

## Maths Curriculum 2014 - Year 6 Medium Term Planning

### Unit 6.1: Place Value

Topic	Key Concepts	Strand	Notes/Non-statutory guidance
Number and Place Value	read, write, order and compare numbers up to 10 000 000 and determine the value of each digit	Number	Pupils use the whole number system, including saying, reading and writing numbers accurately.
Fractions (Including Decimals And Percentages)	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		
Number and Place Value	round any whole number to a required degree of accuracy		
Number and Place Value	use negative numbers in context, and calculate intervals across zero		

### Unit 6.2: Multiplication and Division

Topic	Key Concepts	Strand	Notes/Non-statutory guidance
Addition, Subtraction, Multiplication And Division	multiply multi-digit numbers up to 4 digits by a two digit whole number using the formal written method of long multiplication	Number	Pupils practise addition, subtraction, multiplication and division for larger numbers, using the formal written methods of columnar addition and subtraction, short and long multiplication, and short and long division (see Mathematics Appendix 1). They undertake mental calculations with increasingly large numbers and more complex calculations. Pupils continue to use all the multiplication tables to calculate mathematical statements in order to maintain their fluency. Pupils round answers to a specified degree of accuracy, for example, to the nearest 10, 20, 50 etc., but not to a specified number of significant figures. Pupils explore the order of operations using brackets; for example, $2 + 1 \times 3 = 5$ and $(2 + 1) \times 3 = 9$ . Common factors can be related to finding equivalent fractions.
Addition, Subtraction, Multiplication And Division	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		
Addition, Subtraction, Multiplication And Division	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		

Fractions (Including Decimals And Percentages)	use written division methods in cases where the answer has up to two decimal places		
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### Unit 6.3: Using Factors, Multiples and Primes to work with Fractions

Topic	Key Concepts	Strand	Notes/Non-statutory guidance
Addition, Subtraction, Multiplication And Division	identify common factors, common multiples and prime numbers	Number	<p>Pupils should practise, use and understand the addition and subtraction of fractions with different denominators by identifying equivalent fractions with the same denominator. They should start with fractions where the denominator of one fraction is a multiple of the other and progress to varied and increasingly complex problems. 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, for example as parts of a rectangle.</p> <p>Pupils use their understanding of the relationship between unit fractions and division to work backwards by multiplying a quantity that represents a unit fraction to find the whole quantity (for example, if <math>\frac{1}{4}</math> of a length is 36cm, then the whole length is <math>36 \times 4 = 144\text{cm}</math>). They practise calculations with simple fractions and decimal fraction equivalents to aid fluency, including listing equivalent fractions to identify fractions with common denominators.</p> <p>Pupils can explore and make conjectures about converting a simple fraction to a decimal fraction (for example, <math>3 \div 8 = 0.375</math>). For simple fractions with recurring decimal equivalents, pupils learn about rounding the decimal to three decimal places, or other appropriate approximations depending on the context. Pupils multiply and divide numbers with up to two decimal places by one-digit and two-digit whole numbers. Pupils multiply decimals by whole numbers, starting with the simplest cases, such as <math>0.4 \times 2 = 0.8</math>, and in practical contexts, such as measures and money.</p> <p>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 calculations as the inverse of multiplication.</p>
Fractions (Including Decimals And Percentages)	compare and order fractions, including fractions $>1$		
Fractions (Including Decimals And Percentages)	use common factors to simplify fractions; use common multiples to express fractions in the same denomination		
Fractions (Including Decimals And Percentages)	add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions		

Pupils also develop their skills of rounding and estimating as a means of predicting and checking the order of magnitude of their answers to decimal calculations. This includes rounding answers to a specified degree of accuracy and checking the reasonableness of their answers.

#### Unit 6.4: Perimeter, Area and Volume

Topic	Key Concepts	Strand	Notes/Non-statutory guidance
Space and Time	recognise that shapes with the same areas can have different perimeters and vice versa	Geometry and Measures	They relate the area of rectangles to parallelograms and triangles, for example, by dissection, and calculate their areas, understanding and using the formulae (in words or symbols) to do this.
Space and Time	recognise when it is possible to use formulae for area and volume of shapes		
Space and Time	calculate the area of parallelograms and triangles		
Space and Time	calculate, estimate and compare volume of cubes and cuboids using standard units, including centimetre cubed ( $\text{cm}^3$ ) and cubic metres ( $\text{m}^3$ ), and extending to other units [for example, $\text{mm}^3$ and $\text{km}^3$ ].		

#### Unit 6.5: Arithmetical Operations

Topic	Key Concepts	Strand	Notes/Non-statutory guidance
Addition, Subtraction, Multiplication And Division	use their knowledge of the order of operations to carry out calculations involving the four operations	Number	Pupils practise addition, subtraction, multiplication and division for larger numbers, using the formal written methods of columnar addition and subtraction, short and long multiplication, and short and long division (see Mathematics Appendix 1). They undertake mental calculations with increasingly large numbers and more complex calculations. Pupils continue to use all the multiplication tables to calculate mathematical statements in order to maintain their fluency. Pupils round answers to a specified degree of accuracy, for example, to the nearest 10, 20, 50 etc., but not to a specified number of significant figures.
Addition, Subtraction, Multiplication And Division	solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why		
Addition, Subtraction, Multiplication And Division	solve problems involving addition, subtraction, multiplication and division		
Fractions (Including Decimals And Percentages)	multiply one-digit numbers with up to two decimal places by whole		

<b>Number And Place Value</b>	solve number and practical problems that involve all of the above.	Pupils explore the order of operations using brackets; for example, $2 + 1 \times 3 = 5$ and $(2 + 1) \times 3 = 9$ . Common factors can be related to finding equivalent fractions.
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### Unit 6.6: Translations and Reflections

Topic	Key Concepts	Strand	Notes/Non-statutory guidance
<b>Position And Direction</b>	describe positions on the full coordinate grid (all four quadrants)	Geometry and Measures	Pupils draw and label a pair of axes in all four quadrants with equal scaling. This extends their knowledge of one quadrant to all four quadrants, including the use of negative numbers. Pupils draw and label rectangles (including squares), parallelograms and rhombuses, specified by coordinates in the four quadrants, predicting missing coordinates using the properties of shapes. These might be expressed algebraically for example, translating vertex (a, b) to (a - 2, b + 3); (a, b) and (a + d, b + d) being opposite vertices of a square of side d.
<b>Position And Direction</b>	draw and translate simple shapes on the coordinate plane, and reflect them in the axes.		

### Unit 6.7: Fractions, Decimals and Percentages

Topic	Key Concepts	Strand	Notes/Non-statutory guidance
<b>Fractions (Including Decimals And Percentages)</b>	recall and use equivalences between simple fractions, decimals and percentages, including in different contexts	Number	Pupils should practise, use and understand the addition and subtraction of fractions with different denominators by identifying equivalent fractions with the same denominator. They should start with fractions where the denominator of one fraction is a multiple of the other (for example, $\frac{1}{2} + \frac{1}{8} = \frac{5}{8}$ ) and progress to varied and increasingly complex problems. 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, for example as parts of a rectangle. Pupils use their understanding of the relationship between unit fractions and division to work backwards by multiplying a quantity that represents a unit fraction to find the whole quantity (for example, if 4 1 of a length is 36cm, then the whole length is $36 \times 4 = 144\text{cm}$ ).
<b>Fractions (Including Decimals And Percentages)</b>	associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $\frac{3}{8}$ ]		
<b>Fractions (Including Decimals And Percentages)</b>	multiply simple pairs of proper fractions, writing the answer in its simplest form [for example $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$ ]		
<b>Fractions (Including Decimals And Percentages)</b>	divide proper fractions by whole numbers [for example, $\frac{1}{3} \div 2 = \frac{1}{6}$ ]		

		<p>They practise calculations with simple fractions and decimal fraction equivalents to aid fluency, including listing equivalent fractions to identify fractions with common denominators.</p> <p>Pupils can explore and make conjectures about converting a simple fraction to a decimal fraction (for example, <math>3 \div 8 = 0.375</math>). For simple fractions with recurring decimal equivalents, pupils learn about rounding the decimal to three decimal places, or other appropriate approximations depending on the context. Pupils multiply and divide numbers with up to two decimal places by one-digit and two-digit whole numbers. Pupils multiply decimals by whole numbers, starting with the simplest cases, such as <math>0.4 \times 2 = 0.8</math>, and in practical contexts, such as measures and money.</p> <p>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 calculations as the inverse of multiplication.</p> <p>Pupils also develop their skills of rounding and estimating as a means of predicting and checking the order of magnitude of their answers to decimal calculations. This includes rounding answers to a specified degree of accuracy and checking the reasonableness of their answers.</p>
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### Unit 6.8: Number Problems and Equations

Topic	Key Concepts	Strand	Notes/Non-statutory guidance
Expressing Relationships	enumerate possibilities of combinations of two variables	Algebra	Pupils should be introduced to the use of symbols and letters to represent variables and unknowns in mathematical situations that they already understand, such as: <ul style="list-style-type: none"> <li>- missing numbers, lengths, coordinates and angles</li> <li>- formulae in mathematics and science</li> <li>- equivalent expressions (for example, <math>a + b = b + a</math>)</li> <li>- generalisations of number patterns</li> <li>- number puzzles (for example, what two numbers can add up to).</li> </ul>
Expressing Relationships	find pairs of numbers that satisfy an equation with two unknowns		
Expressing Relationships	express missing number problems algebraically		

## Unit 6.9: Converting Measures

Topic	Key Concepts	Strand	Notes/Non-statutory guidance
Space and time	use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places	Geometry and Measures	Pupils connect conversion (for example, from kilometres to miles) to a graphical representation as preparation for understanding linear/proportional graphs. They know approximate conversions and are able to tell if an answer is sensible. Using the number line, pupils use, add and subtract positive and negative integers for measures such as temperature.
Space and time	solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate		
Space and Time	convert between miles and kilometres		

## Unit 6.10: Accuracy and Proportion

Topic	Key Concepts	Strand	Notes/Non-statutory guidance
Addition, Subtraction, Multiplication And Division	use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy	Number	Pupils recognise proportionality in contexts when the relations between quantities are in the same ratio (for example, similar shapes and recipes). Pupils link percentages or $360^\circ$ to calculating angles of pie charts. Pupils should consolidate their understanding of ratio when comparing quantities, sizes and scale drawings by solving a variety of problems. They might use the notation $a:b$ to record their work. Pupils solve problems involving unequal quantities, for example, 'for every egg you need three spoonfuls of flour', ' $\frac{3}{5}$ of the class are boys'. These problems are the foundation for later formal approaches to ratio and proportion.
Fractions (Including Decimals And Percentages)	solve problems which require answers to be rounded to specified degrees of accuracy		
Multiplicative Relationships	solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison		
Multiplicative Relationships	solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts		
Multiplicative Relationships	solve problems involving unequal sharing and grouping using knowledge of fractions and multiples		

### Unit 6.11: Pie Charts and the Mean

Topic	Key Concepts	Strand	Notes/Non-statutory guidance
Interpreting data	interpret and construct pie charts and line graphs and use these to solve problems	Probability and Statistics	Pupils connect their work on angles, fractions and percentages to the interpretation of pie charts. Pupils both encounter and draw graphs relating two variables, arising from their own enquiry and in other subjects. They should connect conversion from kilometres to miles in measurement to its graphical representation. Pupils know when it is appropriate to find the mean of a data set.
Interpreting data	calculate and interpret the mean as an average		

### Unit 6.12: Formulae and Sequences

Topic	Key Concepts	Strand	Notes/Non-statutory guidance
Expressing Relationships	use simple formulae	Algebra	Pupils should be introduced to the use of symbols and letters to represent variables and unknowns in mathematical situations that they already understand, such as: <ul style="list-style-type: none"><li>- missing numbers, lengths, coordinates and angles</li><li>- formulae in mathematics and science</li><li>- equivalent expressions (for example, <math>a + b = b + a</math>)</li><li>- generalisations of number patterns</li><li>- number puzzles (for example, what two numbers can add up to).</li></ul>
Expressing Relationships	generate and describe linear number sequences		

### Unit 6.13: Dimensions and Scale

Topic	Key Concepts	Strand	Notes/Non-statutory guidance
Properties of shape	draw 2-D shapes using given dimensions and angles	Geometry and Measures	Pupils draw shapes and nets accurately, using measuring tools and conventional markings and labels for lines and angles.
Multiplicative Relationships	solve problems involving similar shapes where the scale factor is known or can be found	Number	

**Unit 6.14: Angles, Shapes and Solids**

Topic	Key Concepts	Strand	Notes/Non-statutory guidance
Properties of shape	recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.	Geometry and Measures	Pupils describe the properties of shapes and explain how unknown angles and lengths can be derived from known measurements. These relationships might be expressed algebraically for example, $d = 2 \times r$ ; $a = 180 - (b + c)$ .
Properties of shape	compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons		
Properties of shape	illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius		
Properties of shape	recognise, describe and build simple 3-D shapes, including making nets		