



Progression in Maths: Brompton and Sawdon Community Primary School

•encouraging children to build upon their knowledge, understanding and skills from EYFS to Year 6

Developing Mathematicians at Brompton and Sawdon Community Primary School

Our mathematics curriculum will give pupils the opportunity to:

- become **fluent** in the fundamentals of mathematics, through varied and frequent practice so they develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- **reason** mathematically, developing arguments, justifications or proof using mathematical language.
- **solve problems** by applying their mathematics to a variety of problems, breaking down problems into a series of simpler steps and persevering in seeking solutions.
- Develop a **deeper understanding** through employing a **mastery approach**.
- communicate, justify, argue and prove using **mathematical vocabulary**.
- better **make sense of the world around them** by **making connections** between mathematics and everyday life
- be **independent, ask questions, investigate**, be **creative** and **imaginative, present, challenge** and be challenged, as outlined in our **Ready to Fly** Pillar, like Sir George Cayley did on our own village in designing and building the first successful glider.
- **Collaborate, contribute** and **support others** as outlined in our **Family** Pillar
- **Listen** to the methods and ideas of others and **be heard** as outlined in our **Respect** Pillar
- Develop maths skills, wherever possible, **across the curriculum**.

• Special Educational Needs and Disabilities (SEND) Inclusive Provision for Mathematics

- In Mathematics, we look to adopt a mastery approach that enables every child to engage and achieve their full potential and have a deeper understanding of concepts that are taught no matter what their prior ability. Where possible, children should be working towards a common goal and working on the same material which increases in difficulty as the task progresses. Tasks may be scaffolded in different ways to enable learners to understand and progress in knowledge and skills.
- We use a concrete, pictorial and abstract approach to allow a range of learning styles to achieve and see Maths in new ways. This allows children to physically see the Maths in motion and children can relate the manipulation of resources to the extension of abstract ideas and concepts. Planning for these opportunities should be reactive in the planning and adapted to allow for reflection time of concepts and consolidation time of methods. We believe in embracing mistakes to build a good resilience in mathematics and where they are seen as a learning opportunity.
- To enable Mastery, some of the following adaptations may be used:
 - Pre-teaching group work looking at specific vocabulary or concepts in Mathematics that the children may find tricky.
 - Small group support of an adult to guide them through the activities they are given.
 - 1:1 support where and when necessary.
 - Word mats that explain some of the key concepts or vocabulary of Mathematics to help the children understand further.
 - Knowledge organisers to refer back to if they are unsure of a particular concept such as place value knowledge, square number knowledge or fractions.
 - Further resources around the classroom to help further understand concepts such as counters, number fans, beads, place value charts.
 - Adapted worksheets to help with the understanding of wording or explanations.

Early Years

In planning and guiding what children learn, practitioners must reflect on the different rates at which children are developing and adjust their practice appropriately. Three characteristics of effective teaching and learning are:

- playing and exploring - children investigate and experience things, and 'have a go'
 - active learning - children concentrate and keep on trying if they encounter difficulties, and enjoy achievements
 - creating and thinking critically - children have and develop their own ideas, make links between ideas, and develop strategies for doing things
- In addition, the Prime Areas of Learning (Personal, Social and Emotional Development, Communication and Language and Physical Development) underpin and are an integral part of children's learning in all areas.

EYFS Mathematics (Statutory)

Developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically. Children should be able to count confidently, develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers. By providing frequent and varied opportunities to build and apply this understanding - such as using manipulatives, including small pebbles and tens frames for organising counting - children will develop a secure base of knowledge and vocabulary from which mastery of mathematics is built. In addition, it is important that the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures. It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and peers about what they notice and not be afraid to make mistakes.

EYFS Mathematics

Number	Number facts	Numerical Patterns	Measure, Shape and Space	Key vocabulary
<ul style="list-style-type: none"> • Have a deep understanding of number to 10, including the composition of each number; • Subitise (recognise quantities without counting) up to 5 	<ul style="list-style-type: none"> • Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts. 	<ul style="list-style-type: none"> • Verbally count beyond 20, recognising the pattern of the counting system; • Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity; • Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally. 	<ul style="list-style-type: none"> • Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function; including measuring. • Recognise a range of shapes and link items that have the same shape. 	<p>Use enriching and widening children's vocabulary that will support later reading comprehension</p> <p>See vocabulary sheets.</p>
<ul style="list-style-type: none"> • Count • Read and write • Identify • Represent 	<ul style="list-style-type: none"> • Recall • Count • Add • Subtract 	<ul style="list-style-type: none"> • Count • Compare • Explore • Represent 	<ul style="list-style-type: none"> • Use • Explore • Recognise 	<ul style="list-style-type: none"> • Use • Explore

KEY STAGE 1

Purpose of Study

Mathematics is a creative and highly interconnected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

National Curriculum

The principal focus of mathematics teaching in key stage 1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, including with practical resources [for example, concrete objects and measuring tools]. At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money. By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practice at this early stage will aid fluency. Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

KEY STAGE 2

Purpose of Study

Mathematics is a creative and highly interconnected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

National Curriculum

Lower Key Stage 2 - The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the 4 operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers.

At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number.

By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work. Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word-reading knowledge and their knowledge of spelling.

Upper Key Stage 2 - The principal focus of mathematics teaching in upper key stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio. At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems. Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them.

By the end of year 6, pupils should be fluent in written methods for all 4 operations, including long multiplication and division, and in working with fractions, decimals and % Pupils should read, spell and pronounce mathematical vocabulary correctly.

Progression of knowledge of skills – Number and Place Value

Strand	1	2	3	4	5	6
<u>Number and place value</u>	<ul style="list-style-type: none"> • count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number • count, read and write numbers to 100 in numerals; count in multiples of 2s, 5s and 10s • given a number, identify 1 more and 1 less • 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 • read and write numbers from 1 to 20 in numerals and words 	<ul style="list-style-type: none"> • count in steps of 2, 3, and 5 from 0, and in 10s from any number, forward and backward • recognise the place value of each digit in a two-digit number (10s, 1s) • identify, represent and estimate numbers using different representations, including the number line • compare and order numbers from 0 up to 100; use <, > and = signs • read and write numbers to at least 100 in numerals and in words • use place value and number facts to solve problems 	<ul style="list-style-type: none"> • count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number. • recognise the place value of each digit in a 3-digit number (100s, 10s, 1s) • compare and order numbers up to 1,000 • identify, represent and estimate numbers using different representations • read and write numbers up to 1,000 in numerals and in words • solve number problems and practical problems involving these ideas 	<ul style="list-style-type: none"> • count in multiples of 6, 7, 9, 25 and 1,000 • identify 1,000 more or less than a given number • count backwards through 0 to include negative numbers • recognise the place value of each digit in a four-digit number (1,000s, 100s, 10s, and 1s) • order and compare numbers beyond 1,000 • identify, represent and estimate numbers using different representations • round any number to the nearest 10, 100 or 1,000 • solve number and practical problems that involve all of the above and with increasingly large positive numbers • read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of 0 and place value 	<ul style="list-style-type: none"> • read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit • count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000 • interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through 0 • round any number up to 1,000,000 to the nearest 10, 100, 1,000, 10,000 and 100,000 • solve number problems and practical problems that involve all of the above • read Roman numerals to 1,000 (M) and recognise years written in Roman numerals 	<ul style="list-style-type: none"> • 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 0 • solve number and practical problems that involve all of the above
Skills	<ul style="list-style-type: none"> ○ Count ○ Read and write ○ Identify ○ Represent ○ Use 	<ul style="list-style-type: none"> ○ Count ○ Read and write ○ Identify ○ Recognise ○ Represent ○ Use ○ Compare and order 	<ul style="list-style-type: none"> ○ Count ○ Read and write ○ Identify ○ Recognise ○ Represent ○ Use ○ Compare and order ○ Estimate ○ Solve 	<ul style="list-style-type: none"> ○ Count ○ Read and write ○ Identify ○ Recognise ○ Represent ○ Compare and order ○ Estimate ○ Solve ○ Round 	<ul style="list-style-type: none"> ○ Count ○ Read and write ○ Identify ○ Recognise ○ Represent ○ Compare and order ○ Estimate ○ Solve ○ Round ○ Determine ○ Interpret 	<ul style="list-style-type: none"> ○ Read and write ○ Identify ○ Recognise ○ Calculate ○ Compare and order ○ Estimate ○ Solve ○ Round ○ Determine ○ Use

Progression of knowledge of skills – Addition and Subtraction

Strand	1	2	3	4	5	6
<u>Addition and Subtraction</u>	<ul style="list-style-type: none"> • read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs • represent and use number bonds and related subtraction facts within 20 • add and subtract one-digit and two-digit numbers to 20, including 0 • solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = ? - 9$ 	<ul style="list-style-type: none"> • solve problems with addition and subtraction: <ul style="list-style-type: none"> ○ using concrete objects and pictorial representations, including those involving numbers, quantities and measures ○ applying their increasing knowledge of mental and written methods • recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 • add and subtract numbers using concrete objects, pictorial representations, and mentally, including: <ul style="list-style-type: none"> ○ a two-digit number and 1s ○ a two-digit number and 10s ○ 2 two-digit numbers ○ adding 3 one-digit numbers • show that addition of 2 numbers can be done in any order (commutative) and subtraction of 1 number from another cannot • recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems 	<ul style="list-style-type: none"> • add and subtract numbers mentally, including: <ul style="list-style-type: none"> ○ a three-digit number and 1s ○ a three-digit number and 10s ○ a three-digit number and 100s • add and subtract numbers with up to 3 digits, using formal written methods of columnar addition and subtraction • estimate the answer to a calculation and use inverse operations to check answers • solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction 	<ul style="list-style-type: none"> • add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate • estimate and use inverse operations to check answers to a calculation • solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why 	<ul style="list-style-type: none"> • add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) • add and subtract numbers mentally with increasingly large numbers • use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy • solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why 	<ul style="list-style-type: none"> • perform mental calculations, including with mixed operations and large numbers • use their knowledge of the order of operations to carry out calculations involving the 4 operations • solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why • solve problems involving addition and subtraction • use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy
Skills	<ul style="list-style-type: none"> ○ Read and write ○ Interpret ○ Represent ○ Use ○ Add ○ Subtract 	<ul style="list-style-type: none"> ○ Recall ○ Check ○ Represent ○ Use ○ Add ○ Subtract ○ Solve ○ Apply ○ Mental methods ○ Prove (show) ○ Inverse 	<ul style="list-style-type: none"> ○ Add ○ Subtract ○ Use ○ Solve ○ Apply ○ Mental methods ○ Formal methods ○ Prove (show) ○ Inverse ○ Estimate ○ Calculate 	<ul style="list-style-type: none"> ○ Add ○ Subtract ○ Use ○ Solve ○ Apply ○ Mental methods ○ Formal methods ○ Prove/explain (why) ○ Inverse ○ Estimate ○ Calculate ○ Determine/decide 	<ul style="list-style-type: none"> ○ Add ○ Subtract ○ Use ○ Solve ○ Apply ○ Mental methods ○ Formal methods ○ Prove/explain (why) ○ Inverse ○ Estimate ○ Calculate ○ Determine/decide 	<ul style="list-style-type: none"> ○ Add ○ Subtract ○ Use ○ Solve ○ Apply ○ Mental methods ○ Formal methods ○ Prove/explain (why) ○ Inverse ○ Estimate ○ Calculate ○ Determine/decide

Progression of knowledge of skills – Fractions, Decimals and Percentages

Strand	1	2	3	4	5	6
<p>Fractions, decimals and percentages</p>	<ul style="list-style-type: none"> recognise, find and name a half as 1 of 2 equal parts of an object, shape or quantity recognise, find and name a quarter as 1 of 4 equal parts of an object, shape or quantity 	<ul style="list-style-type: none"> recognise, find, name and write fractions third, quarter, two-quarters and three-quarters of a length, shape, set of objects or quantity write simple fractions 	<ul style="list-style-type: none"> 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 recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators recognise and show, using diagrams, equivalent fractions with small denominators add and subtract fractions with the same denominator within one whole compare and order unit fractions, and fractions with the same denominators solve problems that involve all of the above 	<ul style="list-style-type: none"> recognise and show, using diagrams, families of common equivalent fractions count up and down in hundredths; recognise that hundredths arise when dividing an object by 100 and dividing tenths by 10 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 add and subtract fractions with the same denominator recognise and write decimal equivalents of any number of tenths or hundreds recognise and write decimal equivalents to quarter, half and three-quarters 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 round decimals with 1 decimal place to the nearest whole number compare numbers with the same number of decimal places up to 2 decimal places solve simple measure and money problems involving fractions and decimals to 2 decimal places 	<ul style="list-style-type: none"> compare and order fractions whose denominators are all multiples of the same number identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number add and subtract fractions with the same denominator, and denominators that are multiples of the same number multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams read and write decimal numbers as fractions recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents round decimals with 2 decimal places to the nearest whole number and to 1 decimal place read, write, order and compare numbers with up to 3 decimal places solve problems involving number up to 3 decimal places recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per 100', and write percentages as a fraction with denominator 100, and as a decimal fraction solve problems which require knowing percentage and decimal equivalents of half, quarter, fifth, two-fifths, four-fifths and those fractions with denominators of multiples of 10 or 25. 	<ul style="list-style-type: none"> 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 divide proper fractions by whole numbers associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction identify the value of each digit in numbers given to 3 decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers up to 3 decimal places multiply one-digit numbers with up to 2 decimal places by whole numbers use written division methods in cases where the answer has up to 2 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
<p>Skills</p>	<ul style="list-style-type: none"> recognise find name 	<ul style="list-style-type: none"> Recognise Find Name Write 	<ul style="list-style-type: none"> Count Find/Recognise Division Find Write Use/solve Show Add/subtract fractions Compare and order 	<ul style="list-style-type: none"> Count Recognise/identify Division Find Write Use (including diagrams) Show Add/subtract fractions Solve/calculate Compare 	<ul style="list-style-type: none"> Count Recognise/identify Division Find Write Use (including diagrams) Show Add/subtract fractions Solve/calculate Compare/order 	<ul style="list-style-type: none"> Count Recognise/identify/recall Division Find Write Use (including diagrams) Show Add/subtract fractions Solve/calculate Compare/order

Progression of knowledge of skills – Measurement

Strand	1	2	3	4	5	6
Measurement	<ul style="list-style-type: none"> • compare, describe and solve practical problems for: length and heights, mass/weight, capacity and volume, time. • measure and begin to record the following: length and heights, mass/weight, capacity and volume, time. • recognise and know the value of different denominations of coins and notes • sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening] • recognise and use language relating to dates, including days of the week, weeks, months and years • tell the time to the hour and half past the hour and draw the hands on a clock face to show these times 	<ul style="list-style-type: none"> • 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 • compare and order lengths, mass, volume/capacity and record the results using >, < and = • recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value • find different combinations of coins that equal the same amounts of money • solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change • compare and sequence intervals of time • tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times • know the number of minutes in an hour and the number of hours in a day 	<ul style="list-style-type: none"> • measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml) • measure the perimeter of simple 2-D shapes • add and subtract amounts of money to give change, using both £ and p in practical contexts • tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks • 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, am/pm, morning, afternoon, noon and midnight • know the number of seconds in a minute and the number of days in each month, year and leap year • compare durations of events 	<ul style="list-style-type: none"> • convert between different units of measure • measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres • find the area of rectilinear shapes by counting squares • estimate, compare and calculate different measures, including money in pounds and pence • read, write and convert time between analogue and digital 12- and 24-hour clocks • solve problems involving converting from hours to minutes, minutes to seconds, years to months, weeks to days 	<ul style="list-style-type: none"> • convert between different units of metric measure • understand and use approximate equivalences between metric units and common imperial units • measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres • calculate and compare the area of rectangles (including squares), including using standard units, square centimetres (cm²) and square metres (m²), and estimate the area of irregular shapes • estimate volume and capacity • solve problems involving converting between units of time • use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling 	<ul style="list-style-type: none"> • solve problems involving the calculation and conversion of units of measure, using decimal notation up to 3 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 3 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 (cm³) and cubic metres (m³), and extending to other units
Skills	<ul style="list-style-type: none"> ○ Compare and describe ○ Solve ○ Measure ○ Recognise ○ Know ○ Use ○ Sequence ○ Tell the time 	<ul style="list-style-type: none"> ○ Chose and use ○ Estimate and measure ○ Compare and order ○ Recognise ○ Find and know ○ Solve ○ Compare and sequence ○ Tell the time and write times 	<ul style="list-style-type: none"> ○ Measure ○ Compare ○ Tell and write the time ○ Estimate ○ Know 	<ul style="list-style-type: none"> ○ Measure ○ Compare ○ Read, tell and write the time ○ Estimate ○ Convert ○ Solve ○ Calculate 	<ul style="list-style-type: none"> ○ Measure ○ Compare ○ Read, tell and write the time ○ Estimate ○ Convert ○ Solve ○ Calculate 	<ul style="list-style-type: none"> ○ Use, read and write ○ Compare ○ Convert ○ Estimate ○ Convert ○ Solve ○ Recognise ○ Calculate

Progression of knowledge of skills – Geometry

Strand	1	2	3	4	5	6
<u>Geometry – Properties of shapes</u>	<ul style="list-style-type: none"> ● recognise and name common 2-D and 3-D shapes, including: <ul style="list-style-type: none"> ○ 2-D shapes [for example, rectangles (including squares), circles and triangles] ○ 3-D shapes [for example, cuboids (including cubes), pyramids and spheres] 	<ul style="list-style-type: none"> ● identify and describe the properties of 2-D shapes, including the number of sides, and line symmetry in a vertical line ● identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces ● identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid] ● compare and sort common 2-D and 3-D shapes and everyday objects 	<ul style="list-style-type: none"> ● draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them ● recognise angles as a property of shape or a description of a turn ● identify right angles, recognise that 2 right angles make a half-turn, 3 make three-quarters of a turn and 4 a complete turn; identify whether angles are greater than or less than a right angle ● identify horizontal and vertical lines and pairs of perpendicular and parallel lines 	<ul style="list-style-type: none"> ● compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes ● identify acute and obtuse angles and compare and order angles up to 2 right angles by size ● identify lines of symmetry in 2-D shapes presented in different orientations ● complete a simple symmetric figure with respect to a specific line of symmetry 	<ul style="list-style-type: none"> ● identify 3-D shapes, including cubes and other cuboids, from 2-D representations ● know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles ● draw given angles, and measure them in degrees (°) ● identify: <ul style="list-style-type: none"> ○ angles at a point and 1 whole turn (total 360°) ○ angles at a point on a straight line and half a turn (total 180°) ○ other multiples of 90° ● use the properties of rectangles to deduce related facts and find missing lengths and angles ● distinguish between regular and irregular polygons based on reasoning about equal sides and angles 	<ul style="list-style-type: none"> ● 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
<u>Geometry – Position and direction</u>	<ul style="list-style-type: none"> ● describe position, direction and movement, including whole, half, quarter and three-quarter turns 	<ul style="list-style-type: none"> ● order and arrange combinations of mathematical objects in patterns and sequences ● 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 (clockwise and anti-clockwise) 	<ul style="list-style-type: none"> ● Pupils connect decimals and rounding to drawing and measuring straight lines in centimetres, in a variety of contexts. (Non-statutory) 	<ul style="list-style-type: none"> ● describe positions on a 2-D grid as coordinates in the first quadrant ● describe movements between positions as translations of a given unit to the left/right and up/down ● plot specified points and draw sides to complete a given polygon 	<ul style="list-style-type: none"> ● 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 	<ul style="list-style-type: none"> ● describe positions on the full coordinate grid (all 4 quadrants) ● draw and translate simple shapes on the coordinate plane, and reflect them in the axes
Skills	<ul style="list-style-type: none"> ○ Recognise ○ Name ○ Describe 	<ul style="list-style-type: none"> ○ Identify ○ Describe ○ Compare ○ Sort ○ Order and arrange ○ Use ○ Distinguish 	<ul style="list-style-type: none"> ○ Draw ○ Recognise ○ Identify ○ Connect 	<ul style="list-style-type: none"> ○ Classify ○ Compare ○ Identify ○ Complete symmetry ○ Describe ○ Plot 	<ul style="list-style-type: none"> ○ Draw and know ○ Recognise and describe ○ Build ○ Compare and classify ○ Illustrate and name ○ Distinguish ○ Represent 	<ul style="list-style-type: none"> ○ Draw ○ Recognise and describe ○ Build ○ Compare and classify ○ Illustrate and name ○ translate

Progression of knowledge of skills – Multiplication and Division

Strand	1	2	3	4	5	6
<p>Multiplication and Division</p>	<p>solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher</p>	<ul style="list-style-type: none"> • recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers • calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (\times), division (\div) and equals ($=$) signs • show that multiplication of 2 numbers can be done in any order (commutative) and division of 1 number by another cannot • solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts 	<ul style="list-style-type: none"> • recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables • write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods • solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects 	<ul style="list-style-type: none"> • recall multiplication and division facts for multiplication tables up to 12×12 • use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together 3 numbers • recognise and use factor pairs and commutativity in mental calculations • multiply two-digit and three-digit numbers by a one-digit number using formal written layout • solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by 1 digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects 	<ul style="list-style-type: none"> • identify multiples and factors, including finding all factor pairs of a number, and common factors of 2 numbers • know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers • establish whether a number up to 100 is prime and recall prime numbers up to 19 • multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers • multiply and divide numbers mentally, drawing upon known facts • divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context • multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000 • recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3) • solve problems involving the four operations, including using their knowledge of factors and multiples, squares and cubes; including scaling by simple fractions and problems involving simple rates 	<ul style="list-style-type: none"> • multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication • divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context • divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context • perform mental calculations, including with mixed operations and large numbers • identify common factors, common multiples and prime numbers • use their knowledge of the order of operations to carry out calculations involving the 4 operations • solve problems involving multiplication and division • use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy
<p>Skills</p>	<p>Solve Represent Multiplication Division Calculate</p>	<ul style="list-style-type: none"> ○ Recall ○ Use ○ Multiplication ○ Division ○ Recognise ○ Write ○ Show ○ Solve 	<ul style="list-style-type: none"> ○ Recall ○ Multiplication ○ Division ○ Recognise ○ Write ○ Formal/mental methods ○ Scaling ○ Solve ○ Calculate 	<ul style="list-style-type: none"> ○ Recall ○ Multiplication ○ Division ○ Recognise ○ Write ○ Formal/mental methods ○ Scaling ○ Solve ○ Calculate 	<ul style="list-style-type: none"> ○ Identify ○ Multiplication ○ Division ○ Recognise ○ Know and use ○ Formal/mental methods ○ Scaling ○ Solve ○ Calculate 	<ul style="list-style-type: none"> ○ Identify ○ Multiplication ○ Division ○ Recognise ○ Know and use ○ Formal/mental methods ○ Scaling ○ Solve ○ Estimate/calculate/check

Progression of knowledge of skills – Extra Units

Strand	1	2	3	4	5	6
<p><u>Extra units – Statistics (Y2, 3, 4, 5 and 6)</u> <u>Ratio and proportion – Y6 ONLY</u> <u>Algebra – Year 6 ONLY</u></p>	N/A	<ul style="list-style-type: none"> interpret and construct simple pictograms, tally charts, block diagrams and tables ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity ask-and-answer questions about totalling and comparing categorical data 	<ul style="list-style-type: none"> interpret and present data using bar charts, pictograms and tables solve one-step and two-step questions [for example 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables 	<ul style="list-style-type: none"> interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs 	<ul style="list-style-type: none"> solve comparison, sum and difference problems using information presented in a line graph complete, read and interpret information in tables, including timetables 	<p><u>Statistics</u></p> <ul style="list-style-type: none"> interpret and construct pie charts and line graphs and use these to solve problems calculate and interpret the mean as an average <p><u>Algebra</u></p> <ul style="list-style-type: none"> use simple formulae generate and describe linear number sequences express missing number problems algebraically find pairs of numbers that satisfy an equation with 2 unknowns enumerate possibilities of combinations of 2 variables <p><u>Ratio and Proportion</u></p> <ul style="list-style-type: none"> solve problems involving the relative sizes of 2 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
	Skills		<ul style="list-style-type: none"> ○ Interpret ○ Construct ○ Ask and answer 	<ul style="list-style-type: none"> ○ Interpret ○ Present ○ Solve 	<ul style="list-style-type: none"> ○ Interpret ○ Present ○ Solve 	<ul style="list-style-type: none"> ○ Complete ○ Read ○ Interpret ○ Solve