Key Performance Indicator	Maths - Year 8 Milestones (Knowledge)
Number: Structure	I can order positive and negative integers, decimals, fractions and numbers given in the form √n.
	I can use the symbols =, ≠, <, >, ≤, ≥ to make order statements about integers, decimals, fractions and numbers given in the form √n.
	I can make use of a number line to: order postive and negative integers, decimals , fractions and percentages; and show relative positions of fractions, decimals and fractions.
	I can use standard units of mass, length, time, money and other measures, including with decimal and fractional quantities.
	I can round numbers and measures to different degrees of accuracy, for example, to a number of decimal places or significant figures.
Number: Calculation	I can 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.
	I can use conventional notation for priority of operations, including brackets, powers, roots and reciprocals.
	I can recognise and use relationships between the operations +, –, ×, ÷, squaring and finding the square root, including inverse operations.
	I can interpret fractions and percentages as operators.
Number: Structure depending on operations: integers	I can use the concepts and vocabulary of prime numbers, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation theorem. I know how to write a number as a product of its prime factors.
	I know the order of operations including powers. I know that $a^0 = 1$. I can apply the multiplication, division and power laws of indices.
Number: Structure depending on operations: beyond integers	I can work interchangeably with terminating decimals their corresponding fractions and percentages (such as 3.5, $^7/_2$, and 350% or 0.375, $^3/_8$, and 37.5%).
Number: Linking & extending FDP	I can interpret percentages and percentage changes as a fraction or a decimal. I can interpret these multiplicatively and express one quantity as a percentage of another. I can compare two quantities using percentages, and work with percentages greater than 100%.
Number: Understanding numbers in contextual calculations	I can use approximation, through rounding to the nearest whole number, or to one or two decimal places, to estimate answers.
	I can use a calculator and other technologies to calculate results accurately and then interpret them appropriately.

	I can round numbers and measures to an appropriate degree of accuracy, for example, to a number of decimal places or significant figures.
Algebra: Notation & vocabulary	I can understand and use the concepts and vocabulary of expressions, equations, inequalities, terms, factors and correlation.
	I can 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 $a \div b$, a^2b in place of $a \times a \times b$, brackets.
	I can substitute integer values into formulae and expressions, including scientific formulae.
Algebra: Manipulation	I can simplify and manipulate algebraic expressions by taking out common factors and simplifying expressions involving sums, products and powers, including the laws of indices. I can factorise an expression by taking out common factors.
	I can change the subject of a formulae when 2 steps are required.
	I can solve linear equations with the unknowns on both sides of the equation.
Algebra: Expressing & exploring relations: functions and graphs	I can understand how the position of a point changes if one or both of its coordinates are multiplied by $^{-}1$.
	I can plot graphs of equations that correspond to straight-line graphs in the coordinate plane.
	I can identify and interpret gradients and intercepts of linear functions graphically and algebraically. I can plot and interpret graphs of linear functions.
	I know the characteristic shape of a graph of a quadratic function.
	I can 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.
	I can find approximate solutions to linear equations using a graph.
Algebra: Sequences	I can generate terms of a sequence from either a term-to-term or a position-to-term rule. I can begin to generate terms of a sequence from a quadratic position-to-term rule.
	I can find the nth term for a linear sequence.
Ratio, Proportion and Rates Of Change: Multiplicative relationships	I can change freely between related standard units, for example speed (m per sec to km per hour and vice-versa).
	I can express one quantity as a fraction of another, where the fraction is less than 1 and where it is greater than 1.

Ratio, Proportion and Rates Of Change: Ratio notation and number multipliers	I can express the division of a quantity into two parts as a ratio, and apply ratio to real contexts and problems (such as those involving conversion, comparison, scaling, mixing, concentrations).
	I can express a multiplicative relationship between two quantities as a ratio or a fraction. I can find a relevant multiplier when solving problems involving proportion.
	I can use scale factors, scale diagrams and maps. I can use scale factors when constructing similar shapes.
	I can relate ratios to fractions and to linear functions.
	I can divide a given quantity into two parts in a given part:part or part:whole ratio. I can express the division of a quantity into two parts as a ratio.
Ratio, Proportion and Rates Of Change: Percentage change	I can solve problems involving percentage change, including original value problems, and simple interest including in financial mathematics.
Ratio, Proportion and Rates Of Change: Direct & inverse proportion	I can solve problems involving direct and inverse proportion, including graphical and algebraic representations.
Ratio, Proportion and Rates Of Change: Compound units	I can change freely between and use compound units (e.g. speed, rates of pay, prices) in numerical contexts.
Geometry: Measuring & calculating	I can draw and measure line segments and angles in geometric figures, including interpreting maps and scale drawings.
	I can calculate the perimeters of 2D shapes, including circles. I can apply the formula for circumference of a circle and I know that the circumference of a circle = $2\pi r = \pi d$.
	I can calculate the areas of circles and composite shapes. I can apply the formula for area of a circle and know that the area = πr^2.
	I know and apply formulae to calculate volume of right prisms (including cylinders). I know that the volume of a prism = area of cross section x length.
	I can use Pythagoras' Theorem and trigonometric ratios in similar triangles to solve problems involving right-angled triangles.
Geometry: Drawing & constructing	I can describe, sketch and draw: points, lines, parallel lines, perpendicular lines, right angles, regular polygons, and other polygons that are reflectively and rotationally symmetric.
	I can use conventional terms and notations, such as complementary to describe angles with a sum of 90˚ and supplementary to describe angles with a sum of 180˚. I know how to identify alternate and corresponding angles on parallel lines.

Geometry: Drawing & constructing	I can use construction methods to: investigate angle bisectors and perpendicular bisectors of sides, of triangles in changing situations. I can explore derived shapes, such as circumcircles and inscribed circles of triangles, and other polygons.
	I can use the standard conventions for labelling the sides and angles of triangle ABC.
	I know and use the criteria for congruence of triangles.
Geometry: Properties and relationships	I can classify quadrilaterals by their geometric properties, and provide convincing arguments to support classification decisions.
	I know that translations, rotations and reflections map shapes onto congruent shapes. I understand that the relation 'is congruent to' implies that there exists a translation, rotation or reflection that takes one shape to another.
	I can construct similar shapes by enlargement, with and without coordinate grids.
	I know how to identify alternate and corresponding angles on parallel lines.
	I can 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). I know how to find the angle sum of any polygon.
	I can use the properties of faces, surfaces, edges and vertices of cubes, cuboids, prisms and cylinders to solve problems in 3-D. I can interpret plans and elevations of 3D shapes.
	I can interpret mathematical relationships both algebraically and geometrically.
Statistics	I can interpret, analyse and compare the distributions of data sets from through appropriate graphical representation involving discrete, continuous and grouped data.
	I can interpret, analyse and compare the distributions of data sets through appropriate measures of central tendency (median, mean, mode and modal class) and spread (range, including consideration of outliers). I know how to use the midpoints of groups to estimate the mean of a set of grouped data.
	I can use and interpret scatter graphs using data for two variables, recognising correlation.
	I can construct and interpret frequency tables, bar charts, pie charts, and pictograms for larger sets of categorical data, and vertical line (or bar) charts for larger sets of ungrouped and grouped numerical data.
Probability	I can describe simple mathematical relationships between two variables that can be seen in the data derived from my own experiments or observations.

Probability	I can apply the property that the probabilities of an exhaustive set of outcomes sum to one and apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one. I know that probability is measured on a 0-1 scale and that the sum of all probabilities for a single event is 1.
	I can list sets and combinations of sets systematically, using tables, grids and Venn diagrams.
	I can construct theoretical possibility spaces for combined experiments with equally likely outcomes and use these to calculate theoretical probabilities. I can calculate theoretical probabilities for single events.