KS3 Mathematics Curriculum

Year 7 Mathematics Curriculum:	
Year 7 Curriculum Concepts: • Make connections between number relationships, and their algebraic and graphical representations. • Use scale factors, scale diagrams and maps. • Understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction. • Divide a given quantity into two parts in each part: part: or part: whole ratio; express the division of a quantity into two parts as a ratio. • Solve problems involving direct and inverse proportion. • Extend and formulise their knowledge of ratio and proportion in working with measures and in formulating proportional relations algebraically	• Interpret when the structure of a numerical problem requires additive, multiplicative, or proportional reasoning. • Use scale factors, scale diagrams and maps. • Solve problems involving direct and inverse proportion, including graphical and algebraic representations. • Move freely between numerical, algebraic, graphical, and diagrammatic representations. • Solve increasingly complex problems. • Use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative

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	Half term 1	Half term 2	Half term 3	Half term 4	Half term 5	Half term 6
Topic - Block	**Algebraic Thinking:** • **Sequences using term to term rules.** • **Understand and use algebraic notation.** • **Equality and equivalence**	**Place value and proportion:** • **Place value and ordering integers and decimals** • **Fraction, decimals, and percentage. Equivalence and Ordering**	**Applications of number:** • **Solving problems with addition and subtraction.** • **Solving problems with multiplication and division.** • **Fractions and Percentages of amounts.**	**Directed number and fractional thinking:** • **Operations and equations with directed number** • **Metal and written methods for the four operations (+, -, × and ÷)** • **Addition and subtraction of fractions**	**Lines and Angles:** • **Constructions, Measuring and using geometric notation.** • **Pie Charts** • **Developing geometric reasoning**	**Reasoning with number:** • **Developing number sense. Place value, decimals, fractions, powers, and roots.** • **Sets and Probability** • **Prime Numbers, factorisation of numbers and simple proof**
Vocab/ Literacy	• Term • Position • Linear (Arithmetic • Difference • Geometric • Fibonacci • Ascending, descending • Rule • Constant • Axis	• Integer value • Inequalities and signs • Degree of accuracy • Standard form	• Inverse operations • Calculation strategies • Expressions • equivalence	• Equivalent fraction • Simplest form • Simple terms	• Construction SSS, SAS, ASA • Sector • Parallel lines	• Chance • Probability • Factorisation • Prime Factors
Knowledge, Skills and Understanding	• Understand and use function machines. • Recognise and continue numerical and picture sequences. • Collecting like terms • Solving linear equations	• Understand place value. • Order positive and negative integers • Make connections between number relationships. • Define "percentage"	• To solve problems using the appropriate operation and develop understanding to apply knowledge into many step calculations	• To solve simple and complex problems using the correct mathematical concept and to layout work in a logical manner	• To learn and apply angle facts to differing situations and use correct terminology to explain reasoning. • Construct and understand Pie Charts	• To write a number as a product of its prime numbers and use this to find HCF and LCM of a pair of numbers. • To find out the probability of single or multiple events happening.
What we will assess	Summative assessment at the end of each block covering all topic areas including solving problems in context.					

Personal Development (Career applications)	• **Sales and retail**
	• **Research analyst**
	• **Engineering**
	  • **Chemical**
	  • **Electrical**
	  • **Mechanical**
		• **Sales and retail**
		• **Research analyst**
		• **Engineering**
		  ○ **Chemical**
		  ○ **Electrical**
		  ○ **Mechanical**
			• **Sales and retail**
			• **Production operatives**
			• **Building industry**
			• **business**
				• **Sales and retail**
				• **Production operatives**
				• **Building industry**
				• **business**
					• **Sales and retail**
					• **Production operatives**
					• **Building industry**
					• **business**
						• **Sales and retail**
						• **Production operatives**
						• **Building industry**
						• **business**

Year 8 Mathematics Curriculum:

Year 8 Curriculum Concepts:
- Develop their use of formal mathematical knowledge to interpret and solve problems.
- Use integer powers and associated real roots (square, cube and higher).
- Interpret and compare numbers in standard form.
- use standard units of mass, length, time, money, and other measures.
- round numbers and measures to an appropriate degree of accuracy

- Construct and interpret appropriate tables, charts, and diagrams.
- Describe simple mathematical relationships between two variables.
- Record, describe and analyse the frequency of outcomes of simple probability experiments.
- Calculate and compare measures of central tendency (mean, mode, median) and spread (range)

- Recognise arithmetic and geometric sequences. Generate terms of a sequence from either a term to term or position to term rule.
- Understand and use the concepts and vocabulary of expressions, equations, inequalities, terms, and factors.
- Simplify and manipulate algebraic expressions.
- Understand and use standard mathematical formulae.
- Use algebraic methods to solve linear equations in one variable.

- apply the properties of angles at a point, on a straight line, vertically opposite angles, and angles in parallel lines.
- derive and use the sum of angles in a triangle and use it to deduce the angle sum in any polygon, and to derive properties of regular polygons.
- derive and illustrate properties of triangles, quadrilaterals, circles, and other plane figures.
- solve problems involving perimeter and area of triangles, parallelograms, trapezia, circles, and composite shapes.
- identify properties of, and describe the results of, reflections applied to given figures.

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	Half term 1	Half term 2	Half term 3	Half term 4	Half term 5	Half term 6
Topic-Block	**Proportional Reasoning** • **Ratio and scale** • **Multiplicative change** • **Multiplying and dividing fractions**	**Representations** • **Working in the cartesian plane** • **Representing data** • **Tables and probability**	**Algebraic Techniques** • **Brackets, equations & inequalities** • **Sequences** • **Indices**	**Developing Number** • **Fractions and percentages** • **Standard index form** • **Number sense**	**Developing Geometry** • **Angles in parallel lines and polygons** • **Area of trapezia and circles** • **Line symmetry & reflections**	**Reasoning with data** • **The data handling cycle** • **Measures of location**
Vocab/ Literacy	• Ratio • Proportion • Simplify • Denominator • Numerator • Variable • Conversion • Scale factor	• Quadrant • Coordinate • Parallel • Equation • Gradient • Linear • Correlation • Bivariate data • Origin • Qualitative • Quantitative • Probability • Outcomes • Intersection • Union	• Expression • Substitute • Coefficient • Equivalent • Expand • Factorise • Inequality • Solve • Term • Position • Linear (Arithmetic) • Difference • Geometric • Fibonacci • Index/Indices • Base	• Percentage • Decimal • Fraction • Estimate • Numerator • Denominator • Multiplier • Index/Indices • Base • Commutative • Integer • Significant figure • Discrete • Continuous	Acute/Obtuse/Reflex • Vertically opposite • Alternate • Corresponding • Co-interior • Transversal • Parallel • Polygon • Equilateral • Perpendicular • Bisect • Trapezium • Radius • Diameter • Compound shape • Symmetry • Congruent	• Biased • Misleading • Frequency • Comparison • Key • Scale • Bivariate data • Range • Spread • Mean/Median/Mode
Knowledge, Skills and Understanding	• Understand and use ratio notation. • Simplifying ratio • Comparing ratios and fractions • Conversion graphs • Similar shapes • Scale diagrams and maps • Multiply fractions. • Divide fractions	• Reading and plotting coordinates in all four quadrants • Plotting straight line graphs • Draw and interpret scatter graphs. • Construct frequency tables • Construct and read two-way tables. • Probability from two-way tables, sample space and Venn diagrams	• Writing expressions • Expanding a single bracket • Factorising an expression into a single bracket • Expanding and simplifying multiple single brackets • Solving linear equations involving brackets • Solving inequalities • Generating sequences from algebraic rules • Understand and use laws of indices	• Calculating fractions and percentages of an amount. • Calculate percentage increase and decrease. • Writing a number as a fraction or percentage of another • Percentage change • Convert between fractions, decimals, and percentages. • Converting numbers to and from standard index form • Calculating with standard index form • Estimation • Calculating with money • Converting between metric units of length, mass, and capacity.	• Basic angle facts • Angles in Parallel lines • Angles in triangles and quadrilaterals • Properties of special triangles and quadrilaterals • Angles in polygons • Constructing triangles • Perimeter and area of triangles, rectangles, and parallelograms • Area of a trapezium • Area of a circle • Area and perimeter of compound shapes • Recognising line symmetry • Reflecting a shape in a mirror line	• Draw and interpret various graphs and charts including bar chart, pie chart and pictogram. • Compare distributions using charts. • Identify misleading graphs. • Calculate the range of a data set. • Calculate the mode, median and mean from a data set. • Choose the most appropriate average. • Compare distributions using average and range.
What we will assess	Summative assessment at the end of each block covering all topic areas including solving problems in context.					

Personal Development (Career applications)	• **Engineering – Chemical**
	• **Food Industry**
	• **Architect**
	• **Construction**
	• **Surveyor**
		• **Statistician**
		• **Research analyst**
		• **Data coordinator**
		• **Surveyor**
			• **Sales and retail**
			• **Research analyst**
			• **Engineering**
			  • **Chemical**
			  • **Electrical**
			  • **Mechanical**
				• **Sales and retail**
				• **Construction industry**
				• **Chemical engineering**
					• **Design**
					• **Architect**
					• **Graphical designer**
						• **Research analyst**
						• **Statistician**
						• **Sports data analyst**

Year 9 Mathematics Curriculum:

Year 9 Curriculum concepts
- Develop algebraic and graphical fluency.
- Recognise, sketch, and produce graphs of linear and quadratic functions.
- Interpret mathematical relationships both algebraically and graphically.
- Reduce a given linear equation in two variables to the standard form $y = mx + c$, calculate and interpret gradients and intercepts of graphs of such linear equations numerically, graphically, and algebraically
- Use linear and quadratic graphs to estimate values of y for given values of x including simultaneous equations.
- Solve problems involving direct and inverse proportion, including graphical and algebraic representations.
- Move freely between numerical, algebraic, graphical, and diagrammatic representations

- Use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement)
- Understand and use standard mathematical formulae, rearrange formulae to change the subject.
- Model situations or procedures by translating them into algebraic expressions or formulae, and by using graphs.
- Make and test conjectures about patterns and relationships, look for proofs or counterexamples.
- Begin to reason deductively in geometry, number, and algebra.
- Use the concepts and vocabulary of prime numbers, factors, and multiples.
- Simplify and manipulate algebraic expressions to maintain equivalence by expanding products or two or more binomials

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	Half term 1	Half term 2	Half term 3	Half term 4	Half term 5	Half term 6
Topic	Algebra	Construction in 2D and 3D shapes Area and Volume	Reasoning with number	Geometry Geometry reasoning	Reasoning with proportion Ratio and proportion Problems	Graphical work (Quadratics) Probability Simultaneous equations Handling data cycle
Vocab/ Literacy	• Gradient, Intercept • Linear • Inequalities • Expanding • Factorising	• Volume • Surface area • Cylinders, Spheres • Plans and Elevations • Loci	• Percentages • Prime factorisation • HCF and LCM • Proportionality	• Parallel lines • Corresponding, co interior, alternate • Squares and roots • Symmetry: rotational	• Scale factor enlargement including negative SF. • Ratio: relationship with fractions. • Direct and inverse proportion • Compound measures	• Probability: outcomes, Venn diagram, theoretical probabilities • Quadratic functions
Knowledge, Skills and Understanding	• Sketching and drawing quadratic and Linear graphs • Fundamentals of forming and solving equation with use of: Substitution, rearranging, inequalities and unknown both sides	• Recognise and properties of shapes including vertices, edges, faces. • Area of polygons Surface area of Cubes, cuboids, and triangular prisms • Volume of prisms including Cylinder and spheres. Construction and use of Loci	• Fractional work including +-x/ • Mixed numbers • Percentage work including • Percentage of amounts • Express one value as a percentage of another • Convert between F, D, P • Increases and decreases. • Compound and simple interest • Problem solving	• Angle facts in parallel lines • Algebraic problems with geometry. • Transformations of shapes • Pythagoras theorem and its use in problem solving. • Trigonometry • Congruence and similarity	• Use of ratio to solve problems and links to fractions. • Find a constant and use direct and inverse proportion. • The use of compound measure Including Speed distance and time. Density mass and volume	• Solve problems based in probability and understand theoretical probability. Complete and use a Venn diagram. • Recognise, sketch, and produce graphs of quadratic functions. • Estimate solutions. • Use simultaneous equations to solve problems. • Complete the data cycle using appropriate data analysis.
What we will assess	Recognise **Summative assessment at the end of each block covering all topic areas including solving problems in context.**					
Personal Development	Algebra skills are a key part of mathematics and are used in all branches of GCSE maths. • **Mechanics** • **Scientists** • **Mathematicians**	• **Usage around own home** • **Landscape gardening** • **Painter and decorator** • **Groundworks**	• **Everyday functional maths** • **Accountant** • **Finance** • **Business** • **Retail**	• **Application in own lives** • **Roofer** • **Builders** • **Architects** • **Joiners**	• **Catering** • **Baker** • **Chefs** • **Planning officer**	• **Data clerk** • **Analysis**