Grimsargh St Michael's CE Primary School
Mathematics Progression

Areas of study	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Number and Place Value	- Have a deep understanding of number to 10, including the composition of each number. - Subitise (recognise quantities without counting) up to 5. - 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	- count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number. - Count numbers to 100 in numerals; count in multiples of 2, 5 and 10. - identify and represent numbers using objects and pictorial representations - read and write numbers to 100 in numerals - read and write numbers from 1 to 20 in numerals and words - given a number, identify one more and one less. - use the language of: equal to, more than, less than (fewer), most, least.	- count in steps of 2, 3 and 5 from 0 and in tens from any number, forward and backward. - read and write numbers to at least 100 in numerals and words. - identify, represent and estimate numbers using different representations, including the number line. - recognise the place value of each digit in a two-digit number (tens, ones) - partition numbers in different ways - compare and order numbers from 0 up to 100; use < > and = signs - find 1 or 10 more or less than a given number - use place value and number facts to solve problems.	- count from 0 in multiples of 4, 8, 50 and 100; find 1, 10 or 100 more or less than a given number - read and write numbers up to 1000 in numerals and in words. - identify, represent and estimate numbers using different representations - recognise the place value of each digit in a three-digit number (hundreds, tens, ones) - compare and order numbers up to 1000 - partition numbers in different ways - round numbers to at least 1000 to the nearest 10 or 100. - solve number problems and practical problems involving these ideas.	- count in multiples of 6,7,9,25 and 1000 - count backwards through zero to include negative numbers - read and write numbers to 10 000 - identify, represent and estimate numbers using different representations - read Roman numerals to 100 (1 to C) and know that over time, the numeral system changed to include the concept of zero and place value - find 0.1, 1, 10, 100 or 1000 more or less than a given number - recognise the place value of each digit in a four-digit number (thousands, hundreds, tens and ones) - order and compare numbers beyond 1000 - 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	- count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000. - count forwards and backwards with positive and negative whole numbers, including through zero. - read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit - read Roman numbers to 1000 (M) and recognise years written in Roman numerals - interpret negative numbers in context. - round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000 - find 0.01, 0.1, 1, 10, 100, 1000 and other powers of 10 more or less than a given number - solve number and practical problems that involve all of the above	- read, write, order and compare numbers up to 10 000 000 and determine the value of each digit. - round and whole number to a required degree of accuracy - use negative numbers in context, and calculate intervals across zero - identify, represent and estimate numbers using the number line - order and compare numbers including integers, decimals and negative numbers - find 0.001, 0.01, 0.1, 1, 10 and powers of 10 more/less than a given number
Addition and Subtraction	Automatically recall (without reference to rhymes, counting or other	- read, write and interpret mathematical statements involving, +, - and = signs	- recall and use addition and subtraction facts to 20 fluently, and derive	- recall/use addition and subtraction facts for 100	- estimate and use inverse operations to check answers to a calculation	- use rounding to check answers to calculations and determine, in the	- use estimation to check answers to calculations and determine, in the

aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts	- 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
	- solve missing number problems such as 7 = □ - 9
		and use related facts up to 100.
		- show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot.
		- add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
		  - a 2 digit number and ones
		  - a 2 digit number and tens
		  - two 2 digit numbers
		  - adding three 1 digit numbers
		- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems
		- solve 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.
			- estimate the answer to a calculation and use inverse operations to check answers
			- add and subtract numbers mentally, including:
			  • a 3 digit number and ones
			  • a 3 digit number and tens
			  • a 3 digit number and hundreds
			- add and subtract numbers with up to 3 digits, using formal written methods of columnar addition and subtraction
			- solve problems, including missing number problems, using number facts, place value and more complex addition and subtraction
				- recall and use addition and subtraction facts for 100.
				- add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate
				- solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why
					context of a problem, levels of accuracy
					- 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
					- 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 and a combination of these, including understanding the meaning of the equals sign
					- solve addition and subtraction problems involving missing numbers
						context of a problem, an appropriate degree of accuracy
						- add and subtract whole numbers and decimals using formal written methods
						- perform mental calculations, including with mixed operations and large 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 all four operations, including those with missing numbers

Multiplication and Division	- Explore and represent patterns within numbers up to 10, including evens and odds, double facts	- recall and use doubles of all numbers to 10 and corresponding halves.	- recall and use multiplication and division facts for to 2, 5 and 10 times tables, including	- recall and use multiplication and division facts for the 3,4 and 8 multiplication tables	- recall multiplication and division facts for multiplication tables up to 12 x12	- identify multiples and factors, including finding all factor pairs of a	- identify common factors, common multiples and prime numbers

Multiplication and Division (cont.)	and how quantities can be distributed equally.	- 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.	recognise odd and even numbers - derive and use doubles of simple two-digit numbers (in which the ones total less than 10) - derive and use halves of simple two-digit even numbers (numbers in which the tens are even) - show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot - calculate mathematical statements for multiplication and division within the multiplication tables and write them using the x, ÷ and = signs - solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods and multiplication and division facts, including problems in contexts.	- derive and use doubles of all numbers to 100 and corresponding halves - 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 methods - solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects and connected to m objects.	- use partitioning to double or halve any number, including decimals to one decimal place - 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 - divide numbers up to 3 digits by a one-digit number using the formal written method of short division and interpret remainders - 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.	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 numbers up to 100 is prime and recall prime numbers up to 19 - recognise and use square numbers and cube numbers, and the notation for squared (²) and cubed (³) - 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 - multiply and divide whole numbers and those involving decimals, by 10, 100 and 1000 - solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes. - solve problems involving multiplication and	- use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy - multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication - multiply one-digit numbers with up to two decimal places by whole numbers - divide numbers up to 4 digits by a two-digit whole number using the formal written method of long or short division, and interpret remainders as whole number remainders, fractions, or by rounding - perform mental calculations, including with mixed operations and large numbers - use written division methods in cases where the answer has up to two decimal places - solve problems involving all four operations, including those with missing numbers - use knowledge of the order of operations to carry out calculations involving the four operations

						division, including scaling by simple fractions and problems involving simple rates - solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign	
Fractions, Decimals and Percentages **Fractions, Decimals and**		- 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	- recognise, find, name and write fractions 1/3, ½, 2/4, and ¾ of a length, shape, set of objects or quantity - recognise the equivalence of 2/4 and ½ - write simple fractions for example ½ of 6 = 3	- 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 objected; unit fractions and no-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 - compare and order unit fractions, and fractions with the same denominators - add and subtract fractions with same denominator within one whole. - solve problems that involve all of the above	- count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten - recognise and show, using diagrams, families of common equivalent fractions - add and subtract fractions with the same denominator - 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 - recognise and write decimal equivalents of any number of tents or hundredths - recognise and write decimal equivalents to ¼, ½, 1/3 - round decimals with one decimal place to the nearest whole 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 e.g. 2/5 + 4/5 = 6/5 = 11/5 - compare and order fractions whose denominators are all multiples of the same 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	- 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 ÷ 2 = 1/6) - identify the value of each digit in numbers give to three decimal places - round decimals with 3 decimal places to the nearest whole number or one or two decimal places. - multiply and divide numbers by 10, 100 and

Percentages (cont.)					- compare numbers with the same number of decimal places up to two decimal places - 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 - solve simple measure and money problems involving fractions and decimals to two decimal places	- 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 three decimal places - solve problems involving numbers up to three 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 ½, ¼, 1/5, 2/5, 4/5 and those fractions with a denominator of a multiple of 10 or 25	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 - associate a fraction with division and calculate decimal fraction equivalents for a simple fraction - recall and use equivalences between simple fractions, decimals and percentages including in different contexts - find simple percentages of amounts - solve problems involving the calculation of percentages and the use of percentages for comparison.
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 unequal sharing and

						grouping using knowledge of fractions and multiples - solve problems involving similar shapes where the scale factor is known or can be found
Algebra						- 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.

Measurement
 	
Measurement (cont.)
		- compare, describe and solve practical problems for:
		  - lengths and heights
		  - mass and weight
		  - capacity and volume
		  - time
		- measure and begin to record the following:
		  - lengths and heights
		  - mass and weight
		  - capacity and volume
		  - time
		- recognise and know the value of different denominations of coins and notes
		- sequence events in chronological order using language
		-recognise and use language relating to dates, including days of the week, weeks, months and years
			- choose and use appropriate standard units to estimate and measure length/height in any direction; mass; temperature; capacity 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; 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
				- measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)
				- continue to estimate and measure temperature to the nearest degree using thermometers
				- 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 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/a.m./p.m.,
					- convert between different units of measure (e.g. km to m, hour to minute)
					- estimate, compare and calculate different measures, including pound and pence
					- order temperatures including those below 0
					- 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
					- write amounts of money using decimal notation
					- measure and calculate the perimeter of rectilinear figure in cm and m
						- convert between different units of metric measure
						- understand and use approximate equivalences between metric units and common imperials units such as inches, pounds and pints
						- use all four operations to solve problems involving measure, using decimal notation, including scaling
						- solve problems involving converting between units of time
						- measure and calculate the perimeter of composite rectilinear shapes in cm and m
						- calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm²) and square metres
							- solve problems involving 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

		- tell the time to the hour and half past the hour and draw the hands on a clock face to show these times	subtraction of money of the same unit, including giving change and measures - 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	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 - measure the perimeter of simple 2D shapes	- find the area of rectilinear shapes by counting squares	(m²) and estimate the area of irregular shapes. - estimate volume (e.g. using 1cm³ blocks to build cuboids and capacity	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
Geometry: Properties of Shape		- recognise and name common 2D shapes (e.g. rectangles (including squares), circles and triangles - recognise and name common 3D shapes (e.g. cuboids (including cubes), pyramids and spheres)	- identify and describe the properties of 2D shapes, including the number of sides and line symmetry in a vertical line - identify 2D shapes on the surface of 3D shapes - compare and sort common 2D shapes and everyday objects - recognise and name common 3D shapes - compare and sort common 3D shapes and everyday objects	- draw 2D shapes - make 3D shapes using modelling materials; recognise 3D 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 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	- compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes - identify lines of symmetry in 2D shapes presented in different orientations - identify acute and obtuse angles and compare and order angles up to two angles by size - identify lines of symmetry in 2D shapes presented in different orientations - complete a simple symmetric figure with respect to a specific line of symmetry	- distinguish between regular and irregular polygons based on reasoning about equal sides and angles - use the properties of rectangles to deduce related facts and find missing lengths and angles - identify 3D shapes, including cubes and other cuboids, from 2D 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) - identify angles at a point on a straight line and ½ a turn (180)	- draw 2D shapes using given dimensions and angles - compare and classify geometric shapes based on their properties and sizes - illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius - recognise, describe and build simple 3D shapes, including making nets - find unknown angles in any triangles, quadrilaterals, and regular polygons - recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles

						- identify other multiples of 90 degrees	
Geometry: Position and Direction		- describe position, direction and movement including whole, half, quarter and three-quarter turns.	- 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)		- describe positions on a 2D 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	- 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 - describe positions on the first quadrant of a coordinate grid	- 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			- 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 categories by quantity - ask and answer questions about totalling and comparing categorical data	- interpret and present data using bar charts, pictograms and tables - solve one-step and two-step questions (e.g. how many more? and how many fewer?) using information presented in scaled bar charts and pictograms and tables	- 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	- complete, read and interpret information in tables, including timetables - solve comparison, sum and difference problems using information presented in a line graph	- interpret and construct pie charts and line graphs and use these to solve problems - calculate and interpret the mean as average