Year 6 Mathematics Yearly Overview

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Focus 1	Place value incl. decimals	Fractions and percentages, ratio and proportion	Place value, sequences and coordinates	Mental and written addition and subtraction	Place value, decimals and fractions	Measurement – mass and volume / capacity
Focus 2	Mental and written addition and subtraction	Geometry and statistics (angles and pie charts)	Calculating with fractions	Measurement, ratio and proportion	Mental and written calculation	Mental and written calculations
Focus 3	Mental and written multiplication	Measurement – area and volume	Mental and written multiplication and division	Area, perimeter and volume of shapes	Calculating fractions, ratio and proportion	Fractions
Focus 4	Mental and written division		Coordinates, translation and reflection		Algebra and sequences	Place value and decimals
Cross-curricular	2D and 3D shape			Statistics – line graphs and pie charts	Coordinates, translation and reflection	2D and 3D shape
Starter activities		Measurement – length, including perimeter	Measurement – temperature, mean	2D and 3D shape	Measurement and statistics - mean	

Year 6 - Autumn 1

Starter suggestions for Number	Starter suggestions for Measurement, Geometry and Statistics
• Know by heart facts for all multiplication tables up to 12 x 12. • Find pairs of numbers with a sum of 100, decimals with a sum of 0.1, 1 or 10. • To derive related facts from those already known (e.g. 4 x 0.8 linked to 4 x 8 or 3 + 7 = 10 linked to 0.3 + 0.7 = 1) • Mentally multiply and divide two-digit and single-digit numbers. • Find doubles and halves of decimals each with units and tenths. • Mentally multiply and divide pairs of multiples of 10 and 100. • Mentally multiply and divide two-digit decimals by a single digit number, e.g., (U.t x U or U.t ÷ U). • Read and write any integer and use decimal notation for tenths, hundredths and thousandths and know what each digit represents. • Order and compare whole numbers up to 1 000 000, negative numbers and decimals. • Count forwards and backwards in steps of 0.001, 0.01, 0.1, 1, 10, 100, 1000, 25, 2.5, 0.2, 0.25 from any positive or negative integer or decimal. • Multiply and divide whole numbers and decimals mentally by 10 or 100, and integers by 1000 and use this to convert between units of measurement, e.g. cm to m, g to kg etc. • Round whole numbers to the nearest 10, 100, 1000 or a number with up to three decimal places to the nearest integer or number of decimal places. • Count in fraction steps and convert equivalent fractions (e.g. count in steps of 1/12 converting to 1/12, 1/6, 1/4, 1/3, 5/12 ...).	• Know and use standard metric units of measure. • Estimate and calculate length (including perimeter), mass, volume/capacity and area. • Convert between units by multiplying and dividing by powers of 10. • Know metric and imperial equivalences of feet, inches, pints and pounds. • Read, write and convert between units of time. • Identify and describe properties of 2D and 3D shapes, including regular and irregular. • Find missing angles and lengths using properties of shape. • Estimate and identify acute, obtuse and reflex angles. • Describe positions on the first quadrant of a coordinate grid.

	Main objectives	**Rationale**
FOCUS1 *Place value including decimals*	• Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit • Round any whole number to a required degree of accuracy • Use negative numbers in context, and calculate intervals across zero • Count forwards or backwards in steps of integers, decimals or powers of 10 for any number • Order and compare numbers including integers, decimals and negative numbers • Find 0.001, 0.01, 0.1, 1, 10 and powers of 10 more or less than a given number • Round decimals with three places to the nearest whole number or one or two decimal places • 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 • Solve number and practical problems that involve all of the above	Children extend their knowledge of the number system to larger numbers and further decimals. The Base 10 notion is centred around grouping in tens i.e. ten 1s are the same as one 10, ten 10s are the same as one 100 and so on and vice versa. Children learn that one is the same as ten $^1/_{10}$s, one $^1/_{10}$ is the same as $^{10}/_{100}$s and that $^1/_{100}$ is the same as $^{10}/_{1000}$s Children understand how numbers relate to each other by ordering and comparing them on a number line, which supports the skill of rounding. This skill will be applied over the coming weeks when estimating calculations. When multiplying and dividing by 10, 100 and 1000, children recognise that this is scaling up and down by powers of 10 and is related to the Base 10 number system.
FOCUS 2 *Mental and written addition and subtraction*	• Perform mental calculations, including with mixed operations and large numbers • Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why • Solve problems involving addition and subtraction • Express missing number problems algebraically • Find pairs of numbers that satisfy an equation with two unknowns • Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy • Add and subtract whole numbers and decimals using formal written methods (columnar addition and subtraction) • Solve problems which require answers to be rounded to specified degrees of accuracy	Children learn when it is appropriate to use mental and written methods of calculation. Children make links with their knowledge of rounding numbers to estimate the answers to calculations. Calculations should be in contexts including, money, measures, real life problems and number enquiries. Children should also explore missing number problems using algebraic notation, including pairs of numbers to satisfy and equation with two unknowns and generalising the relationship between the two numbers. Written methods should be agreed by the school and shared in the progression in written calculations policy. Efficient written methods are required to be taught by the end of Key Stage 2.
FOCUS 3 *Mental and written multiplication*	• Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication • Multiply one-digit numbers with up to two decimal places by whole numbers • Perform mental calculations, including with mixed operations and large numbers • Solve problems involving addition, subtraction, multiplication and division • Express missing number problems algebraically • Find pairs of numbers that satisfy an equation with two unknowns • Use, read, write and convert between standard units, converting measurements of time from a smaller unit to a larger unit, and vice versa • Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy • Solve problems which require answers to be rounded to specified degrees of accuracy	Children learn when it is appropriate to use mental and written methods of calculation. Children make links with their knowledge of rounding numbers to estimate the answers to calculations. Calculations should be in contexts including, money, measures, real life problems and number enquiries. Children should also explore missing number problems using algebraic notation, including pairs of numbers to satisfy and equation with two unknowns and generalising the relationship between the two numbers. If schools are using grid method of multiplication, the written methods for addition in the previous week will be further applied this week. Written methods should be agreed by the school and shared in the progression in written calculations policy. Efficient written methods are required to be taught by the end of Key Stage 2.

| **FOCUS 4**
Mental and written 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
• Use written division methods in cases where the answer has up to two decimal places
• Solve problems involving division
• Solve problems which require answers to be rounded to specified degrees of accuracy
• Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy | Children learn when it is appropriate to use mental and written methods of calculation.
Children make links with their knowledge of rounding numbers to estimate the answers to calculations. Calculations should be in contexts including, money, measures, real life problems and number enquiries.
Children should also explore missing number problems using algebraic notation, including pairs of numbers to satisfy and equation with two unknowns and generalising the relationship between the two numbers.

If schools are using chunking method of division, the written methods for subtraction in the previous week will be further applied this week.
Written methods should be agreed by the school and shared in the progression in written calculations policy. Efficient written methods are required to be taught by the end of Key Stage 2. |
| **CROSS-CURRICULAR**
2D and 3D shape | • Draw 2-D shapes using given dimensions and angles
• Recognise, describe and build simple 3-D shapes, including making nets
• Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons | Children gain practical experience of drawing and making shapes, in order to support their work on recognising, describing, comparing and classifying shapes.
It is important that children see and use regular and irregular polygons and polyhedra and experience them in different orientations.
Children should discover the angle sum of triangles and quadrilaterals and use this knowledge, and knowledge of the term 'regular' to find missing angles. |

Year 6 - Autumn 2

Starter suggestions for Number	Starter suggestions for Measurement, Geometry and Statistics
• Know by heart facts for all multiplication tables up to 12 x 12. • Find pairs of numbers with a sum of 100, decimals with a sum of 0.1, 1 or 10. • To derive related facts from those already known (e.g. 4 x 0.8 linked to 4 x 8 or 3 + 7 = 10 linked to 0.3 + 0.7 = 1) • Mentally multiply and divide two-digit and single-digit numbers. • Find doubles and halves of decimals each with units and tenths. • Mentally multiply and divide pairs of multiples of 10 and 100. • Mentally multiply and divide two-digit decimals by a single digit number, e.g., (U.t x U or U.t ÷ U). • Read and write any integer and use decimal notation for tenths, hundredths and thousandths and know what each digit represents. • Order and compare whole numbers up to 1 000 000, negative numbers and decimals. • Count forwards and backwards in steps of 0.001, 0.01, 0.1, 1, 10, 100, 1000, 25, 2.5, 0.2, 0.25 from any positive or negative integer or decimal. • Multiply and divide whole numbers and decimals mentally by 10 or 100, and integers by 1000 and use this to convert between units of measurement, e.g. cm to m, g to kg etc. • Round whole numbers to the nearest 10, 100, 1000 or a number with up to three decimal places to the nearest integer or number of decimal places. • Count in fraction steps and convert equivalent fractions (e.g. count in steps of 1/12 converting to 1/12, 1/6, 1/4, 1/3, 5/12 ...).	• Know and use standard metric units of measure. • Estimate and calculate length (including perimeter), mass, volume/capacity and area. • Convert between units by multiplying and dividing by powers of 10. • Know metric and imperial equivalences of feet, inches, pints and pounds. • Read, write and convert between units of time. • Identify and describe properties of 2D and 3D shapes, including regular and irregular. • Find missing angles and lengths using properties of shape. • Estimate and identify acute, obtuse and reflex angles. • Describe positions on the first quadrant of a coordinate grid. • Solve comparison, sum and difference problems using information presented in all types of graph.

	Main objectives	Rationale
FOCUS 1 *Fractions and percentages, ration and proportion*	• Identify common factors, common multiples and prime numbers • Compare and order fractions, including fractions >1 (including on a number line) • Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions • Associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. $^3/_8$) • Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts. • Solve problems involving fractions • Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts. • Find simple percentages of amounts • 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	Children use knowledge of multiplication facts to identify factors and multiples of different numbers. In doing so, children can learn that prime numbers are ones whose only factors are themselves and 1. Prime numbers up to 100 can be derived using the Sieve of Eratosthenes. Children apply their knowledge of common factors to create equivalent fractions in order to compare, order and position on a number line. Children recognise that fractions, decimals and percentages are all ways of expressing a proportion. Decimals (decimal fractions) are ways of writing fractions in our Base 10 number system, so converting to tenths, hundredths and thousandths is essential understanding. Children learn that percentage is a way of expressing a proportion as a fraction of 100. Links are made between scaling up or down to create fractions with a denominator that is 100. Links are also made between the equivalence that 10% is the same as $^1/_{10}$ and that to find $^1/_{10}$ of an amount you divide by 10. From finding 10%, other amounts can be found such as 5%, 40% etc. Children also learn how to share in unequal amounts by using ratios. Ratio can also be understood as comparing part to part. This can be applied to scaling up and down to draw similar shapes according to a given ratio.
FOCUS 2 *Geometry and statistics (angles and pie charts)*	• Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles • Interpret and construct pie charts and line graphs and use these to solve problems • Solve comparison, sum and difference problems using information presented in all types of graph	Children's work on angles is extended to applying the understanding of relationships between different ones in order to calculate missing angles on a straight line (total 180˚), around a point (total 360˚) and that vertically opposite angles are equal. The knowledge of angles around a point is then combined with knowledge of percentages when constructing pie charts. Children become familiar with pie charts, understanding the purpose of presenting data in this way and solving problems by interpreting data in different presentations.
FOCUS 3 *Measurement – area and volume*	• Recognise that shapes with the same areas can have different perimeters and vice versa • Calculate the area of parallelograms and triangles • Use, read and write standard units using decimal notation to up to three decimal places • Recognise when it is possible to use the formulae for area and volume of shapes • Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3) and extending to other units (for example, mm^3 and km^3).	The work on perimeter from the previous week can be followed up by investigating shapes with the same perimeter having different areas and vice versa. Children learn how to find the area of triangles and parallelograms by relating their knowledge of finding the area of rectangles. Area of a triangle should be understood by children as ½ (base x height). Area of a parallelogram should be related to area of a rectangle, with children cutting a parallelogram to create a rectangle. Children should learn and understand the formula for finding the area of these 2D shapes, and then relate this to finding the volume of prisms, including cubes and cuboids.

| **STARTER ACTIVITIES**
Measurement – length, including perimeter | • 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, converting measurements of length and mass, from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places
• Convert between miles and kilometres | Children apply their understanding of the Base 10 number system and multiplying and dividing by powers of 10 in order to convert between units of measurement for length and mass.
The learning of measurement should be practically based, and perimeter should be included in the learning of length as it is a measure of distance.
Children are also introduced to the relationship between miles and kilometres i.e. that 8km is roughly equivalent to 5 miles, and use this to convert between these two units. |

Year 6 - Spring 1

<table>
<tr><td colspan="2">Starter suggestions for Number
• Know by heart facts for all multiplication tables up to 10 x 10.
• Find pairs of numbers with a sum of 100, decimals with a sum of 0.1, 1 or 10.
• To derive related facts from those already known (e.g. 4 x 0.8 linked to 4 x 8 or 3 + 7 = 10 linked to 0.3 + 0.7 = 1)
• Mentally multiply and divide two-digit and single-digit numbers.
• Find doubles and halves of decimals each with units and tenths.
• Mentally multiply and divide pairs of multiples of 10 and 100.
• Mentally multiply and divide two-digit decimals by a single digit number, e.g., (U.t x U or U.t ÷ U).
• Identify the multiples/factors of given numbers.
• Read and write any integer and use decimal notation for tenths, hundredths and thousandths and know what each digit represents.
• Compare and order two or more different positive and/or negative integers and/or decimal numbers with up to 3 decimal places, say which is the largest / smallest and use the symbols <, > and = correctly and place on a number line.
• Calculate with negative numbers, including across zero.
• Count forwards and backwards in steps of 0.001, 0.01, 0.1, 1, 10, 100, 1000, 25, 2.5, 0.2, 0.25 from any positive or negative integer or decimal.
• Multiply and divide whole numbers and decimals mentally by 10 or 100, and integers by 1000 and use this to convert between units of measurement, e.g. cm to m, g to kg etc.
• Round whole numbers to the nearest 10, 100, 1000 or a number with up to three decimal places to the nearest integer or number of decimal places.
• Count in fraction steps (e.g. of 1/12 i.e. 1/12, 1/6, 1/4, 1/3, 5/12 ...).</td>
<td colspan="2">Starter suggestions for Measurement, Geometry and Statistics
• Know and use standard metric units of measure.
• Estimate and calculate length (including perimeter), mass, volume/capacity and area.
• Convert between units by multiplying and dividing by powers of 10.
• Know metric and imperial equivalences of feet, inches, pints and pounds.
• Read, write and convert between units of time.
• Identify and describe properties of 2D and 3D shapes, including regular and irregular.
• Find missing angles and lengths using properties of shape.
• Estimate and identify acute, obtuse and reflex angles.
• Describe positions on the first quadrant of a coordinate grid.
• Solve comparison, sum and difference problems using information presented in all types of graph.</td></tr>
<tr><td></td><td></td><td align="center">Main objectives</td><td align="center">Rationale</td></tr>
<tr>
<td colspan="2">FOCUS 1
Place value, sequences and coordinates</td>
<td>• Count forwards or backwards in steps of integers, decimals or powers of 10 for any number
• Use simple formulae
• Generate and describe linear number sequences
• Describe positions on the full coordinate grid (all four quadrants)</td>
<td>Children link counting in steps of different size to sequences and describe and generate formulae for these sequences. A linear number sequence is one that increases or decreases by the same amount each time. The generalising of sequences is then related to the coordinate grid, where children recognise the values of the vertical and horizontal lines. They apply their knowledge of negative numbers to the second, third and fourth quadrants.</td>
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<tr>
<td colspan="2">FOCUS 2
Calculating with fractions</td>
<td>• Identify common factors, common multiples and prime numbers
• Use common factors to simplify fractions; use common multiples to express fractions in the same denomination
• Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
• Multiply simple pairs of proper fractions, writing the answer in its simplest form (using diagram) (e.g. $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$)
• Divide proper fractions by whole numbers (using diagram)(e.g. $\frac{1}{3} \div 2 = \frac{1}{6}$)
• Associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. $\frac{3}{8}$)</td>
<td>Children use knowledge of multiplication facts to identify factors and multiples of different numbers. In doing so, children can learn that prime numbers are ones whose only factors are themselves and 1. Children apply their knowledge of common factors to create equivalent fractions in order to compare, order and position on a number line. Children apply their knowledge of common multiples in order to add and subtract fractions with different denominators, by converting to equivalent fractions. When multiplying and dividing fractions, it is essential that children use diagrams and knowledge of multiplication and division of whole numbers to understand the concept of calculating with fractions. Children recognise that fractions, decimals and percentages are all ways of expressing a proportion. Decimals (decimal fractions) are ways of writing fractions in our Base 10 number system, so converting to tenths, hundredths and thousandths is essential understanding.</td>
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<tr>
<td colspan="2">FOCUS 3
Mental and written multiplication and division</td>
<td>• 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
• Use written division methods in cases where the answer has up to two decimal places
• Solve problems which require answers to be rounded to specified degrees of accuracy
• Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
• Multiply one-digit numbers with up to two decimal places by whole numbers
• Enumerate possibilities of combinations of two variables</td>
<td>Children learn when it is appropriate to use mental and written methods of calculation.
Children make links with their knowledge of rounding numbers to estimate the answers to calculations. Calculations should be in contexts including, money, measures, real life problems and number enquiries.
Children should also explore missing number problems using algebraic notation, including pairs of numbers to satisfy and equation with two unknowns and generalising the relationship between the two numbers.

Written methods should be agreed by the school and shared in the progression in written calculations policy. Efficient written methods are required to be taught by the end of Key Stage 2.</td>
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<tr>
<td colspan="2">FOCUS 4
Coordinates, translation and reflection</td>
<td>• Describe positions on the full coordinate grid (all four quadrants)
• Draw and translate simple shapes on the coordinate plane, and reflect them in the axes</td>
<td>Children combine their understanding of shapes and coordinates. When identifying the coordinates of missing corners of shapes, the coordinate grid should be on plain paper, so children are applying their knowledge of shapes, rather than simply counting squares. When reflecting and translating shapes, children should identify relationships between coordinates of the corners and use these relationships when identifying and checking the coordinates of the transformed shape.</td>
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Y6 Medium Term Planning (mathematics)

STARTER ACTIVITIES *Measurement, temperature and mean*	• Use negative numbers in context, and calculate intervals across zero • Order and compare numbers including integers, decimals and negative numbers • Calculate and interpret the mean as an average	Children use and calculate with negative numbers using the context of temperature (as it is often very cold at this time of year). When ordering numbers from a set of data, they can be introduced to averages. The median could be found once the numbers have been ordered, then leading on to finding the mean, consolidating their addition and division skills.

Year 6 - Spring 2

Starter suggestions for Number	Starter suggestions for Measurement, Geometry and Statistics
• Know by heart facts for all multiplication tables up to 10 x 10. • Find pairs of numbers with a sum of 100, decimals with a sum of 0.1, 1 or 10. • To derive related facts from those already known (e.g. 4 x 0.8 linked to 4 x 8 or 3 + 7 = 10 linked to 0.3 + 0.7 = 1) • Mentally multiply and divide two-digit and single-digit numbers. • Find doubles and halves of decimals each with units and tenths. • Mentally multiply and divide pairs of multiples of 10 and 100. • Mentally multiply and divide two-digit decimals by a single digit number, e.g., (U.t x U or U.t ÷ U). • Identify the multiples/factors of given numbers. • Read and write any integer and use decimal notation for tenths, hundredths and thousandths and know what each digit represents. • Compare and order two or more different positive and/or negative integers and/or decimal numbers with up to 3 decimal places, say which is the largest / smallest and use the symbols <, > and = correctly and place on a number line. • Calculate with negative numbers, including across zero. • Count forwards and backwards in steps of 0.001, 0.01, 0.1, 1, 10, 100, 1000, 25, 2.5, 0.2, 0.25 from any positive or negative integer or decimal. • Multiply and divide whole numbers and decimals mentally by 10 or 100, and integers by 1000 and use this to convert between units of measurement, e.g. cm to m, g to kg etc. • Round whole numbers to the nearest 10, 100, 1000 or a number with up to three decimal places to the nearest integer or number of decimal places. • Count in fraction steps (e.g. of 1/12 i.e. 1/12, 1/6, 1/4, 1/3, 5/12 ...).	• Know and use standard metric units of measure. • Estimate and calculate length (including perimeter), mass, volume/capacity and area. • Convert between units by multiplying and dividing by powers of 10. • Know metric and imperial equivalences of feet, inches, pints and pounds. • Convert between miles and kilometres using knowledge that 5 miles is roughly equivalent to 8km. • Read, write and convert between units of time. • Identify and describe properties of 2D and 3D shapes, including regular and irregular. • Find missing angles and lengths using properties of shape. • Estimate and identify acute, obtuse and reflex angles. • Describe positions on the first quadrant of a coordinate grid. • Solve comparison, sum and difference problems using information presented in all types of graph.

	Main objectives	**Rationale**
FOCUS 1 *Mental and written addition and subtraction*	• Add and subtract whole numbers and decimals using formal written methods (columnar addition and subtraction) • Solve problems involving addition and subtraction • Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why • Use their knowledge of the order of operations to carry out calculations involving the four operations	Children learn when it is appropriate to use mental and written methods of calculation. Children make links with their knowledge of rounding numbers to estimate the answers to calculations. Calculations should be in contexts including, money, measures, real life problems and number enquiries. Children should also explore missing number problems using algebraic notation, including pairs of numbers to satisfy and equation with two unknowns and generalising the relationship between the two numbers. Written methods should be agreed by the school and shared in the progression in written calculations policy. Efficient written methods are required to be taught by the end of Key Stage 2.
FOCUS 2 *Measurement, ratio and proportion*	• Solve problems involving similar shapes where the scale factor is known or can be found • 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 • Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate • 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 unequal sharing and grouping using knowledge of fractions and multiples	Children should use the context of measures to solve problems that involve knowledge of scaling up and down by a given scale factor. This should be done in the context of length when looking at shapes that are mathematically similar i.e. the sides are of equal proportion to each other such as a triangle with sides of 2cm, 3cm and 4cm is similar to a triangle of side 4cm, 6cm and 8cm. Teachers should select from another measures context for children to explore proportion through scaling up and down, and converting between units of measure and using decimal notation. Children should also consider ratio as unequal sharing and grouping, using real life contexts such as recipes. Links should also be made with fractions and percentages as ways of describing proportions of amounts.
FOCUS 3 *Area, perimeter and volume of shapes*	• Recognise that shapes with the same areas can have different perimeters and vice versa • Recognise when it is possible to use the formulae for area and volume of shapes • Calculate the area of parallelograms and triangles • Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3) and extending to other units (for example, mm^3 and km^3).	Children investigate how shapes of the same area can have different perimeters and vice versa. They relate finding the area of triangles and parallelograms to finding the area of rectangles. Once the area of a given shape has been found, children link this to finding the volume of prisms that have this shape at opposite ends. Children understand volume as 'solid' volume (the amount of three dimensional space occupied by an object) and understand why cubic units are used.
	• Convert between miles and kilometres • Interpret and construct pie charts and line graphs and use these to solve problems • Solve comparison, sum and difference problems using information presented in all types of graph	Children explore line graphs further by creating conversion graphs for miles to kilometres and vice versa. They use this graph to convert between the two units of distance and apply this knowledge to numbers beyond those covered on the graph. Children continue to construct and interpret different graphs and charts, including pie charts, however, the majority of the time should be focused on interpreting the data and solving problems, rather than the construction of graphs and charts.

STARTER ACTIVITIES *2D and 3D shape*	- Draw 2-D shapes using given dimensions and angles - Recognise, describe and build simple 3-D shapes, including making nets - Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons - Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius - Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles	Children gain practical experience of drawing and making shapes, in order to support their work on recognising, describing, comparing and classifying shapes. It is important that children see and use regular and irregular polygons and polyhedra and experience them in different orientations. Children's knowledge and understanding of circles is developed through the introduction of new language including radius, diameter and circumference, and understanding the relationships between any of these terms. Children should discover the angle sum of triangles and quadrilaterals and use this knowledge, and knowledge of the term 'regular' to find missing angles.

Year 6 - Summer 1	

Starter suggestions for Number
- Know by heart facts for all multiplication tables up to 10 x 10.
- Find pairs of numbers with a sum of 100, decimals with a sum of 0.1, 1 or 10.
- To derive related facts from those already known (e.g. 4 x 0.8 linked to 4 x 8 or 3 + 7 = 10 linked to 0.3 + 0.7 = 1)
- Mentally multiply and divide two-digit and single-digit numbers.
- Find doubles and halves of decimals each with units and tenths.
- Mentally multiply and divide pairs of multiples of 10 and 100.
- Mentally multiply and divide two-digit decimals by a single digit number, e.g., (U.t x U or U.t ÷ U).
- Identify the multiples/factors of given numbers.
- Read and write any integer and use decimal notation for tenths, hundredths and thousandths and know what each digit represents.
- Compare and order two or more different positive and/or negative integers and/or decimal numbers with up to 3 decimal places, say which is the largest / smallest and use the symbols <, > and = correctly and place on a number line.
- Calculate with negative numbers, including across zero.
- Count forwards and backwards in steps of 0.001, 0.01, 0.1, 1, 10, 100, 1000, 25, 2.5, 0.2, 0.25 from any positive or negative integer or decimal.
- Multiply and divide whole numbers and decimals mentally by 10 or 100, and integers by 1000 and use this to convert between units of measurement, e.g. cm to m, g to kg etc.
- Round whole numbers to the nearest 10, 100, 1000 or a number with up to three decimal places to the nearest integer or number of decimal places.
- Count in fraction steps (e.g. of 1/12 i.e. 1/12, 1/6, 1/4, 1/3, 5/12 ...).

Starter suggestions for Measurement, Geometry and Statistics
- Know and use standard metric units of measure.
- Estimate and calculate length (including perimeter), mass, volume/capacity and area.
- Convert between units by multiplying and dividing by powers of 10.
- Know metric and imperial equivalences of feet, inches, pints and pounds.
- Convert between miles and kilometres using knowledge that 5 miles is roughly equivalent to 8km.
- Read, write and convert between units of time.
- Identify and describe properties of 2D and 3D shapes, including regular and irregular.
- Find missing angles and lengths using properties of shape.
- Estimate and identify acute, obtuse and reflex angles.
- Describe positions on the first quadrant of a coordinate grid.
- Solve comparison, sum and difference problems using information presented in all types of graph.

	Main objectives	Rationale
FOCUS 1 *Place value, decimals and fractions*	• Count forwards or backwards in steps of integers, decimals or powers of 10 for any number • Order and compare numbers including integers, decimals and negative numbers • Find 0.001, 0.01, 0.1, 1, 10 and powers of 10 more or less than a given number • Round decimals with three places to the nearest whole number or one or two decimal places • Use common factors to simplify fractions; use common multiples to express fractions in the same denomination • Compare and order fractions, including fractions >1 (including on a number line) • Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions • Associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. $\frac{3}{8}$)	Prior to end of year statutory assessments, it is useful to consolidate children's understanding of the number system as a whole and how numbers can be represented in different ways e.g. as precise values, as estimates when rounding, as fractions or decimals, on a number line, as a diagram etc.
FOCUS 2 *Mental and written calculation*	• Perform mental calculations, including with mixed operations and large numbers • Add and subtract whole numbers and decimals using formal written methods (columnar addition and subtraction) • Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why • Solve problems involving addition, subtraction, multiplication and division • Use their knowledge of the order of operations to carry out calculations involving the four operations • 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 • Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy	Prior to end of year statutory assessments, it is useful to consolidate children's understanding of calculations across all four operations. Children should continue to learn when it is appropriate to use mental methods and when to use written methods. Problems should be presented in a variety of real life and abstract situations, so children recognise clues that indicate the operation(s) to use. Children should therefore be given examples of mixed problems, rather than problems that are all the same operation. When solving problems, children should be encouraged to express their understanding of the context before trying to solve the problem.
FOCUS 3 *Calculating fractions, ratio and proportion*	• Multiply simple pairs of proper fractions, writing the answer in its simplest form (using diagram) (e.g. $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$) • Divide proper fractions by whole numbers (using diagram)(e.g. $\frac{1}{3} \div 2 = \frac{1}{6}$). • 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.	Prior to end of year statutory assessments, it is useful for children to apply their knowledge of place value, multiplication and division in the context of fractions, ratio and proportion. When multiplying and dividing fractions, it is essential that children use diagrams and knowledge of multiplication and division of whole numbers to understand the concept of calculating with fractions. Teachers should select from different contexts for children to explore proportion through scaling up and down. Children should also consider ratio as unequal sharing and grouping, using real life contexts such as recipes.

Y6 Medium Term Planning (mathematics)

FOCUS 4 *Algebra and sequences*	• Use simple formulae • Generate and describe linear number sequences • Convert between miles and kilometres	Children can use the work from the previous week on to explore relationships between the coordinates of the corners of some 2D shapes, generalise and express relationships using formulae. Children extend their work to generalise, identify and create formulae for linear number sequences, including for use when converting miles to kilometres and vice versa using the knowledge that 5 miles is roughly equivalent to 8km.
CROSS-CURRICULAR *Coordinates, translation and reflection*	• Draw 2-D shapes using given dimensions and angles • Describe positions on the full coordinate grid (all four quadrants) • Draw and translate simple shapes on the coordinate plane, and reflect them in the axes	Children combine their understanding of shapes and coordinates. When identifying the coordinates of missing corners of shapes, the coordinate grid should be on plain paper, so children are applying their knowledge of shapes, rather than simply counting squares. When reflecting and translating shapes, children should identify relationships between coordinates of the corners and use these relationships when identifying and checking the coordinates of the transformed shape.
STARTER ACTIVITIES *Measurement (length and time) and statistics – mean*	• 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, converting measurements of length and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places • Calculate and interpret the mean as an average • Solve comparison, sum and difference problems using information presented in all types of graph	Children should use their performance in PE (athletics) to generate length and time measurements, for jumping, throwing and running. These measurements can be used to explore converting units of measure; scaling up and down; finding the mean measurement of a given selection; presenting data in different ways; solving problems when interpreting graphs presented in different ways.

Y6 Medium Term Planning (mathematics)

	Year 6 - Summer 2	

<table>
<tr><td colspan="2">Starter suggestions for Number</td><td>Starter suggestions for Measurement, Geometry and Statistics</td></tr>
<tr><td colspan="2">

- Know by heart facts for all multiplication tables up to 10 x 10.
- Find pairs of numbers with a sum of 100, decimals with a sum of 0.1, 1 or 10.
- To derive related facts from those already known (e.g. 4 x 0.8 linked to 4 x 8 or 3 + 7 = 10 linked to 0.3 + 0.7 = 1)
- Mentally multiply and divide two-digit and single-digit numbers.
- Find doubles and halves of decimals each with units and tenths.
- Mentally multiply and divide pairs of multiples of 10 and 100.
- Mentally multiply and divide two-digit decimals by a single digit number, e.g., (U.t x U or U.t ÷ U).
- Identify the multiples/factors of given numbers.
- Read and write any integer and use decimal notation for tenths, hundredths and thousandths and know what each digit represents.
- Compare and order two or more different positive and/or negative integers and/or decimal numbers with up to 3 decimal places, say which is the largest / smallest and use the symbols <, > and = correctly and place on a number line.
- Calculate with negative numbers, including across zero.
- Count forwards and backwards in steps of 0.001, 0.01, 0.1, 1, 10, 100, 1000, 25, 2.5, 0.2, 0.25 from any positive or negative integer or decimal.
- Multiply and divide whole numbers and decimals mentally by 10 or 100, and integers by 1000 and use this to convert between units of measurement, e.g. cm to m, g to kg etc.
- Round whole numbers to the nearest 10, 100, 1000 or a number with up to three decimal places to the nearest integer or number of decimal places.
- Count in fraction steps (e.g. of 1/12 i.e. 1/12, 1/6, 1/4, 1/3, 5/12 ...).
</td><td>

- Know and use standard metric units of measure.
- Estimate and calculate length (including perimeter), mass, volume/capacity and area.
- Convert between units by multiplying and dividing by powers of 10.
- Know metric and imperial equivalences of feet, inches, pints and pounds.
- Convert between miles and kilometres using knowledge that 5 miles is roughly equivalent to 8km.
- Read, write and convert between units of time.
- Identify and describe properties of 2D and 3D shapes, including regular and irregular.
- Find missing angles and lengths using properties of shape.
- Estimate and identify acute, obtuse and reflex angles.
- Describe positions on the first quadrant of a coordinate grid.
- Solve comparison, sum and difference problems using information presented in all types of graph.
</td></tr>
</table>

	Main objectives	**Rationale**
FOCUS 1 *Measurement – mass and volume/capacity*	- 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, converting measurements of mass and volume from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places - Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3) and extending to other units (for example, mm^3 and km^3)	Children should continue to work practically with the concepts of mass and volume, enhancing their understanding of both measures, including gaining a 'benchmark' measure to support estimation, as well as being able to accurately measure using different equipment and converting between units. When converting between units, children should relate this to their understanding of the Base 10 number system.
FOCUS 2 *Mental and written calculations*	- Perform mental calculations, including with mixed operations and large numbers - Add and subtract whole numbers and decimals using formal written methods (columnar addition and subtraction) - Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why - Solve problems involving addition, subtraction, multiplication and division - Use their knowledge of the order of operations to carry out calculations involving the four operations - 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 - Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy	During this final half term it is important that the children continue to consolidate and refine their calculation skills so that they are secure before transition to secondary school.
FOCUS 3 *Fractions*	- Use common factors to simplify fractions; use common multiples to express fractions in the same denomination - Compare and order fractions, including fractions >1 (including on a number line) - Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions - Multiply simple pairs of proper fractions, writing the answer in its simplest form (using diagram) (e.g. $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$) - Divide proper fractions by whole numbers (using diagram) (e.g. $\frac{1}{3} \div 2 = \frac{1}{6}$)	During this final half term it is important that the children continue to consolidate and refine their understanding of and skills related to fractions so that they are secure before transition to secondary school.

FOCUS 4 *Place value and decimals*	• Count forwards or backwards in steps of integers, decimals or powers of 10 for any number • Order and compare numbers including integers, decimals and negative numbers • Find 0.001, 0.01, 0.1, 1, 10 and powers of 10 more or less than a given number • Round decimals with three places to the nearest whole number or one or two decimal places	During this final half term it is important that the children continue to consolidate and refine their understanding of the structure of the number system so that they are secure before transition to secondary school.
CROSS-CURRICULAR *2D and 3D shape*	• Draw 2-D shapes using given dimensions and angles • Recognise, describe and build simple 3-D shapes, including making nets • Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons • Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius • Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles	Children gain practical experience of drawing and making shapes, in order to support their work on recognising, describing, comparing and classifying shapes. It is important that children see and use regular and irregular polygons and polyhedra and experience them in different orientations. Children's knowledge and understanding of circles is developed through the introduction of new language including radius, diameter and circumference, and understanding the relationships between any of these terms. Children should discover the angle sum of triangles and quadrilaterals and use this knowledge, and knowledge of the term 'regular' to find missing angles.