KS3 Algebra Progression Grid

By the end of KS3, pupils will be able to:

- Understand basic algebraic forms.
- Build and form one step equations using function machines.
- Describe and continue sequences using diagrams and lists of numbers.
- Recognise and use linear graphs.
- Recognise and use non-linear graphs.
- Plot linear graphs.
- Multiply out a single bracket and factorise into a single bracket.
- Expand a pair of binomials.
- Find the nth term for linear sequences and generate sequences from an nth term rule.
- Simplify expressions with powers.
- Substitute into formulae and equations.
- Add, subtract, multiply and divide simple algebraic fractions.
- Form and solve linear equations and inequalities.
- Rearrange formulae and equations.
- Test algebraic conjectures.

	Algebra - Understand Notation and Substitute: Acquire and Apply	**Algebra - Equivalence and Proof: Acquire and Apply**	**Algebra - Solve Equations and Inequalities: Acquire and Apply**	**Algebra - Linear and Non-linear Graphs: Acquire and Apply**	**Algebra - Sequences: Acquire and Apply**
Year 9 Greater Depth	Can substitute into more complex formulae and equations.	Can change the subject of a more complex formula. Can expand three binomials.	Can use equations to solve complex word problems. Can rearrange complex formulae including brackets and squares.	Can use graphs and tables to solve complex word problems. Can investigate graphs of simultaneous equations. Can solve simultaneous equations graphically. Can recognise perpendicular lines. Can model real-life graphs including inverse proportion. Can write an equation in the form y=mx + c.	Can find the rule for the nth term of a sequence – extended for complex sequences.
Year 9 Expected Year 8 Greater Depth	Can explore and understand powers of powers. Can substitute into formulae and equations. Can multiply and divide simple algebraic fractions.	Can expand a pair of binomials. Can rearrange an equation to the form y=mx +c. Can rearrange formulae (one-step). Can rearrange formulae (two-step). Can test algebraic conjectures. Can investigate algebraic proof	Can form and solve equations and inequalities with unknowns on both sides. Can represent inequalities. Can solve equations and inequalities in context.	Can explore and understand direct proportion graphs. Can explore and understand gradients. Can explore and understand non-linear graphs. Can find the midpoint of a line segment. Can draw and interpret quadratic graphs. Can interpret graphs in many forms, including reciprocal and piecewise, exponential and speed/distance/time. Can simplify, use and interpret y=mx + c. Can understand the properties of parallel lines on an axes.	Can find the rule for the nth term of a sequence. Can test conjectures with algebra. Can represent sequences (review and extend to problem solving contexts).
Year 8 Expected Year 7 Greater Depth	Can form algebraic expressions. Can add and subtract expressions with indices. Can add and subtract simple algebraic fractions. Can simplify algebraic expressions by multiplying and dividing indices. Can use the addition and subtraction laws for indices.	Can add and subtract simple algebraic fractions. Can multiply out a single bracket. Can factorise into a single bracket. Can expand multiple brackets and simplify. Can identify and use formulae, expressions, identities and equations.	Can solve equations including brackets. Can form and solve equations with brackets. Can understand and solve simple inequalities. Can form and solve simple inequalities. Can identify and use formulae, expressions, identities and equations.	Can explore and understand conversion graphs. Can work with coordinates in all four quadrants. Can identify and draw lines that are parallel to the axes. Can recognise and use lines of the form: - y = x - y = kx - y = x + a - y = mx + c Can recognise graphs with negative gradients.	Can find missing numbers within sequences. Can generate sequences given complex algebraic rules.

Year 7 Expected	Can use function machines to find inputs, outputs and number operations, for one and two step expressions. Can use diagrams and letters to generalise number operations. Can substitute values into single and two-step expressions. Can evaluate algebraic expressions with directed numbers. Can use known algebraic facts to derive other facts.	Can understand the difference between equality and equivalence. Can understand the meaning of like and unlike terms. Can simplify algebraic expressions by collecting like terms. Can collect like terms in the context of directed numbers. Can use known algebraic facts to derive other facts.	Can form and solve one-step equations. Can form and solve two-step equations.	Can represent functions graphically.	Can recognise linear and non-linear sequences. Can continue linear and non-linear sequences. Can generate sequences from an algebraic rule. Can explain the term to term rule of numerical sequences in words. Can represent sequences in tabular and graphical forms.

KS3 Geometry and Measures Progression Grid

By the end of KS3, pupils will be able to:

- Identify 2D and 3D shapes.
- Solve problems using the perimeter and area of squares, rectangles, parallelograms and triangles.
- Find the perimeter and area of compound shapes.
- Calculate and solve problems using the area of trapezia.
- Find the circumference and area of a circle and parts of a circle.
- Calculate the surface area and volume of cubes, cuboids, prisms and cylinders.
- Sketch and recognise nets of cuboids and other 3D shapes.
- Recognise the plans and elevations of 3D shapes.
- Use rulers, protractors and other measuring equipment to reconstruct mathematical diagrams.
- Measure and draw angles.
- Identify and use the sum of angles on a straight line and around a point, and the equality of vertically opposite angles.
- Identify and calculate with co-interior, alternate and corresponding angles.
- Use geometric reasoning to solve problems with angles.
- Solve angle problems with angles in parallel lines and polygons.
- Calculate and use the sum of the interior angles in any polygon.
- Understand and use the exterior angles of any polygon.
- Reflect shapes in horizontal, vertical and diagonal lines.
- Rotate a shape about a point.
- Translate points and shapes by a given vector.
- Enlarge a shape by a positive integer or fractional scale factor.
- Test conjectures about shapes.
- Use Pythagoras' theorem to calculate missing sides in a right-angled triangle.

	Geometry and Measures - Perimeter, Area and Volume: Acquire and Apply	**Geometry and Measures - Construct and Transform Geometric Figures: Acquire and Apply**	**Geometry and Measures - Shape Properties: Acquire and Apply**	**Geometry and Measures - Angles: Acquire and Apply**	**Geometry and Measures - Pythagoras and Trigonometry: Acquire and Apply**	**Geometry and Measures - Geometric Proof: Acquire and Apply**
Year 9 Greater Depth	Can explore volumes of cones, pyramids, spheres and compound shapes. Can explore the surface area of prisms.	Can find a locus of distance from a point. Can find a locus of distance from a straight line or shape. Can find a locus equidistant from two points. Can find a locus of distance from two lines. Can find the result of a series of transformations. Can enlarge a shape by a negative scale factor.	Can work out missing sides and angles in a pair of given similar shapes. Can solve problems with similar triangles.	Can solve angle problems with algebra.	Can use Pythagoras' theorem in 3D shapes. Can explore ratios in right-angled triangles.	Can link constructions and geometrical reasoning. Can explore proofs of Pythagoras' theorem.
Year 9 Expected Year 8 Greater Depth	Can calculate the surface area of cubes and cuboids. Can calculate the surface area of triangular prisms. Can calculate the surface area of cylinders. Can calculate the volume of cubes and cuboids. Can calculate the volume of prisms and cylinders.	Can construct and interpret scale drawings. Can construct triangles from given information. Can construct an angle bisector. Can construct a perpendicular bisector of a line segment. Can construct a perpendicular to a point. Can construct a perpendicular from a point. Can identify the order of rotational symmetry of a shape. Can compare and contrast rotational symmetry with line symmetry. Can rotate a shape about a point.	Can understand and use the properties of diagonals and quadrilaterals. Can test conjectures about shapes. Can identify 2D and 3D shapes. Can recognise prisms. Can sketch and recognise nets of cuboids and other 3D shapes. Can recognise the plans and elevations of 3D shapes. Can recognise enlargement and similarity.	Can investigate and use angles formed by diagonals of quadrilaterals. Can solve angle problems using chains of reasoning. Can test conjectures with angles.	Can identify the hypotenuse of right-angled triangles. Can determine whether a triangle is right-angled. Can calculate missing sides in a right-angled triangle. Can use Pythagoras' theorem on coordinate axes.	Can find and prove simple geometric facts. Can explore and identify congruent figures and triangles. Can develop chains of reasoning to solve angle problems. Can prove a triangle is or isn't right-angled.

		Can translate points and shapes by a given vector. Can describe translations. Can compare rotation and reflection of shapes. Can enlarge a shape by a positive integer or fractional scale factor.				
Year 8 Expected Year 7 Greater Depth	Can calculate and solve problems using the area of trapezia. Can calculate the perimeter and area of compound shapes. Can find the circumference of a circle. Can investigate and calculate the area of a circle and parts of a circle without a calculator. Can calculate the area of a circle and parts of a circle with a calculator.	Can work with scale factors. Can recognise line symmetry. Can reflect shapes in a horizontal, vertical or diagonal line.	Can investigate and understand the properties of special quadrilaterals.	Can investigate and use parallel line angle rules. Can identify and calculate with co-interior, alternate and corresponding angles. Can solve complex problems with parallel line angles. Can identify and calculate with sides and angles in special quadrilaterals. Can understand and use the exterior angles of any polygon. Can calculate and use the sum of the interior angles in any polygon. Can calculate missing interior angles in regular polygons.		Can use known facts to obtain simple angle proofs.
Year 7 Expected	Can solve perimeter problems. Can solve problems using the area of rectangles and parallelograms. Can solve problems using the area of triangles.	Can understand and use geometric notation. Can draw and measure line segments including geometric figures. Can identify perpendicular and parallel lines. Can construct triangles using SSS, SAS and ASA rules. Can construct more complex polygons.	Can recognise the properties of different types of triangles and quadrilaterals. Can identify polygons up to a decagon.	Can classify angles. Can measure and draw angles. Can understand and use the sum of angles at a point. Can understand and use the sum of angles on a straight line. Can understand and use the equality of vertically opposite angles. Can apply the sum of angles in triangles and quadrilaterals. Can solve angle problems using properties of triangles and quadrilaterals. Can solve complex angle problems.		

KS3 Ratio, Proportion and Rates of Change Progression Grid

By the end of KS3, pupils will be able to:

- Convert metric units.
- Recognise and understand multiplicative relationships in a range of contexts.
- Draw and interpret scale diagrams.
- Interpret maps.
- Simplify and share into ratios.
- Compare ratios and solve problems involving ratios.
- Solve problems with direct proportion.
- Interpret and use direct proportion and conversion graphs.
- Solve problems with inverse proportion.
- Solve unit pricing problems.
- Solve speed, distance and time problems.
- Solve mass, density and volume problems.
- Use distance, time graphs.

	Ratio, Proportion and Rates of Change - Multiplicative Relationships: Acquire and Apply	**Ratio, Proportion and Rates of Change - Ratio and Rates: Acquire and Apply**
Year 9 Greater Depth	Can explore and understand graphs with inverse relationships.	Can solve problems with ratio and algebra. Can convert compound units.
Year 9 Expected Year 8 Greater Depth	Can explore and understand direct proportion graphs. Can convert metric units of area and volume. Can construct and interpret scale drawings. Can solve direct proportion problems. Can interpret and use direct proportion and conversion graphs. Can solve problems with inverse proportion.	Can express ratios in the form 1:n Can link gradient and ratio. Can solve unit pricing problems (best buys). Can solve problems given the whole or a part. Can solve speed, distance and time problems without a calculator. Can solve speed, distance and time problems with a calculator. Can use distance, time graphs. Can solve problems with density, mass and volume. Can calculate rates of change and their units.
Year 8 Expected Year 7 Greater Depth	Can understand and use scale factors. Can draw and interpret scale diagrams. Can interpret maps using scale factors and ratios. Can convert between currencies. Can explore and understand conversion graphs. Can explore and understand similar shapes. Can convert metric units in problem solving contexts.	Can understand and use ratio notation. Can solve problems involving ratios of the form 1:n (or n:1). Can solve proportional problems involving the ratio m:n. Can divide into a ratio. Can express ratios in their simplest integer form. Can compare ratios and related fractions. Can understand π as the ratio between diameter and circumference.
Year 7 Expected	Can convert metric units. Can use multiplicative relationships between known facts.	

KS3 Statistics and Probability Progression Grid

By the end of KS3, pupils will be able to:

- Draw, interpret and use bar charts, line graphs and pictograms.
- Find and use the mean, mode, median and range to solve problems.
- Compare distributions using averages and the range.
- Construct and interpret pie charts.
- Identify misleading graphs.
- Design and criticise questionnaires.
- Read and interpret grouped and ungrouped frequency tables.
- Find the mean from grouped and ungrouped frequency tables.
- Identify and represent discrete and continuous data.
- Draw and interpret scatter graphs.
- Understand and describe linear correlation, and identify non-linear relationships.
- Draw and use lines of best fit.
- Use the language of probability and understand that the sum of probabilities of all possible outcomes is 1.
- Use the probability scale.
- Generate and use sample spaces to find probabilities.
- Interpret and create Venn diagrams, and use these to find probabilities.
- Solve problems and find probabilities using frequency trees.
- Represent data and find probabilities using two-way tables.
- Use the product rule for finding the total number of possible outcomes.
- Compare experimental and theoretical probability.

	Statistics - Represent and Interpret Data: Acquire and Apply	**Statistics - Statistical Measures: Acquire and Apply**	**Statistics - Bivariate Data: Acquire and Apply**	**Probability: Acquire and Apply**
Year 9 Greater Depth	Can confidently and consistently apply the skills and knowledge of representing and interpreting data to complex and challenging problem solving contexts in mathematics, in combination with other related mathematical concepts.	Can confidently and consistently apply statistical measures to complex and challenging problem solving contexts in mathematics, in combination with other related mathematical concepts.	Can confidently and consistently apply the skills and knowledge of bivariate data to complex and challenging problem solving contexts in mathematics, in combination with other related mathematical concepts.	Can interpret probability tree diagrams. Can use probability tree diagrams to solve ‘without replacement’ problems.
Year 9 Expected Year 8 Greater Depth	Can confidently apply the skills and knowledge of representing and interpreting data to a range of problem solving contexts in mathematics.	Can find the mean from an ungrouped frequency table. Can find the mean from a grouped frequency table.	Can confidently apply the skills and knowledge of bivariate data to a range of problem solving contexts in mathematics.	Can use the product rule for finding the total number of possible outcomes. Can compare experimental and theoretical probability. Can understand and use relative frequency, including convergence. Can use frequency tree diagrams to find probabilities.
Year 8 Expected Year 7 Greater Depth	Can recognise different types of data. Can read and interpret ungrouped frequency tables. Can read and interpret grouped frequency tables. Can represent data in two-way tables. Can draw, interpret and solve problems with pictograms. Can draw and interpret line graphs. Can draw and interpret multiple bar charts. Can identify misleading graphs. Can design and criticise questionnaires. Can represent grouped discrete data. Can represent continuous data grouped into equal classes.	Can understand mean, mode and median, and choose the most appropriate average. Can identify outliers. Can compare distributions using averages and the range.	Can draw and interpret scatter graphs. Can understand and describe linear correlation. Can draw and use lines of best fit. Can identify non-linear relationships.	Can construct sample spaces for one or more events. Can find probabilities from a sample space. Can find probabilities from two-way tables. Can find probabilities from Venn diagrams. Can understand and use the complement of a set.
Year 7 Expected	Can solve problems with line charts and bar charts. Can solve problems with frequency trees. Can interpret pie charts using a protractor. Can draw pie charts.	Can find the range of a set of numbers. Can find the mean of a set of numbers. Can solve problems using the mean.		Can use the language of probability. Can calculate the probability of a single event. Can use the probability scale.

				Can understand that the sum of probabilities of all possible outcomes is 1. Can generate sample spaces for single events. Can identify and represent sets. Can interpret and create Venn diagrams. Can understand and use the intersection and union of sets.

KS3 Number Progression Grid

By the end of KS3, pupils will be able to:

- Recognise and use numbers up to 1 billion using diagrams and number lines.
- Understand the links between fractions, decimals and percentages and convert fluently between them.
- Solve addition and subtraction problems in a variety of contexts.
- Solve multiplication and division problems in a variety of contexts.
- Understand and recognise directed numbers in a variety of contexts.
- Add, subtract, multiply and divide fractions with different denominators and mixed numbers.
- Use efficient strategies to derive facts and solve calculations.
- Identify prime numbers and find the prime factor decomposition of a number
- Understand and calculate with numbers in standard index form.
- Apply skills of rounding and estimation.
- Understand and use negative and fractional indices.
- Understand different types of numbers, including integers, rational and real numbers.
- Convert metric units of length and area.
- Use error interval notation.
- Understand and use number concepts in the context of financial mathematics.
- Find fractions and percentages of amounts
- Express a change as a percentage.
- Recognise and solve percentage problems.
- Find the original amount after a percentage change, or percentage increase or decrease.

	Number - Understand & Represent: Acquire and Apply	**Number - Calculations: Acquire and Apply**	**Number - Understand fractions and decimals: Acquire and Apply**	**Number - Percentages: Acquire and Apply**	**Personal Development: Mental maths and financial management: Acquire and Apply**
Year 9 Greater Depth	Can confidently and consistently apply the skills and knowledge of factors, multiples and primes, rounding, standard form and indices to complex and challenging problem solving contexts in mathematics, in combination with other related mathematical concepts.	Can understand and use surds.	Can confidently and consistently apply the skills and knowledge of fractions, decimals and percentages to complex and challenging problem solving contexts in mathematics, in combination with other related mathematical concepts.	Can solve problems with repeated percentage change.	Can confidently and consistently apply number skills and knowledge to complex and challenging financial management contexts.
Year 9 Expected Year 8 Greater Depth	Can understand and use negative indices. Can understand and use fractional indices. Can understand different types of numbers, including integers, rational and real numbers.	Can multiply and divide mixed numbers. Can convert metric units of length and area. Can use error interval notation. Can understand and use number concepts in the context of financial mathematics.	Can multiply and divide mixed numbers. Can understand real and rational numbers.	Can use the equivalence of fractions, decimals and percentages to solve problems. Can recognise and solve percentage problems. Can find the original amount after a percentage change. Can find the original amount after a percentage increase or decrease. Can understand and use percentage concepts in the context of financial mathematics.	Can solve problems with bills and bank statements. Can calculate simple interest. Can calculate compound interest. Can solve problems with Value Added Tax. Can calculate wages and taxes. Can solve problems with exchange rates. Can solve unit pricing (best buys) problems.
Year 8 Expected	Can compare and order numbers in standard form.	Can multiply by 0.1 and 0.01. Can multiply and divide fractions.	Can convert fluently between fractions, decimals and percentages.	Can increase and decrease an amount by a percentage.	Can calculate with money.

Year 7 Greater Depth	Can write a 1 significant figure number in standard form. Can write numbers of any size in standard form. Can round to given numbers of decimal places and significant figures.	Can convert between units and of time. Can calculate with money. Can estimate the answer to a calculation.	Can calculate fractions, decimals and percentages with and without a calculator. Can explore fractions above 1. Can solve problems with fractions greater than 1. Can express one number as a fraction or percentage of another without a calculator. Can express one number as a fraction or percentage of another using calculator methods.	Can calculate and use multipliers. Can express one quantity as a percentage of another and compare two quantities using percentages. Can explore and work with percentages greater than 100%.	
Year 7 Expected	Can understand and use place value. Can compare and order numbers. Can round to powers of 10 and 1 significant figure. Can use factors and multiples. Can order directed numbers. Can write a number as a product of its prime factors Can find common factors of a set of numbers including Highest Common Factor. Can find common multiples of a set of numbers including Lowest Common Multiple.	Can use the four operations with positive integers and decimals. Can use a calculator. Can multiply and divide by positive powers of 10. Can understand and use order of operations. Can add and subtract fractions including mixed numbers. Can use known number facts to derive other facts.	Can interchange between fractions and decimals below 1. Can find fractions of an amount (up to 1).	Can interchange between fractions, decimals and percentages up to 100%. Can find the percentage of amounts using mental and calculator methods (up to 100%).	Can choose the most appropriate method: mental strategies, formal written or calculator. Can use efficient mental arithmetic strategies. Can solve financial maths problems.