



KS3 Curriculum Map – Mathematics:

Topic	Substantive Knowledge This is the specific, factual content for the topic, which should be connected into a careful sequence of learning.	Disciplinary Knowledge (Skills) This is the action taken within a particular topic in order to gain substantive knowledge.	Assessment Opportunities What assessments will be used to measure student progress?
Number	<ul style="list-style-type: none"> • 4 operations with positive and negative integers, decimals, fractions, and mixed numbers • Order of operations (BIDMAS) • Rounding and estimating • Converting between fractions, mixed numbers, decimals and percentages • Percentages • Prime factorisation, HCF, LCM • Powers and roots • Reciprocals • Laws of indices • Use of calculators 	<ul style="list-style-type: none"> • Addition, subtraction, multiplication and division of positive and negative integers, including mental and written strategies • Addition, subtraction, multiplication and division of decimals, fractions and mixed numbers • 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 • Rounding to the nearest power of ten, decimal place rounding, significant figure rounding, and use of rounding in estimation problems • Convert between fractions, mixed numbers, decimals and percentages, and use this skill to compare proportions and answer complex numerical problems • Percentage of an amount including percentages greater than 100%, percentage increase and decrease, percentage change/error • Prime factor decomposition using factor trees • 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 	<ul style="list-style-type: none"> • Fluency and mastery homework • Teacher assessment during lesson • End of module 1 test • End of year assessments • PQWC

		<ul style="list-style-type: none"> • Find powers of numbers and roots • Find the reciprocal of a number and recognise the product of a number and its reciprocal makes 1 • Use the rules of indices for multiplication, division, and brackets • Use calculators to accurately answer problems including how to use powers, roots, brackets, fractions, and mixed numbers 	
Angles and Shape	<ul style="list-style-type: none"> • Angle rules for lines, triangles and quadrilaterals • Angle definitions for parallel lines • Tessellation 	<ul style="list-style-type: none"> • Understand perpendicular means at a right angle/90° • Use angles around a point, angles on a straight line, angles in a triangle, and angles in a quadrilateral • Use rules for alternate, corresponding, vertically opposite, and co-interior angles in parallel lines • Use special properties of triangles and quadrilaterals to answer problems such as the base angles in an isosceles triangle being equal • Solve geometrical problems using correct terminology • Understand what tessellation is and why some shapes tessellate 	<ul style="list-style-type: none"> • Fluency and mastery homework • Teacher assessment during lesson • End of module 2 test • End of year assessments • PQWC
Algebra	<ul style="list-style-type: none"> • Algebra vocabulary • Collect like terms • Substitution • Solve linear equations • Multiply a single term over a bracket • Factorise a single term from an expression • Function machines • Sequences and nth term 	<ul style="list-style-type: none"> • Use letter symbols to represent unknown numbers or variables • Know the meanings of term, expression, equation and formula • Know and use the order of operations and understand that algebra follow the same conventions and order as arithmetic • Simplify linear algebraic expressions by collect like terms • Substitute numbers into algebraic expressions and formulae to solve problems • Construct and solve simple linear equations with integer coefficients • Multiply a single term over a bracket 	<ul style="list-style-type: none"> • Fluency and mastery homework • Teacher assessment during lesson • End of module 2 test • End of year assessments • PQWC

		<ul style="list-style-type: none"> • Factorise algebraic expressions by finding a single common term • Use functions machines and use brackets to represent the output of a function machine as an algebraic expression • Generate linear sequences using term-to-term & position-to-term rules • Find the nth term of an arithmetic sequence including from diagrams • Recognise and generate special sequences including those for odd, even, triangular, square, cube numbers and Fibonacci-type sequences, and powers of 2 	
Plans and Elevations	<ul style="list-style-type: none"> • 3D shape vocabulary • Plans and elevations • Nets 	<ul style="list-style-type: none"> • Know the meanings of faces, surfaces, edges and vertices and identify them in 3D shapes • Recognise and draw 3D shapes from their plans and elevations • Create plans and elevations for given 3D shapes • Construct nets of 3D shapes 	<ul style="list-style-type: none"> • Fluency and mastery homework • Teacher assessment during lesson • End of module 2 test • End of year assessments • PQWC
Real Life Graphs	<ul style="list-style-type: none"> • Real life graphs • Conversion graphs 	<ul style="list-style-type: none"> • Plot and Interpret graphs arising from real situations such as distance-time and speed-time graphs • Understand that the steeper the gradient the faster the object in a distance-time graph • Use conversion graphs such as for exchange rates • Recognise real life graphs for water depth problems with 3D shapes 	<ul style="list-style-type: none"> • Fluency and mastery homework • Teacher assessment during lesson • End of module 2 test • End of year assessments • PQWC

<p>Perimeter and Area</p>	<ul style="list-style-type: none"> • Units of measurement • Area of 2D shapes • Volume and surface area of cuboids • Circle vocabulary • Area and circumference of circles and part-circles 	<ul style="list-style-type: none"> • Choose and use units of measurement to measure, estimate, calculate and solve problems in a range of contexts • Know rough metric equivalents of imperial measures in everyday use and use given conversions to answer problems • Know and use the formulae for the area of a triangle, parallelogram and trapezium • Find the volume and surface area of cuboids or 3D shapes formed of cuboids • Construct equations to solve cuboid volume and surface area problems • Understand circle vocabulary such as radius, diameter, circumference, arc, sector, chord, and segment • 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 	<ul style="list-style-type: none"> • Fluency and mastery homework • Teacher assessment during lesson • End of module 3 test • End of year assessments • PQWC
<p>Pythagoras' Theorem</p>	<ul style="list-style-type: none"> • Pythagoras' theorem • Contextual problems 	<ul style="list-style-type: none"> • Understand the hypotenuse is the side opposite the right-angle in a right-angled triangle • Use Pythagoras' theorem to find missing sides in right-angled triangles including within contextual problems 	<ul style="list-style-type: none"> • Fluency and mastery homework • Teacher assessment during lesson • End of module 3 test • End of year assessments • PQWC
<p>Probability</p>	<ul style="list-style-type: none"> • Simple probability • Sample spaces • Two-way tables • Experimental data and relative frequency 	<ul style="list-style-type: none"> • 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 • Know that, if the probability of an event occurring is p, then the probability of it not occurring $1-p$ • 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 • Know when to add or multiply two probabilities in simple situations • Work out probabilities from two-way tables, including conditional probabilities and missing values • Compare estimated experimental probabilities with theoretical probabilities, including relative frequencies • Interpret results of an experiment using probability language and appreciate that random processes are unpredictable • Estimate the number of times an event will occur, given the probability and the number of trials 	<ul style="list-style-type: none"> • Fluency and mastery homework • Teacher assessment during lesson • End of module 3 test • End of year assessments • PQWC

<p>Straight Line Graphs</p>	<ul style="list-style-type: none"> Plot straight line graphs Find equations of lines 	<ul style="list-style-type: none"> Plot graphs of linear functions where y is given explicitly in terms of x Find the equation of a line given the graph Understand 'm' and 'c' in the context of graphs of straight lines Use straight line graphs to solve contextual problems 	<ul style="list-style-type: none"> Fluency and mastery homework Teacher assessment during lesson End of year assessments PQWC
<p>Transformations</p>	<ul style="list-style-type: none"> Symmetry Reflection Translation Rotation Enlargement Invariance 	<ul style="list-style-type: none"> Identify rotational and reflective symmetry in 2-D shapes Reflect shapes in axes and lines such as $x=c$, $y=c$, $y=x$, $y=-x$ Translate shapes using vectors Rotate shapes around points with angles that are multiples of 90° Enlarge shapes from a point given positive integer scale factors Describe translations using the information above Understand the word invariant and identify numbers of invariant points for transformations 	<ul style="list-style-type: none"> Fluency and mastery homework Teacher assessment during lesson End of year assessments PQWC
<p>Statistics</p>	<ul style="list-style-type: none"> Types of data Pie charts Stem and leaf diagrams Two-way tables Frequency diagrams Averages and range Comparing data 	<ul style="list-style-type: none"> Understand the differences between qualitative and quantitative data, and discrete and continuous data Construct and interpret pie charts Construct and interpret stem and leaf diagrams Plan, construct and interpret two-way tables for recording data Construct and interpret frequency diagrams Calculate the mean, median, mode and range for discrete data Compare two simple distributions using summary statistics or graphs Calculate possible values of the set of data given summary statistics 	<ul style="list-style-type: none"> Fluency and mastery homework Teacher assessment during lesson Year 8 module 1 assessment PQWC
<p>Number calculations</p>	<ul style="list-style-type: none"> Calculations Powers, roots and indices Systematic Counting 	<ul style="list-style-type: none"> Understand and use equivalences between 0.1, $\frac{1}{10}$ and 10^{-1}, and multiply and divide by any integer power of 10 Use given number facts to find the answer to another Be able to find square roots and cube roots by factorising Apply systematic listing strategies inc. use of the product rule for counting 	<ul style="list-style-type: none"> Year 8 Module 1 Test In class teacher assessment Fluency & Mastery Homework End of year exams
<p>Ratio, proportion & rates of change</p>	<ul style="list-style-type: none"> Using, understanding and applying ratio notation Proportion Compound measures Unit conversion 	<ul style="list-style-type: none"> Use ratio notation, including reduction to simplest form and 3-part ratios 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) Express multiplicative relationship between 2 quantities as ratio/fraction Understand and use proportion as equality of ratios 	<ul style="list-style-type: none"> Year 8 Module 1 Test In class teacher assessment Fluency & Mastery Homework End of year exams

		<ul style="list-style-type: none"> • Relate ratios to fractions and to linear functions • Use the unitary method to solve simple word problems involving ratio and direct proportion • Understand and use density, speed or pressure to solve problems involving constant or average rates of change • 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 • Calculate average speed, distance, time in mph and metric units and convert between metric speed measures 	
Angles	<ul style="list-style-type: none"> • Angles in polygons • Angles of parallel lines 	<ul style="list-style-type: none"> • Find and use interior and exterior angles in both regular and irregular polygons • Know and use properties of angles, parallel and intersecting lines, polygons 	<ul style="list-style-type: none"> • Year 8 Module 1 Test • In class teacher assessment • Fluency & Mastery Homework • End of year exams
Algebra	<ul style="list-style-type: none"> • Algebraic Fractions • Substitution • Changing the subject • Linear equations • Trial & Improvement 	<ul style="list-style-type: none"> • $+$, $-$, \times, \div and simplify algebraic fractions where numerator and denominator are single terms • Substitute numbers into expressions and formula • change the subject of a formula • Construct and solve multi-step linear equations with integer coefficients • Use systematic trial and improvement methods and ICT tools to find approximate solutions of equations 	<ul style="list-style-type: none"> • Year 8 Module 2 Test • In class teacher assessment • Fluency & Mastery Homework • End of year exams
Geometry & Measures	<ul style="list-style-type: none"> • Coordinate geometry • Constructions 	<ul style="list-style-type: none"> • Find the length of a line segment • Find the coordinates of a mid-point of a line • Solve geometrical problems on coordinate axes • Use a compass & straight edge to construct a perpendicular bisector (Including to and from a point & including knowing the perpendicular is the shortest distance from a point to a line), angular bisectors & triangles • Construct angles of 60°, 90°, 30°, 45° 	<ul style="list-style-type: none"> • Year 8 Module 2 Test • In class teacher assessment • Fluency & Mastery Homework • End of year exams
Equations of lines	<ul style="list-style-type: none"> • Plot graphs of linear functions • Equations of straight lines • Simultaneous equations 	<ul style="list-style-type: none"> • Generate points and plot graphs of linear functions • Recognise that linear functions can be rearranged to give y explicitly in terms of x • Know that the gradient of a line is the change in y over change in x. • Use gradients to interpret how one variable changes in relation to another • Find the gradient of lines given by equations of the form $y = mx + c$ and $ax + by = c$ • <i>Find the equation of a straight line from its graph</i> • Parallel lines 	<ul style="list-style-type: none"> • Year 8 Module 3 Test • In class teacher assessment • Fluency & Mastery Homework • End of year exams

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

<p>Venn diagrams and set notation</p>	<ul style="list-style-type: none"> • Introduction to sets 	<ul style="list-style-type: none"> • Set notation & definitions • Venn Diagram • Union & intersection of sets 	<ul style="list-style-type: none"> • In class teacher assessment • Fluency & Mastery Homework • End of year exams
<p>Algebraic manipulation</p>	<ul style="list-style-type: none"> • Quadratics • Identities • Algebraic Proof 	<ul style="list-style-type: none"> • Expand and simplify double brackets • Square a linear expression and collect like terms • expand product of two or more linear expressions of form $ax \pm b$ • Factorise and solve quadratic expressions of the form $x^2 + bx + c$, including the difference of two squares • Introduce factorising and solving quadratic equations of the form $ax^2 + bx + c$ where $a > 1$ • Algebraic identities • Answer simple proof and 'show that' questions using consecutive integers $(n, n + 1)$, squares a^2, b^2, even numbers $2n$, and odd numbers $2n + 1$ 	<ul style="list-style-type: none"> • In class teacher assessment • Fluency & Mastery Homework • End of year exams