Stanton-in-Peak Church of England Primary School

Maths Programme of Study Progression of skills

"Life in all its fullness." John 10:10

Strand: **Number and Place Value**

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• 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 twos, fives and tens. • Given a number, identify one more and one less. • Identify and represent numbers using objects & 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.	• Count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward. • Recognise the place value of each digit in a two-digit number (tens, ones). • 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.	• 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 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 up to 1000 in numerals and in words. • Solve number problems and practical problems involving these ideas.	• Count in multiples of 6, 7, 9, 25 and 1000. • 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 (THTU, HTU, TU, and U). • 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 know that over time, the numeral system changed to include the concept of zero and place value.	• 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 number up to 1 000 000. • Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including 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.	• Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit. • Round any whole number to a required degree of accuracy. • Use negative numbers in context, and calculate intervals across zero. • Solve number and practical problems that involve all of the above.

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Strand: **Calculation - addition & subtraction**

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Addition & subtraction • Pupils should be taught to: read, write & interpret mathematical statements involving addition (+), subtraction (-) & equals (=) signs • Represent and use number bonds and related subtraction facts within 20 • Add and subtract one-digit & two-digit numbers to 20, including zero. • Solve one-step problems that involve addition and subtraction, using concrete objects & pictorial representations, and missing number problems such as 7 = [ ] - 9.	**Addition & subtraction** • Solve problems with addition & 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 and subtraction of one number from another cannot. • Recognise and use the inverse relationship between addition & subtraction and use this to check calculations and missing number problems.	**Addition & subtraction** • 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 & subtract numbers with up to three digits, using formal written methods of columnar + and – • Estimate answers to calculations; use inverses to check • Solve problems, including missing number problems, using number facts, place value & more complex + & - .	**Addition & subtraction** • 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 + and - two-step problems in contexts, deciding which operations and methods to use & why.	**Addition & subtraction** • Add and subtract whole numbers with more than 4 digits, including using formal methods (columnar + & -) • Add and subtract numbers mentally with increasingly large numbers. • Use rounding to check answers 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 & why.	**Addition, subtraction, multiplication & division** • 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 whole number using the formal written method of short division where appropriate, interpreting remainders according to the context • Perform mental calculations, including with mixed operations and large numbers. • Identify common factors, common multiples and prime numbers • Use their knowledge of the order of operations to carry out calculations involving the four operations • Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why • Solve problems involving addition, subtraction, multiplication and division • Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.

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Strand: **Calculation – multiplication and division**

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Multiplication & division • Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations	**Multiplication & division** • Recall & use multiplication & division facts for 2, 5 & 10 tables, including recognising odd and even numbers • Calculate mathematical statements for multiplication and division within the multiplication tables; write them using multiplication (x), division (÷) & equals (=) signs. • Show that multiplication 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.	**Multiplication & division** • Recall & use x and ÷ facts for the 3, 4 and 8 tables. • Write and calculate statements for x and ÷ using tables they know, including for TU x U 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.	**Multiplication & division** • Recall multiplication and division facts 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 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 one digit, integer scaling problems and harder correspondence problems such as ***n*** objects are connected to **m** objects.	**Multiplication & division** • Identify multiples & factors; find all factor pairs of a number & common factors of 2 numbers. • Know & use the vocabulary of prime numbers, prime factors & composite numbers. • Establish whether a number up to 100 is prime; recall primes up to 19. • Multiply numbers up to 4 digits by a one or two-digit number using a formal 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; interpret remainders appropriately for the context • Multiply and divide whole numbers and those involving decimals by 10, 100 & 1000. • Recognise and use square numbers & cube numbers and notation for squared ^{2}, cubed ^{3} • Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes • Solve problems involving + - x ÷ and a combination of these, including understanding meaning of = sign • Solve problems involving x and ÷ including scaling by simple fractions & problems involving simple rates.	**ALGEBRA** • Use simple formulae • Generate and describe linear number sequences • Express missing number problems algebraically • Find pairs of numbers that satisfy number sentences involving two unknowns • Enumerate possibilities of combinations of two variables. **RATIO AND PROPORTION** • Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts • Solve problems involving the calculation of percentages (for example, of measures, and such as 15% of 360) and the use of percentages for comparison • Solve problems involving similar shapes where the scale factor is known or can be found • Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples. ***For Fractions see below...***

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Strand: **Calculation – fractions, decimals and percentages**

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Fractions • 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,	**Fractions** • Recognise, find, name and write fractions $^1/_3$, $^1/_4$, $^2/_4$ & $^3/_4$ of a length, shape, set of objects or quantity • Write simple fractions e.g. $^1/_2$ of 6 = 3 and recognise the equivalence of $^2/_4$ and $^1/_2$	**Fractions** • 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 & 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, and fractions with the same denominators. • Solve problems that involve all of the above.	**Fractions** • 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, 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 hundredths. • Recognise & 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 measure and money problems involving fractions and decimals to two decimal places.	**Fractions** • Compare & order fractions whose denominators are all multiples of the same number • Identify, name & write equivalent fractions of a given fraction, represented visually, inc. $^1/_{10}$ & $^1/_{100}$ • Recognise mixed numbers & improper fractions; convert from one form to the other; write mathematical statements > 1 as a mixed number [e.g. $^2/_5 + ^4/_5 = ^6/_5 = 1^1/_5$] • Add & subtract fractions with the same denominator & multiples of the same number. • Multiply proper fractions & mixed numbers by whole numbers, supported by materials & diagrams. • Read and write decimal numbers as fractions [e.g. 0.71 = $^{71}/_{100}$] • Recognise and use $^1/_{1000}$ and relate them to $^1/_{10}$, $^1/_{100}$ & 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 three decimal places • Solve problems with number to three decimal places. • Recognise the per cent symbol (%) and understand that per cent relates to 'the number of parts per 100' and write percentages as a fraction with denominator hundred; and as a decimal fraction Solve problems which require knowing percentage and decimal equivalents of $^1/_2$, $^1/_4$, $^1/_5$, $^2/_5$, $^4/_5$ and those with a denominator of a multiple of 10 or 25.	**Fractions** • Use common factors to simplify fractions; use common multiples to express fractions in the same denomination. • Compare & order including fractions >1 • Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions. • Multiply simple pairs of proper fractions, writing the answer in its simplest form [for example $^1/_4 \times ^1/_2 = ^1/_8$] • Divide proper fractions by whole numbers [for example $^1/_3 \div 2 = ^1/_6$] • Associate a fraction with division and calculate decimal fraction equivalents [for example 0.375] for a simple fraction [for example $^3/_8$] • Identify the value of each digit to three decimal places & x and ÷ numbers by 10, 100 and 1000 - with answers to 3 decimal places • Multiply one-digit numbers with up to two decimal places by whole numbers • Use written ÷ methods where the answer has up to 2 decimal places • Solve problems which require answers to be rounded to specified degrees of accuracy • Recall & use equivalences between simple fractions, decimals & percentages, including in different contexts.

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Strand: **Measures**

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• 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 [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 & volume; time (hours, minutes, seconds) • Recognise and know the value of different denominations of coins and notes. • Sequence events in chronological order using language such as: 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.	• 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.	• 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, hours and o'clock; use vocabulary such as a.m./p.m., 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.]	• 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 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.	• Convert between different units of metric measure [e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and milliliter] • 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) & square metres (m^2) and estimate the area of irregular shapes • Estimate volume [eg. 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.	• Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate • Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places • Convert between miles and kilometres • Recognise that shapes with the same areas can have different perimeters and vice versa. • Recognise when it is possible to use formulae for area and volume of shapes. • Calculate the area of parallelograms and triangles. • Calculate, estimate and compare volume of cubes and cuboids using standard units, including centimetre cubed (cm^3) and cubic metres (m^3), and extending to other units [for example mm^3 and km^3.]

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Strand: **Geometry**

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Geometry: Properties of shapes • 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). **Position and direction** • Describe position, directions and movements, including half, quarter and three-quarter turns.	**Geometry: Properties of shapes** • Identify & describe the properties of 2-D shapes, including the number of sides & 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, [e.g. a circle on a cylinder & a triangle on a pyramid.] • Compare and sort common 2-D and 3-D shapes and everyday objects. **Position and direction** • 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, distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise)	**Geometry: Properties of shapes** • Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them. • Recognise that angles are a property of shape or a description of a turn • 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 of perpendicular and parallel lines.	**Geometry: Properties of shapes** • 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 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. **Position and direction** • 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.	**Geometry: Properties of shapes** • 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: angles at a point and one whole turn (total 360°); angles at a point on a straight line and $\frac{1}{2}$ 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. **Position and direction** • 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.	**Geometry: Properties of shapes** • 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. **Position and direction** • 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.

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Strand: **Statistics**

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Pupils should be taught to: • 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 totaling and comparing categorical data.	**Pupils should be taught to:** • Interpret and present data using bar charts, pictograms and tables • Solve one and two step questions [For example: *"How many more?"* and *"How many fewer?"*] ... using information presented in scaled bar charts and pictograms and tables.	**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.