'Raising the Achievement of All'

WELL-SEQUENCED CONTEXUALISED/INCLUSIVE AMBITIOUS

SUBJECT: MATHS **Year: 9**

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	U1: Fractions, Decimals and Percentages U2: Probability U3: Sets and Venn Diagrams	**U4: Simultaneous Equations-Solving Algebraically U5: Simultaneous Equations-Solving Graphically U6: Angle Review**	**U7: Congruence U8: Pythagoras Theorem U9: Ratio Review**	**U10: Similarity and Enlargement U11: Trigonometry**	**U12: Algebra Review U13: Quadratic Expressions U14: Surds**	**U15: Indices U16: Standard Form U17: Growth and Decay**
Key Questions	**U1: Can you convert any decimal into a fraction and or a percentage? U2: How do we represent 'chance' in maths? U3: What is the difference between an intersection and a union?**	**U4: How do we manipulate equations to solve them? U5: How do we use algebra when there are several unknowns? U6: How can angles help to solve shape problems?**	**U7: What is the difference between a bisector and a perpendicular line? U8: Where would we use Pythagoras in industry? U9: How can we use ratio to our advantage?**	**U10: Are similar shapes the same? U11: Can you use trigonometry to find a missing angle?**	**U12: Can you solve equations with brackets? U13: How do we plot algebraic expressions onto graphs? U14: What is a surd?**	**U15: What are the different index laws? U16: What is standard form and why do we use it? U17: What is a multiplier?**
Content: 'Know what'	-Recognise the connections between fractions, decimals and percentages -Understand probability is a numerical measure of chance on a scale from 0 to 1 inclusive. -Understand a variety of representations of combined events -Understand the difference between	-Know that equivalent equations are satisfied with the same value/s -Identify pairs of equations that are equivalent -Know definition of simultaneous equations -Angle facts in triangle, on a straight line and around a point -Angles in parallel lines -Formula for interior and exterior angles in a polygon	-Know the definition of a bisector -Understand the congruency conditions for triangles SSS SAS -Know that the square of the hypotenuse is equal to the sum of the squares of the other two sides -Identify, describe and define the hypotenuse of a right-angled triangle	-Understand angles do not change and proportions remain constant in similar shapes -Know the symbol ~ means 'similar' -Understand the constant of proportionality is a relationship within a shape and the scale factor is a relationship between shapes -Understand the centre of enlargement (CoE)	-Know the order of operations -Understand ab=a×b, $a^2 = a \times a$ -Know the equation of a straight line is y = mx + c -Know that quadratics are expressions and equations that include a squared variable (and no higher order power) -Know the shape of a quadratic graph is	-Understand and know index notation -Know the index laws - Understand standard form is useful for representing very small and very large numbers -Understand why compound change creates a non-linear graph -Understand how to reverse percentage change using inverse operations and by rearranging equations

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	theoretical and experimental Probability -Understand set notation for intersections, unions, complements and the universal set – Identify and interpret sets described by notation and within Venn diagrams – Interpret a range of sets in qualitative and numerical contexts		-Describe proportional relationships using ratios and fractions -Understand all ratios can be written in the form 1:n	determines the position of an enlarged shape -when lengths are enlarged with scale factor x the area is enlarged with scale factor x^2 -Understand right angled triangle can be enlarged and drawn within a unit circle	different from a linear graph -Understand that every x-value has a corresponding $y$value -Recognise the relationship between the graph and the equation -Understand surd notion and that a surd is an expression that includes a root	
Expertise: 'Know how'	independent events -Compare probabilities using a variety of representations -Calculate the probability of a pair of combined events -Solve probability problems using sample spaces, twoway tables and probability tree diagrams. -Determine whether an experiment is fair or biased -Work with probabilities which are determined by two events -Identify and represent intersections on Venn diagrams	-Solve one and twostep equations -Solve equations including those with fractional and negative solutions, and with unknowns on both sides -Substitute into expressions -Solve simple simultaneous equations with substitution -Solve simultaneous equations graphically -Calculate missing angles including parallel lines -Find missing interior and exterior angles in polygons	-Construct a perpendicular bisector and an angle bisector -draw a locus of points -Construct a triangle -Find the area of squares on squared paper and use the area to find the side length and find the length of a slanted side using the area of its square -Find any missing side length of a right-angled triangle -Find the distance between any two coordinate pairs using Pythagoras	-Identify corresponding sides/angles under rotation/reflection -find missing side lengths using constants of proportionality -Find the scale factor from corresponding distances from CoE - enlarge a shape on a coordinate grid -Identify the opposite and adjacent of a right-angled triangle in relation to another given angle - Find lengths of opposites and adjacents from a hypotenuse and a given angle in a right-angled triangle	-Manipulate algebraic expressions by expanding brackets and simplifying or factorising - Identify common factors in an expression -Substitute into expressions including indices and negatives -Solve equations using inverse operations -Identify a quadratic expression -Substitute into a quadratic expression -Plot a quadratic graph -Estimate y-values from x-values using a graph and expand double brackets	- Write numbers in index form in decimal and fractional forms - Simplify expressions involving indices with the same base -Interpret numbers in standard form and convert between ordinary numbers and numbers in standard form -Solve problems with very large and very small numbers -Use decimal multipliers to find percentage change -Use a sequence of decimal multipliers to find repeated percentage change

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	-To interpret intersections from contexts		-Use scale factors, constants of proportionality and unit ratios to solve problems	-Find the angles in right-angled triangles from two side lengths, using inverse trig functions	- Identify and manipulate surds -Collect like terms including surds - Interpret answers in surd form	-Find the original amount after compound change has occurred
SMSC	-Recognise importance of decimals in the context of money and medicine - How and where a venn diagram is used	-Angles in the context of the architecture around us -Opportunities to explore where we use algebra in a real-life context e.g. pricing	**-**The use of angles in graphics and construction careers	**-** students question "why" and avoid assumption when analysing angle problems	**-**The logical organisation of information and having resilience to solve problems independently	**-**Recognise where we use percentages in real life context -Use percentages to make comparisons recognising their use is retail and nutrition
Key Words	Keywords: Numerator, denominator, equivalent fractions, simplify, convert, percentage, decimal, improper fraction, mixed number, probability, outcome, sample space, event, complement, certain, impossible, universal set, element, subset, union (∪), intersection (∩), complement (′), Venn diagram.	Keywords: Variable, coefficient, constant, equation, expression, elimination, substitution, simultaneous equations, coordinates, gradient, intercept, intersection, parallel lines, perpendicular lines, acute, obtuse, reflex, right angle, corresponding angles, alternate angles, co-interior angles, vertically opposite angles, complementary, supplementary.	Keywords: Congruent, corresponding sides, corresponding angles, translation, rotation, reflection, transformation, hypotenuse, right-angled triangle, square, square root, Pythagoras' theorem, ratio, proportion, simplify, equivalent ratios, unitary method, part-to-part, part-to-whole, scale factor.	Keywords: Similar shapes, congruent shapes, enlargement, centre of enlargement, scale factor, linear scale factor, area scale factor, volume scale factor, corresponding sides, corresponding angles, trigonometry, sine (sin), cosine (cos), tangent (tan), opposite, adjacent, hypotenuse, inverse trigonometry, angle of elevation, angle of depression, SOH CAH TOA.	Keywords: Expression, equation, term, variable, coefficient, constant, like terms, expand, factorise, simplify, substitute, solve, quadratic, roots, solutions, parabola, discriminant, surd, rational, irrational, square root, simplify surds, like surds, rationalise, conjugate.	Keywords: Indices, index, base, power, square, cube, zero index, negative index, fractional index, standard form, significant figures, decimal places, positive index, negative index, powers of 10, growth, decay, percentage increase, percentage decrease, compound interest, depreciation, multiplier, initial value, final value, repeated percentage change.
Disciplinary Literacy	-Guided reading of questions -Students explain reasoning					

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	-What is the same and what is different activities -Talk tasks to develop oracy -Identify and explain key concepts and keywords					
Careers Links	**Develops numerical reasoning and statistical thinking used by** actuaries, financial analysts, insurance underwriters, healthcare professionals, data scientists, and economists**. Probability and data classification are fundamental in risk assessment, finance and scientific research.**	**Supports careers requiring mathematical modelling and precision, including** engineers, architects, software developers, surveyors, physicists, and computer scientists**. These topics are used to solve complex real-world problems and design accurate systems and structures.**	**Relevant to** civil engineers, architects, construction managers, surveyors, carpenters, and product designers**. Understanding scale, measurement and geometric relationships is essential for designing, building and manufacturing safely and accurately.**	**Links directly to** architects, structural engineers, pilots, surveyors, game developers, geologists, and renewable energy engineers**. Trigonometry and similarity are used in navigation, mapping, engineering design and 3D modelling.**	**Develops advanced algebraic thinking used by** mathematicians, engineers, physicists, economists, software developers, and AI specialists**. These concepts underpin mathematical modelling, optimisation and scientific problem-solving.**	**Supports careers in** scientific research, medicine, environmental science, finance, astronomy, engineering, and epidemiology**. Students explore exponential relationships used in population growth, radioactive decay, investment modelling and large-scale scientific calculations.**