Love to Learn

Malcolm Sargent Primary School

Maths skills Progression Map
(based on 2014 National Curriculum)

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	Year 1	Year 2	Year 3
Number and Place Value	Pupils should be taught to: • 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 different multiples including ones, twos, fives and tens • given a number, identify one more and one less • identify and represent numbers using concrete 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 1 to 20 in numerals and words	Pupils should be taught to: • count in steps of 2, 3, and 5 from 0, and count in tens from any number, forward or backward • recognise the value of each digit in a two digit number (tens, ones) • identify, represent and estimate numbers using different representation, 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	Pupils should be taught to: • count from 0 in multiples of 4, 8, 50 and 100; finding 10 or 100 more than a given number • recognise the place value of each digit in a three-digit number (hundreds, tens, ones) • compare and order numbers up to 1000 • identify, represent and estimate numbers using different representations • read and write numbers to at least 1000 in numerals and in words • solve number problems and practical problems involving these ideas

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	Year 4	Year 5	Year 6
Number and Place Value	Pupils should be taught to: • count in multiples of 6, 7, 9, 25 and 100 • find 1000 more or less than a given number • count backwards through zero to include negative numbers • recognise the place value of each digit in a four-digit number (thousands, hundreds, tens and ones) • order and compare numbers beyond 1000 • identify, represent and estimate numbers using different representations • round any number to the nearest 10, 100 or 1000 • 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 understand how, over time, the numeral system changed to include the concept of zero and place value	Pupils should be taught to: • 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 through zero • round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000 • solve number problems and practical problems that involve all of the above • read Roman numerals to 1000 (M) and recognise years written in Roman numerals	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 problems and practical problems that involve all of the above

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	Year 1	Year 2	Year 3
Addition and Subtraction	Pupils should be taught to: • 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 zero • solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 =□ - 9	Pupils should be taught to: • solve simple one-step 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 • 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: ◊ a two-digit number and ones ◊ a two-digit number and tens ◊ two two-digit numbers ◊ adding three one-digit numbers • show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot • recognise and use the inverse relationship between addition and subtraction and use this to check calculations and missing number problems	Pupils should be taught to: • add and subtract numbers mentally, including: ◊ a three-digit number and ones ◊ a three-digit number and tens ◊ a three-digit number and hundreds • add and subtract numbers with up to three 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

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	Year 4	Year 5	Year 6
Addition and Subtraction	Pupils should be taught to: • 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	Pupils should be taught to: • 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	Pupils should be taught to: • solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

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Multiplication and Division	Pupils should be taught to: • solve one step problems involving multiplication and division, calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher	Pupils should be taught to: • 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 (x), division (÷) and equals (=) signs • show that multiplications of two numbers can be done in any order (commutative) and division of one 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	Pupils should be taught to: • 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 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 integer scaling problems and correspondence problems in which n objects are connected to m objects

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Multiplication and Division	Pupils should be taught to: • recall multiplication and division facts for multiplication tables up to 12 x 12 • 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 • recognise and use factor pairs and commutatively 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 one digit, integer scaling problems and harder correspondence problems such as which n objects are connected to m objects	Pupils should be taught to: • identify multiples and factors, including finding all factor pairs of a number, and common factors of two 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 1000 • recognise and use square numbers and cube numbers, and the notations, $(^2)$ $(^3)$ • solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes • solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign • solve problems involving multiplication and division, including scaling by simple fractions and problems	Pupils should be taught to: • multiply multi-digit numbers up to 4 digits by a two-digit whole number using the efficient 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 context • perform mental calculations, including with mixed operations and large numbers • identify common factors, common multiples and prime numbers • using their knowledge of the order of operations to carry out calculations involving the four operations • solve problems involving addition, subtraction, multiplication and division • use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy

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Fractions	Pupils should be taught to: • recognise, find and name a half as one of two equal parts of an object, shape or quantity • recognise, find and name a quarter as one of four equal parts of an object, shape or quantity	Pupils should be taught to: • recognise, find name and write fractions $^1/_3$, $^1/_4$, $^2/_4$, and $^3/_4$ of a length, shape, set of objects or quantity • write simple fractions e.g. $^1/_2$ of 6 = 3 and recognise the equivalent of two quarters and one half	Pupils should be taught to: • 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 (e.g. $^5/_7 + ^1/_7 = ^6/_7$) • compare and order unit fractions with the same denominators • solve problems that involve all of the above

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	Year 4	Year 5	Year 6
Fractions (Including Decimals and Percentages)	Pupils should be taught to: • 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 a hundred and dividing tenths by ten • solve problems involving increasingly harder fractions to calculate 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 hundredths • 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 one decimal place to the nearest whole number • compare numbers with the same number of decimal places up to two decimal places • solve simple measures and money problems involving fractions and decimals to two decimal places	Pupils should be taught to: • 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 to the other and write mathematical statements >1 as a mixed number (e.g. $^2/_5 + ^4/_5 = ^6/_5 = 1\ ^1/_5$) • 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 (e.g. $0.71 = ^{71}/_{100}$) • recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents • round decimals with two decimal places to the nearest whole number and to one decimal place • read, write, order and compare numbers with up to 3 decimal places • solve problems involving numbers up to 3 decimal places • recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal • solve problems which require knowing percentage and decimal equivalents of $^1/_2$, $^1/_4$, $^1/_+$, $^2/_+$, $^4/_+$ and those fractions with a denominator of a multiple of 10 or 25	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 (e.g. ¼ x ½ = $^1/_8$) • divide proper fractions by whole numbers (e.g. $^1/_3 \div 2 = ^1/_6$) • associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. $^3/_8$) • 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

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Measures	Pupils should be taught to: • compare, describe and solve practical problems for: ◊ lengths and heights (e.g. long/short, longer/ shorter, tall/short, double/half) ◊ mass or weight (e.g. heavy/light, heavier than, lighter than) ◊ capacity/volume (e.g. full/empty, more than, less than, half, half full, quarter) ◊ time (e.g. quicker, slower, earlier, later) • Measure and begin to record the following: ◊ lengths and heights ◊ mass/weight ◊ capacity and volume ◊ time (hours, minutes, seconds) • recognise and know the value of different denominations of coins and notes • sequence events in chronological order using language (e.g. before, after, next, first, today, tomorrow, morning, afternoon and evening) • recognise and use the 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	Pupils should be taught to: • 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 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	Pupils should be taught to: • 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 giving change, using both £ and p in practical contexts • tell and write the time from an analogue clock, including using Roman numerals from 1 to X11, and 12 hour and 24 hour clocks • estimate and read time to the nearest minute; record and compare time in terms of seconds, minutes, hours and o'clock; use vocabulary such as 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, for example to calculate the time taken by particular events or tasks.

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Measurement	Pupils should be taught to: • convert between different units of measure (e.g. kilometre to metre; hour to minute) • measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres • find the area of rectilinear shapes by counting • 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	Pupils should be taught to: • convert between different units of measure (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) • understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints • measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres • calculate and compare the area of rectangles (including squares) and including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes • estimate volume (e.g. using 1 cm^3 blocks to build cuboids (including cubes)) and capacity (e.g. using water) • 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	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 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 (e.g. mm^3 and km^3)

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Geometry	Properties of Shape	Pupils should be taught to: • recognise and name common 2-D and 3-D shapes, including: • 2-D shapes (e.g. rectangles (including squares), circles and triangles) • 3-D shapes (e.g. cuboids (including cubes), pyramids and spheres)	Pupils should be taught to: • identify and describe the properties of 2-D shapes, including the number of sides and 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	Pupils should be taught to: • draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations; and describe them with increasing accuracy • recognise angles as a property of shape and associate angles with turning • identify right angles, recognise that two right 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 • Identify horizontal and vertical lines and pairs
	Position, Direction, Motion	• describe position, directions and movements, including half, quarter and three-quarter turns	• order and arrange combinations of mathematical objects in patterns • use mathematical vocabulary to describe position, direction and movement, including distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise/anti-clockwise)	
Statistics			• interpret and construct simple pictograms, tally charts, block diagrams and simple 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 compare categorical data	• interpret and present data using bar charts, pictograms and tables • solve one-step and two-step questions such as 'How many more?' and 'How many fewer?' using information presented in scaled bar charts and pictograms and tables

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		Year 4	Year 5	Year 6
Geometry	Properties of Shape	Pupils should be taught to: • compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes • identify acute and obtuse angles and compare and order angels up to two 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	Pupils should be taught to: • identify 3-D shapes, including cubes and cuboids, from 2-D representations • know angles are measured in degrees; estimate and compare acute, obtuse and reflex angles • draw given angles, measuring them in degrees (°) • identify ◊ 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° • use the properties of a rectangle to deduce related facts and find missing lengths and angles • distinguish between regular and irregular polygons based on reasoning about equal sides and angles	Pupils should be taught to: • draw 2D 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

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		Year 4	Year 5	Year 6
Geometry continued	Position, Direction and Motion	Pupils should be taught to: • describe positions on a 2-D grid as coordinates in the first quadrant • describe movement 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	Pupils should be taught to: • 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	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
Statistics		Pupils should be taught to: • 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	Pupils should be taught to: • solve comparison, sum and difference problems using information presented in a line graph • complete, read and interpret information in tables, including timetables	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

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	Year 4	Year 5	Year 6
Ratio and Proportion			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 (e.g 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
Algebra			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