Mathematics Progression: Understanding the EYFS to KS1 progression

Organisation of knowledge	Number	Measurement	Geometry
Relevant ELG	**ELG: Number** - Have a deep understanding of number to 10, including the composition of each number - Subitise (recognise quantities without counting) up to 5 - Automatically recall (without reference to rhymes, counting and other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts. **ELG: Number patterns** - 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		
KS1 readiness objective	- To count confidently - To show a deep understanding of numbers up to 10 - To match numerals with a group of objects to show how many there are (up to 10) - To be able to identify relationships and patterns between numbers up to 10 - To show an awareness that numbers are made up of smaller numbers, exploring partitioning in different ways - To add and subtract one in practical activities	- To measure themselves and everyday objects using a mixture of non-standard and standard measurements - To develop spatial reasoning using measures - To begin to order and sequence events using everyday language related to time - To begin to measure time with timers (e.g. digital stopwatches and sand timers) and calendars - To explore the use of different measuring tools in everyday experiences and play	- To use informal language (e.g. heart-shaped, hand-shaped) and some mathematical language to describe shapes around them - To use spatial language, including following and giving directions, using relative terms - To develop spatial reasoning with shape and space - To compose and decompose shapes, and understanding which shapes can combine together to make another shape

Mathematics Progression: National Curriculum Programme of Study

Purpose of study

Mathematics is a creative and highly inter-connected 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.

Aims of the National Curriculum

The national curriculum for mathematics aims to ensure that all pupils:
- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can solve problems by applying their mathematics to a variety of routine and non- routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects.

The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

Information and communication technology (ICT)

Calculators should not be used as a substitute for good written and mental arithmetic. They should therefore only be introduced near the end of key stage 2 to support pupils' conceptual understanding and exploration of more complex number problems, if written and mental arithmetic are secure. In both primary and secondary schools, teachers should use their judgement about when ICT tools should be used.

Spoken language
The national curriculum for mathematics reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their mathematical vocabulary and presenting a mathematical justification, argument or proof. They must be assisted in making their thinking clear to themselves as well as others and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

School curriculum
The programmes of study for mathematics are set out year-by-year for key stages 1 and 2. Schools are, however, only required to teach the relevant programme of study by the end of the key stage. Within each key stage, schools therefore have the flexibility to introduce content earlier or later than set out in the programme of study. In addition, schools can introduce key stage content during an earlier key stage, if appropriate. All schools are also required to set out their school curriculum for mathematics on a year-by-year basis and make this information available online.

Attainment targets
By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.
Schools are not required by law to teach the example content in [square brackets] or the content indicated as being 'non-statutory'.

Mathematics Progression: Subject Content in KS1 and KS2

Key Stage 1
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.

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 four 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 four operations, including long multiplication and division, and in working with fractions, decimals and percentages.
Pupils should read, spell and pronounce mathematical vocabulary correctly.

	EYFS*	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Number and Place Value		Recite the number names in order within 100 forwards and backward from any number Compare numbers to 20	I can count, read and write numbers to 100 in numerals Recognise the place value of each digit in a 2 digit number identifying the next and previous multiple of 10 2 x table *	I can count, read and write numbers to 1000 in numerals, identifying the next and previous multiple of 10 and 100 4 x table *	I can count, read and write numbers to 10,000 in numerals Round the nearest 1,000 and 100 9 x table *	I can count, read and write numbers to 1,000,000 in numerals Round to the nearest 1 and 0.1	I can count, read and write numbers to 10,000,000 in numerals Round numbers with accuracy
Number facts		Count forwards and back in 2s, 10s, 5s	Recall the multiplication and division facts for 2, and 10 times tables 10 x table *	Secure the multiplication and division facts for 2, and 10 times tables 8 x table *	I know the multiplication and division facts for all times tables up to 12 × 12 7 x table *	Secure the multiplication and division facts for all times tables up to 12 × 12 I can identify prime numbers up to 50	Know the first 5 cube numbers
Addition and Subtraction		I know number bonds to 10 and number bonds for each number to 10 Know odd and even numbers to 20	I know number bonds for each number within 20 Know the addition and subtraction facts for multiples of 10 to 100 5 x table *	I know number bonds to 100 (Add and subtract pairs of numbers within 100 without crossing a 10) I can find 5, 10 or 100 more or less than a given number 3 x table *	I know number bonds for each number to 100 and inverse Add and subtract pairs of numbers within 100 and to multiples of 100 under 1000 11 x table *	Add and subtract numbers mentally with increasingly large numbers Add and subtract pairs of numbers that are a multiple of 10 within 1000 Add and subtract decimals	Add and subtract, multiply and divide numbers mentally with increasingly large numbers
Multiplication and division		Count forwards and back in 2s, 10s, 5s Count forwards and back through odd numbers	Recall the multiplication and division facts for 2, 5 and 10 times tables 2 x 10 x 5x *	Multiply and divide single digit number by 10/100 Recall the multiplication and division facts for 3, 4 and 8 times tables 6x table *	Multiply and divide two digit number by 10/100 Recognise factor pairs Square Numbers	Multiply and divide two or three digit number by 10/100/1000 Identify multiples and factors including finding all factor pairs of a number Know the terms: factor, prime and composite	Multiply and divide by 10/100/1000 with numbers up to 3dp Identify common factors, common multiples and prime numbers
Fractions		I know doubles and halves of numbers to 10	I know doubles and halves of numbers to 20 Recognise and write simple fractions ½ of 6 = 3 and recognise the equivalence of 2/4 and 1/2 2 x 10 x 5x *	Double and halve numbers to 1000 (any number to 20 and multiples of 10 and 5 beyond 20) Add fractions with the same denominator within 1 whole Count up and down in tenths 12x table *	Double and halve numbers to 10,000 (any number to 50 and multiples of 10 and 5 beyond 50) Count up and down in hundredths Add and subtract fractions with the same denominator	Double and halve numbers to 1,000 (any number to 100 and multiples of 10 beyond 100) Add and subtract fractions with the same denominators that are multiples of the same number	Double and halve numbers to 10,000 Multiply simple pairs of proper fractions, writing its answer in its simplest form
Geometry		Recognise common 2D shapes presented in different orientations	Use precise language to describe the properties of 2D and 3D shapes	Understand the terms right angle perpendicular, ¼, ½, ¾ turn, clockwise, anticlockwise	Identify acute and obtuse angles Compare and classify geometric shapes including quadrilaterals and triangles	Know the language, acute, obtuse and reflex Approximate angles	Calculate area and perimeter and find missing values