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 8	Learning Cycle: Autumn 1		
Substantive Concept	Number	**Topic/Unit**	Place Value
Powerful Knowledge	Core • Round to any given degree of accuracy (dp and sf) • Estimating answers		Challenge • Error Intervals • Calculating with error intervals • Truncation Support • Round to nearest 10, 100, 1000, whole • Round to 1dp
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 that estimation involves rounding to 1 significant figure		
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 8	Learning Cycle: Autumn 1		
Substantive Concept	Number	**Topic/Unit**	FDP
Powerful Knowledge	Core • Convert between fractions, decimals and percentages • Ordering fractions, decimals and percentages • Expressing one number as a fraction or decimal of another number		Challenge • Percentage change (Profit/loss) Support • Conversion of FDP: $\frac{1}{2}, \frac{1}{4}, \frac{3}{4}, \frac{1}{10}, \frac{1}{5}, \frac{1}{20}, \frac{1}{100}$ • Ordering of FDP using above conversions
Core Disciplinary Skills	Articulate the connection between fractions, decimals and percentages. Understand how to convert between fractions decimals and percentages Understand how to order fractions, decimals and percentages		
National Curriculum Coverage	N9, N10	**Resources** *To be added later*	
Key Vocabulary	Fraction, Decimal, Percentage, Numerator, Denominator, Profit, Loss, Convert	**Assessment**	

Year 8	Learning Cycle: Autumn 1		
Substantive Concept	Algebra	**Topic/Unit**	Simplifying Algebra
Powerful Knowledge	Core • Identify equation, expression, identity and formulae • Expanding a single bracket by a letter or number • Expanding two brackets by a single term and then simplify the result • Factorising expressions by a single term; letter or number		Challenge • Expanding two brackets to give a quadratic • Factorising quadratics Support • Collecting like terms; two variables • Expand a single bracket by a number
Core Disciplinary Skills	Understand and articulate the difference between expressions, equations, formulae and identities Interpret algebraic notation Confidently multiply terms involving more than one variable		
National Curriculum Coverage	A1, A3,	**Resources** *To be added later*	
Key Vocabulary	Expression, Equation, Identity, Formulae, Like Term, Quadratic	**Assessment**	

Year 8	Learning Cycle: Autumn 1		
Substantive Concept	Number	**Topic/Unit**	Percentages
Powerful Knowledge	Core • Calculate percentage increase • Calculate percentage decrease • Expressing one number as a percentage of another number		Challenge • Reverse percentage • Simple intertest Support • Calculate a percentage of a number mentally • Calculate a percentage of a number with a calculator
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	Increase, Decrease, Multiplier	**Assessment**	

Year 8	Learning Cycle: Autumn 1		
Substantive Concept	Data	**Topic/Unit**	Displaying Data
Powerful Knowledge	Core • Interpret and draw two-way tables • Interpret and draw frequency trees • Display grouped data (frequency diagram and frequency polygon) • Interpret and draw Multiple bar charts • Interpret and draw composite bar charts		Challenge • Problem solving questions for two-way tables • Probability from tables Support • Interpret and draw tally tables • Interpret and draw bar Charts • Interpret and draw pictograms
Core Disciplinary Skills	Understand the difference between discrete and continuous data and how they are represented graphically Know how to interpret data from graphs and charts		
National Curriculum Coverage	S1, S2	**Resources** *To be added later*	
Key Vocabulary	Interpret, Frequency, Frequency tree, Frequency polygon, Discrete, Continuous, Multiple, Composite	**Assessment**	

Year 8	**Learning Cycle: Autumn 2**		
Substantive Concept	**Probability**	**Topic/Unit**	**Probability**
Powerful Knowledge	Core • Probability scale (worded and numerical) • Probabilities of mutually exclusive events sum to 1 • Generate a sample space diagram for combined events • Calculating probabilities from sample space diagrams • Generating a Venn diagram for simple sets of number properties • Calculating probabilities from Venn diagrams		Challenge • Generating a Venn diagram for frequencies • Calculating missing probabilities for mutually exclusive events algebraically Support • Using words to describe the probability of events • Probability scale (worded and numerical) • Probabilities of mutually exclusive events sum to 1
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 8	**Learning Cycle: Autumn 2**		
Substantive Concept	Number	**Topic/Unit**	Ratio
Powerful Knowledge	Core • Writing ratios in the form 1:n • Simple map scales • Solve ratio problems		Challenge • Combining ratio • Map Scales Support • Simplifying ratio including mixed units • Sharing in the ratio
Core Disciplinary Skills	Understand the concept of ratio Know how to simplify ratio and how 1:n can relate to map scales		
National Curriculum Coverage	RP4, RP6	**Resources** *To be added later*	
Key Vocabulary	Ratio, Multiplier	**Assessment**	

Year 8	Learning Cycle: Autumn 2		
Substantive Concept	Ratio	**Topic/Unit**	Proportion
Powerful Knowledge	Core • Using the Unitary Method • Currency Conversions • Best Buys • Recipes		Challenge • Similar shapes • Graphing Proportion Support • Proportion as a fraction of a whole • Recipes
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, Best buy, Recipe, Similar shape	**Assessment**	

Year 8	Learning Cycle: Autumn 2		
Substantive Concept	Shape	**Topic/Unit**	Area and Perimeter
Powerful Knowledge	Core • Calculate the area of a trapezium • Calculate the area of Compound Shapes • Labelling Parts of a Circle • Calculate the area of Circles • Calculate the circumference of Circles		Challenge • Arc Length • Sector Area • Area involving algebra Support • Areas of Rectangles, triangles, parallelograms • Area and perimeter of rectilinear compound shapes
Core Disciplinary Skills	Understand the formulas for area Substitute numbers into area formulae Know the parts of a circle		
National Curriculum Coverage	G1, G2, A6, A7	**Resources** *To be added later*	
Key Vocabulary	Area, Perimeter, Compound shape, Circle, Arc, Circumference, Radius, Diameter, Chord, Tangent, Segment, Sector	**Assessment**	

Year 8	Learning Cycle: Autumn 2		
Substantive Concept	Numbers	**Topic/Unit**	Four Operations of Fractions
Powerful Knowledge	Core • Addition and subtractions of fractions including mixed numbers • Multiplication of Fractions (Including Mixed Numbers) • Division of Fractions (including Mixed Numbers)		Challenge • Algebraic Fractions: addition, subtraction, multiplication, division Support • Addition and subtraction of fractions where the denominator are multiples • Converting mixed numbers and improper fractions • Multiplying fractions • Dividing fractions
Core Disciplinary Skills	Understand how to convert mixed numbers and improper fractions Understand how to add, subtract, multiply and divide mixed numbers		
National Curriculum Coverage	N4, N11	**Resources** *To be added later*	
Key Vocabulary	Fraction, denominator, numerator, Mixed Number, Improper Fractions, multiplication, division, reciprocal	**Assessment**	

Year 8	Learning Cycle: Spring 1		
Substantive Concept	Algebra	**Topic/Unit**	Linear Graphs
Powerful Knowledge	Core • Midpoint of a line (plotted) • Plot and recognise graphs in the form $y = mx + c$ • Determine if coordinates lie on the line?		Challenge • Plot and recognise graphs in the form $ax + by = d$ • Midpoint of a line given two coordinates without plotting Support • Plot and read coordinates in all four quadrants • Draw and recognise $y =, x\ =$ and $y = x$ lines • Draw graphs in the form $y = x + c$ and $y = ax$
Core Disciplinary Skills	Know what a midpoint is Understand what a linear graph looks like Confidently substitute numbers into the equation of a line Confidently plot coordinates		
National Curriculum Coverage	A2, A5, A8, A9, A10, A11,	**Resources** *To be added later*	
Key Vocabulary	Midpoint, Linear, Gradient, Intercept, Axis, Coordinate, Plot, Substitute	**Assessment**	

Year 8	Learning Cycle: Spring 1		
Substantive Concept	Algebra	**Topic/Unit**	Sequences
Powerful Knowledge	Core • Generating a sequence from a rule (linear) • Finding a specific term • Recognise the difference between linear and non-linear sequences • Finding the missing term of a linear sequence • Find the nth term of a linear sequence		Challenge • Generating a sequence from a quadratic rule • Find the next terms of geometric sequences • Recognising and naming different types of sequences: arithmetic, geometric, quadratic, Fibonacci Support • Picture sequences • Continuing arithmetic sequences and finding the term to term rule
Core Disciplinary Skills	Recognise the difference between a linear and a non-linear sequence Understand how to substitute numbers into an expression Understand what a term to term rule is		
National Curriculum Coverage	A14, A15, A16	**Resources** *To be added later*	
Key Vocabulary	Arithmetic, Geometric, Linear, Non-Linear, Sequence, Term, Common Difference, Common Ratio	**Assessment**	

Year 8	Learning Cycle: Spring 1		
Substantive Concept	Algebra	**Topic/Unit**	Indices
Powerful Knowledge	Core • Index Law – Multiplying including a coefficient greater than 1 • Index Law – Dividing including a coefficient greater than 1 • Index Law – Brackets		Challenge • Index laws involving negative powers • Bracket index law involving a coefficient of x being greater than 1 $(2x^3)^5$ Support • Square and cube numbers • Evaluating and writing basic index notation eg $3x3x3x3=3^4$
Core Disciplinary Skills	Confidently apply the index laws Combine knowledge of negative numbers and index laws		
National Curriculum Coverage	A1	**Resources** *To be added later*	
Key Vocabulary	Index, Indices, Base, Power, Negative, Coefficient, Variable, Evaluate, Simplify, Product	**Assessment**	

Year 8	Learning Cycle: Spring 1		
Substantive Concept	Number	**Topic/Unit**	Product of Prime Factors
Powerful Knowledge	Core • Express numbers as a product of prime factors • Highest common factor (HCF) using a Venn diagram • Lowest common multiple (LCM) using a Venn diagram		Challenge • Proving a square and cube number • Given the prime decomposition of two numbers, identify the HCF and LCM • Solve written problems involving LCM Support • Prime numbers • Listing factors and identify common factors from the list • Listing multiples and identify common multiples from the list
Core Disciplinary Skills	Understand what factors, multiples and primes are Articulate prime number decomposition Understand and calculate HCF and LCM		
National Curriculum Coverage	N3	**Resources** *To be added later*	
Key Vocabulary	Prime, Factor, Common, HCF, LCM, Product, Decomposition, Venn diagram, Multiple	**Assessment**	

Year 8	Learning Cycle: Spring 2		
Substantive Concept	Statistics	**Topic/Unit**	Comparing data
Powerful Knowledge	Core • Averages and range from ungrouped data • Comparing data using averages and spread		Challenge • Averages from tabled and grouped data (estimated mean and modal class interval) • Comparing data using average and spread • Misleading data Support • Calculate averages and range from sets of data
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, Mode, Average, Range, Median, Estimate, Interval, Grouped, Modal class, Discrete, Continuous,	**Assessment**	

Year 8	Learning Cycle: Spring 2		
Substantive Concept	Statistics	**Topic/Unit**	Scatter Diagrams
Powerful Knowledge	Core • Describe the relationship between the variables. • Plot points onto a scatter graph • Describe and understand correlation. • Interpret a scatter graph. • Draw a line of best fit and use to read off values on either axis.		Challenge • Extrapolation, comment on the reliability of predictions Support • Interpreting pie charts • Drawing pie charts
Core Disciplinary Skills	Understand and describe what bivariate data Understand and describe correlation Plot and interpret scatter diagrams		
National Curriculum Coverage	S1 and S3.	**Resources** *To be added later*	
Key Vocabulary	Correlation, Outlier, Anomaly, Variable, Bivariate, Line of best fit	**Assessment**	

Year 8	Learning Cycle: Spring 2		
Substantive Concept	Geometry and measures	**Topic/Unit**	Angles
Powerful Knowledge	Core • Understand and use angle notation. • Angles in parallel lines; corresponding, alternate, co-interior		Challenge • Multi step angles problems involving hidden parallel lines angle facts combined with other shapes. Support • Angles around a point • Angles on a straight line • Vertically opposite angles
Core Disciplinary Skills	Identify angles which are alternate, corresponding or co-interior and solve problems containing these. Students can use prior knowledge of angles around a point, vertically opposite etc to support their core knowledge.		
National Curriculum Coverage	G10, G11	**Resources** *To be added later*	
Key Vocabulary	Corresponding, Co-interior, Alternate, Parallel	**Assessment**	

Year 8	Learning Cycle: Spring 2		
Substantive Concept	Number	**Topic/Unit**	Dividing by decimals
Powerful Knowledge .	Core • Divide a decimal by an integer • Use formal written methods to divide two decimals		Challenge • Understand the relationship between dividing by values greater than or less than 1. • Dividing with standard form Support • Divide an integer by a single digit • Understand the significance of remainders in problems
Core Disciplinary Skills	Know and articulate a formal written method for dividing decimals		
National Curriculum Coverage	N4	**Resources** *To be added later*	
Key Vocabulary	Decimal, Integer, Divisor, Quotient	**Assessment**	

Year 8	Learning Cycle: Summer 1		
Substantive Concept	Algebra	**Topic/Unit**	Substitution
Powerful Knowledge	Core • Substituting into more complex formulae including those used within the science curriculum e.g. v=u+at • Writing and working with formulae.		Challenge • Substitution into formulas where rearrangement is needed Support • Understand algebraic notation • Substituting into one and two step formulas • Function machines
Core Disciplinary Skills	Understand what substitution is Substitute into expressions and formulae Write algebraic formulae from written problems		
National Curriculum Coverage	A1, A2, A5	**Resources** *To be added later*	
Key Vocabulary	Substitution, Formulae, Term, Variable, Coefficient.	**Assessment**	

Year 8	Learning Cycle: Summer 1		
Substantive Concept	Geometry	**Topic/Unit**	Volume and Surface Area
Powerful Knowledge	Core • Surface area of cubes and cuboids • Volume of cubes and cuboids		Challenge • Volume of prisms and cylinders • Surface area of prisms and cylinders Support • Name 3D shapes • Identify edges, faces and vertices • Find the volume of cuboids by counting cubes
Core Disciplinary Skills	Understand and articulate what surface area and volume are Know how to calculate volume of cuboids Know how to calculate the surface area of cuboids		
National Curriculum Coverage	G1	**Resources** *To be added later*	
Key Vocabulary	Surface area, Volume, Face, Edges, Prism, Cube Cuboid	**Assessment**	

Year 8	Learning Cycle: Summer 1		
Substantive Concept	Algebra	**Topic/Unit**	Solving Equations
Powerful Knowledge	Core • Solve equations with unknowns on both sides • Solve equations involving brackets • Forming and solving equations using perimeter and angle rules		Challenge • Forming and solving equations with unknowns on both sides with negative coefficient • More complex problems involving perimeter, area and angle in parallel lines rules • More complex forming and solving equations such as $\frac{2x-1}{3} = 3(3x + 7)$ Support • Solve one step equations • Solve two step 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 8	Learning Cycle: Summer 2		
Substantive Concept	Geometry and Measures	**Topic/Unit**	Transformations
Powerful Knowledge	Core • Reflect a shape in any given line • Describe a reflection • Rotate a shape around a given coordinate (not just the origin) • Describe a rotation • Translate a shape using a vector • Describe a translation		Challenge • Combined transformations (reflection, rotation, translation only) • Describing a single transformation following combined transformations Support • Reflect a shape in horizontal and vertical lines • Rotate a shape around a given point • Translate a shape using left/right, up/down
Core Disciplinary Skills	Understand and articulate how to reflect, rotate and translate a shape Understand and articulate vector notation Know what properties of a shape remain after a transformation		
National Curriculum Coverage	G8	**Resources** *To be added later*	
Key Vocabulary	Vertical, Horizontal, Diagonal, Reflect, Translate, Rotate, Vector, Vertex, Congruent, Orientation, Origin, Clockwise, Anticlockwise	**Assessment**	

Year 8	Learning Cycle: Summer 2		
Substantive Concept	Geometry and Measures	**Topic/Unit**	Enlargement
Powerful Knowledge	Core • Enlarge a shape by a positive scale factor • Enlarge a shape by a positive, integer scale factor given a centre of enlargement • Describe an enlargement with positive scale factor		Challenge • Enlarge a shape using fractional scale factors and a centre of enlargement • Describe enlargements with fractional scale factor Support • Enlarge a shape by a scale factor
Core Disciplinary Skills	Understand and articulate that enlargement can make shapes bigger and smaller Understand how to use a centre of enlargement		
National Curriculum Coverage	G9	**Resources** *To be added later*	
Key Vocabulary	Enlarge, Scale factor, Coordinate, Origin, Centre of enlargement	**Assessment**	

Year 8	Learning Cycle: Summer 2		
Substantive Concept	Ratio and Proportion	**Topic/Unit**	Real Life Graphs
Powerful Knowledge	Core • Draw and interpret a conversion graph • Read from a distance time graph • Draw a distance time graph		Challenge • To find speed from a distance time graph • To find the average speed for an entire journey from a distance time graph Support •
Core Disciplinary Skills	Conversion graphs including exchanging money, weight, volume Know how to draw axes, ensuring equal spacing Be able to find the gradient of a line		
National Curriculum Coverage	R9, R10	**Resources** *To be added later*	
Key Vocabulary	Conversion, Distance, Time, Proportion, Currency	**Assessment**	