Maths

Programme of Study	Year 8 Milestones (Knowledge)
Number: Structure	Apply the four operations, including formal written methods, to integers, decimals and simple fractions (proper and improper), and mixed numbers – all both positive and negative
	Use conventional notation for priority of operations, including brackets, powers, roots and reciprocals
	Use the concepts and vocabulary of prime numbers, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation
	Calculate exactly with fractions
	Calculate with and interpret standard form $A \times 10^n$, where $1 \leq A < 10$ and n is an integer
	Apply systematic listing strategies
Number: Fraction, decimals and percentages	Work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and 7/2 or 0.375 or 3/8)
	Identify and work with fractions in ratio problems
	Interpret fractions and percentages as operators
Number: Measures and Accuracy	Round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures)
Algebra: Notation, Vocabulary and Manipulation	Use and interpret algebraic notation, including: a^2b in place of $a \times a \times b$, coefficients written as fractions rather than as decimals
	Substitute numerical values into scientific formulae
	Understand and use the concepts and vocabulary of inequalities and factors
	Simplify and manipulate algebraic expressions by taking out common factors and simplifying expressions involving sums, products and powers, including the laws of indices
	Rearrange formulae to change the subject
Algebra: Graphs	Plot graphs of equations that correspond to straight-line graphs in the coordinate plane
	Identify and interpret gradients and intercepts of linear functions graphically and algebraically
	Recognise, sketch and interpret graphs of linear functions and quadratic functions
	Plot and interpret graphs and graphs of non-standard functions in real contexts, to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration

Algebra: Solving Equations	Solve linear equations with the unknown on both sides of the equation
	Find approximate solutions to linear equations using a graph
Algebra: Sequences	Generate terms of a sequence from either a term-to-term or a position-to-term rule
	Deduce expressions to calculate the nth term of linear sequences.
Ratio, Proportion and Rates of Change	Change freely between compound units (e.g. speed, rates of pay, prices) in numerical contexts
	Use compound units such as speed, rates of pay, unit pricing)
	Use scale factors, scale diagrams and maps
	Express the division of a quantity into two parts as a ratio; apply ratio to real contexts and problems (such as those involving conversion, comparison, scaling, mixing, concentrations)
	Express a multiplicative relationship between two quantities as a ratio or a fraction
	Understand and use proportion as equality of ratios
	Relate ratios to fractions and to linear functions
	Compare lengths, areas and volumes using ratio notation
	Work with percentages greater than 100%
	Solve problems involving percentage change, including original value problems, and simple interest including in financial mathematics
	Solve problems involving direct and inverse proportion, including graphical and algebraic representations
Geometry and Measures: Properties and Structures	Understand and use alternate and corresponding angles on parallel lines
	Derive and use the sum of angles in a triangle (e.g. to deduce and use the angle sum in any polygon, and to derive properties of regular polygons)
	Identify, describe and construct similar shapes, including on coordinate axes, by considering enlargement
	Interpret plans and elevations of 3D shapes

Geometry and Measures:Mensuration and Calculation	Measure line segments and angles in geometric figures, including interpreting maps and scale drawings and use of bearings
	Calculate perimeters of 2D shapes, including circles
	Calculate areas of circles and composite shapes
	Know and apply formulae to calculate volume of right prisms (including cylinders)
Statistics	apply statistics to describe a population
	use and interpret scatter graphs of bivariate data
	Recognise correlation
	Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate graphical representation involving discrete, continuous and grouped data
	Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency (median, mean, mode and modal class) and spread (range, including consideration of outliers)
Probability	Apply the property that the probabilities of an exhaustive set of outcomes sum to one; apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one
	Enumerate sets and combinations of sets systematically, using tables, grids and Venn diagrams
	Construct theoretical possibility spaces for combined experiments with equally likely outcomes and use these to calculate theoretical probabilities