maintain fluency. use estimation to check answers to calculations & determine, in the context of a problem, an appropriate degree of accuracy. identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places. <p>Use mental strategies to solve problems e.g.</p> <ul style="list-style-type: none"> x4 by doubling and doubling again x5 by x10 and halving x20 by x10 and doubling x9 by multiplying by 10 and adjusting x6 by multiplying by 3 and doubling <p>Children should know the square numbers up to 12×12 & derive the corresponding squares of multiples of 10 e.g. $80 \times 80 = 6400$</p> <p>How many different \times/\div facts can you make using 72? 7.2? 0.72?</p> <p>What is the best approximation for 4.4×18.6?</p>													
Written Calculations	<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 (<i>short & long multiplication</i>) multiply one-digit numbers with up to two decimal places by whole numbers <table border="1" style="float: right;"> <tr><td>£</td><td>6.23</td></tr> <tr><td>x</td><td>27</td></tr> <tr><td colspan="2"><hr/></td></tr> <tr><td></td><td>43.61</td></tr> <tr><td></td><td>124.60</td></tr> <tr><td>£</td><td>168.21</td></tr> </table> <p style="text-align: center;">Revert to expanded methods if children find formal calculation method difficult (see Y4/Y5)</p>	£	6.23	x	27	<hr/>			43.61		124.60	£	168.21	
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Representations to support mental and written calculations.	<p>Look at long-multiplication calculations containing errors, identify the errors and determine how they should be corrected</p> <table border="1" style="display: inline-table; margin-right: 20px;"> <tr><td>x</td><td>8</td><td>0.4</td><td>0.06</td><td></td></tr> <tr><td>11</td><td>88</td><td>4.4</td><td>0.66</td><td>= 93.06</td></tr> </table> <table border="1" style="display: inline-table; margin-left: 20px;"> <tr><td>8.46</td></tr> <tr><td>x 11</td></tr> <tr><td>93.06</td></tr> </table> <p>What's the same? What's different?</p> <div style="border: 1px solid black; padding: 5px; display: inline-block;"> $a \times 3 = b + 7 = 14.5$ </div>	x	8	0.4	0.06		11	88	4.4	0.66	= 93.06	8.46	x 11	93.06
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Fractions	<ul style="list-style-type: none"> multiply simple pairs of proper fractions, writing the answer in its simplest form e.g. $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$ <p>Three key applications of understanding:</p> <ul style="list-style-type: none"> Recognise that $\frac{1}{4}$ of 12, $\frac{1}{4} \times 12$ and 12 divided by 4 are equivalent Use cancellation to simplify the product of a fraction and an integer e.g. $\frac{1}{4} \times 15 = 3$, $\frac{3}{4} \times 15 = 2 \times \frac{3}{4} \times 15 = 2 \times 3 = 6$ Work out how many $\frac{1}{5}$s in 15, how many $\frac{2}{5}$s in 15, how many $\frac{2}{5}$s in 1 etc. <p>To calculate $\frac{1}{4} \times \frac{1}{2}$, find $\frac{1}{4}$ of a rectangle/array, then divide that $\frac{1}{4}$ into $\frac{1}{2}$s. So $\frac{1}{4}$ of $\frac{1}{2}$ is $\frac{1}{8}$.</p> <p>Pupils should use a variety of images to support their understanding of multiplication with fractions. This follows earlier work about fractions as operators (fractions of), as numbers, and as equal parts of objects, e.g. as parts of a rectangle.</p>													
Links from other strands	<ul style="list-style-type: none"> identify common factors, common multiples and prime numbers use their knowledge of the order of operations to carry out calculations involving the four operations solve problems involving addition, subtraction, multiplication and division explore the order of operations using brackets; for example, $2 + 1 \times 3 = 5$ and $(2 + 1) \times 3 = 9$. Fractions, decimals and percentages including equivalences in different contexts. solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison solve problems involving similar shapes where the scale factor is known or can be found solve problems involving unequal sharing and grouping using knowledge of fractions and multiples. Algebra including formulae, linear number sequences, combinations of variables Measurement including solving problems with conversion of units, decimal notation, area & volume Statistics including pie charts, line charts and calculating the mean 													



Rhodes Avenue Primary School Calculation Policy for division Year 6

Informal methods to support mental Calculations	<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. identify common factors, common multiples and prime numbers. <div style="border: 1px solid black; padding: 5px; margin: 10px 0; text-align: center;"> <i>I know that 366 will divide by 6 because it has 2 and 3 as factors</i> </div> <ul style="list-style-type: none"> Solve problems involving addition, subtraction, multiplication and division use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.
Written Calculations	<ul style="list-style-type: none"> 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. Pupils practise division for larger numbers, using the formal written methods of short and long division. <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px;"> <p>Long division 432 ÷ 15 becomes</p> $\begin{array}{r} 28 \text{ r}12 \\ 15 \overline{)432} \\ \underline{30} \\ 132 \\ \underline{120} \\ 12 \end{array}$ <p>Answer: 28 remainder 12</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p>432 ÷ 15 becomes</p> $\begin{array}{r} 28 \\ 15 \overline{)432} \\ \underline{30} \\ 132 \\ \underline{120} \\ 12 \end{array}$ <p>Answer: 28 $\frac{12}{15}$</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p>432 ÷ 15 becomes</p> $\begin{array}{r} 28.8 \\ 15 \overline{)432.0} \\ \underline{30} \\ 132 \\ \underline{120} \\ 120 \\ \underline{120} \\ 0 \end{array}$ <p>Answer: 28.8</p> </div> </div>
Representations to support mental and written calculations.	<div style="border: 2px solid orange; padding: 5px; margin-bottom: 10px;"> <p>Revert to expanded methods if children find formal calculation method difficult</p> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;">  <p>£1362.72 ÷ 40 = ?</p> <p>£1362.72 ÷ 4 = £340.68 [½ and ½ again.]</p> <p>£340.68 ÷ 10 = £34.068 which rounds to £34.07.</p> </div> <div style="width: 30%; border: 1px solid orange; padding: 5px;"> <p>To introduce the long division model, use a calculation which can be represented both with manipulatives and by a short division algorithm. Use questioning and discussion to compare written methods.</p> </div> <div style="width: 30%;"> $\begin{array}{r} 24 \text{ r}2 \\ 4 \overline{)98} \\ \underline{80} \\ 18 \\ \underline{16} \\ 2 \end{array}$ <p>What's the same? What's different?</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> <p>20 + 4 r. 2 or 2/4 or 0.5</p>  </div> <div style="text-align: center;"> <p>20 + 4</p>  </div> </div>
Fractions	<ul style="list-style-type: none"> use common factors to simplify fractions, compare and order fractions, including fractions > 1 add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions divide proper fractions by whole numbers [for example, 1/3 ÷ 2 = 1/6 .] associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375.] <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <div style="margin-top: 10px;"> <p>Pupils use their understanding of the relationship between unit fractions and division to work backwards. use written division methods in cases where the answer has up to 2 dp.</p> <div style="border: 1px solid gray; padding: 5px; display: inline-block;"> <p>2/5 of a number is 20. What is the number?</p> </div> <div style="margin-left: 20px;">  </div> </div>
Links from other strands	<ul style="list-style-type: none"> Pupils are introduced to the division of decimal numbers by one-digit whole number, initially, in practical contexts involving measures and money. They recognise division as the inverse of multiplication. Pupils also develop their skills of rounding and estimating. This includes rounding answers to a specified degree of accuracy and checking the reasonableness of their answers. (FRACTIONS) solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate. use, read, write and convert between standard units....using decimal notation to up to 3d.p. (MEASURES) interpret and construct pie charts and line graphs and use these to solve problems calculate and interpret the mean as an average. (STATISTICS) solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts (RATIO AND PROPORTION) <div style="margin-top: 10px; border: 1px solid gray; padding: 5px; display: inline-block;"> <p>"8 is the best estimate for 72.34 ÷ 8.91; because the numbers in the algorithm can be rounded to 72 ÷ 9."</p> </div>