

Year 9: Curriculum Implementation Plan

Mathematics – Year 9 Higher – Overview				
Knowledge and Skills – Students will be taught to...	Reading, Oracy, Literacy	Formative Assessment	Summative Assessment	Link to GCSE Content
Please see individual units below.	<ul style="list-style-type: none"> • Reading worded questions to understand the context and decide how to approach a problem • Paired discussion of problems • Writing responses to worded questions such as “Explain why...” • Expanding vocabulary of key mathematical terms • Giving verbal responses in class question-and-answer 	<ul style="list-style-type: none"> • Questioning in class • Self-assessment • Peer-assessment • Starter and homework questions • Mini-tests • Show of hands and other forms of whole-class feedback • Review of student work during lessons • Mini-whiteboards 	Whole-class assessments towards the end of each term, based on work completed during the year to date, and including GCSE-style questions.	Please see individual units below.

Mathematics – Unit 1 – Straight line graphs	
Knowledge and Skills – Students will be taught to...	Links to KS3 National Curriculum content (green) and KS4 content (red)
<ul style="list-style-type: none"> Identify/use the equations of lines parallel to the axes, $y=x$, and $y=-x$ Use a table of values to plot a line graph Understand and use the line equation $y = mx + c$ Identify the equation of a line from its graph Interpret the gradient and y-intercept of real-life graphs Model inverse real-life graphs (Higher) Explore gradients of perpendicular lines (Higher) 	<p>Work with coordinates in all four quadrants</p> <p>Recognise, sketch and produce graphs of linear functions of one variable with appropriate scaling, using equations in x and y and the Cartesian plane</p> <p>Calculate and interpret gradients and intercepts of graphs of linear equations</p> <p>Use the form $y = mx + c$ to identify parallel and perpendicular lines</p> <p>Recognise, sketch and interpret graphs of linear functions</p>
Mathematics – Unit 2 – Forming and solving equations	
Knowledge and Skills – Students will be taught to...	Links to KS3 National Curriculum content (green) and KS4 content (red)
<ul style="list-style-type: none"> Solve 1-step and 2-step equations and inequalities Solve equations and inequalities with brackets Solve inequalities where negative numbers are involved Solve equations and inequalities with the unknown on both sides Solve equations and inequalities in context Substitute into formulae and expressions Rearrange 1-step formulae 	<p>Use algebraic methods to solve linear equations in one variable</p> <p>Understand and use the concepts and vocabulary of equations and inequalities</p> <p>Recognise and use relationships between operations including inverse operations</p> <p>Solve linear inequalities in one variable</p>
Mathematics – Unit 3 – Testing conjectures	
Knowledge and Skills – Students will be taught to...	Links to KS3 National Curriculum content (green) and KS4 content (red)
<ul style="list-style-type: none"> Identify factors, common factors, and the highest common factor Identify multiples, common multiples, and the lowest common multiple Identify prime numbers Identify statements as true or false Identify statements as always, sometimes or never true Use mathematical argument to show that a statement is true Conjecture with numbers, algebra, brackets and the 100 grid Expand a product of three binomials (Higher) 	<p>Use the concepts and vocabulary of prime numbers, factors, multiples, common factors, common multiples, highest common factor, and lowest common multiple</p> <p>Simplify and manipulate algebraic expressions by expanding products of two or more binomials</p> <p>Use algebra to support and construct arguments</p>

Mathematics – Unit 4 – Three dimensional shapes	
Knowledge and Skills – Students will be taught to...	Links to KS3 National Curriculum content (green) and KS4 content (red)
<ul style="list-style-type: none"> • Know the names of 2D and 3D shapes • Recognise prisms, using the language of vertices and edges • Identify/sketch/construct nets of cuboids • Sketch and recognise nets of other 3D shapes • Identify/draw plans and elevations of 3D shapes • Calculate the area of rectangles, triangles, parallelograms, trapeziums and circles • Calculate the surface area of cubes, cuboids, triangular prisms and cylinders • Calculate the volume of cubes, cuboids, prisms and cylinders • Calculate the volume of spheres, pyramids and cones (Higher) 	<p>Use the properties of faces, surfaces, edges and vertices of cubes, cuboids, prisms, and cylinders to solve problems in 3D</p> <p>Construct and interpret plans and elevations of 3D shapes</p> <p>Calculate surface areas and volumes of spheres, pyramids, and cones</p>
Mathematics – Unit 5 – Constructions and congruency	
Knowledge and Skills – Students will be taught to...	Links to KS3 National Curriculum content (green) and KS4 content (red)
<ul style="list-style-type: none"> • Draw and measure acute, obtuse and reflex angles • Interpret scale drawings • Construct the locus of a distance from a point, and distance from a line/shape, or equidistant from two points • Construct a perpendicular bisector and the perpendicular to/from a point • Construct the locus of points equidistant from two lines • Construct an angle bisector • Construct triangles using protractor and compasses • Identify congruent figures • Identify congruent triangles using SSS, SAS, ASA, RHS 	<p>Draw and measure angles in geometric figures, including interpreting scale drawings</p> <p>Derive and use the standard ruler and compass constructions</p> <p>Recognise and use the perpendicular distance from a point to a line as the shortest distance to the line</p> <p>Apply angle facts, triangle congruence, and similarity to derive results about angles and sides</p> <p>Identify congruent triangles; know and use the criteria for congruence of triangles</p> <p>Apply the concepts of congruence and similarity, including the relationship between lengths in similar figures</p>
Mathematics – Unit 6 – Numbers	
Knowledge and Skills – Students will be taught to...	Links to KS3 National Curriculum content (green) and KS4 content (red)
<ul style="list-style-type: none"> • Understand the terms integer, real number, rational number • Understand and use surds (Higher) • Work with directed number in algebraic contexts • Use prime factorisation to identify HCF and LCM • Add, subtract, multiply and divide fractions • Solve problems with integers, decimals and fractions • Solve problems with numbers in standard form 	<p>Distinguish between exact representations of roots and their decimal approximations</p> <p>Use prime factorisation, including using product notation and the unique factorisation property</p> <p>Interpret numbers in standard form</p> <p>Calculate exactly using surds</p> <p>Calculate with numbers in standard form</p>

Mathematics – Unit 7 – Using percentages	
Knowledge and Skills – Students will be taught to...	Links to KS3 National Curriculum content (green) and KS4 content (red)
<ul style="list-style-type: none"> • Convert between fractions, decimals and percentages • Increase/decrease by a percentage using a calculator • Identify the percentage of a given increase, decrease, profit or loss • Solve reverse percentage problems • Solve a range of percentage problems with and without a calculator • Solve problems involving repeated percentage change (Higher) 	<p>Work interchangeably with terminating decimals and their corresponding fractions</p> <p>Interpret percentages and percentage changes as a fraction or a decimal, interpret these multiplicatively; interpret percentages as operators</p> <p>Work with percentages greater than 100%</p>
Mathematics – Unit 8 – Maths and money	
Knowledge and Skills – Students will be taught to...	Links to KS3 National Curriculum content (green) and KS4 content (red)
<ul style="list-style-type: none"> • Understand/interpret bills and bank statements • Calculate simple interest and compound interest • Calculate wages, tax and VAT • Understand/use exchange rates • Solve problems using unit pricing 	<p>Use compound units such as unit pricing to solve problems</p> <p>Set up, solve and interpret the answers in growth and decay problems, including compound interest</p>
Mathematics – Unit 9 – Deduction	
Knowledge and Skills – Students will be taught to...	Links to KS3 National Curriculum content (green) and KS4 content (red)
<ul style="list-style-type: none"> • Identify/calculate angles near parallel lines • Solve angle problems involving algebra • Conjecture with angles and shapes • Reason with constructions 	<p>Understand and use the relationship between parallel lines and alternate and corresponding angles</p> <p>Use algebra to support and construct arguments</p>
Mathematics – Unit 10 – Rotation and translation	
Knowledge and Skills – Students will be taught to...	Links to KS3 National Curriculum content (green) and KS4 content (red)
<ul style="list-style-type: none"> • Identify line symmetry and rotational symmetry • Rotate a shape on a grid or on co-ordinate axes • Translate a shape using a vector • Identify rotations, reflections and invariance • Perform a series of reflections, rotations and translations (Higher) 	<p>Construct congruent triangles, with and without coordinate grids</p> <p>Identify properties of translations and rotations applied to given figures</p> <p>Describe translations as 2D vectors</p> <p>Describe the changes and invariance achieved by combinations of rotations, reflections and translations</p>

Mathematics – Unit 11 – Pythagoras’ theorem	
Knowledge and Skills – Students will be taught to...	Links to KS3 National Curriculum content (green) and KS4 content (red)
<ul style="list-style-type: none"> Calculate missing sides in right-angled triangles Use Pythagoras’ theorem to determine whether a triangle is right-angled Explore proofs using Pythagoras’ theorem Use Pythagoras’ theorem in 3D shapes (Higher) 	<p>Use Pythagoras’ Theorem to solve problems involving right-angled triangles</p> <p>Derive results about angles and sides, including Pythagoras’ Theorem, and use known results to obtain simple proofs</p> <p>Apply Pythagoras’ Theorem in right-angled triangles in 2D and 3D</p>
Mathematics – Unit 12 – Enlargement and similarity	
Knowledge and Skills – Students will be taught to...	Links to KS3 National Curriculum content (green) and KS4 content (red)
<ul style="list-style-type: none"> Enlarge a shape using a positive integer scale factor Use a centre of enlargement Enlarge a shape by a positive fractional scale factor and centre Enlarge a shape by a negative scale factor (Higher) Work out missing sides and angles in similar shapes Solve problems with similar triangles (Higher) Explore ratios of sides in right-angled triangles (Higher) 	<p>Use scale factors</p> <p>Apply similarity to derive results about angles and sides</p> <p>Apply the concept of similarity, including the relationship between lengths in similar figures</p> <p>Interpret and use fractional scale factors for enlargements</p>
Mathematics – Unit 13 – Solving ratio and proportion problems	
Knowledge and Skills – Students will be taught to...	Links to KS3 National Curriculum content (green) and KS4 content (red)
<ul style="list-style-type: none"> Solve problems involving direct proportion Interpret conversion graphs and relate them to direct proportion Solve problems involving inverse proportion Recognise/interpret graphs showing inverse proportion (Higher) Solve problems involving division in a ratio Solve ‘best buy’ problems Solve ratio problems involving algebra 	<p>Solve problems involving direct and inverse proportion, including graphical and algebraic representations</p> <p>Use ratio notation</p> <p>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</p> <p>Use compound units such as unit pricing to solve problems</p> <p>Recognise and interpret graphs and equations that illustrate direct proportion</p>

Mathematics – Unit 14 – Rates	
Knowledge and Skills – Students will be taught to...	Links to KS3 National Curriculum content (green) and KS4 content (red)
<ul style="list-style-type: none"> • Solve problems involving speed, distance and time, with and without a calculator • Plot/interpret distance-time graphs • Solve problems involving density, mass and volume • Solve ‘flow’ problems and identify a suitable graph for a given situation • Understand the units used for different rates of change • Convert between compound units of speed and density (Higher) 	<p>Use standard units of time</p> <p>Use compound units such as speed and density to solve problems</p> <p>Model situations or procedures using graphs</p> <p>Find approximate solutions to contextual problems from given graphs of a variety of functions, including piece-wise linear graphs</p> <p>Convert between related compound units (speed, rates of pay, prices, density) in numerical contexts</p> <p>Interpret the gradient of a graph in cases such as distance-time graphs</p>
Mathematics – Unit 15 – Probability	
Knowledge and Skills – Students will be taught to...	Links to KS3 National Curriculum content (green) and KS4 content (red)
<ul style="list-style-type: none"> • Identify simple theoretical probabilities as decimals and fractions • Use experimental data to identify relative frequency and expected outcomes • Construct/use a sample space diagram for independent events • Construct/use a probability tree diagram for dependent and independent events (Higher) • Use Venn diagrams and two-way tables to identify probabilities 	<p>Enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams</p> <p>Generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities</p> <p>Record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes, using appropriate language and the 0-1 probability scale</p> <p>Calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions</p> <p>Use a probability model to predict the outcomes of future experiments</p>