Mathematics Progression of Knowledge and Skills

	Nursery	Reception	ELG
Number	• Recognise up to 3 objects without having to count them individually • Recite numbers past 5 • Say one number for each object in order: 1, 2, 3, 4, 5 • Know that the last number when counting a small set of objects tells you how many there are in total • Show 'finger numbers' up to 5 • Link numerals and amounts up to 5, e.g. shows the correct number of objects to match the numeral • Experiment with own symbols and marks as well as numerals • Solve real-life problems with numbers up to 5 • Compare quantities using language such as, '*more than*' *'fewer than'*	• Count objects, actions and sounds • Recognise how many are in a small group of objects without counting • Link numerals to sets of objects • Count beyond 10 • Compare numbers • Understand the *one more than/one less than* relationship between consecutive numbers • Explore the composition of numbers to 10 • Automatically recall number bonds for numbers 0-5 and some to 10	• Automatically recalls (without rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts • Has a deep understanding of number to 10, including the composition of each number • Recognise quantities up to 5 without counting
Numerical Patterns	• Talk about and explore 2D and 3D shape using informal and math language • Understand position through language alone with no pointing • Describe a familiar route • Use words like *in front of* and *behind* to discuss routes and locations • Make comparisons between objects (size, length, weight and capacity) • Select shapes appropriately for pictures and building • Combine shapes to make new ones • Talk about/identify patterns in the environment using informal language • Continue and create simple repeating patterns (ABAB) • Notice and correct an error in a simple repeating pattern • Begin to describe a sequence of events (real or fictional)	• Select, rotate and manipulate shapes in order to develop spatial reasoning skills • Investigate composing and decomposing shapes and recognise a shape can have other shapes within it • Continue, copy and create repeating patterns • Compare length, weight and capacity	• 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 • Verbally count beyond 20, recognising the pattern of the counting system

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Number and Place Value	• Count to and across 100, forwards and backwards, beginning with 0 or 1, or any given number • Count, read and write numbers to 100 in numerals • Count in multiples of 2s, 5s and 10s from 0 • Identify one more/one less • Identify and represent numbers using objects and pictorial representations and use the language of: *equal to, more than, less than (fewer), most, least* • Read and write numbers 1-20 in words • *Partition and combine numbers into tens and ones (using apparatus if required)*	• Count in 2s, 3s and 5s from 0, and in 10s forward/ backward from a number • Recognise the place value of each digit in a 2-digit number (tens, ones) • Identify, represent and estimate numbers using different representations • Compare and order numbers from 0 up to 100 • use <, > and = signs • Read & write numbers to 100 in numerals & words • Use place value & number facts to solve problems • Partition 2-dgit numbers into different combinations of tens and ones (using apparatus) • Reason about numbers to solve more complex problems and explain thinking	• 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 in any 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 words • Solve number problems and practical problems using the above	• Count in multiples of 6, 7, 9, 25 and 1,000 • Find 1,000 more/ less than a number • Count backwards through zero (negative numbers) • Recognise the place value in a 4-digit number (1,000s, 100s, 10s, 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 involving the above • Read Roman numerals to 100 (I – C)	• Read, write, order and compare numbers to 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, 1000, 10,000 and 100,000 • Solve number and practical problems that involve the above • Read Roman numerals to 1,000 (M) and recognise years in Roman numerals	• 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 the above • Demonstrate an understanding of place value including decimals, e.g. 28.13 = 28 + ? + 0.03

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Addition and Subtraction	• Read, write and interpret mathematical statements involving +, - and = signs • Demonstrate an understanding of the commutative law *3 + 2 = 5 therefore 2 + 3 = 5* • Demonstrate an understanding of inverse relationships *3 + 2 = 5 so 5 – 2 = 3* • Recall at least four number bonds of 10 and reason about associated facts *6 + 4 = 10, so 4 + 6 = 10 and 10 – 6 = 4* • Represent and use number bonds and subtraction facts within 20 • Add and subtract 1-digit and 2-digit numbers to 20, including 0 • Solve one-step problems that involve addition, subtraction and missing numbers using objects and pictorial representations	• Solve problems with addition and subtraction using objects & pictorial representations and written & mental methods • Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 • Add and subtract a two-digit number and 1s, a two-digit number and 10s and 2 two-digit numbers using objects, pictorial representations, mentally • Add 3 one-digit numbers using objects, pictorial representations, mentally • Show that addition can be done in any order but subtraction cannot • Recognise and use the inverse relationship between addition and subtraction to check calculations and solve missing number problems	• Mentally add and subtract a three-digit number and 1s, a three-digit number and 10s and a three-digit number and 100s • Add and subtract numbers with up to 3 digits, using formal written methods • 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	• Add and subtract numbers with up to 4 digits using formal written methods • 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	• 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 levels of accuracy • Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why	**Addition, Subtraction, Multiplication and Division** • Multiply multi-digit numbers up to 4-digits by a two-digit whole number (long multiplication) • Divide numbers up to four-digits by a two-digit whole number using long division with remainders (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 knowledge of the order of operations to do calculations involving 4 operations (BIDMAS) • Solve addition & subtraction multi-step problems in contexts • Solve problems involving addition, subtraction, multiplication and division • Use estimation to check answers to calculations and determine an appropriate degree of accuracy
Multiplication and Division	• Solve one step problems involving multiplication and division using objects, pictorial representations and arrays with a little support • Count in 2s, 5s and 10s to solve problems	• Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers • Calculate multiplication and division statements within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs • Show that multiplication of 2 numbers can be done in any order and division of 1 number by another cannot • Solve problems, including in contexts, involving multiplication and division using objects, arrays, repeated addition, mental methods and number facts	• Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables • Write and calculate multiplication and division statements using known multiplication tables, including for two-digit numbers times one-digit numbers, using mental and formal written methods • Solve problems, including missing number problems, involving multiplication and division	• Recall multiplication and division facts for multiplication tables up to 12 × 12 • Use place value and known and facts to multiply and divide mentally • Recognise and use factor pairs in mental calculations • Multiply two-digit and three-digit numbers by a one-digit number using formal written layout • Solve harder problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by 1 digit	• Find pairs of factors of two-digit numbers and common factors of two numbers • Know/use vocabulary of prime numbers, prime factors and composite (non-prime) numbers • Establish if a two-digit number is prime and recall prime numbers up to 19 • Multiply numbers up to 4 digits by a one- or two-digit number using an appropriate method • Multiply and divide numbers mentally • Divide numbers up to four-digits by a one-digit number using an appropriate method with remainders	

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		• *Use multiplication and division facts for 2, 5 and 10 to make deductions outside known facts, e.g. know that multiples of 5 end in 5 or 0 and use this to reason that 18x 5 cannot be 92* • *Solve word problems involving multiplication and division with more than one step* • *Recall doubles and halves to 20*			• Multiply & divide whole numbers & those with decimals by 10, 100, 1,000 • Recognise and use square numbers(^{2}) & cube numbers(^{3}) • Solve problems involving multiplication and division (using factors & multiples, squares & cubes) • Solve problems using addition, subtraction, multiplication and division & a combination of these	
Years 1, 2, 3 & 4 **Fractions** **Years 5 & 6** **Fractions, Percentages and Decimals**	• 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	• Recognise, find, name and write fractions 1/3, 1/4, 2/4 and 3/4 of length, shape, set of objects or quantity • Write simple fractions and recognise the equivalence of 2/4 and 1/2	• Count up and down in tenths • 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 • Recognise and show equivalent fractions with small denominators • Add and subtract fractions (same denominator within one whole) • Compare and order unit fractions, and fractions with the same denominators • Solve problems involving fractions • *Record 1/10 as 0.1, 3/10 as 0.3 etc.*	• Recognise and show families of common equivalent fractions • Count up and down in hundredths • Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities • Add and subtract fractions (same denominator) • Recognise and write decimal equivalents of any number of tenths or hundreds • Recognise and write decimal equivalents to 1/4 1/2, 3/4 • 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	**Fractions, Percentages and Decimals** • Compare and order fractions (denominators all multiples of the same number) • Identify, name and write equivalent fractions represented visually • Recognise mixed numbers and improper fractions and convert from one to another • Add and subtract fractions with same denominator, and denominators that are multiples of same number • Multiply proper fractions and mixed numbers by whole numbers (materials and diagrams to support) • Read and write decimal numbers as fractions • Recognise and use thousandths and relate them to 1/10ths, 1/100ths 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	**Fractions, Percentages and Decimals** • Use common factors to simplify fractions; use common multiples to express fractions • Compare and order fractions, including fractions >1 • Add and subtract fractions with different denominators and mixed numbers • 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 • Identify the value of each digit to 3 decimal places • Multiply & divide numbers by 10/100/1,000 (answers up to 3 decimal places) • Multiply 1-digit numbers with up to 2 decimal places by whole numbers • Use written division methods where answer has up to 2 decimal places • Solve problems which require answers to be rounded

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					• Solve problems involving number up to 3 decimal places • Recognise the per cent symbol (%) and write percentages as a fraction with denominator 100, and as a decimal fraction • Solve problems using knowledge of percentage and decimal equivalents and fractions with a denominator of a multiple of 10 or 25	• Recall and use equivalences between simple fractions, decimals and percentages
Measurement	• Compare, describe and solve practical problems for lengths/heights, mass/ weight, capacity/volume and time • Measure and begin to record lengths/heights, mass/weight, capacity/ volume and time • Recognise and know the value of coins and notes • Sequence events in chronological order using *before, after, next, first, today, yesterday, tomorrow* • Recognise and use language relating to dates (days of the week, weeks, months and years) • Tell time to the hour & half past and draw the hands on a clock to show times	• Use standard units of measurement for mass, capacity, length/height • Compare and order mass, volume/capacity and lengths using <, >, = • Recognise and use £ and p • Combine amounts to make a particular value and find different ways to use coins to equal the same amount • Solve simple problems involving addition and subtraction of money (pounds or pence), including giving change • Compare and sequence intervals of time • Tell time to five minutes and draw hands on a clock • Know number of minutes in an hour and number of hours in a day	• 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 • Tell and write the time using an analogue clock, including using Roman numerals & 12 & 24-hour • Estimate and read time to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary • Know the number of seconds in a minute & the number of days in each month, year and leap year • Compare durations	• Convert between different units of measure • Measure and calculate the perimeter of a rectilinear figure in cm and metres • Count squares to find the area of rectilinear shapes • Estimate, compare and calculate different measures • 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	• 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 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 using decimal notation, including scaling	• 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 from a smaller unit of measure to a larger unit, and vice versa, using decimal notation 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/volume of shapes • Calculate the area of parallelograms/triangles • Calculate, estimate and compare volume of cuboids in standard units
Geometry	• Recognise and name 2D and 3D shapes • Describe position, direction and movement (whole, half, quarter and three-quarter turns)	• Identify and describe the properties of 2-D shapes, including number of sides and line symmetry in a vertical line • Identify and describe the properties of 3-D shapes,	• Draw 2-D shapes and make 3-D shapes • Recognise/describe 3-D shapes in different orientations • identify right angles, recognise that 2 right angles make a half-turn, 3	• Compare and classify regular shapes based on their properties and sizes • Identify acute and obtuse angles and compare and order angles by size • Identify lines of symmetry in 2-D shapes	• Identify 3-D shapes from 2-D representations • Know angles are measured in degrees • Estimate and compare acute, obtuse, reflex angles	• Draw 2-D shapes using given dimensions & angles • Recognise, describe and build simple 3-D shapes • Compare and classify geometric shapes and find unknown angles

		including number of edges, vertices and faces • Identify 2-D shapes on the surface of 3-D shapes • Compare and sort common 2-D and 3-D shapes and objects	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/vertical lines & pairs of parallel/ perpendicular lines	• Complete a simple symmetric figure • Describe positions on a 2-D grid as coordinates • Describe movements between positions • Plot points/draw sides to complete a polygon	• Draw angles and measure them in degrees (°) • Identify angles at a point and created by turns • Distinguish between regular and irregular polygons • Identify, describe and represent the position of a shape following a reflection or translation	• Illustrate and name parts of circles (radius, diameter, circumference) • Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles • Describe positions on the full coordinate grid • Draw and translate shapes on coordinate plane, and reflect them in the axes
Statistics		• Interpret and construct simple pictograms, tally charts, block diagrams and tables • Ask and answer simple questions by counting, sorting, totalling and comparing	• Interpret and present data using bar charts, pictograms and tables • Solve one-step and two-step questions using information presented in scaled bar charts, pictograms and tables	• Interpret and present discrete and continuous data using appropriate graphical methods • Solve comparison, sum and difference problems using information presented	• Solve comparison, sum and difference problems using information presented in a line graph • Complete, read and interpret information in tables, including timetables	• Interpret and construct pie charts and line graphs and use to solve problems • Calculate and interpret the mean as an average
Ratio and proportion						• Solve problems involving the calculation of percentages (use division and multiplication facts) • Solve problems involving the relative size of two quantities • Solve problems involving similar shapes where the scale factor is known or can be found • Solve problems involving unequal sharing and grouping
Algebra						• 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