Mathematics Planning

National Curriculum

2022

Year 6

How to Use the Medium Term Planning

This planning document is intended to provide planning support to meet all statutory requirements of the National Curriculum and to aid teachers in planning a progressive learning journey for children within Year 6.

Overview Documents

This document starts with the mathematics skills and the coverage of each strand across the entire year of planning. Teachers and TAs can use this to plan mixed starters in order to pre-teach, consolidate learning or as revision, as well as guidance for day-to-day planning, assessment (linked to ScholarPack) and establishing how long until a topic will next be revisited or if additional lessons to achieve the skill are necessary.

This is followed by an overview document. This identifies six half termly blocks of six weeks with focus areas of mathematics for each week. The units are designed to be cohesive and allow for application of learning and skills across the mathematics curriculum. The 'assess and review' weeks can be used to gain information for teacher assessments or can be used to pick up elements that need further support. It is not designed to be used as an entire week of testing with no teaching. This is a suggested layout and teachers should adapt to meet the needs of their class as required.

'Ctrl' and clicking on each week will take you to the associated Half Termly Planning, outlining the focus area for each week in more detail.

Half Termly Planning Documents

The half termly planning documents have been compiled to the following principles:

- Each half term is predominantly learning about number.
- Almost all weeks are focused on one area of mathematics, giving children time to focus on a single area for a longer amount of time.
- The 'knowledge' explains the understanding the child will need to achieve the skills. This also explains why specific skills have been put together and how to enhance the teaching and learning during that week, e.g. number work is often given a context of data, measures, money or problem solving.
- The skills are the end of year expectations and it is the decision of teachers whether to visit the whole objective more than once throughout the year or to organise progression within each objective.
- Every skill is covered at least twice within the year.

Adaptive teaching

At Brettenham, we help children develop their conceptual understanding of mathematics by using concrete objects, pictorial representations and abstract thinking, therefore if a child is struggling with a particular abstract concept, we adapt and take a step back to concrete or pictorial, providing them with resources to enable them to understand. As the objectives in the yearly plans are based on age related expectations, children who may struggle to reach the objectives independently will be provided with scaffolds to provide extra support. Scaffolding supports mathematical understanding by providing the necessary support in applying new information. These approaches help children achieve in lessons which they would not be able to on their own.

Progression

The planning documents are followed by a table showing skill progression from Early Years to Year 6. This can be used to establish and build upon previous knowledge, see where children's learning is heading and to also easily identify and fill any gaps in their knowledge.

National Curriculum Documentation

At the end of this document is the National Curriculum programme of study for Year 6. This contains the skills for Year 6 along with the non-statutory guidance to help with interpretation.

Yearly skills and coverage for Year 6 Mathematics

With links to the Content Domain

Number - number and place value	Coverage					
	Aut1	**Aut2**	**Spr1**	**Spr2**	**Sum1**	**Sum2**
(6N2) Read, write, order and compare numbers up to 10 000 000	W1					
(6N3) Determine the value of each digit in numbers up to 10 000 000	W1					
(6N4) Round any whole number to a required degree of accuracy	W1					
(6N5) Use negative numbers in context, and calculate intervals across zero	W1		W3			
(6N6) Solve number and practical problems that involve 6N2 - 6N5	W1					

Number – addition, subtraction, multiplication and division (calculations)	Coverage					
	Aut1	**Aut2**	**Spr1**	**Spr2**	**Sum1**	**Sum2**
(6C3) Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy	W2 W3 W5 W6				W2	W2
(6C4) Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why	W2 W3			W1	W2	W2
(6C5) Identify common factors, common multiples and prime numbers		W1	W4			
(6C6) Perform mental calculations, including with mixed operations and large numbers	W2 W3 W5 W6				W2	W2
(6C7a) Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication	W3		W6		W2	W2
(6C7b) 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	W6		W5		W2	W2
(6C7c) 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	W6		W5		W2	W2
(6C8) Solve problems involving addition, subtraction, multiplication and division	W2 W3 W5 W6			W1	W2	W2
(6C9) Use their knowledge of the order of operations to carry out calculations involving the four operations				W1	W2	W2

Number - fractions	Coverage					
	Aut1	**Aut2**	**Spr1**	**Spr2**	**Sum1**	**Sum2**
(6F2) Use common factors to simplify fractions; use common multiples to express fractions in the same denomination			W4		W1	W3
(6F3) Compare and order fractions, including fractions > 1		W1			W1	W3
(6F4) Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions		W1	W4		W1	W3
(6F5a) Multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, 1/4 × 1/2 = 1/8]			W4		W3	W3
(6F5b) Divide proper fractions by whole numbers [for example, 1/3 ÷ 2 = 1/6]			W4		W3	W3
(6F6) Associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, 3/8]		W1	W4		W1	
(6F9a) Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers up to three decimal places	W1					
(6F9b) Multiply one-digit numbers with up to two-decimal places by whole numbers	W3		W6			
(6F9c) Use written division methods in cases where the answer has up to two decimal places	W6		W5			
(6F10) Solve problems which require answers to be rounded to specified degrees of accuracy	W2 W3 W5 W6		W5 W6			
(6F11) Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts		W1 W2				

Ratio and Proportion	Coverage					
	Aut1	**Aut2**	**Spr1**	**Spr2**	**Sum1**	**Sum2**
(6R1) Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts		W2		W2	W3	
(6R2) Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison		W2		W2	W3	
(6R3) Solve problems involving similar shapes where the scale factor is known or can be found		W2		W2	W3	
(6R4) Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples		W2		W2	W3	

Algebra	Coverage					
	Aut1	**Aut2**	**Spr1**	**Spr2**	**Sum1**	**Sum2**

	Aut1	Aut2	Spr1	Spr2	Sum1	Sum2
(6A1) Express missing number problems algebraically	W2 W3 W5					
(6A2) Use simple formulae			W1		W5	
(6A3) Generate and describe linear number sequences			W1		W5	
(6A4) Find pairs of numbers that satisfy an equation with two unknowns	W2 W3 W5					
(6A5) Enumerate possibilities of combinations of two variables	W6					

Measurement	Coverage					
	Aut1	Aut2	Spr1	Spr2	Sum1	Sum2
(6M5) 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	W3	W4 W5		W2	W6	W1
(6M6) Convert between miles and kilometres		W4		W5	W5	
(6M7a) Recognise that shapes with the same areas can have different perimeters and vice versa		W5		W4		
(6M7b) Calculate the area of parallelograms and triangles		W5		W4		
(6M7c) Recognise when it is possible to use formulae for the area of shapes		W5		W4		
(6M8a) Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm3) and cubic metres (m3), and extending to other units [for example, mm3 and km3]		W5		W4		W1
(6M8b) Recognise when it is possible to use formulae for the volume of shapes		W5		W4		
(6M9) Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate		W4		W2	W6	W1

Geometry - properties of shapes	Coverage					
	Aut1	Aut2	Spr1	Spr2	Sum1	Sum2
(6G2a) Compare and classify geometric shapes based on their properties and sizes	W4			W3		W5
(6G2b) Describe simple 3-D shapes	W4			W3		W5
(6G3a) Draw 2-D shapes using given dimensions and angles	W4			W3	W4	W5
(6G3b) Recognise and build simple 3-D shapes, including making nets	W4			W3		W5
(6G4a) Find unknown angles in any triangles, quadrilaterals, and regular polygons	W4			W3		W5
(6G4b) Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles		W3		W3		W5
(6G5) Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius				W3		W5

Geometry – position and direction	Coverage					
	Aut1	Aut2	Spr1	Spr2	Sum1	Sum2
(6P2) Draw and translate simple shapes on the coordinate plane, and reflect them in the axes			W2		W4	
(6P3) Describe positions on the full coordinate grid (all four quadrants)			W1 W2		W4	

Statistics	Coverage					
	Aut1	Aut2	Spr1	Spr2	Sum1	Sum2
(6S1) Interpret and construct pie charts and line graphs and use these to solve problems		W3		W5		
(6S3) Calculate and interpret the mean as an average			W3		W6	

Year 6 Mathematics Yearly Overview

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Week 1	Place value incl. decimals	Fractions	Place value, sequences and coordinates	Mental and written addition and subtraction	Place value, decimals and fractions	Measurement – mass and volume / capacity
Week 2	Mental and written addition	Fractions, percentages, ratio and proportion	2D shape, coordinates, translation and reflection	Measurement, ratio and proportion	Mental and written calculation	Mental and written calculations
Week 3	Mental and written subtraction	Geometry - angles Statistics – pie charts	Measurement – temperature, mean	2D and 3D shape	Calculating fractions, ratio and proportion	Fractions
Week 4	Mental and written multiplication (time)	Measurement – length, including perimeter and mass	Calculating with fractions	Area, perimeter and volume of shapes	Coordinates, translation and reflection	Place value and decimals
Week 5	Mental and written division	Measurement – area and volume	Mental and written division	Statistics – line graphs and pie charts	Algebra and sequences	2D and 3D shape
Week 6	2D and 3D shape	Assess and review week	Mental and written multiplication	Assess and review week	Measurement (length and time) and statistics - mean	Assess and review week

		Year 6 Autumn 1	
	Links to domain & progression	**Skills**	**Knowledge**
Week 1 *Place value including decimals*	6N2 6N3 6N4 6N5 6F9a 6N6	• Identify, represent and estimate numbers using the number line. • 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.* • *Recall and use addition and subtraction facts for 1 (with decimal numbers to two decimal places).* • *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 $\frac{1}{10}$s, one $\frac{1}{10}$ is the same as $\frac{10}{100}$s and that $\frac{1}{100}$ is the same as $\frac{10}{1000}$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.
Week 2 *Mental and written addition*	6C6 6C4 6C8 6A1 6A4 6C3 6F10	• Perform mental calculations, including with mixed operations and large numbers and decimals. • *Identify, represent and estimate numbers using the number line.* • *Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method).* • *Select a mental strategy appropriate for the numbers involved in the calculation.* • Solve addition multi-step problems in contexts, deciding which operations and methods to use and why. • Solve problems involving addition. • Express missing number problems algebraically. • Find pairs of numbers that satisfy an equation with two unknowns. • Use estimation and inverse to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy. • *Add whole numbers and decimals using formal written methods (columnar addition).* • 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.
Week 3 *Mental and written subtraction*	6C6 6C4 6C8 6A1 6A4 6C3 6F10	• Perform mental calculations, including with mixed operations and large numbers and decimals. • *Identify, represent and estimate numbers using the number line.* • *Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method).* • *Select a mental strategy appropriate for the numbers involved in the calculation.* • Solve subtraction multi-step problems in contexts, deciding which operations and methods to use and why. • Solve problems involving subtraction. • Express missing number problems algebraically. • Find pairs of numbers that satisfy an equation with two unknowns. • Use estimation and inverse to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy. • *Subtract whole numbers and decimals using formal written methods (columnar 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.
Week 4 *Mental and written multiplication in the context of time*	6C7a 6F9b 6C6	• 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 and decimals. • *Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method).* • *Select a mental strategy appropriate for the numbers involved in the calculation.*	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.

	6C8 6A1 6A4 6M5 6C3 6F10	• 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 and inverse 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.	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.
Week 5 *Mental and written division*	6C6 6C7b 6C7c 6F9c 6C8 6F10 6C3	• Perform mental calculations, including with mixed operations and large numbers and decimals. • 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. • *Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method).* • Solve problems involving division. • Solve problems which require answers to be rounded to specified degrees of accuracy. • Use estimation and inverse 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.
Week 6 *2D and 3D shape*	6G3a 6G3b 6G2b 6G2a 6G4a	• 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. • *Continue to complete and interpret information in a variety of sorting diagrams (including those used to sort properties of numbers and shapes).*	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	
	Links to domain & progression	**Skills**	**Knowledge**
Week 1 *Fractions*	6C5 6F3 6F4 6F6 6F11	• 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. $\frac{3}{8}$). • Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts. • *Solve problems involving fractions.*	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.
Week 2 *Fractions, percentages, ratio and proportion*	6F11 6R1 6R2 6R3 6R4	• 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 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.
Week 3 *Geometry – angles* *Statistics – pie charts*	6G4b 6S1	• 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.
Week 4 *Measurement – length, including perimeter and mass*	6M9 6M5 6M6	• Solve problems involving the calculation and conversion of units of measure (including money and time), 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.
Week 5 *Measurement – area and volume*	6M7a 6M7b 6M5 6M7c 6M8b 6M8a	• 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 (cm³) and cubic metres (m³) and extending to other units (for example, mm³ and km³).	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 $\frac{1}{2}$ (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.
Week 6		Assess and review week	It is useful at regular intervals for teachers to consider the learning that has taken place over a term (or half term), assess and review children's understanding of the learning and use this to inform where the children need to go next.

		Year 6 Spring 1	
	Links to domain & progression	**Skills**	**Knowledge**
Week 1 *Place value, sequences and coordinates*	6A2 6A3 6P3	• *Count forwards or backwards in steps of integers, decimals or powers of 10 for any number.* • *Describe and extend number sequences including those with multiplication and division steps, inconsistent steps, alternating steps and those where the step size is a decimal.* • Use simple formulae. • Generate and describe linear number sequences. • Describe positions on the full coordinate grid (all four quadrants).	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.
Week 2 *2D shape, coordinates, translation and reflection*	6P3 6P2	• 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.
Week 3 *Measurement, temperature and mean*	6N5 6S3	• 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.
Week 4 *Calculating with fractions*	6C5 6F2 6F4 6F5a 6F5b 6F6	• 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. $\frac{3}{8}$).	Children use knowledge of multiplication facts to identify factors and multiples of different numbers. In doing so, they 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.
Week 5 *Mental and written division*	6C7b 6C7c 6F9c 6F10	• 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. • *Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method).* • 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.
Week 6 *Mental and written multiplication*	6C7a 6F9b 6F10 6A5	• 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. • *Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method).* • *Select a mental strategy appropriate for the numbers involved in the calculation.* • Solve problems which require answers to be rounded to specified degrees of accuracy. • Enumerate possibilities of combinations of two variables.	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. Children should explore finding all possibilities problems when there are two variables e.g. using the two variables of colour and parts of a house, how many different houses are possible if the walls, roof and door can be either red, blue or yellow. When all combinations have been found, then the children should identify and generalise about the number of combinations and the choices for each variable. 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.

		Year 6 Spring 2	
	Links to domain & progression	**Skills**	**Knowledge**
Week 1 *Mental and written addition and subtraction*	 6C8 6C4 6C9	• *Identify, represent and estimate numbers using the number line.* • *Add and subtract whole numbers and decimals using formal written methods (columnar addition and subtraction).* • *Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method).* • *Select a mental strategy appropriate for the numbers involved in the calculation.* • 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.
Week 2 *Measurement, ratio and proportion*	6R3 6M5 6M9 6R1 6R2 6R4	• 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 (including money and time), 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.
Week 3 *2D and 3D shape*	6G3a 6G3b 6G2b 6G2a 6G4a 6G5 6G4b	• 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. • *Continue to complete and interpret information in a variety of sorting diagrams (including those used to sort properties of numbers and shapes).* • 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.
Week 4 *Area, perimeter and volume of shapes*	6M7a 6M7c 6M8b 6M7b 6M8a	• 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.
Week 5 *Statistics – line graphs and pie charts*	6M6 6S1	• 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.
Week 6		Assess and review week.	It is useful at regular intervals for teachers to consider the learning that has taken place over a term (or half term), assess and review children's understanding of the learning and use this to inform where the children need to go next.

	Links to domain & progression	Skills	Knowledge

<table>
<tr><th colspan="4" align="center">Year 6 Summer 1</th></tr>
<tr><th></th><th>Links to domain & progression</th><th>Skills</th><th>Knowledge</th></tr>
<tr>
<td>Week 1
<i>Place value, decimals and fractions</i></td>
<td>

6F2

6F3

6F4

6F6</td>
<td>

<i>Count forwards or backwards in steps of integers, decimals or powers of 10 for any number.</i>
<i>Order and compare numbers including integers, decimals and negative numbers.</i>
<i>Identify, represent and estimate numbers using the number line.</i>
<i>Find 0.001, 0.01, 0.1, 1, 10 and powers of 10 more or less than a given number.</i>
<i>Round decimals with three places to the nearest whole number or one or two decimal places.</i>
Use common factors to simplify fractions; use common multiples to express fractions in the same denomination.
Compare and order fractions, including fractions >1 <i>(including on a number line)</i>.
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. $\frac{3}{8}$)

</td>
<td>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.</td>
</tr>
<tr>
<td>Week 2
<i>Mental and written calculation</i></td>
<td>6C6

6C4

6C8

6C9

6C7a

6C7b

6C7c

6C3</td>
<td>

Perform mental calculations, including with mixed operations and large numbers and decimals.
<i>Identify, represent and estimate numbers using the number line.</i>
<i>Add and subtract whole numbers and decimals using formal written methods (columnar addition and subtraction).</i>
<i>Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method).</i>
<i>Select a mental strategy appropriate for the numbers involved in the calculation.</i>
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 and inverse to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.

</td>
<td>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.</td>
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<tr>
<td>Week 3
<i>Calculating fractions, ratio and proportion</i></td>
<td>6F5a

6F5b

6R1

6R2

6R3

6R4</td>
<td>

Multiply simple pairs of proper fractions, writing the answer in its simplest form <i>(using diagram)</i> (e.g. $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$).
Divide proper fractions by whole numbers <i>(using diagram)</i> (e.g. $\frac{1}{3} \times 2 = \frac{1}{6}$).
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.

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<td>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.</td>
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<tr>
<td>Week 4
<i>2D shape, coordinates, translation and reflection</i></td>
<td>6G3a
6P3

6P2</td>
<td>

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.

</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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<tr>
<td>Week 5
<i>Algebra and sequences</i></td>
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<td>

<i>Describe and extend number sequences including those with multiplication and division steps, inconsistent steps, alternating steps and those where the step size is a decimal.</i>

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<td>Children can use the work from the previous week on to explore relationships between the coordinates of</td>
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</table>

	6A2 6A3 6M6	• Use simple formulae. • Generate and describe linear number sequences. • Convert between miles and kilometres.	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.
Week 6 *Measurement (length and time) and statistics – mean*	6M9 6M5 6S3	• Solve problems involving the calculation and conversion of units of measure (including money and time), 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.

		Year 6 Summer 2	
	Links to domain & progression	**Skills**	**Knowledge**
Week 1 *Measurement – mass and volume/capacity*	6M9 6M5 6M8a	• Solve problems involving the calculation and conversion of units of measure (including money and time), 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.
Week 2 *Mental and written calculations*	6C6 6C4 6C8 6C9 6C7a 6C7b 6C7c 6C3	• Perform mental calculations, including with mixed operations and large numbers and decimals. • *Add and subtract whole numbers and decimals using formal written methods (columnar addition and subtraction).* • *Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method).* • *Select a mental strategy appropriate for the numbers involved in the calculation.* • 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 and inverse 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.
Week 3 *Fractions*	6F2 6F3 6F4 6F5a 6F5b	• 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.
Week 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.* • *Calculate differences in temperature, including those that involve a positive and negative temperature.* • *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.* • *Describe and extend number sequences including those with multiplication and division steps, inconsistent steps, alternating steps and those where the step size is a decimal.*	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.
Week 5 *2D and 3D shape*	6G3a 6G3b 6G2b 6G2a 6G4a 6G5 6G4b	• 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. • *Continue to complete and interpret information in a variety of sorting diagrams (including those used to sort properties of numbers and shapes).* • 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.
Week 6		Assess and review week	It is useful at regular intervals for teachers to consider the learning that has taken place over a term (or half term), assess and review children's understanding of the learning and use this to inform where the children need to go next.

Whole School Domain Progression

		Number and place value; approximation and estimation / rounding (KS2)					
Strand	**Early Years outcomes**	**National Curriculum reference Year 1**	**National Curriculum reference Year 2**	**National Curriculum reference Year 3**	**National Curriculum reference Year 4**	**National Curriculum reference Year 5**	**National Curriculum reference Year 6**
N1 Counting (in multiples)	Nursery Outcomes Recite numbers past 5. Say one number name for each item from 1-5. Know that the last number reached when counting a set of objects tells you have many there is in total. Reception Outcomes (ELG) Verbally count beyond 20, recognising the pattern of the counting system.	**1N1a** Count to and across 100, forward and backwards, beginning with 0 or 1, or from any given number **1N1b** Count in multiples of twos, fives and tens	**2N1** Count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward	**3N1b** Count from 0 in multiples of 4, 8, 50 and 100	**4N1** Count in multiples of 6, 7, 9, 25 and 1000	**5N1** Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000	
N2 Read, write, order and compare numbers	Nursery Outcomes Link numerals and amounts: for example, showing the right number of objects to match the numeral, up to 5. Experiment with their own symbols and marks as well as numerals. Reception Outcome Link the number symbol (numeral) with its cardinal number value. (1-10)	**1N2a** Count, read and write numbers to 100 in numerals	**2N2a** Read and write numbers to at least 100 in numerals and in words	**3N2a** Compare and order numbers up to 1000 Read and write numbers to 1000 in numerals and in words	**4N2a** Order and compare numbers beyond 1000	**5N2** Read, write, order and compare numbers to at least 1 000 000	**6N2** Read, write, order and compare numbers up to 10 000 000
	Nursery Outcomes Compare quantities saying 'lots' 'more' and 'same'. Reception Outcomes (ELG) Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity.	**1N2b** Given a number, identify one more and one less **1N2c** Read and write numbers from 1 to 20 in numerals and words	**2N2b** Compare and order numbers from 0 up to 100; use <, > and = signs	**3N2b** Find 10 or 100 more or less than a given number	**4N2b** Find 1000 more or less than a given number		
N3 Place value; Roman numerals			**2N3** Recognise the place value of each digit in a two-digit number (tens, ones)	**3N3** Recognise the place value of each digit in a three-digit number (hundreds, tens, ones)	**4N3a** Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens and ones)	**5N3a** Determine the value of each digit in numbers up to 1 000 000	**6N3** Determine the value of each digit in numbers up to 10 000 000
					4N3b Read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the	**5N3b** Read Roman numerals to1000 (M) and recognise years written in Roman numerals	

Strand	Early Years outcomes	National Curriculum reference Year 1	National Curriculum reference Year 2	National Curriculum reference Year 3	National Curriculum reference Year 4	National Curriculum reference Year 5	National Curriculum reference Year 6
					concept of zero and place value		
N4 Identify, represent and estimate; rounding	Nursery Outcomes Show 'finger numbers' up to 5. Subitise up to 3 objects. Link numerals and amounts: for example, showing the right number of objects up to 5. Reception Outcome (ELG) Link numeral with cardinal number value (1-10) Subitise (recognise quantities without counting) up to 5	**1N4** Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least	**2N4** Identify, represent and estimate numbers using different representations, including the number line	**3N4** Identify, represent and estimate numbers using different representations	**4N4a** Identify, represent and estimate numbers using different representations	**5N4** Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000	**6N4** Round any whole number to a required degree of accuracy
					4N4b Round any number to the nearest 10, 100 or 1000		
N5 Negative numbers					**4N5** Count backwards through zero to include negative numbers	**5N5** Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero	**6N5** Use negative numbers in context, and calculate intervals across zero
N6 Number problems			**2N6** Use place value and number facts to solve problems	**3N6** Solve number problems and practical problems involving **3N1–3N5**	**4N6** Solve number and practical problems that involve **4N1–4N5** and with increasingly large positive numbers	**5N6** Solve number problems and practical problems that involve **5N1–5N5**	**6N6** Solve number problems and practical problems that involve **6N2–6N5**

Addition, subtraction, multiplication and division (calculations)

Strand	Early Years outcomes	National Curriculum reference Year 1	National Curriculum reference Year 2	National Curriculum reference Year 3	National Curriculum reference Year 4	National Curriculum reference Year 5	National Curriculum reference Year 6
C1 Add / subtract mentally	Reception Outcome (ELG) Automatically recall number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.	**1C1** Represent and use number bonds and related subtraction facts within 20	**2C1a** Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100	**3C1** Add and subtract numbers mentally, including: - a three-digit number and ones - a three-digit number and tens - a three-digit number and hundreds		**5C1** Add and subtract numbers mentally with increasingly large numbers	
			2C1b Add and subtract numbers mentally, including: - a two-digit number and ones - a two-digit number and tens - two two-digit numbers - adding three one-digit numbers				
		1C2a	**2C2**	**3C2**	**4C2**	**5C2**	

C2 Add / subtract using written methods		Add and subtract one-digit and two-digit numbers to 20, including zero	Add and subtract numbers using concrete objects and pictorial representations, including: - a two-digit number and ones - a two-digit number and tens - two two-digit numbers -adding three one-digit numbers	Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction	Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate	Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)	
		1C2b Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs					
C3 Estimate, use inverses and check			**2C3** To recognise and use the inverse relationship between addition and subtraction and use this to check calculations and missing number problems	**3C3** Estimate the answer to a calculation and use inverse operations to check answers	**4C3** Estimate and use inverse operations to check answers to a calculation	**5C3** Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy	**6C3** Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy
C4 Add/subtract to solve problems		**1C4** Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = □ – 9	**2C4** Solve problems with addition and subtraction: - using concrete objects and pictorial representations, including those involving numbers, quantities and measures - applying their increasing knowledge of mental and written methods	**3C4** Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction	**4C4** Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why	**5C4** Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why	**6C4** Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
C5 Properties of number (multiples, factors, primes, squares and cubes)						**5C5a** Identify multiples and factors, including finding all factor pairs of a number and common factors of two numbers	**6C5** Identify common factors, common multiples and prime numbers
						5C5b Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers	
						5C5c Establish whether a number up to 100 is prime and recall prime numbers up to 19	
						5C5d Recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3})	
C6			**2C6** Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables,	**3C6** Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables	**4C6a** Recall multiplication and division facts for multiplication tables up to 12 x 12	**5C6a** Multiply and divide numbers mentally drawing upon known facts	**6C6** Perform mental calculations, including with mixed operations and large numbers

	EYFS	Y1	Y2	Y3	Y4	Y5	Y6
Multiply / divide mentally			including recognising odd and even numbers				
					4C6b 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	**5C6b** Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000	
					4C6c Recognise and use factor pairs and commutativity in mental calculations		
C7 Multiply / divide using written methods			**2C7** Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs	**3C7** Write and calculate mathematical statements for multiplication and division using the multiplication tables that children know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods	**4C7** Multiply two-digit and three-digit numbers by a one-digit number using formal written layout	**5C7a** 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	**6C7a** Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
						5C7b 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	**6C7b** 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
							6C7c 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
C8 Solve problems (commutative, associative, distributive and all four operations)	**Nursery Outcomes** Solve some real-world mathematical problems with numbers up to 5, **Reception Outcomes (ELG)** Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed evenly.	**1C8** 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	**2C8** Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts	**3C8** Solve problems, including missing number problems, involving multiplication and division, including integer scaling problems and correspondence problems in which n objects are connected to m objects	**4C8** 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	**5C8a** Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes	**6C8** Solve problems involving addition, subtraction, multiplication and division
						5C8b	

					Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign	
					5C8c Solve problems involving multiplication and division including scaling by simple fractions and problems involving simple rates	
C9 Order of operations		**2C9a** Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot				**6C9** Use their knowledge of the order of operations to carry out calculations involving the four operations
		2C9b Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot				

Fractions, decimals and percentages

Strand	Early Years outcomes	National Curriculum reference Year 1	National Curriculum reference Year 2	National Curriculum reference Year 3	National Curriculum reference Year 4	National Curriculum reference Year 5	National Curriculum reference Year 6
F1 Recognise, find, write, name and count fractions	**Reception Outcomes** Halving and sharing objects practically.	**1F1a** Recognise, find and name a half as one of two equal parts of an object, shape or quantity	**2F1a** Recognise, find, name and write fractions 1/3, ¼ , 2/4 and ¾ of a length, shape, set of objects or quantity	**3F1a** Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10	**4F1** Count up and down in hundredths; recognise that hundredths arise when dividing an object by a hundred and dividing tenths by ten		
		1F1b Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity	**2F1b** Write simple fractions [e.g.: ½ of 6 = 3]	**3F1b** Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators			
				3F1c Recognise and use fractions as numbers:			

					unit fractions and non-unit fractions with small denominators		
F2 Equivalent fractions			**2F2** Recognise the equivalence of 2/4 and ½	**3F2** Recognise and show, using diagrams, equivalent fractions with small denominators	**4F2** Recognise and show, using diagrams, families of common equivalent fractions	**5F2a** Recognise mixed numbers and improper fractions and convert from one form to the other; write mathematical statements >1 as a mixed number [e.g.: 2/5 + 4/5 = 6/5= 1 1/5]	**6F2** Use common factors to simplify fractions; use common multiples to express fractions in the same denomination
						5F2b Identify name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths	
F3 Comparing and ordering fractions				**3F3** Compare and order unit fractions and fractions with the same denominators		**5F3** Compare and order fractions whose denominators are all multiples of the same number	**6F3** Compare and order fractions, including fractions >1
F4 Add / subtract fractions				3F4 Add and subtract fractions with the same denominator within one whole [e.g.: 5/7 + 1/7= 6/7]	**4F4** Add and subtract fractions with the same denominator	**5F4** Add and subtract fractions with the same denominator and denominators that are multiples of the same number	**6F4** Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
F5 Multiply / divide fractions						**5F5** Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams	**6F5a** Multiply simple pairs of proper fractions, writing the answer in its simplest form [e.g.: ¼ × ½ = 1/8]
							6F5b Divide proper fractions by whole numbers [e.g.: 1/3 ÷ 2 = 1/6]
F6 Fractions / decimals equivalence					**4F6a** Recognise and write decimal equivalents to ¼, ½, 3/4	**5F6a** Read and write decimal numbers as fractions [e.g.: 0.71 = 71/100]	**6F6** Associate a fraction with division to calculate decimal fraction equivalents (e.g.: 0.375) for a simple fraction [e.g.: 3/8]
					4F6b Recognise and write decimal equivalents of any number of tenths or hundredths	**5F6b** Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents	
F7 Rounding decimals [KS2]					**4F7** Round decimals with one decimal place to the nearest whole number	**5F7** Round decimals with two decimal places to the nearest whole number and to one decimal place	

Strand							
F8 Compare and order decimals					**4F8** Compare numbers with the same number of decimal places up to two decimal places	**5F8** Read, write, order and compare numbers with up to three decimal places	
F9 Multiply / divide decimals					**4F9** Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths		**6F9a** Identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places
							6F9b Multiply one-digit numbers with up to two decimal places by whole numbers
							6F9c Use written division methods in cases where the answer has up to two decimal places
F10 Solve problems with fractions and decimals				**3F10** Solve problems that involve 3F1–3F4	**4F10a** Solve problems involving increasingly harder fractions to calculate quantities and fractions to divide quantities, including non-unit fractions where the answer is a whole number	**5F10** Solve problems involving numbers up to three decimal places	**6F10** Solve problems which require answers to be rounded to specified degrees of accuracy
					4F10b Solve simple measure and money problems involving fractions and decimals to two decimal places		
F11 Fractions / decimal / percentage equivalence						**5F11** Recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred'; write percentages as a fraction with denominator hundred, and as a decimal	**6F11** Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts
F12 Solve problems with percentages						**5F12** Solve problems which require knowing percentage and decimal equivalents of ½, ¼, 1/5, 2/5, 4/5 and those fractions with a denominator of a multiple of 10 or 25	
Ratio and proportion							
Strand	**Early Years outcomes**	**National Curriculum reference Year 1**	**National Curriculum reference Year 2**	**National Curriculum reference Year 3**	**National Curriculum reference Year 4**	**National Curriculum reference Year 5**	**National Curriculum reference Year 6**

Strand	Early Years outcomes	National Curriculum reference Year 1	National Curriculum reference Year 2	National Curriculum reference Year 3	National Curriculum reference Year 4	National Curriculum reference Year 5	National Curriculum reference Year 6
R1 Relative sizes, similarity							**6R1** Solve problems involving the relative sizes of two quantities, where missing values can be found by using integer multiplication and division facts
R2 Use of percentages for comparison							**6R2** Solve problems involving the calculation of percentages [e.g.: of measures such as 15% of 360] and the use of percentages for comparison
R3 Scale factors							**6R3** Solve problem involving similar shapes where the scale factor is known or can be found
R4 Unequal sharing and grouping							**6R4** Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples

Algebra							
Strand	**Early Years outcomes**	**National Curriculum reference Year 1**	**National Curriculum reference Year 2**	**National Curriculum reference Year 3**	**National Curriculum reference Year 4**	**National Curriculum reference Year 5**	**National Curriculum reference Year 6**
A1 Missing number problems expressed in algebra							**6A1** Express missing number problems algebraically
A2 Simple formulae expressed in words							**6A2** Use simple formulae
A3 Generate and describe linear number sequences							**6A3** Generate and describe linear number sequences
A4 Number sentences involving two unknowns							**6A4** Find pairs of numbers that satisfy an equation with two unknowns
A5							**6A5**

Enumerate all possibilities of combinations of							Enumerate possibilities of combinations of two variables

Measurement

Strand	Early Years outcomes	National Curriculum reference Year 1	National Curriculum reference Year 2	National Curriculum reference Year 3	National Curriculum reference Year 4	National Curriculum reference Year 5	National Curriculum reference Year 6
M1 Compare, describe and order measures	**Reception Outcomes** Make comparisons between 2 objects relating to their size, length, weight and capacity. **Reception Outcomes** Compare length, weight and capacity.	**1M1** Compare, describe and solve practical problems for: - lengths and heights [e.g.: long/short, longer/ shorter, tall/short, double/half] - mass/weight [e.g.: heavy/light, heavier than, lighter than] - capacity and volume [e.g.: full/empty, more than, less than, half, half full, quarter] - time [e.g.: quicker, slower, earlier, later]	**2M1** Compare and order lengths, mass, volume/ capacity and record the results using >, < and =	**3M1a** Compare lengths(m/cm/mm)	**4M1** Compare different measures, including money in pounds and pence		
				3M1b Compare mass (kg/g)			
				3M1c Compare volume / capacity (l/ml)			
M2 Estimate, measure and read scales		**1M2** Measure and begin to record the following: - lengths and heights - mass/weight - capacity and volume - time (hours, minutes, seconds)	**2M2** Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit using rulers, scales, thermometers and measuring vessels	**3M2a** Measure lengths (m/cm/mm)	**4M2** Estimate different measures, including money in pounds and pence		
				3M2b Measure mass (kg/g)			
				3M2c Measure volume / capacity (l/ml)			
M3 Money	**Reception Outcome** To use everyday language related to money.	**1M3** Recognise and know the value of different denominations of coins and notes	**2M3a** Recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value				
			2M3b Find different combinations of coins that equal the same amounts of money				
M4	**Reception Outcome** To use everyday language related to time.	**1M4a** Tell the time to the hour and half past the hour and draw	**2M4a** Tell and write the time to five minutes, including quarter	**3M4a**	**4M4a**		

Telling time, ordering time, duration and units of time		the hands on a clock face to show these times	past/to the hour and draw the hands on a clock face to show these times	Tell and write the time from an analogue clock; 12-hour clocks	Read, write and convert time between analogue and digital 12-hour clocks		
		1M4b Sequence events in chronological order using language [e.g.: before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]	**2M4b** Compare and sequence intervals of time	**3M4b** Tell and write the time from an analogue clock; 24-hour clocks	**4M4b** Read, write and convert time between analogue and digital 24-hour clocks		
		1M4c Recognise and use language relating to dates, including days of the week, weeks, months and years	**2M4c** Know the number of minutes in an hour and the number of hours in a day	**3M4c** Tell and write the time from an analogue clock, including using Roman numerals from I to XII	**4M4c** Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days	**5M4** Solve problems involving converting between units of time	
				3M4d Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock/a.m./p.m., morning, afternoon, noon and midnight			
				3M4e Know the number of seconds in a minute and the number of days in each month, year and leap year			
				3M4f Compare durations of events, [e.g.: to calculate the time taken by particular events or tasks]			
M5 Convert between metric units					**4M5** Convert between different units of measurement [e.g.: kilometre to metre; hour to minute]	**5M5** Convert between different units of metric measure [e.g.: kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre]	**6M5** 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 of up to three decimal places
M6 Convert metric/imperial						**5M6** Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints	**6M6** Convert between miles and kilometres
M7 Perimeter, area				**3M7** Measure the perimeter of simple 2–D shapes	**4M7a** Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres	**5M7a** Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres	**6M7a** Recognise that shapes with the same areas can have different perimeters and vice versa

				4M7b Find the area of rectilinear shapes by counting squares	**5M7b** Calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm²) and square metres (m²) and estimate the area of irregular shapes	**6M7b** Calculate the area of parallelograms and triangles
						6M7c Recognise when it is possible to use the formulae for the area of shapes
M8 Volume					**5M8** Estimate volume [e.g.: using 1cm3 blocks to build cuboids (including cubes)] and capacity [e.g.: using water]	**6M8a** Calculate, estimate and compare volume of cubes and cuboids using standard units, including centimetre cubed (cm³) and cubic metres (m³), and extending to other units [e.g.: mm³ and km³]
						6M8b Recognise when it is possible to use the formulae for the volume of shapes
M9 Solve problems (a: money; b: length; c: mass / weight; d: capacity / volume)		**2M9** Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change	**3M9a** Add and subtract amounts of money to give change, using both £ and p in practical contexts	**4M9** Calculate different measures, including money in pounds and pence	**5M9a** Use all four operations to solve problems involving measure [money] using decimal notation, including scaling	**6M9** Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate
			3M9b Add and subtract lengths (m/cm/mm)		**5M9b** Use all four operations to solve problems involving measure [e.g.: length] using decimal notation, including scaling	
			3M9c Add and subtract mass (kg/g)		**5M9c** Use all four operations to solve problems involving measure [e.g.: mass] using decimal notation, including scaling	
			3M9d Add and subtract volume / capacity (l/ml)		**5M9d** Use all four operations to solve problems involving measure [e.g.: volume] using decimal notation, including scaling	

Geometry: properties of shape

Strand	Early Years outcomes	National Curriculum reference Year 1	National Curriculum reference Year 2	National Curriculum reference Year 3	National Curriculum reference Year 4	National Curriculum reference Year 5	National Curriculum reference Year 6
G1 Recognise and name common shapes	Beginning to talk about the shapes of everyday objects, e.g. 'round' and 'tall'. Shows interest in shape by sustained construction activity or by talking about shapes or arrangements. Talk about and explore 2D and 3D shapes (for example, circles, rectangles, triangles and cuboids) using informal and mathematical language: 'sides', 'corners', 'straight', 'flat'.	**1G1a** Recognise and name common 2-D shapes [e.g.: rectangles (including squares), circles and triangles]	**2G1a** Compare and sort common 2-D shapes and everyday objects				
		1G1b Recognise and name common 3-D shapes [e.g.: cuboids (including cubes), pyramids and spheres]	**2G1b** Compare and sort common 3-D shapes and everyday objects				
G2 Describe properties and classify shapes			**2G2a** Identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line	**3G2** Identify horizontal, vertical lines and pairs of perpendicular and parallel lines	**4G2a** Compare and classify geometric shapes, including quadrilaterals and triangles based on their properties and sizes	**5G2a** Use the properties of rectangles to deduce related facts and find missing lengths and angles	**6G2a** Compare and classify geometric shapes based on their properties and sizes
			2G2b Identify and describe the properties of 3-D shapes including the number of edges, vertices and faces		**4G2b** Identify lines of symmetry in 2–D shapes presented in different orientations	**5G2b** Distinguish between regular and irregular polygons based on reasoning about equal sides and angles	**6G2b** Describe simple 3–D shapes
					4G2c Complete a simple symmetric figure with respect to a specific line of symmetry		
G3 Draw and make shapes and relate 2-D to 3-D shapes (including nets)			**2G3** Identify 2-D shapes on the surface of 3-D shapes, [e.g.: a circle on a cylinder and a triangle on a pyramid]	**3G3a** Draw 2–D shapes			**6G3a** Draw 2–D shapes using given dimensions and angles
				3G3b Make 3–D shapes using modelling materials; recognise 3–D shapes in different orientations and describe them		**5G3b** Identify 3–D shapes including cubes and other cuboids, from 2–D representations	**6G3b** Recognise and build simple 3D shapes, including making nets
G4 Angles – measuring and properties				**3G4a** Recognise that angles are a property of shape or a description of a turn	**4G4** Identify acute and obtuse angles and compare and order angles up to two right angles by size	**5G4a** Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles	**6G4a** Find unknown angles in any triangles, quadrilaterals and regular polygons
				3G4b Identify right angles, recognise that two right		**5G4b** Identify:	**6G4b** Recognise angles where they meet at a point, are on a

				angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle		- angles at a point and one whole turn (total 360°) - angles at a point on a straight line and ½ a turn (total 180°) - other multiples of 90°	straight line, or are vertically opposite, and find missing angles
						5G4c Draw given angles and measure them in degrees (°)	
G5 Circles							**6G5** Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius

Geometry: position and direction

Strand	Early Years outcomes	National Curriculum reference Year 1	National Curriculum reference Year 2	National Curriculum reference Year 3	National Curriculum reference Year 4	National Curriculum reference Year 5	National Curriculum reference Year 6
P1 Patterns	Talk about patterns in the environment. For example, stripes on clothes. Use informal language like 'pointy', 'spotty'. Continue, copy and create repeating patterns.		**2P1** Order and arrange combinations of mathematical objects in patterns and sequences				
P2 Describe position, direction and movement	Understand positional language with focus on under, over, behind, infront, forwards, backwards.	**1P2** Describe position, directions and movement, including half, quarter and three-quarter turns	**2P2** Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clock-wise and anti-clockwise)		**4P2** Describe movements between positions as translations of a given unit to the left/right and up/down	**5P2** Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed	**6P2** Draw and translate simple shapes on the co-ordinate plane, and reflect them in the axes
P3 Coordinates					**4P3a** Describe positions on a 2–D grid as co-ordinates in the first quadrant		**6P3** Describe positions on the full co-ordinate grid (all four quadrants)
					4P3b Plot specified points and draw sides to complete a given polygon		

Statistics

Strand	Early Years outcomes	National Curriculum reference Year 1	National Curriculum reference Year 2	National Curriculum reference Year 3	National Curriculum reference Year 4	National Curriculum reference Year 5	National Curriculum reference Year 6
S1 Interpret and represent data			**2S1** Interpret and construct simple pictograms, tally charts, block diagrams and simple tables	**3S1** Interpret and present data using bar charts, pictograms and tables	**4S1** Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs	**5S1** Complete, read and interpret information in tables, including timetables	**6S1** Interpret and construct pie charts and line graphs and use these to solve problems
S2 Solve problems involving data			**2S2a** Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity	**3S2** Solve one-step and two step questions [e.g.: 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts, pictograms and tables	**4S2** Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs	**5S2** Solve comparison, sum and difference problems using information presented in a line graph	
			2S2b Ask and answer questions about totalling and comparing categorical data				
S3 Mean average							**6S3** Calculate and interpret the mean as an average

National Curriculum

Year 6 programme of study

Number – number and place value

Statutory requirements

Pupils should be taught to:
- 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;
- solve number and practical problems that involve all of the above.

Notes and guidance (non-statutory)
Pupils use the whole number system, including saying, reading and writing numbers accurately.

Number – addition, subtraction, multiplication and division

Statutory requirements

Pupils should be taught to:
- 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;
- 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 estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.

Notes and guidance (non-statutory)
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 x 3 = 5 and (2 + 1) x 3 = 9.

Common factors can be related to finding equivalent fractions.

Number – fractions (including decimals and percentages)

Statutory requirements

Pupils should be taught to:
- use common factors to simplify fractions; use common multiples to express fractions in the same denomination;
- compare and order fractions, including fractions > 1;
- 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 [for example, $\frac{1}{4}$ x $\frac{1}{2}$ = $\frac{1}{8}$];
- divide proper fractions by whole numbers [for example, $\frac{1}{3}$ ÷ 2 = $\frac{1}{6}$;
- associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $\frac{3}{8}$];
- 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;
- multiply one-digit numbers with up to two decimal places by whole numbers;
- 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;
- recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

Notes and guidance (non-statutory)

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 $\frac{1}{4}$ of a length is 36cm, then the whole length is 36 × 4 = 144cm).

They practise calculations with simple fractions and decimal fraction equivalents to aid fluency, including listing equivalent fractions to identify fractions with common denominators.

Pupils can explore and make conjectures about converting a simple fraction to a decimal fraction (for example, 3 ÷ 8 = 0.375). 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 0.4 × 2 = 0.8, and in practical contexts, such as measures and money.

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.

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.

Ratio and proportion

Statutory requirements

Pupils should be taught to:
- 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.

Notes and guidance (non-statutory)

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° 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.

Algebra

Statutory requirements

Pupils should be taught to:
- use simple formulae;
- generate and describe linear number sequences;
- express missing number problems algebraically;
- find pairs of numbers that satisfy an equation with two unknowns;
- enumerate possibilities of combinations of two variables.

Notes and guidance (non-statutory)

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:
- missing numbers, lengths, coordinates and angles;
- formulae in mathematics and science;
- equivalent expressions (for example, *a + b = b + a*);
- generalisations of number patterns;
- number puzzles (for example, what two numbers can add up to).

Measurement

Statutory requirements

Pupils should be taught to:
- 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, 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;
- convert between miles and kilometres;
- recognise that shapes with the same areas can have different perimeters and vice versa;
- recognise when it is possible to use 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].

Notes and guidance (non-statutory)

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.
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.

Pupils could be introduced to compound units for speed, such as miles per hour, and apply their knowledge in science or other subjects as appropriate.

Geometry – properties of shapes

Statutory requirements

Pupils should be taught to:
- 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.

Notes and guidance (non-statutory)

Pupils draw shapes and nets accurately, using measuring tools and conventional markings and labels for lines and angles.

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, $d = 2 \times r$; $a = 180 - (b + c)$.

Geometry – position and direction

Statutory requirements

Pupils should be taught to:

- 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.

Notes and guidance (non-statutory)

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.

Statistics

Statutory requirements

Pupils should be taught to:

- interpret and construct pie charts and line graphs and use these to solve problems;
- calculate and interpret the mean as an average.

Notes and guidance (non-statutory)

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.