Curriculum Intent

In terms of our Mathematics Framework, our curriculum:

- Will inspire our pupils to appreciate the beauty of Mathematics.
- Will provide pupils with the confidence and resilience to think critically and creatively.
- Will develop mathematical abilities and skills that enable students to succeed both academically and in everyday life.
- Has a pivotal role in developing pupils' communication skills across the curriculum and ensuring success in our academies.
- Ensures pupils can understand, interpret and present mathematical information in a variety of forms.
- Actively encourages pupils to vocalise their thoughts and ideas on the concepts explored and develops their cultural capital by exposing them to 'real-life' problems and applications.
- Reflects our high expectations for every child to gain the powerful knowledge, by providing the support and challenge they specifically need.
- Will cover the breadth and depth of the 2014 National Curriculum for Mathematics

Year 9	Learning Cycle: Autumn 1		
Substantive Concept	Number	**Topic/Unit**	Standard Form
Powerful Knowledge	Core • Converting large and small ordinary numbers into standard form • Converting standard form numbers into ordinary numbers • Expressing in correct standard form ($58 \times 10^6 = 5.8 \times 10^7$) • Comparing and ordering numbers in standard form		Challenge • Solving problems of standard form in context • Multiplying and dividing in standard form • Adding and subtracting in standard form Support • Multiplying and dividing by powers of 10 • Understand place value
Core Disciplinary Skills	Understanding standard form notation (including when n is 0) Understanding of equivalence Understand that the decimal point does not move when converting numbers into standard form		
National Curriculum Coverage	N8	**Resources** *To be added later*	
Key Vocabulary	Standard form, Ordinary form, Base, Power, Index/Indices	**Assessment**	

Year 9	Learning Cycle: Autumn 1		
Substantive Concept	Geometry and Measures	**Topic/Unit**	Angles in polygons
Powerful Knowledge	Core • Find the interior and exterior angles of a regular polygon • Calculate the sum of the interior angles of any polygon using the formula (n-2) x180° • Use the interior angle and exterior angle to find the number of sides of a polygon		Challenge • Solving problems involving more than one polygon • Solve problems relating to interior/exterior angles of polygons using algebra Support • Identifying and naming triangles and quadrilaterals • Angles in a triangle • Angles in a quadrilateral
Core Disciplinary Skills	Know the names and properties of 2D shapes up to 10 sided Understand and articulate the rules for finding angles in polygons		
National Curriculum Coverage	G12	**Resources** *To be added later*	
Key Vocabulary	Angle, Regular, Irregular, Polygon, Interior, Exterior, Triangle, Quadrilateral, Pentagon, Hexagon, Heptagon, Octagon, Nonagon, Decagon	**Assessment**	

Year 9	Learning Cycle: Autumn 1		
Substantive Concept	Ratio and Proportion	**Topic/Unit**	Compound Measures
Powerful Knowledge	Core • Converting units of time (decimal hours and fractional hours) • Solving problems involving speed, distance and time • Converting units of speed		Challenge • Solving problems involving multiple parts of a journey • Calculating average speed of a journey Support • 12/24-hour clock • Time differences • Reading timetables
Core Disciplinary Skills	Understand the formulae relating to speed, distance and time Know standard measures of length and speed		
National Curriculum Coverage	RP1, RP10	**Resources** *To be added later*	
Key Vocabulary	Compound, Speed, Distance, Time	**Assessment**	

Year 9	Learning Cycle: Autumn 1		
Substantive Concept	Algebra	**Topic/Unit**	Manipulating algebraic expressions
Powerful Knowledge	Core • Expanding two brackets • Factorising into single brackets		Challenge • Expanding two or more brackets • Factorising quadratics Support • Simplifying expressions • Expanding a single bracket by a term
Core Disciplinary Skills	Interpret algebraic notation Correctly identify like terms and understand that you can only add like terms together Recognise the difference between different orders of the same variable and the implications for simplification.		
National Curriculum Coverage	A1, A3, A4	**Resources** *To be added later*	
Key Vocabulary	Expression, Equation, Term, Variable, Notation, Coefficient, convention, indices	**Assessment**	

Year 9	Learning Cycle: Autumn 1		
Substantive Concept	Algebra	**Topic/Unit**	Rearranging Formula
Powerful Knowledge	Core • Rearranging formula: one step and two step		Challenge • Rearranging formula Support • Using function machines to find output and input
Core Disciplinary Skills	understand and use standard mathematical formulae; rearrange formulae to change the subject		
National Curriculum Coverage	A3	**Resources** *To be added later*	
Key Vocabulary	Rearrange. Formula. Subject	**Assessment**	

Year 9	Learning Cycle: Autumn 2		
Substantive Concept	Number	**Topic/Unit**	Powers, roots and reciprocals
Powerful Knowledge	Core • Square and cube numbers and associated roots • Negative Indices and power of zero • Calculator roots and powers • Reciprocals		Challenge • Negative Indices and power of zero • Calculator roots and powers • Reciprocals • Fractional roots Support • Square and cube numbers and associated roots • Calculator roots and powers
Core Disciplinary Skills			
National Curriculum Coverage	N7	**Resources** *To be added later*	
Key Vocabulary	Power, Root, Indices, Inverse, Square, Cube	**Assessment**	

Year 9	Learning Cycle: Autumn 2		
Substantive Concept	Number	**Topic/Unit**	Error Intervals
Powerful Knowledge	Core • Rounding to any degree of accuracy • Error Intervals • Calculating with error intervals (addition and subtraction)		Challenge • Error Intervals • Calculating with error intervals • Truncation Support • Rounding to decimal places • Rounding to 1sf • Estimating
Core Disciplinary Skills	Articulate and apply a method of rounding Know when to round up and when to truncate (5 or more round up, 4 or below stay the same) Understand errors in measurement		
National Curriculum Coverage	N13, N14	**Resources** *To be added later*	
Key Vocabulary	Round, Significant figures, Estimation, Error Interval, Upper and Lower Bounds, Truncate	**Assessment**	

Year 9	Learning Cycle: Autumn 2		
Substantive Concept	Number	**Topic/Unit**	Percentages
Powerful Knowledge	Core • Calculating a percentage change • Finding original values • Simple and compound interest		Challenge • Simple interest • Growth and decay Support • Calculate a percentage of an amount • Calculate percentage increase • Calculate percentage decrease
Core Disciplinary Skills	Understand that percentage means out of 100 Understand how to express a percentage increase/decrease as a multiplier		
National Curriculum Coverage	N10, N11, N12	**Resources** *To be added later*	
Key Vocabulary	Decimal, Percentage, Profit, Loss, Interest, Compound, Multiplier	**Assessment**	

Year 9	Learning Cycle: Autumn 2		
Substantive Concept	**Ratio and Proportion**	**Topic/Unit**	Direct and inverse proportion
Powerful Knowledge	Core • Direct proportion problems • Graphical representation of direct proportion • Writing direct proportion using algebra • Inverse proportion problems		Challenge • Solving inverse proportion problems • Writing direct proportion using algebra • Writing inverse proportion using algebra Support • Using the Unitary Method • Currency Conversions
Core Disciplinary Skills	Understand that proportion is compared to a whole Understand how to use multipliers		
National Curriculum Coverage	R1, R2, R4, R5, R6, R7, R9, R10	**Resources** *To be added later*	
Key Vocabulary	Scale Factors, Ratio, Unitary Method, Currency Conversions, Proportion, Inverse Proportion	**Assessment**	

Year 9	Learning Cycle: Autumn 2		
Substantive Concept	Algebra	**Topic/Unit**	Solving Linear Inequalities
Powerful Knowledge	Core • Representing inequalities on a number line • Reading inequalities • Solving one step and two step inequalities		Challenge • Representing inequalities on a number line • Reading inequalities • Solving inequalities Support • Comparing using inequality signs • Representing inequalities on a number line
Core Disciplinary Skills	understand and use the concepts and vocabulary of inequalities		
National Curriculum Coverage	A3	**Resources** *To be added later*	
Key Vocabulary	Inequality, Solve, Greater, Less Equal	**Assessment**	

Year 9	Learning Cycle: Spring 1		
Substantive Concept	Shape	**Topic/Unit**	Volume and surface area
Powerful Knowledge	Core • Volume cuboids, prisms, cylinders • Surface area cuboids		Challenge • Volume and surface area spheres and cones Support • Volume cubes and cuboids • Surface area cubes and cuboids
Core Disciplinary Skills	Understand and articulate what surface area and volume are Know how to calculate volume of cuboids, prisms and cylinders Know how to calculate the surface area of cuboids, prisms and cylinders		
National Curriculum Coverage	G1	**Resources** *To be added later*	
Key Vocabulary	Surface area, Volume, Face, Edges, Prism, Cube, Cuboid, Cylinder	**Assessment**	

Year 9	Learning Cycle: Spring 1		
Substantive Concept	Algebra	**Topic/Unit**	Quadratic, Cubic and Reciprocal Graphs
Powerful Knowledge	Core • Draw linear and quadratic graphs • Solve quadratics using a graph • Solve simultaneous equations graphically		Challenge • Draw quadratic, cubic and reciprocal graphs • Solve quadratics using a graph • Solve simultaneous equations graphically Support • Draw y = and x = graphs • Draw linear graphs
Core Disciplinary Skills	Understand the feature of different graphs Understand how to solve equations using graphs		
National Curriculum Coverage	A8, A9, A10, A12	**Resources** *To be added later*	
Key Vocabulary	Linear, Quadratic, Cubic, Reciprocal, Cartesian, Coordinate, Solve	**Assessment**	

Year 9	Learning Cycle: Spring 1		
Substantive Concept	Shape	**Topic/Unit**	Congruence and Similarity
Powerful Knowledge	Core • Find missing lengths in similar shapes • Prove similarity • Understand rules of congruency • Prove congruency		Challenge • Find missing lengths in similar shapes • Prove similarity • Understand rules of congruency • Prove congruency Support • Understand and find scale factors • Find missing lengths in similar shapes
Core Disciplinary Skills	Understand and apply triangle congruence and similarity to derive results about angles and sides Complete simple proofs		
National Curriculum Coverage	G13	**Resources** *To be added later*	
Key Vocabulary	Similarity, Congruence, Scale factor, Proof	**Assessment**	

Year 9	Learning Cycle: Spring 1		
Substantive Concept	Shape	**Topic/Unit**	Construction and Loci
Powerful Knowledge	Core • Construct line and angle bisector • Construct perpendiculars from a line and point • Loci; single region		Challenge • Construct line and angle bisector • Construct perpendiculars from a line and point • Loci; single region Support • Draw angles • Construct triangles using compasses and protractors
Core Disciplinary Skills			
National Curriculum Coverage	G4	**Resources** *To be added later*	
Key Vocabulary	Construct, Loci, Perpendicular, Arc	**Assessment**	

Year 9	Learning Cycle: Spring 1		
Substantive Concept	Data	**Topic/Unit**	Probability
Powerful Knowledge	Core • Probability of an event happening • Listing outcomes • Probability from two-way tables		Challenge • Product rule for counting • Probability tree diagrams for non-conditional probability • Using tree diagrams to calculate probabilities Support • Probability of an event happening • Sample space diagrams • Probability from two-way tables
Core Disciplinary Skills	Understand the concept of probability Be able to successfully add and subtract (including with fractions and decimals)		
National Curriculum Coverage	P1, P2, P3, P4	**Resources** *To be added later*	
Key Vocabulary	Mutually exclusive, probabilities, sample space, Venn diagram, combined events	**Assessment**	

Year 9	Learning Cycle: Spring 2		
Substantive Concept	Algebra	**Topic/Unit**	Forming and Solving Equations
Powerful Knowledge	Core • Solving equation • Form and solve equations involving worded problems and geometry problems		Challenge • Form and solve equations involving worded problems and geometry problems • Form and solve inequalities Support • Solving two step and three step equations • Forming basic angle rule and perimeter equations
Core Disciplinary Skills	Understand inverse operations to solve equations Understand algebraic notation		
National Curriculum Coverage	A1, A3, A4, A7	**Resources** *To be added later*	
Key Vocabulary	Term, expression, equation, linear, variable, coefficient, inverse, balance	**Assessment**	

Year 9	Learning Cycle: Spring 2		
Substantive Concept	Shape	**Topic/Unit**	Pythagoras and Trigonometry
Powerful Knowledge	Core • Using Pythagoras theorem to find missing sides • Distance between two coordinates • Use trigonometry to find missing sides • Use trigonometry to find missing angles		Challenge • Using Pythagoras theorem to find missing sides • Distance between two coordinates • Use trigonometry to find missing sides • Use trigonometry to find missing angles Support • Properties of triangles • Pythagoras theorem
Core Disciplinary Skills	Understand and use Pythagoras Therorem Understand and use trigonometrical ratios		
National Curriculum Coverage	G14	**Resources** *To be added later*	
Key Vocabulary	Pythagoras Theorem, Trigonometry, Sine, Cosine, Tangent, Hypotenuse, Adjacent, Opposite	**Assessment**	

Year 9	Learning Cycle: Spring 2		
Substantive Concept	Algebra	**Topic/Unit**	Equation of a line
Powerful Knowledge	Core • Identify the gradient and y-intercept from a given equation • Calculate gradient from a diagram • Write the equation of a line from a diagram		Challenge • Identify the gradient and y-intercept from a given equation • Calculate gradient from a diagram and two coordinates • Write the equation of a line from a diagram • Write the equation of a line from two coordinates Support • Plotting coordinates in all four quadrants • Finding the midpoint of two points
Core Disciplinary Skills	Understand what gradient and y-intercept are Understand how to write the equation of a line in the form $y = mx + c$		
National Curriculum Coverage	A11	**Resources** *To be added later*	
Key Vocabulary	Equation, Intercept, Gradient	**Assessment**	

Year 9		Learning Cycle: Spring 2		
Substantive Concept		Data	**Topic/Unit**	Averages and spread
Powerful Knowledge	•	• Compare data sets using averages and range • Averages and range of tabled data • Mean of grouped data		Challenge • Mean, median and mode from tabled and grouped data • Comparing grouped and tabled data using averages and range • Box plots Support • Averages and range of data • Comparing data using averages and range
Core Disciplinary Skills		Calculate the mean, mode, median and the range from a data set Compare averages and range with a written justification		
National Curriculum Coverage		S1, S2	**Resources** *To be added later*	
Key Vocabulary		Mean, median, mode, range, consistency Quartiles, Inter quartile range	**Assessment**	