RET Maths - KS3 Stage Ladder

Students will be taught to:

- develop fluent knowledge, skills and understanding of mathematical methods and concepts.
- acquire, select and apply mathematical techniques to solve problems.
- reason mathematically, make deductions and inferences, and draw conclusions.
- comprehend, interpret and communicate mathematical information in a variety of forms appropriate to the information and context.

RUSSELL EDUCATION TRUST

Stage		Number	Algebra	Ratio, proportion & rates of change	Geometry & measures	Probability	Statistics
Y9++	7	• Find upper & lower bounds of complex calculations.	• Find the nth term of quadratic sequences. • Write a quadratic expression as the difference of two squares. • Form and solve simultaneous equations to solve worded problems.	• Complete direct & indirect proportion problems using algebra.	• Enlarge a shape by a fractional & negative scale factor. • Solve problems using the circle theorems. • Use Pythagoras' Theorem & the trigonometric ratios to solve problems.	• Identify the best strategy to solve unfamiliar probability problems.	• Interpret, analyse and compare two sets of data.
Y9+	6	• Solve problems involving standard form. • State upper & lower bounds of simple calculations.	• Solve complex equations with brackets & fractions. • Use $y = mx + c$ to solve problems. • Expand & simplify three or more brackets. • Solve simultaneous equations algebraically. • Manipulate algebraic fractions.	• Solve problems involving density/mass/volume. • Calculate repeated percentage change including compound interest. • Solve complex & unfamiliar problems involving ratio. • Solve problems involving exponential growth.	• Calculate the area & perimeter of a parts of a circle, including sectors. • Use trigonometric ratios to find missing lengths & angles in right-angled triangles. • Solve problems using Pythagoras' theorem. • Calculate the volume & surface area of composite solids.	• Use probability tree diagrams to solve problems.	• Use scatter graphs to make predictions, interpolate & extrapolate apparent trends while knowing the dangers of so doing. • Understand that correlation does not imply causation.
Avg EOY9	5	• Complete calculations involving standard form. • Express a number as the product of its prime factors. • Solve problems using the HCF & LCM. • State error intervals.	• Find the nth term of sequences involving fractions. • Solve equations with brackets & fractions. • Expand and simplify two single brackets. • Understand the meaning of m and c in $y = mx + c$. • Rearrange simple formulae. • Expand double brackets. • Factorise quadratic expressions.	• Solve problems involving ratio. • Complete calculations involving density/mass/volume. • Solve real life problems involving direct & indirect proportion. • Calculate reverse percentages. • Calculate simple interest. • Use & interpret distance/time graphs.	• Solve problems involving surface area and volume. • Solve problems involving angles and state the correct angle reasons. • Calculate the area & perimeter of a semicircle or quarter circle. • Calculate the surface area of a prism. • Calculate the volume & surface area of a cylinder. • Calculate interior & exterior angles of polygons.	• Use probability space diagrams to solve problems. • Use Venn diagrams to solve probability problems. • Use two-way tables & frequency trees to solve probability problems.	• Use averages & the range to compare sets of data. • Estimate the mean from a grouped frequency table. • Draw & interpret scatter graphs & identify types of correlation. • Use two-way tables, Venn diagrams & frequency trees to solve problems.

			• Plot graphs with & without a table.		• Use Pythagoras' Theorem.		
Avg EOY8	**4**	• Round to a given number of significant figures. • Complete calculations using mixed numbers. • Estimate calculations. • Use standard form. • Calculate with fractions, decimals & mixed numbers. • Find the HCF & LCM. • Use powers & roots.	• Write and simplify algebraic expressions. • Substitute into a formula. • Plot a graph from an equation. • Find the nth term of a simple sequence. • Expand single brackets. • Form & solve simple algebraic equations. • Use the equation of a straight line ($y = mx + c$).	• Solve problems involving percentages. • Write one quantity as a percentage of another. • Calculate percentage change. • Complete calculations involving distance/speed/time. • Solve real life problems involving direct proportion.	• Calculate the area of a parallelogram, trapezium, & compound shape. • Calculate surface area of a cuboid. • Find missing angles in parallel lines. • Calculate the area & circumference of a circle. • Calculate the volume of a prism. • Complete translations & enlargements.	• Understand the difference between experimental probability & theoretical probability. • Draw and use probability space diagrams. • Create probability sample space diagrams to solve problems.	• Calculate the mean from a frequency table. • Draw conclusions by comparing pie charts. • Draw scatter & interpret graphs.
Avg EOY7	**3**	• Round to a given number of decimal places. • Estimate simple calculations. • Complete calculations with negative numbers. • Convert between, & complete calculations with fractions, decimals & percentages.	• Write simple algebraic expressions. • Substitute into a simple formula. • Plot graphs from simple equations. • Solve algebraic equations.	• Find a percentage increase or decrease. • Simplify a ratio. • Share a quantity into a given ratio. • Convert between a ratio and a fraction.	• Calculate the area of a parallelogram & compound rectilinear shapes. • Calculate the surface area of a cube. • Find missing angles in quadrilaterals. • Rotate a shape.	• Understand probability scales. • Work out the probability of a simple event. • Draw probability space diagrams.	• Construct & interpret a pie chart. • Use grouped frequency tables. • Find the mean, median & mode and range from a set of data and be able to state the most appropriate average to describe a data set.
Avg EOY6	**2**	• Round to 1dp. • Complete formal numerical calculations involving $+, -, \times, \div$. • Convert between, & complete calculations with simple fractions, decimals & percentages. • Identify factors, multiples & primes.	• Plot coordinates in all four quadrants. • Use simple formulae. • Describe & continue sequences.	• Use units of measurement (length, mass, volume, time). • Calculate a percentage of an amount.	• Know the properties of 3D shapes. • Calculate the area of a rectangle & triangle. • Calculate the volume of a cube & cuboid. • Find missing angles on a straight line, at a point & in a triangle. • Reflect a shape.		• Interpret & draw tables, bar charts & pictograms. • Interpret a pie chart. • Calculate the mean, median and mode.
	1	• Understand/use place value and round to nearest whole number. • Compare & order fractions & decimals. • Use negative numbers in context.	• Plot coordinates in the first quadrant. • Generate sequences from given rules and find missing numbers in a sequence.	• Convert between different units of length (mm, cm, m, km). • Understand that percent means 'per 100'. • Find simple percentages (1%, 10%, 25%, 50%, 75% etc) of amounts.	• Know the properties of 2D shapes. • Find the area of a shape by counting squares. • Find the volume of a solid by counting cubes. • Identify types of angles (acute, obtuse, reflex).	•	• Interpret & draw simple tables and bar charts.

		• Recognise square & cube numbers.			• Reflect shapes.		