Maths

Year 7 KPIs	Year 7 Milestones (Knowledge)
Number: Structure	Order positive and negative integers, decimals and fractions
	Use the symbols =, ≠, <, >, ≤, ≥
	Apply the four operations, including formal written methods, to integers, decimals and simple fractions (proper and improper), and mixed numbers
	Understand and use place value (e.g. when working with very large or very small numbers, and when calculating with decimals)
	Recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions
	Use conventional notation for priority of operations, including brackets
	Use the concepts and vocabulary of prime numbers, factors (divisors), multiples, common factors, common multiples, highest common factor and lowest common multiple
	Use positive integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5
Number: Measures and Accuracy	Use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate
	Estimate answers; check calculations using approximation and estimation, including answers obtained using technology
Algebra: Notation, Vocabulary and Manipulation	Use and interpret algebraic notation, including: ab in place of $a \times b$, $3y$ in place of $y + y + y$ and $3 \times y$, a^2 in place of $a \times a$, a^3 in place of $a \times a \times a$, a/b in place of $a \div b$, brackets
	Substitute numerical values into formulae and expressions
	Snderstand and use the concepts and vocabulary of expressions, equations, formulae and terms
	Simplify and manipulate algebraic expressions by collecting like terms and multiplying a single term over a bracket
	Understand and use standard mathematical formulae
	Where appropriate, interpret simple expressions as functions with inputs and outputs
Algebra: Graphs	Work with coordinates in all four quadrants

Algebra: Solving Equations	Solve linear equations in one unknown algebraically
Algebra: Sequences	Generate terms of a sequence from a term-to-term rule
	Recognise and use sequences of triangular, square and cube numbers, simple arithmetic progressions
Ratio, Proportion and Rates Of Change	Change freely between related standard units (e.g. time, length, area, volume/capacity, mass) in numerical contexts
	Express one quantity as a fraction of another, where the fraction is less than 1 or greater than 1
	Use ratio notation, including reduction to simplest form
	Divide a given quantity into two parts in a given part:part or part:whole ratio
	Define percentage as ‘number of parts per hundred’
	Interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively
	Express one quantity as a percentage of another
	Compare two quantities using percentages
	Solve problems involving percentage change, including percentage increase/decrease
Probability	Record describe and analyse the frequency of outcomes of probability experiments using tables and frequency trees
	Apply ideas of randomness, fairness and equally likely events to calculate expected outcomes of multiple future experiments
	Relate relative expected frequencies to theoretical probability, using appropriate language and the 0 - 1 probability scale
	Construct theoretical possibility spaces for single experiments with equally likely outcomes and use these to calculate theoretical probabilities

Geometry and Measures: Properties and Structures	Use conventional terms and notations: points, lines, vertices, edges, planes, parallel lines, perpendicular lines, right angles, polygons, regular polygons and polygons with reflection and/or rotation symmetries
	Use the standard conventions for labelling and referring to the sides and angles of triangles
	Draw diagrams from written description
	Apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles
	Derive and apply the properties and definitions of: special types of quadrilaterals, including square, rectangle, parallelogram, trapezium, kite and rhombus; and triangles and other plane figures using appropriate language
	Identify, describe and construct congruent shapes including on coordinate axes, by considering rotation, reflection and translation
	Solve geometrical problems on coordinate axes
	Identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference
	Identify properties of the faces, surfaces, edges and vertices of: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres
Geometry and Measures:Mensuration and Calculation	Use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc.)
	Measure line segments and angles in geometric figures
	Know and apply formulae to calculate area of triangles, parallelograms, trapezia
	Calculate perimeters of 2D shapes
	Know the formulae: circumference of a circle = $2\pi r = \pi d$, area of a circle = πr^2
	Know and apply formulae to calculate volume of cuboids
Vectors	Describe translations as 2D vectors
Statistics	Interpret and construct tables, charts and diagrams, including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data and know their appropriate use
	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)