



## KS3 Curriculum Map – Mathematics:

<b>Topic</b>	<b>Substantive Knowledge</b>  This is the specific, factual content for the topic, which should be connected into a careful sequence of learning.	<b>Disciplinary Knowledge (Skills)</b>  This is the action taken within a particular topic in order to gain substantive knowledge.	<b>Assessment Opportunities</b>  What assessments will be used to measure student progress?
Number	<ul style="list-style-type: none"> <li>• Order of operations (BIDMAS)</li> <li>• Directed number</li> <li>• 4 operations with decimals, fractions, and mixed numbers</li> <li>• Reciprocals</li> <li>• Converting between fractions, mixed numbers, decimals and percentages</li> <li>• Percentages</li> <li>• Laws of indices</li> </ul>	<ul style="list-style-type: none"> <li>• Apply the correct order of operations (BIDMAS) and understand that the division and multiplication are the same level and are completed left to right, and analogously for addition and subtraction</li> <li>• Addition, subtraction, multiplication and division of decimals, fractions and mixed numbers</li> <li>• Find the reciprocal of a number and recognise the product of a number and its reciprocal makes 1</li> <li>• Convert between fractions, mixed numbers, decimals and percentages, and use this skill to compare proportions and answer complex numerical problems (including fractions that lead to recurring decimals)</li> <li>• Percentage of an amount including percentages greater than 100%, percentage increase and decrease, percentage change/error</li> <li>• Use the rules of indices for multiplication, division, and brackets</li> </ul>	<ul style="list-style-type: none"> <li>• Fluency and mastery homework</li> <li>• Teacher assessment during lesson</li> <li>• End of module 1 test</li> <li>• End of year assessments</li> <li>• PQWC</li> </ul>
Algebra	<ul style="list-style-type: none"> <li>• Algebra vocabulary</li> <li>• Collect like terms</li> <li>• Substitution</li> <li>• Solve linear equations</li> <li>• Multiply a single term over a bracket</li> </ul>	<ul style="list-style-type: none"> <li>• Use letter symbols to represent unknown numbers or variables</li> <li>• Know the meanings of term, expression, equation and formula</li> <li>• Know and use the order of operations and understand that algebra follow the same conventions and order as arithmetic</li> <li>• Simplify linear algebraic expressions by collect like terms</li> <li>• Substitute numbers into algebraic expressions and formulae to solve problems</li> </ul>	<ul style="list-style-type: none"> <li>• Fluency and mastery homework</li> <li>• Teacher assessment during lesson</li> <li>• End of module 2 test</li> <li>• End of year assessments</li> <li>• PQWC</li> </ul>

	<ul style="list-style-type: none"> <li>Factorise a single term from an expression</li> <li></li> </ul>	<ul style="list-style-type: none"> <li>Construct and solve simple linear equations with integer coefficients</li> <li>Multiply a single term over a bracket</li> <li>Factorise algebraic expressions by finding a single common term</li> </ul>	
Angles	<ul style="list-style-type: none"> <li>Angle rules for lines, triangles and quadrilaterals</li> <li>Angle definitions for parallel lines</li> <li>Tessellation</li> </ul>	<ul style="list-style-type: none"> <li>Understand perpendicular means at a right angle/90°</li> <li>Use angles around a point, angles on a straight line, angles in a triangle, and angles in a quadrilateral</li> <li>Use rules for alternate, corresponding, vertically opposite, and co-interior angles in parallel lines</li> <li>Use special properties of triangles and quadrilaterals to answer problems such as the base angles in an isosceles triangle being equal</li> <li>Solve geometrical problems using correct terminology</li> <li>Understand what tessellation is and why some shapes tessellate</li> </ul>	<ul style="list-style-type: none"> <li>Fluency and mastery homework</li> <li>Teacher assessment during lesson</li> <li>End of module 2 test</li> <li>End of year assessments</li> <li>PQWC</li> </ul>
Shape, Perimeter and Area	<ul style="list-style-type: none"> <li>Properties of quadrilaterals</li> <li>3D shape vocabulary</li> <li>Plans and elevations</li> <li>Nets</li> <li>Units of measurement</li> <li>Area of 2D shapes</li> <li>Volume and surface area of cuboids</li> <li>Circle vocabulary</li> <li>Area and circumference of circles and part-circles</li> </ul>	<ul style="list-style-type: none"> <li>Derive and apply properties of special types of quadrilaterals</li> <li>Know the meanings of faces, surfaces, edges and vertices and identify them in 3D shapes</li> <li>Recognise and draw 3D shapes from their plans and elevations</li> <li>Create plans and elevations for given 3D shapes</li> <li>Construct nets of 3D shapes</li> <li>Choose and use units of measurement to measure, estimate, calculate and solve problems in a range of contexts</li> <li>Know rough metric equivalents of imperial measures in everyday use and use given conversions to answer problems</li> <li>Know and use the formulae for the area of a triangle, parallelogram and trapezium</li> <li>Find the volume and surface area of cuboids or 3D shapes formed of cuboids</li> <li>Construct equations to solve cuboid volume and surface area problems</li> <li>Understand circle vocabulary such as radius, diameter, circumference, arc, sector, chord, and segment</li> </ul>	<ul style="list-style-type: none"> <li>Fluency and mastery homework</li> <li>Teacher assessment during lesson</li> <li>End of module 3 test</li> <li>End of year assessments</li> <li>PQWC</li> </ul>

		<ul style="list-style-type: none"> <li>• Know and use the formulae for the circumference and area of a circle, and use these to answer problems relating to shapes that contain semicircles and quarter-circles</li> </ul>	
Pythagoras' Theorem	<ul style="list-style-type: none"> <li>• Pythagoras' theorem</li> <li>• Contextual problems</li> </ul>	<ul style="list-style-type: none"> <li>• Understand the hypotenuse is the side opposite the right-angle in a right-angled triangle</li> <li>• Use Pythagoras' theorem to find missing sides in right-angled triangles including within contextual problems</li> </ul>	<ul style="list-style-type: none"> <li>• Fluency and mastery homework</li> <li>• Teacher assessment during lesson</li> <li>• End of module 3 test</li> <li>• End of year assessments</li> <li>• PQWC</li> </ul>
Sequences	<ul style="list-style-type: none"> <li>• Function machines</li> <li>• Sequences and nth term</li> </ul>	<ul style="list-style-type: none"> <li>• Use functions machines and use brackets to represent the output of a function machine as an algebraic expression</li> <li>• Generate linear sequences using term-to-term &amp; position-to-term rules</li> <li>• Find the nth term of an arithmetic sequence including from diagrams</li> <li>• Recognise and generate special sequences including those for odd, even, triangular, square, cube numbers and Fibonacci-type sequences, and powers of 2</li> </ul>	<ul style="list-style-type: none"> <li>• Fluency and mastery homework</li> <li>• Teacher assessment during lesson</li> <li>• End of year assessments</li> <li>• PQWC</li> </ul>
Straight Line Graphs	<ul style="list-style-type: none"> <li>• Plot straight line graphs</li> <li>• Find equations of lines</li> </ul>	<ul style="list-style-type: none"> <li>• Plot graphs of linear functions where <math>y</math> is given explicitly in terms of <math>x</math></li> <li>• Find the equation of a line given the graph</li> <li>• Understand 'm' and 'c' in the context of graphs of straight lines</li> <li>• Use straight line graphs to solve contextual problems</li> </ul>	<ul style="list-style-type: none"> <li>• Fluency and mastery homework</li> <li>• Teacher assessment during lesson</li> <li>• End of year assessments</li> <li>• PQWC</li> </ul>
Real Life Graphs	<ul style="list-style-type: none"> <li>• Real life graphs</li> <li>• Conversion graphs</li> </ul>	<ul style="list-style-type: none"> <li>• Plot and Interpret graphs arising from real situations such as distance-time and speed-time graphs</li> <li>• Understand that the steeper the gradient the faster the object in a distance-time graph</li> <li>• Use conversion graphs such as for exchange rates</li> <li>• Recognise real life graphs for water depth problems with 3D shapes</li> </ul>	<ul style="list-style-type: none"> <li>• Fluency and mastery homework</li> <li>• Teacher assessment during lesson</li> <li>• End of module 2 test</li> <li>• End of year assessments</li> <li>• PQWC</li> </ul>

Probability	<ul style="list-style-type: none"> <li>• Simple probability</li> <li>• Sample spaces</li> <li>• Two-way tables</li> <li>• Experimental data and relative frequency</li> </ul>	<ul style="list-style-type: none"> <li>• Identify all possible mutually exclusive outcomes of a single event and know and apply the fact that the sum of probabilities of all outcomes is 1</li> <li>• Know that, if the probability of an event occurring is <math>p</math>, then the probability of it not occurring is <math>1-p</math></li> <li>• Use diagrams and tables to record all possible mutually exclusive outcomes for single events and for two successive events, to include 2-way tables and sample spaces</li> <li>• Know when to add or multiply two probabilities in simple situations</li> <li>• Work out probabilities from two-way tables, including conditional probabilities and missing values</li> <li>• Compare estimated experimental probabilities with theoretical probabilities, including relative frequencies</li> <li>• Interpret results of an experiment using probability language and appreciate that random processes are unpredictable</li> <li>• Estimate the number of times an event will occur, given the probability and the number of trials</li> </ul>	<ul style="list-style-type: none"> <li>• Fluency and mastery homework</li> <li>• Teacher assessment during lesson</li> <li>• End of module 3 test</li> <li>• End of year assessments</li> <li>• PQWC</li> </ul>
Statistics	<ul style="list-style-type: none"> <li>• Types of data</li> <li>• Pie charts</li> <li>• Stem and leaf diagrams</li> <li>• Two-way tables</li> <li>• Frequency diagrams</li> <li>• Averages and range</li> <li>• Comparing data</li> </ul>	<ul style="list-style-type: none"> <li>• Understand the differences between qualitative and quantitative data, and discrete and continuous data</li> <li>• Construct and interpret pie charts</li> <li>• Construct and interpret stem and leaf diagrams</li> <li>• Plan, construct and interpret two-way tables for recording data</li> <li>• Construct and interpret frequency diagrams</li> <li>• Calculate the mean, median, mode and range for discrete data</li> <li>• Compare two simple distributions using summary statistics or graphs</li> <li>• Calculate possible values of the set of data given summary statistics</li> </ul>	<ul style="list-style-type: none"> <li>• Fluency and mastery homework</li> <li>• Teacher assessment during lesson</li> <li>• Year 8 module 1 assessment</li> <li>• PQWC</li> </ul>
Number calculations	<ul style="list-style-type: none"> <li>• Calculations</li> <li>• Powers, roots and indices</li> <li>• Systematic Counting</li> <li>• Prime factor decomposition</li> <li>• HCF and LCM</li> </ul>	<ul style="list-style-type: none"> <li>• Understand and use equivalences between <math>0.1</math>, <math>\frac{1}{10}</math> and <math>10^{-1}</math>, and multiply and divide by any integer power of 10</li> <li>• Use given number facts to find the answer to another</li> <li>• Be able to find square roots and cube roots by factorising</li> <li>• Apply systematic listing strategies inc. use of the product rule for counting</li> <li>• Prime factor decomposition using factor trees</li> <li>• Find highest common factors and lowest common multiples of pairs or groups of numbers using prime factorisation and other methods, and apply this skill to contextual problems</li> </ul>	<ul style="list-style-type: none"> <li>• Year 8 Module 1 Test</li> <li>• In class teacher assessment</li> <li>• Fluency &amp; Mastery Homework</li> <li>• End of year exams</li> </ul>

<p>Ratio, proportion &amp; rates of change</p>	<ul style="list-style-type: none"> <li>Using, understanding and applying ratio notation</li> <li>Proportion</li> <li>Compound measures</li> <li>Unit conversion</li> </ul>	<ul style="list-style-type: none"> <li>Use ratio notation, including reduction to simplest form and 3-part ratios</li> <li>Divide a given quantity into two parts in a given part:part or part:whole ratio; express the division of a quantity into two parts as a ratio; apply ratio to real contexts and problems (such as those involving conversion, comparison, scaling, mixing, concentrations)</li> <li>Express multiplicative relationship between 2 quantities as ratio/fraction</li> <li>Understand and use proportion as equality of ratios</li> <li>Relate ratios to fractions and to linear functions</li> <li>Use the unitary method to solve simple word problems involving ratio and direct proportion</li> <li>Represent direct proportion graphically</li> <li>Understand and use density, speed or pressure to solve problems involving constant or average rates of change</li> <li>Change freely between related standard units (e.g. time, length, area, volume/capacity, mass) and compound units (e.g. speed, rates of pay, prices, density, pressure) in numerical and algebraic contexts</li> <li>Calculate average speed, distance, time in mph and metric units and convert between metric speed measures</li> </ul>	<ul style="list-style-type: none"> <li>Year 8 Module 1 Test</li> <li>In class teacher assessment</li> <li>Fluency &amp; Mastery Homework</li> <li>End of year exams</li> </ul>
<p>Angles</p>	<ul style="list-style-type: none"> <li>Angles in polygons</li> <li>Angles of parallel lines</li> </ul>	<ul style="list-style-type: none"> <li>Find and use interior and exterior angles in both regular and irregular polygons</li> <li>Know and use properties of angles, parallel and intersecting lines, polygons</li> <li>Solve geometric problems involving angles</li> </ul>	<ul style="list-style-type: none"> <li>Year 8 Module 1 Test</li> <li>In class teacher assessment</li> <li>Fluency &amp; Mastery Homework</li> <li>End of year exams</li> </ul>
<p>Algebra</p>	<ul style="list-style-type: none"> <li>Algebraic Fractions</li> <li>Substitution</li> <li>Changing the subject</li> <li>Linear equations</li> <li>Trial &amp; Improvement</li> </ul>	<ul style="list-style-type: none"> <li><math>+</math>, <math>-</math>, <math>\times</math>, <math>\div</math> and simplify algebraic fractions where numerator and denominator are single terms</li> <li>Substitute numbers into expressions and formula</li> <li>change the subject of a formula</li> <li>Construct and solve multi-step linear equations with integer coefficients</li> <li>Use systematic trial and improvement methods and ICT tools to find approximate solutions of equations</li> </ul>	<ul style="list-style-type: none"> <li>Year 8 Module 2 Test</li> <li>In class teacher assessment</li> <li>Fluency &amp; Mastery Homework</li> <li>End of year exams</li> </ul>
<p>Compound Measures</p>	<ul style="list-style-type: none"> <li>Speed and average speed</li> <li>Density</li> <li>Pressure</li> </ul>	<ul style="list-style-type: none"> <li>Understand the relationship between speed, distance and time, know the formula relating them, and use this to solve problems involving constant or average speed</li> <li>Introduce the concepts of, and know and use the formulae, for density and pressure</li> <li>Change freely between related standard units (e.g. time, length, area, volume/capacity, mass) and compound units (e.g. speed, rates of pay, prices, density, pressure) in numerical and algebraic contexts</li> </ul>	<ul style="list-style-type: none"> <li>Year 8 Module 2 Test</li> <li>In class teacher assessment</li> <li>Fluency &amp; Mastery Homework</li> <li>End of year exams</li> </ul>

		<ul style="list-style-type: none"> <li>Calculate average speed, distance, time in mph and metric units and convert between metric speed measures (including from graphs)</li> </ul>	
Inequalities	<ul style="list-style-type: none"> <li>Inequalities on a Number Line</li> <li>Solving Inequalities</li> <li>Set Notation</li> </ul>	<ul style="list-style-type: none"> <li>Representing inequalities on a number line</li> <li>Write down whole number values that satisfy an inequality</li> <li>Solve linear inequalities in one variable</li> <li>Solve two simultaneous linear inequalities algebraically</li> <li>Represent the solution set for inequalities using set notation</li> <li>Use inequality notation to specify simple error intervals due to truncation or rounding</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>
Bearings and scale drawing	<ul style="list-style-type: none"> <li>Bearings</li> <li>Scale drawing</li> </ul>	<ul style="list-style-type: none"> <li>Use bearings to specify direction</li> <li>Give a bearing between the points on a map or scaled plan</li> <li>Given the bearing of <math>A</math> from <math>B</math>, work out the bearing of <math>B</math> from <math>A</math></li> <li>Mark on a diagram the position of <math>B</math> given its bearing from <math>A</math></li> <li>Read and construct scale drawings</li> <li>Use and interpret maps and scale drawings, using a variety of scales and units and using proper map scales (1 : 25 000)</li> <li>Use and interpret scale drawings, where scales use mixed units, and drawings aren't done on squared paper, but have measurements marked on them.</li> <li></li> </ul>	<ul style="list-style-type: none"> <li>Year 8 Module 2 Test</li> <li>In class teacher assessment</li> <li>Fluency &amp; Mastery Homework</li> <li>End of year exams</li> </ul>
Graphs	<ul style="list-style-type: none"> <li>Plot graphs of linear functions</li> <li>Equations of straight lines</li> <li>Simultaneous equations</li> </ul>	<ul style="list-style-type: none"> <li>Generate points and plot graphs of linear functions</li> <li>Recognise that linear functions can be rearranged to give <math>y</math> explicitly in terms of <math>x</math></li> <li>Know that the gradient of a line is the change in <math>y</math> over change in <math>x</math>.</li> <li>Use gradients to interpret how one variable changes in relation to another</li> <li>Find the gradient of lines given by equations of the form <math>y = mx + c</math> and <math>ax + by = c</math></li> <li>Find the equation of a straight line from its graph</li> <li>Parallel lines</li> </ul>	<ul style="list-style-type: none"> <li>Year 8 Module 3 Test</li> <li>In class teacher assessment</li> <li>Fluency &amp; Mastery Homework</li> <li>End of year exams</li> </ul>
Geometry & Measures	<ul style="list-style-type: none"> <li>Coordinate geometry</li> </ul>	<ul style="list-style-type: none"> <li>Find the length of a line segment</li> <li>Find the coordinates of a mid-point of a line</li> <li>Solve geometrical problems on coordinate axes</li> </ul>	<ul style="list-style-type: none"> <li>Year 8 Module 2 Test</li> <li>In class teacher assessment</li> <li>Fluency &amp; Mastery Homework</li> <li>End of year exams</li> </ul>

Area and volume	<ul style="list-style-type: none"> <li>• Conversion between measures</li> <li>• Surface area &amp; Volume</li> </ul>	<ul style="list-style-type: none"> <li>• Convert between area measures and between volume measures</li> <li>• Calculate the surface area and volume of right prisms (including the use of Pythagoras Theorem to calculate missing sides in triangular prisms when calculating surface area and volume)</li> <li>• Calculate the lengths and areas given the volumes in right prisms</li> </ul>	<ul style="list-style-type: none"> <li>• Year 8 Module 3 Test</li> <li>• In class teacher assessment</li> <li>• Fluency &amp; Mastery Homework</li> <li>• End of year exams</li> </ul>
Simultaneous equations	<ul style="list-style-type: none"> <li>• Simultaneous equations</li> </ul>	<ul style="list-style-type: none"> <li>• Solve a pair of simultaneous linear equations by eliminating one variable and by linking a graph of the equations to the algebraic solution</li> <li>• Solve simultaneous linear equations by substitution</li> <li>• Consider cases of simultaneous linear equations that have no solution or an infinite number of solutions</li> <li>• Construct and solve simultaneous equations</li> </ul>	<ul style="list-style-type: none"> <li>• Year 8 Module 3 Test</li> <li>• In class teacher assessment</li> <li>• Fluency &amp; Mastery Homework</li> <li>• End of year exams</li> </ul>
Trigonometry	<ul style="list-style-type: none"> <li>• Trigonometry with right angled triangles</li> <li>• Trigonometric exact values</li> </ul>	<ul style="list-style-type: none"> <li>• Understand and use trigonometric relationships in right-angled triangles, and use these to solve problems (including bearings and angle of elevation and depressions)</li> <li>• Use the trigonometric keys of a calculator</li> <li>• Exact values and surds for trig functions: Know the exact values of <math>\sin \theta</math> and <math>\cos \theta</math> for <math>\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ</math> and <math>90^\circ</math>; know the exact value of <math>\tan \theta</math> for <math>\theta = 0^\circ, 30^\circ, 45^\circ</math> and <math>60^\circ</math></li> </ul>	<ul style="list-style-type: none"> <li>• In class teacher assessment</li> <li>• Fluency &amp; Mastery Homework</li> <li>• End of year exams</li> </ul>
Fractions and percentages	<ul style="list-style-type: none"> <li>• Percentages &amp; Fractions</li> <li>• Multiple percentage/proportion change</li> </ul>	<ul style="list-style-type: none"> <li>• Interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively</li> <li>• Express one quantity as a percentage of another</li> <li>• Compare two quantities using percentages, including a range of calculations and contexts</li> <li>• Work with percentages greater than 100%</li> <li>• Find a percentage of a quantity using a multiplier</li> <li>• Solve problems involving percentage change, including percentage increase/decrease (using a multiplier and other methods) and original value problems</li> <li>• Use percentages in real-life situations: VAT, value of profit or loss, simple interest, income tax calculations</li> <li>• Use compound interest</li> <li>• Represent repeated proportional change using a multiplier raised to a power</li> <li>• Use percentages in real-life situations: compound interest, depreciation, percentage profit and loss</li> <li>• Calculate repeated proportional change</li> <li>• Express one quantity as a fraction of another, where the fraction is greater than 1</li> </ul>	<ul style="list-style-type: none"> <li>• In class teacher assessment</li> <li>• Fluency &amp; Mastery Homework</li> <li>• End of year exams</li> </ul>

<p>Constructions</p>	<ul style="list-style-type: none"> <li>• Constructions</li> </ul>	<ul style="list-style-type: none"> <li>• (Including to and from a point &amp; including knowing the perpendicular is the shortest distance from a point to a line), angular bisectors &amp; triangles</li> <li>• Construct angles of <math>60^\circ</math>, <math>90^\circ</math>, <math>30^\circ</math>, <math>45^\circ</math></li> </ul>	<ul style="list-style-type: none"> <li>• In class teacher assessment</li> <li>• Fluency &amp; Mastery Homework</li> <li>• End of year exams</li> </ul>
<p>Algebraic manipulation</p>	<ul style="list-style-type: none"> <li>• Quadratics</li> </ul>	<ul style="list-style-type: none"> <li>• Expand and simplify double brackets</li> <li>• Square a linear expression and collect like terms</li> <li>• expand product of two or more linear expressions of form <math>ax \pm b</math></li> <li>• Factorise and solve quadratic expressions of the form <math>x^2 + bx + c</math>, including the difference of two squares</li> <li>• Introduce factorising and solving quadratic equations of the form <math>ax^2 + bx + c</math> where <math>a &gt; 1</math></li> <li>• Algebraic identities</li> <li>• Answer simple proof and 'show that' questions using consecutive integers <math>(n, n + 1)</math>, squares <math>a^2, b^2</math>, even numbers <math>2n</math>, and odd numbers <math>2n + 1</math></li> </ul>	<ul style="list-style-type: none"> <li>• In class teacher assessment</li> <li>• Fluency &amp; Mastery Homework</li> <li>• End of year exams</li> </ul>