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 7	Learning Cycle: Autumn 1		
Substantive Concept	Number	**Topic/Unit**	Rounding
Powerful Knowledge	Core • Compare and order decimals • Round to any given number of decimal places • Round to 1 significant figure • Apply rounding to practical problems		Challenge • Round to any given number of significant figures. • Estimate answers by rounding • State error intervals Support • Correctly identify place value • Round to the nearest 10, 100, 1000, integer, or any multiple of 10.
Core Disciplinary Skills	Correctly identify place value. Know when to round up and when to truncate (5 or more round up; 4 or below stay the same)		
National Curriculum Coverage	N1, N13, N14	**Resources** *To be added later*	
Key Vocabulary	Integer, Decimal, Place value, Round, Truncate, Significant figures, Estimation, Error Interval, Upper and Lower Bound	**Assessment**	

Year 7	Learning Cycle: Autumn 1		
Substantive Concept	Number	**Topic/Unit**	Multiplying and dividing by powers of ten
Powerful Knowledge	Core • Multiply integers and decimals by positive powers of ten • Divide integers and decimals by positive powers of ten • Perform multi-step calculations that involve multiplying or dividing by powers of 10		Challenge • Multiple / divide by negative powers of 10 (e.g. 0.1, 0.01) • Convert between numbers written in standard form and ordinary numbers Support • Multiply integers by 10, 100, 1000
Core Disciplinary Skills	Recognise and articulate the effect of multiplying by positive powers of ten has on place value Recognise and articulate the effect of dividing by positive powers of ten has on place value		
National Curriculum Coverage	N1, N4, N8,	**Resources** *To be added later*	
Key Vocabulary	Multiply, Divide, Place Value, integer, power, Indices, Base, Index, Standard form	**Assessment**	

Year 7	Learning Cycle: Autumn 1		
Substantive Concept	Number	**Topic/Unit**	Multiplication
Powerful Knowledge	Core • Multiply whole numbers (up to 3 digits by 3 digits) without a calculator. • Multiply a decimal by a whole number • Solve problems involving multiplication		Challenge • Multiplication of decimals by decimals (up to 2 decimal place) • Multiplying numbers in standard form Support • Further practice of multiplication facts up to 10 x 10 • Multiplication of 2 and 3 digit numbers by a single digit
Disciplinary Skills	Confidently demonstrate a written method for the multiplication of integers Confidently demonstrate a written method for the multiplication of decimals		
National Curriculum Coverage	N1, N4	**Resources** *To be added later*	
Key Vocabulary	Multiplication, Place holder, Decimal place	**Assessment**	

Year 7	Learning Cycle: Autumn 1		
Substantive Concept	Number	**Topic/Unit**	Negative Numbers
Powerful Knowledge	Core • Use negative numbers in context • Compare and order directed numbers • Calculate with directed numbers (add, subtract, multiply, divide) • Use a calculator for directed number calculations		Challenge • Evaluating powers of negative numbers $(-2)^3$ Support • Use negative numbers in context • Order directed numbers using number lines
Core Disciplinary Skills	Confidently understand directed number in context Confidently perform directed number calculations (four rules)		
National Curriculum Coverage	N2, N4	**Resources** *To be added later*	
Key Vocabulary	Subtract, Negative Commutative, Product, Ascending, Descending, Greater than, Less than	**Assessment**	

Year 7	Learning Cycle: Autumn 1		
Substantive Concept	Algebra	**Topic/Unit**	Simplifying Expressions
Powerful Knowledge	Core • Interpret algebraic notation • Know the meaning of 'expression' • Simplify by adding and subtracting like terms including up to 3 variables • Multiply out a single bracket by a number or letter (up to 3 terms inside)		Challenge • Collect terms involving indices • Multiply out several brackets and simplify by collecting terms eg: $3(x-2)-4(2x-3)$ Support • Simplify by adding and subtracting like terms; single term • Simplifying by adding like terms; two terms
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 7	Learning Cycle: Autumn 2		
Substantive Concept	Number	**Topic/Unit**	Metric Units
Powerful Knowledge	Core • Convert between metric units of measure • Convert between metric units of capacity • Convert between metric units of mass • Compare different units		Challenge • Add and subtract different units • Use inequalities to compare different units • Convert between metric and imperial units Support • Draw lines in cm and mm • Convert units of length, mass and capacity with no decimals.
Core Disciplinary Skills	• Visual representation of measurements • Confidently multiply and divide by 10, 100, 1000 • Recall the metric unit conversions facts		
National Curriculum Coverage	N12, R1	**Resources** *To be added later*	
Key Vocabulary	Millimetres, Centimetres, Metres, Kilometres, Milligrams, Grams, Kilograms, Millilitres Litres, Length, Mass, Volume, Capacity	**Assessment**	

Year 7	Learning Cycle: Autumn 2		
Substantive Concept	Number	**Topic/Unit**	Division
Powerful Knowledge	Core • Dividing by two digits numbers • Remainders written as decimals • Understanding the significance of remainders		Challenge • Division of decimals by decimals • Standard form division Support • Dividing using times table facts • Dividing by a single digit
Core Disciplinary Skills	Confidently demonstrate a method for dividing integers Confidently demonstrate a method for dividing decimals Understand in problems when to round a decimal answer up or down		
National Curriculum Coverage	N4	**Resources** *To be added later*	
Key Vocabulary	Division, Multiplication, Factors, Place Value, Decimals, Remainders	**Assessment**	

Year 7	Learning Cycle: Autumn 2		
Substantive Concept	Data	**Topic/Unit**	Averages
Powerful Knowledge	Core • Calculate mean, median and mode from a list of numbers. • Calculate range • Understanding the difference between averages and spread.		Challenge • Reverse mean problems. • Calculate mean, median, mode and range from a frequency table Support • Calculate mean, median and mode from small lists of numbers • Calculate range
Core Disciplinary Skills	Understand what averages and spread are. Confidently calculate averages and range		
National Curriculum Coverage	S1	**Resources** *To be added later*	
Key Vocabulary	Mean, Median, Mode, Range, Consistency, Spread, Average.	**Assessment**	

Year 7	Learning Cycle: Autumn 2		
Substantive Concept	Number	**Topic/Unit**	Factors, Multiples and Primes
Powerful Knowledge	Core • List factors for a given number • List multiples of a given number • Recognise Prime numbers • Find the HCF by listing factors • Find the LCM by listing multiples		Challenge • Prime Factor Decomposition • Use Venn diagrams to find HCF and LCM Support • Factors of numbers using multiplication tables • Multiples of numbers using multiplication tables
Core Disciplinary Skills	Understand and identify factors Understand and identify multiples Understand and identify prime numbers		
National Curriculum Coverage	N3	**Resources** *To be added later*	
Key Vocabulary	Factor, Multiple, prime number, common, Highest, Divisible, Decomposition, Venn diagram	**Assessment**	

Year 7	Learning Cycle: Autumn 2		
Substantive Concept	Shape	**Topic/Unit**	Perimeter
Powerful Knowledge	Core • Perimeter of rectilinear compound shapes when missing sides need to be found • Perimeter of other compound shapes • Perimeter of shapes with special triangles and quadrilaterals		Challenge • Perimeter of shapes as an algebraic expression • Circumference of Circle • Perimeter of compound shapes involving half and quarter circles Support • Perimeter of rectangles • Perimeter of shapes/polygons (side lengths given) • Perimeter of rectilinear compound shapes (side lengths given)
Core Disciplinary Skills	Understand and articulate what perimeter is Calculate the perimeter of compound shapes Calculate and solve problems involving perimeters of 2-D shapes (including circles) and composite shapes		
National Curriculum Coverage	G1, G2, A6, A7	**Resources** *To be added later*	
Key Vocabulary	Perimeter, 2D Shapes, Rectilinear, Compound shape, Regular, Isosceles, Equilateral, Scalene, Circumference, Radius, Diameter	**Assessment**	

Year 7	Learning Cycle: Spring 1		
Substantive Concept	Algebra	**Topic/Unit**	Substitution
Powerful Knowledge	Core • Use function machines with all operations numerically – finding inputs and outputs. • Using machines with algebraic expressions and applying operations which involve algebra. • Substitute numerical values into expressions including negatives • Substitute numerical values into simple formulae		Challenge • Substitute numerical values into expressions including negatives and fractions. • Substitute terms into formulae including those in context such as kinematics equations or electricity. Support • Use single step function machines • Simple substitution involving one operation
Core Disciplinary Skills	Use a function machine to find an output whether the input is numerical or algebraic. Confidently articulate what substitution is. Understand how to substitute numbers into expressions and formulae		
National Curriculum Coverage	A1, A2, D4, N7	**Resources** *To be added later*	
Key Vocabulary	Substitute, Term, Expression, Coefficient, Formula, Formulae, Constant, Input/output, Operation.	**Assessment**	

Year 7	Learning Cycle: Spring 1		
Substantive Concept	Number	**Topic/Unit**	Fractions, Decimals, Percentages
Powerful Knowledge	Core • Mental FDP conversions for the basic fractions: • Convert between fractions, decimals and percentages with a calculator • Comparing and ordering fractions, decimals and percentages (without a calculator)		Challenge • Ordering FDP (with/without a calculator) • FDP conversions involving improper fractions • Recognise recurring decimals Support • FDP conversions • Recognising percentages as parts of 100
Core Disciplinary Skills	Work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and 2 7 or 0.375 and 8.3) Define percentage as ‘number of parts per hundred’ Compare two quantities using percentages, and work with percentages greater than 100%		
National Curriculum Coverage	N9, N10, 11,	**Resources** *To be added later*	
Key Vocabulary	Fraction. Decimal, Percentages, Recurring, Improper fraction	**Assessment**	

Year 7	Learning Cycle: Spring 1		
Substantive Concept	Number	**Topic/Unit**	Powers and Roots
Powerful Knowledge	Core • Recognise, recall and calculate square numbers up to 15^2 and associated roots • Recognise, recall and calculate cube numbers up to 10^3 and associated roots • Perform multi-step calculations involving powers and roots • Understand basic index notation $3^4 = 3 \times 3 \times 3 \times 3$ • Use a calculator to calculate with powers and roots		Challenge • Use higher integer powers and associated roots (e.g. 4, 5, 7, 10) • Calculate negative powers and roots using a calculator • Distinguish between exact roots and decimal approximation Support • Practice multiplication facts up to 10 x 10 • Square numbers up to 10^2 and cube numbers up to 5^3; using drawings where necessary
Disciplinary Skills	Confidently recall and apply multiplication facts up to at least 12 x 12 Recognise and decode index notation Use a calculator effectively to calculate powers and roots Understand that powers and roots are inverse operations		
National Curriculum Coverage	N7	**Resources**	
Key Vocabulary	Power, Root, Indices, Inverse, Square, Cube	**Assessment**	

Year 7	Learning Cycle: Spring 1		
Substantive Concept	Algebra	**Topic/Unit**	Solving Equations
Powerful Knowledge	Core • Solve two step equations in all formats. • Form and solve simple two step equations e.g. perimeter and angles.		Challenge • 3 step equations and may include brackets. • Form and solve more complex worded/context problems. Support • Inverse operations using function machines • Solve one step equations
Core Disciplinary Skills	Use a formal procedure to solve one and two step equations Confidently interpret real life situations using algebra		
National Curriculum Coverage	A6, A7, A10	**Resources** *To be added later*	
Key Vocabulary	Solve, Inverse, Form, Expression, Equation Equate	**Assessment**	

Year 7	Learning Cycle: Spring 1		
Substantive Concept	Shape	**Topic/Unit**	Area
Powerful Knowledge	Core • Area of triangles • Area of parallelograms • Area of compound shapes involving rectangles and triangles • Find missing lengths of rectangles when the area is given		Challenge • Find missing lengths when the area is given • Area of Trapeziums • Area of Circles Support • Area found by counting Squares • Area of rectangles
Core Disciplinary Skills	Derive and apply formulae to calculate and solve problems involving the area of triangles, parallelograms and trapezia. Calculate and solve problems involving areas of circles and composite shapes		
National Curriculum Coverage	G1, G2, A6, A7	**Resources** *To be added later*	
Key Vocabulary	Area, 2D Shapes, Compound shapes, Expression, Equation	**Assessment**	

Year 7	Learning Cycle: Spring 2		
Substantive Concept	Number	**Topic/Unit**	Fractions
Powerful Knowledge	Core • Calculate fractions of amounts • Find equivalent fractions • Ordering fractions		Challenge • Fractions of an amount with mixed numbers • Reverse fraction of an amount • Simplifying simple algebraic fractions Support • Fractions of an amount using manipulatives/diagrams • Fractions of an amount using unit fractions
Core Disciplinary Skills	Understand what equivalent fraction is Know the denominator is the number of parts Confidently find equivalent fractions by multiplying and dividing		
National Curriculum Coverage	N2, N3, N11	**Resources** *To be added later*	
Key Vocabulary	Numerator, Denominator, Equivalent, Cancel, Simplify, Factor, Original, Mixed number, Improper	**Assessment**	

Year 7	Learning Cycle: Spring 2		
Substantive Concept	Number	**Topic/Unit**	Order of operation
Powerful Knowledge	Core • Use order of operations (BIDMAS) to calculate • Add brackets to make calculations correct		Challenge • Order of operations calculations involving roots Support • Use order of operations to calculate (No brackets or powers)
Core Disciplinary Skills	Use conventional notation for the priority of operations, including brackets, powers and roots Use integer powers and associated real roots (square, cube and higher)		
National Curriculum Coverage	N4, N7	**Resources** *To be added later*	
Key Vocabulary	Brackets, Indices, Division, Multiplication, Addition, Subtraction, Fractional	**Assessment**	

Year 7	Learning Cycle: Spring 2		
Substantive Concept	Number	**Topic/Unit**	Percentages
Powerful Knowledge	Core • Calculate percentages mentally; 50%, 25%, 10%, 5%, 1% and use these percentages to find 20%, 75%, …. • Use a calculator to find percentage of a quantity • Calculate percentage increase and decreases without a calculator		Challenge • Calculate percentage increase and decrease using a multiplier • Calculating simple interest. Support • Percentages with integer answers and questions. • Finding 50% and 25% mentally using times tables.
Core Disciplinary Skills	Understand that percentage means out of 100 Confidently calculate percentages without a calculator Understand how to calculate percentages with a calculator		
National Curriculum Coverage	N10	**Resources** *To be added later*	
Key Vocabulary	Percentage, Proportion, Increase, Decrease	**Assessment**	

Year 7	Learning Cycle: Spring 2		
Substantive Concept	Geometry and Measures	**Topic/Unit**	2D Shapes
Powerful Knowledge	Core • Draw and measure angles • Understand and use angle and line notation • Construct triangles (including use of a compass and protractor) • Identify polygons up to a dodecagon • Identifying properties of triangles, quadrilaterals and polygons (including parallel sides and types of angles)		Challenge • Construct triangles given a diagram and draw it to scale. • Construct other 2D shapes, such as a hexagon Support • Drawing and measure lines and angles • Name 2D shapes
Core Disciplinary Skills	Recognition of 2D shapes up to 10 sides and their properties Confidently use mathematical equipment including a protractor, ruler and compass.		
National Curriculum Coverage	D7, G3, G5	**Resources** *To be added later*	
Key Vocabulary	Parallel, Acute, Obtuse, Reflex, Right angle, Isosceles, Scalene, Equilateral, Polygon, Triangle, Quadrilateral, Pentagon, Hexagon, Heptagon, Octagon, Nonagon, Decagon, dodecagon	**Assessment**	

Year 7	Learning Cycle: Spring 2		
Substantive Concept	Number	**Topic/Unit**	Addition and subtraction of fractions
Powerful Knowledge	Core • Convert between mixed numbers and improper fractions • Addition and subtraction of fractions		Challenge • Adding and subtracting mixed numbers, • Simplifying basic algebraic fractions • Addition and subtraction of algebraic fractions Support • Equivalent fractions $\frac{1}{2}, \frac{1}{4}, \ldots$. • Add and subtract fractions with same denominator and denominators which are multiples
Core Disciplinary Skills	Confidently add and subtract fractions using formal written methods. Understand fractions/wholes so that they can convert between a mixed number and an improper fraction.		
National Curriculum Coverage	D5	**Resources** *To be added later*	
Key Vocabulary	Numerator, Denominator, Mixed number, Improper	**Assessment**	

Year 7	Learning Cycle: Summer 1		
Substantive Concept	Geometry	**Topic/Unit**	Angle Rules
Powerful Knowledge	Core • Apply the properties of angles at a point • Apply the properties of angles on a straight line • Apply the properties of vertically opposite angles • Derive and illustrate angle properties of triangles • Derive and illustrate angle properties of quadrilaterals		Challenge • Combining angle facts in shapes (eg. Exterior angles of a triangle) • Form and solve equations using angle rules Support • Identify and name different types of angles • Calculate angles on a straight line and about a point
Core Disciplinary Skills	Recognise and use angle and line properties and notation Recall basic angle facts (angles on a straight-line sum to 180°, angles around a point sum to 360°, angles in a triangle sum to 180°, angles in a quadrilateral sum to 360°, vertically opposite angles are equal)		
National Curriculum Coverage	G7, G10	**Resources** *To be added later*	
Key Vocabulary	Angles, at a point, straight line, triangles (scalene, right-angled, isosceles, equilateral), quadrilaterals (square, rectangle) vertically opposite, trapezium, parallelogram, rhombus, kite, intersect	**Assessment**	

Year 7	Learning Cycle: Summer 1		
Substantive Concept	Algebra	**Topic/Unit**	Coordinates
Powerful Knowledge	Core • Accurately draw and label axes • Plot coordinates in all 4 quadrants • Draw and identify graphs in the form y=, x=, y=x, y=-x		Challenge • Plotting graphs in the form $y = mx + c$ $y = mx + c$ • Identify the gradient and y intercept of a line Support • Understand scale on a graph • Plotting coordinates in the first quadrant
Core Disciplinary Skills	Be able to plot coordinates and use coordinate notation Label and identify lines parallel to the axes To understand the scaling that it used on a coordinate grid		
National Curriculum Coverage	A8, A9, A10, A11	**Resources** *To be added later*	
Key Vocabulary	Quadrant, Coordinate, horizontal, vertical, origin, parallel, gradient, intercept	**Assessment**	

Year 7	Learning Cycle: Summer 1		
Substantive Concept	Number	**Topic/Unit**	Multiplying and dividing fractions
Powerful Knowledge	Core • Multiplying a unit and non-unit fraction by an integer • Multiplying two or more unit and non-unit fractions • Understanding of a reciprocal • Dividing a fraction by an integer, and an integer by a fraction • Dividing two or more unit and non-unit fractions		Challenge • Multiplying mixed numbers/improper fractions • Dividing mixed numbers/improper fractions • Multiplying and dividing fractions involving simple algebraic terms Support • Multiplying a unit fraction by an integer or unit fraction • Dividing an integer by a unit fraction
Core Disciplinary Skills	Simplifying fractions using equivalent fractions Understand the concept of a reciprocal Be able to successfully multiply integers		
National Curriculum Coverage	N4	**Resources** *To be added later*	
Key Vocabulary	Fraction, numerator, denominator, reciprocal, integer, product, mixed number, improper fraction	**Assessment**	

Year 7	Learning Cycle: Summer 1		
Substantive Concept	Number/Algebra	**Topic/Unit**	Sequences
Powerful Knowledge	Core • Recognise and continue a sequence (linear/arithmetic, geometric and other non-linear e.g. Fibonacci) • Identify the term-to-term rule of linear and non-linear sequences • Generate a linear sequence from a worded description and when given a position-to-term rule (e.g. $2n + 1$)		Challenge • Recognise and continuing more complex non-linear sequences (e.g Triangular numbers, and sequences involving directed numbers, fractions, decimals and algebraic terms) • Generate a non-linear sequence from a worded description (e.g. geometric) • Finding then nth term of a linear sequence Support • Recognise and continuing a sequence diagrammatically (simple representations such as counters) • Identify the term-to-term rule and continue linear sequences
Core Disciplinary Skills	Recognise and articulate the effect of adding, subtracting, multiplying and dividing Substitute positive integers into an expression		
National Curriculum Coverage	A14, A15, A16	**Resources** *To be added later*	
Key Vocabulary	Arithmetic, linear, non-linear, geometric, term-to-term, position-to-term, Fibonacci, triangular	**Assessment**	

Year 7	Learning Cycle: Summer 2		
Substantive Concept	Geometry and Measure	**Topic/Unit**	Transformations
Powerful Knowledge	Core • Reflect a shape in a vertical or horizontal line • Describe a reflection giving the equation of the line of reflection • Translate a shape using vector notation • Describe a translation using vector notation • Reflect a shape in a diagonal line		Challenge • Reflection when given equations Support • Lines of symmetry • Translate a shape using word directions
Core Disciplinary Skills	Recognise and draw reflections Recognise and draw translations using vectors		
National Curriculum Coverage	G8	**Resources** *To be added later*	
Key Vocabulary	Vertical, horizontal, diagonal, reflect, translate, vector, vertex, congruent, orientation, symmetry	**Assessment**	

Year 7	Learning Cycle: Summer 2		
Substantive Concept	Statistics	**Topic/Unit**	Interpreting and Displaying Data
Powerful Knowledge	Core • Interpret and draw bar charts • Interpret and draw pictograms • Interpret and draw pie charts		Challenge • Dual bar charts • Composite bar charts Support • Interpret and draw tally tables • Interpret and display pictograms and bar charts with simplified keys and axes
Core Disciplinary Skills	Confidently create suitable scales for a bar chart Confidently using a protractor Confidently use and interpret a key		
National Curriculum Coverage	S2	**Resources** *To be added later*	
Key Vocabulary	Scale, Key, Compare, Angle, Protractor, Construct, Interpret, Discrete, Sector	**Assessment**	

Year 7	Learning Cycle: Summer 2		
Substantive Concept	Ratio	**Topic/Unit**	Ratio
Powerful Knowledge	Core • Simplify a ratio • Simplify ratio with different units • Convert between ratios and fractions • Share in a given ratio		Challenge • Sharing in a ratio – one part given • Sharing in a ratio – difference given • Simplify ratios in the form 1: n Support • Writing ratios from diagrams • Simplify simple ratios
Core Disciplinary Skills	Understand the concept of ratio Simplify using common factors		
National Curriculum Coverage	R1, R4, R5, R6	**Resources** *To be added later*	
Key Vocabulary	Ratio, equivalent, factor, equal parts, part, share, proportion, fraction	**Assessment**	