Stage 9 Mathematics Curriculum Sequence						
Subject Intent: For every learner to be confident and fluent mathematicians who enjoy and succeed in mathematics, leaving school with a solid foundation of mathematical skills, knowledge and understanding, primed for their chosen fields in the 21st century.						
	Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
Big idea/Theme	**Calculating** • Calculate with powers and roots • Explore the use of standard form • Explore the effects of rounding	**Algebra: manipulation** • Understand equations and identities • Manipulate algebraic expressions • Construct algebraic statements	**Patterns** • Investigate Fibonacci numbers • Investigate Fibonacci type sequences • Explore quadratic sequences	**Calculating space** • Solve problems involving arcs and sectors • Solve problems involving prisms • Investigate right-angled triangles • Solve problems involving Pythagoras' theorem	**Algebra: visualising** • Investigate features of straight line graphs • Explore graphs of quadratic functions • Explore graphs of other standard non-linear functions • Create and use graphs of non-standard functions • Solve kinematic problems	**Probability** • Understand and use tree diagrams • Develop understanding of probability in situations involving combined events • Use probability to make predictions
Big Idea/Theme	**Visualising and constructing** • Know standard mathematical constructions • Apply standard mathematical constructions	**Proportional reasoning** • Solve problems involving different types of proportion • Investigate ways of representing proportion	**Solving equations and inequalities** • Explore the meaning of an inequality • Solve linear inequalities	**Conjecturing** • Explore the congruence of triangles • Investigate geometrical situations • Form conjectures	**Solving equations and inequalities** • Solve simultaneous equations • Use graphs to solve equations • Solve problems involving	**Presentation of data** • Construct and interpret graphs of time series • Interpret a range of charts and graphs • Interpret scatter diagrams

	• Explore ways of representing 3D shapes	• Understand and solve problems involving congruence • Understand and solve problems involving similarity • Know and use compound units in a range of situations		• Create a mathematical proof	simultaneous equations	• Explore correlation
Knowledge that needs to stick	• Know how to interpret the display on a scientific calculator when working with standard form	• Know the difference between direct and inverse proportion • Know the definition of speed • Know the definition of density • Know the definition of pressure	• Know the meaning of a quadratic sequence • Know how to represent an inequality on a number line	• Know the definitions of arc, sector, tangent and segment • Know Pythagoras' theorem • Know the conditions for congruent triangles	• Know the characteristic shape of the graph of a cubic function • Know the characteristic shape of the graph of a reciprocal function • Know that the point of intersection of two lines represents the solution to the corresponding	• Know how to use a tree diagram for combined events

					simultaneous equations	
Demonstration of Knowledge (Assessment)	• Live assessment in the classroom • Analysis of students' written work and verbal responses • Spaced retrieval • Stage and age appropriate exam questions • Strategic questioning • Misconception checks	• Live assessment in the classroom • Analysis of students' written work and verbal responses • Spaced retrieval • Stage and age appropriate exam questions • Strategic questioning • Misconception checks	• Live assessment in the classroom • Analysis of students' written work and verbal responses • Spaced retrieval • Stage and age appropriate exam questions • Strategic questioning • Misconception checks	• Live assessment in the classroom • Analysis of students' written work and verbal responses • Spaced retrieval • Stage and age appropriate exam questions • Strategic questioning • Misconception checks	• Live assessment in the classroom • Analysis of students' written work and verbal responses • Spaced retrieval • Stage and age appropriate exam questions • Strategic questioning • Misconception checks	• Live assessment in the classroom • Analysis of students' written work and verbal responses • Spaced retrieval • Stage and age appropriate exam questions • Strategic questioning • Misconception checks
Links to key stage 2 & 3/ prior knowledge needed	• Know the meaning of powers • Know the meaning of roots • Know the multiplication and division laws of indices • Understand and use standard	• Manipulate expressions by collecting like terms • Know that $x \times x = x^2$ • Calculate with negative numbers • Know the grid method for multiplying two	• Generate a linear sequence from its nth term • Substitute positive numbers into quadratic expressions • Find the nth term for an increasing linear sequence	• Know and use the number π • Know and use the formula for area and circumference of a circle • Know how to use formulae to find the area of rectangles, parallelograms,	• Plot straight-line graphs • Interpret gradients and intercepts of linear functions graphically and algebraically • Recognise, sketch and interpret graphs	• Add fractions (decimals) • Multiply fractions (decimals) • Convert between fractions, decimals and percentages • Use frequency trees to record

	form to write numbers • Interpret a number written in standard form • Round to a given number of decimal places or significant figures • Know the meaning of the symbols <, >, ≤, ≥ • Measure distances to the nearest millimetre • Create and interpret scale diagrams • Use compasses to draw circles • Interpret plan and elevations	two-digit numbers • Know the difference between an expression, an equation and a formula • Find a relevant multiplier in a situation involving proportion • Plot the graph of a linear function • Understand the meaning of a compound unit • Convert between units of length, capacity, mass and time	• Find the nth term for a decreasing linear sequence • Understand the meaning of the four inequality symbols • Solve linear equations including those with unknowns on both sides	triangles and trapezia • Know how to find the area of compound shapes • Know angle facts including angles at a point, on a line and in a triangle • Know angle facts involving parallel lines and vertically opposite angles • Know the properties of special quadrilaterals • Know Pythagoras' theorem	of linear functions • Recognise graphs of simple quadratic functions • Plot and interpret graphs of kinematic problems involving distance and speed • Solve linear equations • Substitute numbers into formulae • Plot graphs of functions of the form $y = mx + c$, $x \pm y = c$ and $ax \pm by = c$) • Manipulate expressions by multiplying by a single term	outcomes of probability experiments • Use experimental and theoretical probability to calculate expected outcomes • Know the meaning of discrete and continuous data • Interpret and construct frequency tables • Construct and interpret pictograms, bar charts, pie charts, tables, vertical line charts, histograms (equal class widths) and scatter diagrams
Skill set development	Problem solving Mathematical reasoning Number sense	Problem solving Mathematical reasoning Quantitative reasoning	Problem solving Mathematical reasoning Quantitative reasoning	Problem solving Mathematical reasoning Quantitative reasoning	Problem solving Mathematical reasoning Quantitative reasoning	Problem solving Mathematical reasoning Quantitative reasoning

	Quantitative reasoning Communication Spatial sense Independence Teamwork	Ability to manipulate Construct logical arguments Communication Representation Independence Teamwork	Communication Representation Pattern spotting Independence Teamwork	Construct logical arguments Communication Spatial sense Measurement Independence Teamwork	Ability to manipulate Communication Independence Teamwork	Communication Interpretation Inference Information ordering Independence Teamwork
Key Vocabulary (Tier 2/ Tier 3)	Power Root Index, Indices Standard form Inequality Truncate Round Minimum, Maximum Interval Decimal place Significant figure Compasses Arc Line segment Perpendicular Bisect Perpendicular bisector Locus, Loci Plan Elevation	Inequality Identity Equivalent Equation Formula, Formulae Expression Expand Linear Quadratic Direct proportion Inverse proportion Multiplier Linear Congruent, Congruence Similar, Similarity Compound unit Density, Population density Pressure	Term Term-to-term rule Position-to-term rule nth term Generate Linear Quadratic First (second) difference Fibonacci number Fibonacci sequence (Linear) inequality Unknown Manipulate Solve Solution set Integer	Circle, Pi Radius, diameter, chord, circumference, arc, tangent, sector, segment (Right) prism, cylinder Cross-section Hypotenuse Pythagoras' theorem Congruent, congruence Similar (shapes), similarity Hypotenuse Conjecture Derive Prove, proof Counterexample	Function, equation Quadratic, cubic, reciprocal Gradient, y-intercept, x-intercept, root Sketch, plot Kinematic Speed, distance, time Acceleration, deceleration Linear, non-linear Parabola, Asymptote Rate of change Equation Simultaneous equation Variable Manipulate Eliminate Solve Derive Interpret	Outcome, equally likely outcomes Event, independent event, dependent event Tree diagrams Theoretical probability Experimental probability Random Bias, unbiased, fair Relative frequency Enumerate Set Categorical data, Discrete data Continuous data, Grouped data Axis, axes Time series Compound bar chart Scatter graph (scatter diagram,

						scattergram, scatter plot) Bivariate data (Linear) Correlation Positive correlation, Negative correlation Line of best fit Interpolate Extrapolate Trend
Reading and Oracy	Students need to be able read, speak and think in mathematical language, identifying key concepts and processes of the wordier questions. Teachers will improve students' verbal communication skills, to enable them to show their understanding of mathematics accurately. Common strategies within lessons are: - giving students sufficient time to read and process information from wordier questions - asking open questions - expanding and justifying answers - repetition of a correctly modelled sentence, to practice oracy skills - using the correct vocabulary and terms within discussions - referring to definitions and meanings when using tier 2 and 3 mathematically vocabulary - addressing common misconceptions.					
Numeracy	Addition Subtraction Multiplication Division Arithmetic Estimation, approximation and rounding	Algebra Graphs Ratio and proportion	Algebra Inequalities Symbols	Area and surface area Geometry Measurement Perimeter and circumference	Algebra Graphs Equations Simultaneous equations	Data, graphs and charts Presenting data Probability Statistical analysis

Opportunities						
Careers	Biologists Astronomers Architects Civil engineers	Chemists Nuclear engineers Banking and finance	Designers Business managers Analysts	Construction Engineering Decorators	Economists Statisticians Resource managers	Traders Meteorologists Scientists
SMSC including British Values, Culture and Diversity	The mathematics curriculum helps prepare pupils for life in a modern Britain by developing their personal qualities and social skills with the chance to discuss, argue and challenge other people's ideas in a safe environment. Everyone is encouraged to express their own personal views on the mathematical topics. Alongside everyone learning how to be accepting of other people's views, students gain realisation that there is not always one route to an answer but several different ways. **Spiritual** - pupils are encouraged to use their imagination and creativity to break problems down and solve them by thinking out side of the box. **Moral** – pupils look at consequences and what happens if rules are not followed. Will an action to one number apply to all numbers? **Social** – developing personal qualities and social skills. Being able to work with others, show perseverance, being able to ask for help and not being afraid to try something new. **Cultural** – understanding others students' views and being able to express their own views. Exploring problems from a range of cultures.					
Relationship and Sex Education and Health Education	The mathematics curriculum aims to provide pupils with the knowledge and understanding that will enable them to lead a happy, healthy and successful adult life. All pupils are supported to develop resilience, to know how and when to ask for help, and to know where to access support. This develops their capacity to make sound decisions when facing risks, challenges and complex contexts in their lives. Character traits such as perseverance and self-belief, together with personal attributes such as honesty, integrity, tolerance and kindness, will be actively cultivated and celebrated.					

Key Documents:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/908013/Relationships_Education__Relationships_and_Sex_Education__RSE__and_Health_Education.pdf

https://www.thecdi.net/write/CDI-Framework-Jan2020-web.pdf