Mathematics Curriculum Map

Year 3	Year 4	Year 5	Year 6
Number			
Fluency Focus			
Numbers with up to at least 3 digits (whole numbers and decimals with up to 1 dp) through a wide variety of models and representations	Numbers up to and including 4 digits (whole numbers and decimal numbers with up to 2 decimal places) through a wide variety of models and representations	Numbers up to 1 million (whole numbers and decimal with up to 3 decimal places) through a wide variety of models and representations	Numbers up to 10 million (whole numbers, negative numbers and decimals with up to 3 decimal places) through a wide variety of models and representations
Understanding the number system			
• counts: - from 0 in multiples of 4, 8, 50 and 100 - up and down in tenths; recognising that tenths arise from dividing an object into 10 equal parts and in dividing one digit numbers or quantities by 10 • reads, writes, compares and orders numbers up to 1000 • in numerals and words • recognises the place value of each digit in a three-digit • number (hundreds, tens, ones) • finds 10 or 100 more or less than a given number	• identifies, represents and estimates numbers using different representations • counts fluently forwards and backwards to include: - multiples of 6, 7, 9, 25 and 1000 - through zero to include negative numbers - in hundredths - intervals of 10, 100 and 1000 from a given number • recognises the place value of each digit and uses this when ordering and comparing numbers: - beyond 1000 and when finding 1000 more than a given number	• understands and applies the knowledge of place value e.g. reads, writes, orders, compares, estimates, multiplies and divides numbers by 10, 100 and 1000 up to 1 000 000 and to 3 decimal places and as fractions • rounds decimals with two decimal places to the nearest whole number and to one decimal place and any whole number up to 1,000,000 to the nearest 10, 100, 1000, 10,000, and 100,000 • counts fluently forwards and backwards to include:	• reads, writes, orders and compares numbers within the fluency focus: - uses this knowledge to develop their skills of rounding to any degree of accuracy, estimating, predicting and checking the reasonableness of answers • identifies the value of each digit in numbers to 10 000 000 and numbers with up to 3 decimal places and multiplies and divides by 10, 100 and 1000, giving answers to three decimal places • compares and orders fractions, including fractions >1

• identifies, represents and estimates numbers using different representations including those related to measure • solves number problems and practical problems within the context of the fluency focus • understands unit fractions and non-unit fractions with small denominators: - recognises, finds, writes and uses fractions of a discrete set of objects (3F1b and 3F1c) - recognises and shows, using diagrams, equivalent fractions e.g. on a number line and deduces relationships between them such as size and equivalence going beyond the [0,1] interval, including relating to measure - compares and orders unit fractions and fractions with the same denominators	- with the same number of decimal places up to two decimal places - understanding the value of zero as a place holder - rounds any number to the nearest 10, 100 or 1000 and decimals with one decimal place to the nearest whole number • recognises that hundredths arise when dividing an object by a hundred and dividing tenths by ten • recognises and shows, using diagrams, families of common equivalent fractions • reads Roman numerals to 100 (I to C) solves number problems and practical problems within the context of the fluency focus	- powers of 10 from any given number up to 1,000,000 - including through zero and interprets negative numbers in context • reads Roman numerals to 1000 (M) and recognises years written in Roman numerals • recognises and converts mixed numbers, improper fractions and recognises and uses thousandths and relates to tenths, hundredths and decimal equivalents • compares and orders fractions whose denominators are all multiples of the same number • identifies equivalent fractions of a given fraction represented visually • recognises and shows approximate proportions of a whole and use unit and non-unit fractions, decimals and percentages to describe these, e.g. recognises simple equivalence between fractions, decimals and percentages of any number; ½ ¼ 1/5 2/5 4/5 and those with a denominator of a multiple of 10 or 25	• recognises, describes and uses number patterns and relationships to make generalisations about sequences within the whole number system • uses negative numbers in context, and calculates intervals across zero • uses common multiples to express fractions in the same denomination • recalls and uses equivalences between simple fractions, decimals and percentages including in different contexts solves number problems and practical problems within the context of the fluency focus

		solves number problems and practical problems within the context of the fluency focus	
Arithmetic laws and relationships			
• estimates the answer to a calculation and uses inverse operations to check answers Uses and understands commutativity and associativity (for example, 4 x 12 x 5 = 4 x 5 x 12 = 20 x 12= 240) and multiplication and division facts (for example, using 3 x 2 = 6, 6 ÷ 3 = 2 and 2 = 6 ÷ 3) to derive facts (30 x 2 = 60, 60 ÷ 3 = 20 and 20 = 60 ÷3).	• understands and applies the commutative, associative and distributive 'rules' when solving calculations e.g. - that 7 x 8 = (5 x 8) + (2 x 8) (distributive) = 7 x 2 x 4 (associative) - 'balancing expressions' including those using division, such as 20 + ? = 100 ÷ 4 - Understands the relationship between non-unit fractions and multiplication and division, to include equivalence and fractions as operators.	• uses the commutative, associative and distributive 'rules' when solving calculations in the four operations and other mathematical domains e.g. - distributivity can be expressed as a(b+c)= ab + ac - construct equivalence statements (3 x 270 = 3 x 3 x 9 x 10 = 9^2 x 10) - finding the volume of a cuboid • recognises, describes using correct vocabulary, and uses number patterns and relationships to establish e.g. - multiples, all factor pairs for a given number and common factors for two numbers - prime factors and composite (non-prime) numbers to 100 (recall primes to 19). - Square and cube numbers (and uses notation and recall all square numbers to 144)	uses their knowledge of the order of operations to carry out calculations involving the four operations e.g. 2 + 1 x 3 = 5 and (2 + 1) x 3 = 9
Mental fluency			

• adds and subtracts numbers mentally, including: - a three-digit number and ones - a three-digit number and tens - a three-digit number and hundreds • recalls and uses multiplication and division facts for the 3, 4 and 8 multiplication tables Writes and calculates mathematical statements for multiplication and division using the multiplication tables that children know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.	• uses a range of mental strategies for all four operations appropriate to context and within the fluency focus • considers the reasonableness of results by reference to the context or to the size of the numbers using the skills of estimation and checks accuracy e.g. use of the inverse • uses mental recall of multiplication facts including all tables up to 12 x 12 and quickly derives corresponding division facts, e.g. uses their knowledge of tables and place value in calculations with multiples of 100, such as 600 ÷ 3 = 200 can be derived from 2 x 3 = 6 • uses place value, known and derived facts to multiply and divide, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers. Recognises and uses factor pairs and commutativity in mental calculations.	• justifies solutions and determines in the context of the problem levels of accuracy using estimation, rounding and use of inverse operation • uses a range of mental methods of addition and subtraction within the fluency focus e.g. decimal complements to 1 • multiplies and divides numbers mentally using known facts and uses derived facts e.g. 2.3 x 4 = 9.2 Multiplies and divides whole numbers and those involving decimals by 10, 100 and 1000.	• uses estimation to check answers to calculations and determines in the context of a problem, an appropriate degree of accuracy • identifies common factors, common multiples and prime numbers • performs mental calculations, including with mixed operations and large numbers Continues to use all known facts to calculate mathematical statements with increasing complexity.
Written fluency			

adds and subtracts numbers with up to three digits, using formal written methods of columnar addition and subtraction	• combines knowledge of number facts and rules of arithmetic to solve written calculations within the fluency focus • adds and subtracts numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate • estimates and uses inverse operations to check answers to a calculation multiplies two-digit and three-digit numbers by a one-digit number using formal written layout	• uses formal written columnar methods of addition and subtraction within the fluency focus and reasons why they are appropriate • multiplies numbers with up to four digits by a one or two digit number using a formal written method, including long multiplication for two digit numbers divides numbers with up to four digits by a one digit number using the formal written method of short division and interprets remainders appropriately for the context	• solves addition and subtraction problems within the fluency focus and gives reasons why operations and methods are appropriate multiplies multi-digit numbers up to four digits by a two digit number using the formal written method of long multiplication and divides numbers up to four digits by a two digit number using the formal written methods of long and short division and interprets remainders as whole numbers, fractions, or by rounding, as appropriate for the context
Fractions, decimals and percentages			
adds and subtracts fractions with the same denominator within one whole e.g.: 5/7 + 1/7 = 6/7	• adds and subtracts fractions with the same denominator • recognises and writes decimal equivalents to ¼, ½, ¾ and of any number of tenths or hundredths • calculates fractions of quantities, including non-unit fractions where the answer is a whole number e.g. find ¾ of 20 litres	• adds and subtracts fractions whose denominators are multiples of the same number multiplies proper fractions and mixed numbers by whole numbers supported by materials and diagrams	• uses common factors to simplify fractions • adds and subtracts fractions with different denominators and mixed numbers, using the concept of equivalent fractions • multiplies simple pairs of proper fractions, writing the answer in its simplest form [e.g. ¼ x ½ = 1/8]

	finds 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		• divides proper fractions by whole numbers e.g. 1/3 ÷2=1/6 • associates a fraction with division and calculates decimal fraction equivalents for a simple fraction e.g. 3 ÷ 5 = 0.6 = 3/5 • multiplies one-digit numbers with up to two decimal places by whole numbers uses written division methods in cases where the answer has two decimal places
Solving problems			
Solves problems including: • missing number problems, using number facts, place value, and more complex addition and subtraction • missing number problems involving multiplication and division integer scaling problems e.g. four times as high, eight times as long etc.	**Solves problems including:** • using a range of mental and written methods across routine and non-routine problems • solves addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why • solves problems involving multiplying and adding, including using	**Solves problems including:** • using a range of mental and written methods across routine and non-routine problems • solves numerical problems within the fluency focus and through a range of contexts including understanding the meaning of the = sign e.g. - addition and subtraction multi-step problems in contexts deciding	**Solves problems including:** • using a range of mental and written methods across routine and non-routine problems • solves increasingly complex numerical problems (including multistep) within the fluency focus and through a range of contexts using estimation to check answers and an appropriate degree of accuracy

• correspondence problems in which n objects are connected to m objects e.g. 3 hats and 4 coats, how many different outfits; 12 sweets shared equally between 4 children; 4 cakes shared equally between 8 children fractions	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 • solves problems involving increasingly harder fractions to calculate quantities and fractions to divide quantities, including non-unit fractions where the answer is a whole number and measure and money problems involving fractions and decimals to two decimal places	which operation to use and why - using knowledge of factors, multiples, squares and cubes - scaling by simple fractions and problems involving simple rates - multiplying and dividing by powers of 10 in scale drawings - using all four operations to balance equations (33 = 5 x a)	solves problems which require answers to be rounded to specified degrees of accuracy
Algebra (in preparation for Year 6 statements)			
Begins to generalise using simple algebraic statements e.g. there are 4 chairs for every table, calculate the chairs needed for 8/10/n tables.	Begins to use simple formulae expressed in words e.g. rules for finding the perimeter of rectilinear shapes uses and interprets coordinates in the first quadrant	Begins to write equations to express situations. Locates points and solves problems in the first quadrant.	Uses simple formulae to generate, express and describe: - linear number sequences - mathematical formula - missing number, lengths,

			coordinates and angles problems - equivalent expressions (a + b = b + a) Finds pairs of numbers that satisfy an equation with two unknowns. Finds all possibilities of combinations of two variables.
Ratio and proportion			
			Solves problems involving: relative sizes of two quantities where missing values can be found by using integer multiplication and division calculation of percentages and the use of percentages for comparison (percentages of 360° to calculate angles on a pie chart) similar shapes where the scale factor is known or can be found unequal quantities (e.g. for every egg you need three spoonful of flour)

Year 3	Year 4	Year 5	Year 6
Measurement			
Money			
continues to become fluent in recognising the value of coins	is fluent in the use of all denominations		
Metric / imperial measures			
• uses standard metric units of length (m/cm/mm), capacity/volume (l/ml) and mass (kg/g) in a range of contexts to measure, compares, adds and subtracts - includes mixed units and simple equivalence e.g. 5m = 500cm - reads simple scales, e.g. increments of 2, 5 or 10 includes simple scaling by integers when comparing e.g. 5 times as high or twice as long	• converts different units of measure e.g. km to m - builds on their understanding of place value and decimal notation to record metric measures accurately, including money - uses multiplication to convert from larger to smaller units - uses division to convert from smaller to larger units	• converts between different units of metric units of measure for length, capacity and mass, e.g. 1.2 kg = 1200 g; how many 200 ml cups can be filled from a 2 litre bottle?; write 605cm in metres understands and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints	• uses, reads, writes and converts 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 of up to three decimal places • converts between miles and kilometres connects conversion from kilometres to miles in measurement to its graphical representation
Perimeter, area, volume			
• measures the perimeter of simple 2D shapes - understands perimeter as a measure of length	• measures and calculates the perimeter of a rectilinear figure including squares in centimetres and metres - expresses perimeter algebraically in the same units	• measures and calculates the perimeter of composite rectilinear shapes in centimetres and metres - calculates the perimeter of rectangles and related composite shapes including using the relations of	• recognises that shapes with the same areas can have different perimeters and vice versa • calculates the area of parallelograms and triangles • recognises when it is possible to use the formulae for the area of shapes

	• finds the area of rectilinear shapes using counting squares - understands area as a measure of surface relates area to arrays and multiplication	perimeter or area to find unknown lengths - missing measure questions can be expressed algebraically e.g. 4 + 2b = 20 for a rectangle of sides 2 cm and b cm and perimeter of 20 cm • calculates and compares 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 • estimates volume, e.g.: using $1cm^3$ blocks to build cuboids (including cubes) and capacity (e.g. using water)	• calculates, estimates and compares volume of cubes and cuboids using standard units, including centimetre cubed (cm^3) and cubic metres (m^3), and extending to other units e.g. mm^3 and km^3 recognises when it is possible to use the formulae for the volume of shapes
Chronology			
• estimates, reads, tells and writes the time with increasing accuracy to the nearest minute - uses both analogue and digital including using Roman numerals from I to XII - 12 & 24 hour clocks using am and pm where necessary - records time • knows and recalls:	• reads, writes and converts between analogue (including clock faces using Roma numerals) and digital 12 and 24 hour clocks using am and pm where necessary converts between different units of measure e.g. hours to minutes	• calculates the duration of an event using appropriate units of time, e.g. 'a film starts at 6:45pm and finishes at 8:05pm. How long did it last?' - calculates time durations that bridge the hour reads and interprets timetables	

- the number of seconds in a minute - the number of days in each month, year and leap year • uses vocabulary of time such as o'clock, morning, afternoon, noon, midnight compares duration of events including in terms of seconds, minutes and hours			
Solves problems			
• adds and subtracts amounts of money to give change using £ and p including mixed units • solves problems in practical contexts - calculates the time taken by particular events or tasks solves problems involving length, mass and capacity/volume	• estimates, compares and calculates different measures, including money in pounds and pence • converts between hours and minutes; minutes to seconds; years to months and weeks to days - calculates time durations that pass through the hour	• solves problems involving converting between units of time uses all four operations to solve problems involving measure (a: money; b: length; c: mass / weight; d: capacity / volume) using decimal notation, including scaling	solves problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate
Geometry			
Properties of Shape			
• draws and describes 2D shapes and their properties • includes reflective symmetry, regular & irregular	• compares and classifies geometric shapes based on their properties and sizes e.g. quadrilaterals and triangles extending to parallelogram,	• uses the properties of rectangles to deduce related facts and find missing lengths and angles	• compares and classifies geometric shapes based on their properties and sizes • describes simple 3D shapes

• identifies right angles and angles greater than or less than 90°, • describes acute and obtuse for angles greater or lesser than a right angle e.g. recognises right-angled and equilateral triangles • makes, recognises and describes 3D shapes, and their properties, in different orientations e.g. triangular prism, square based pyramid • extends knowledge to symmetrical and non-symmetrical polygons and polyhedral - identifies horizontal and vertical lines - identifies pairs of perpendicular and parallel lines connects decimals and rounding when drawing and measuring straight lines in cm in a variety of contexts	rhombus and trapezium; isosceles and scalene • identifies acute and obtuse angles; compares and orders angles up to two right angles (180°) by size • decides if a polygon is regular or irregular • identifies lines of symmetry in 2-D shapes presented in different orientations • recognises line symmetry in a variety of diagrams including where the line of symmetry does not dissect the original shape e.g. the original shape may be placed at a distance from and parallel to the axis • completes a simple symmetric figure with respect to a specific line of symmetry • becomes familiar with different orientations of lines of symmetry e.g. vertical, horizontal and diagonal axes uses a variety of media e.g. peg boards, geo-strips and ICT representation	• distinguishes between regular and irregular polygons based on reasoning about equal sides and angles - uses conventional markings for parallel lines and right angles • identifies 3D shapes including cubes and other cuboids, from 2D representations • knows angles are measured in degrees: estimate and compare acute, obtuse and reflex angles • identifies: - 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° • draws given angles and measure them in degrees(°) uses the term diagonal and makes conjectures about the angles formed between sides, and between diagonals and parallel sides and other properties of quadrilaterals	• draws 2D shapes using given dimensions and angles • recognises and builds simple 3D shapes including making nets - visualises a 3D shape from its net and matches vertices that will be joined - visualises where patterns drawn on a 3D shape will occur on its net • finds unknown angles in any triangles, quadrilaterals and regular polygons • recognises angles where they meet at a point, are on a straight line, or are vertically opposite, and finds missing angles - explains how unknown angles and lengths can be derived from known measurements - relationships might be expressed algebraically e.g. d = 2 x r; a = 180 – (b + c) illustrates and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius
Position and Direction			

• recognises that two right angles make a half turn, three make three quarters of a turn and four a complete turn (360°) continues to consolidate Y2 statements	• describes positions on a 2-D grid as co-ordinates in the first quadrant - draws and describes a pair of axes in one quadrant, with equal scales and integer labels - reads, writes and uses pairs of co-ordinates e.g.(2,5) • describes movements between positions as translations of a given unit to the left/right and up/down plots specified points and draws sides to complete a given polygon	• identifies, describes and represents the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed - translates shapes horizontally or vertically - uses a grid and co-ordinates in the first quadrant to plot the reflection in a mirror line presented in lines that are parallel to the axes begins to use the distance of vertices from the mirror line to reflect shapes more accurately	• draws and translates simple shapes on the coordinate plane, and reflects them in the axis - predicts missing coordinates using the properties of shapes. These might be expressed algebraically for example, translating vertex (a, b) to (a-2, b+3); (a, b and (a+d, b+d) being opposite vertices of a square of side d describes positions on the full coordinate grid (all four quadrants)
Statistics			
Processing, representing and interpreting data			
• interprets and presents data using bar charts, pictograms and tables • compares data e.g. say how many more…than… and recognise the category that has most/least • uses a key to interpret represented data • understands and uses simple scales in pictograms and bar	• completes, reads and interprets information presented in bar charts (e.g.: finds the difference between two bars showing temperatures, where one is 20°C and the other is 13°C, on a scale labelled in multiples of five) • interprets and presents discrete and continuous data	• completes, reads and interprets information in tables, including timetables • solves comparison, sum and difference problems using information presented in a line graph - collects, represents and interprets continuous data - decides upon an appropriate scale for a graph, e.g. labelled	• interprets and constructs pie charts and line graphs and uses these to solve problems - connects work on angles, fractions and percentages to the interpretation of pie charts • recognises the difference between discrete and continuous data • recognises when information is presented in a misleading

charts with increasing accuracy e.g. 2, 5, 10 units per cm includes reading between labelled divisions • solves one-step and two-step questions e.g. How many more? How many fewer? • uses information presented in scaled bar charts, pictograms and tables in many contexts responds to questions of a more complex nature e.g. How many children took part in this survey altogether? How would the data differ if we asked the children in Year 6?	using bar charts, and time graphs using a greater range of scales • solves comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs relates the graphical representation of data to recording change over time	divisions representing 2, 5, 10, 100 reads between the labelled divisions, e.g. reads 17 on a scale labelled in fives	way, e.g. compares two pie charts where the sample sizes are different • when drawing conclusions, identifies further questions to ask - begins to decide which representation of data is most appropriate and why • calculates and interprets the mean as an average - knows when it is appropriate to find the mean median and mode of a data.

Working mathematically

Years 3&4	Years 5&6
Application	
Ideas, questions and lines of enquiry	
• develops the mathematics they use in a wide range of contexts - makes suggestions of ways to tackle a range of problems - makes connections to previous work • chooses equipment appropriate to the task independently	• identifies and obtain necessary information to carry through a task and solve mathematical problems - recognises when information is or is not crucial to the solving of a problem - determines what is missing and develops lines of enquiry • selects the most appropriate equipment and explains choices

• poses and answers questions related to a problem and suggests a range of possible approaches to the solution	• uses their mathematical experiences to explore ideas and raises questions to pursue further lines of enquiry
Represent and communicate	
• represents problems pictorially, using a model or with concrete resources - restates the problem in another way presents work in a clear and organised way - uses and interprets a wide range of mathematical symbols and diagrams • begins to work in an organised way from the start using strategies such as recording results in order and checks for accuracy • discusses their mathematical work and uses mathematical language in a more precise and accurate way	• shows understanding of situations by describing them mathematically using symbols, words and diagrams • decides how best to represent conclusions, using appropriate recording - begins to understand and use formulae and symbols to represent problems • organises work from the outset, looks for ways to record systematically and checks results to see if they are reasonable - checks for and spots errors while working constructs complex explanations and reasoned arguments
Plan an approach and implement it	
• uses facts and procedures to solve simple and more complex problems • develops own strategies for solving problems and applying mathematics to practical contexts finds solutions that match the context of the problem	• understands and uses facts and procedures creatively to solve complex or unfamiliar problems • uses appropriate mathematical concepts, processes, skills and tools to solve a problem • interprets the mathematical solution in the context of the problem and makes sense of the solution
Computational complexity	

• solves problems with more than one step at least one of which is more complex	• solves problems with a larger number of numeric steps, at least one of which is more complex
Reasoning	
Make connections	
• makes connections to previous work within mathematics and with other subjects • poses and answer questions that will help make sense of the problem • poses 'What if?' questions that may change the outcome or direction of the problem	• poses own questions and create problems for peers that are similar to ones worked on in class • develops own lines of enquiry
Evaluate	
• suggests refinements to elements of problem solving by comparing other approaches and against 'modelled' examples	• considers efficiency of methods and adapts work accordingly throughout problem solving activities
Draw conclusions	
• predicts conclusions and reason why when referring to work • comments on whether the conclusion was expected • makes valid inferences when referring to own work	• conjectures to develop own line of enquiry when testing outcomes • draws own valid conclusions and give an explanation of reasoning (including written explanations)
Generalise	
• finds solutions and makes predictions by identifying patterns when working • forms generalised rules in words, using concrete resources or own representation	• identifies more complex patterns and begins to express generalisations using symbolic notation

Justify	
• justifies answers and solutions by referring to their work and support with examples	• justifies methods chosen and why the solution is the best one or not • supports conclusions with examples and counter examples.
Problem solving strategies	
• identifies irrelevant information; uses lists and tables to identify and organise information • uses informed 'guess and check' • seeks a pattern • draws a diagram or model • seeks an exception • breaks the problem down into simpler steps • - e.g. works backwards	• organises, deconstructs and prioritises information; uses systematic lists and tables to identify information • uses informed 'guess, check and improve' • identifies and uses a pattern • draws a mathematical model to support visualisation of problem • uses and applies negative proof (uses counter argument to prove the rule) • uses a structured approach to tackle the problem (devise a plan) - e.g. works backwards • solves a simpler related problem