Stage 8 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	**Numbers and the number system** · Identify and use the prime factorisation of a number · Understand and use standard form	**Understanding risk I** · Understand the meaning of probability · Explore experiments and outcomes · Develop understanding of probability	**Exploring fractions, decimals and percentages** · Explore links between fractions, decimals and percentages	**Investigating angles** · Develop knowledge of angles · Explore geometrical situations involving parallel lines	**Calculating space** · Investigate circles · Discover pi · Solve problems involving circles · Explore prisms and cylinders	**Understanding risk II** · Explore experiments and outcomes · Develop understanding of probability ·Use probability to make predictions
Big Idea/Theme	**Calculating** · Calculate with negative numbers · Apply the correct order of operations	**Algebra: manipulation** · Understand the concept of a factor · Understand the notation of algebra · Manipulate algebraic expressions	**Proportional reasoning** · Explore the uses of ratio · Investigate the connection between ratio and proportion · Solve problems involving	**Calculating fractions, decimals and percentages** · Calculate with fractions · Calculate with percentages	**Algebra: visualising** · Plot and interpret linear graphs · Plot and quadratic graphs · Model real situations using linear graphs	**Presentation of data** · Explore types of data · Construct and interpret graphs · Select appropriate graphs and charts

		· Evaluate algebraic statements	proportional reasoning · Solve problems involving compound units			
Big Idea/Theme	**Visualising and constructing** · Explore enlargement of 2D shapes · Use and interpret scale drawings · Use and interpret bearings · Explore ways of representing 3D shapes		**Patterns** · Use a term-to-term rule to generate a sequence · Find the term-to-term rule for a sequence · Describe a sequence using the term-to-term rule	**Solving equations and inequalities** · Solve linear equations with the unknown on one side · Solve linear equations with the unknown on both sides · Explore connections between graphs and equations		**Measuring data** · Investigate averages · Explore ways of summarising data · Analyse and compare sets of data
Knowledge that needs to stick	· Know how to write a number as a product of its prime factors	· Know that probability is measured on a 0-1 scale · Know that the sum of all	· Know percentage and decimal equivalents for fractions with a denominator of 3, 5, 8 and 10	· Know how to identify alternate angles · Know how to identify	· Know that circumference = $2\pi r = \pi d$ · Know that area of a circle = πr^2	· Know how to use experimental probability to calculate expected outcomes

	· Know how to round to significant figures · Know the order of operations including powers · Know how to enter negative numbers into a calculator · Know how to measure and write bearings	probabilities for a single event is 1 · Know that $a^0 = 1$	· Know how to find a relevant multiplier when solving problems involving proportion · Know how to find and use the nth term for a linear sequence	corresponding angles · Know how to find the angle sum of any polygon · Know how to solve problems involving percentage change, including original value problems · Know how to solve linear equations with unknowns on both sides	· Know that volume of prism = area of cross-section × length · Know how to plot and interpret graphs of linear functions	· Know how to plot and interpret a scatter diagram · Know to use the midpoints of groups to estimate the mean of a set of grouped data
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	• Live assessment in the classroom • Analysis of students' written work and verbal responses • Spaced retrieval • Stage and age appropriate exam questions	• Live assessment in the classroom • Analysis of students' written work and verbal responses • Spaced retrieval • Stage and age appropriate exam questions	• Live assessment in the classroom • Analysis of students' written work and verbal responses • Spaced retrieval • Stage and age appropriate exam questions	• Live assessment in the classroom • Analysis of students' written work and verbal responses • Spaced retrieval • Stage and age appropriate exam questions	• 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	• Strategic questioning • Misconception checks	• Strategic questioning • Misconception checks	• Strategic questioning • Misconception checks	• Strategic questioning • Misconception checks	• Strategic questioning • Misconception checks
Links to key stage 2/ prior knowledge needed	· Know the meaning of a prime number · Recall prime numbers up to 50 · Understand the use of notation for powers · Know how to round to the nearest whole number, 10, 100, 1000 and to decimal places · Multiply and divide numbers by powers of 10 · Know how to identify the first	· Understand the equivalence between fractions, decimals and percentages · Compare fractions, decimals or percentages · Simplify a fraction by cancelling common factors · Know basic algebraic notation (the rules of algebra) · Simplify an expression by collecting like terms	· Understand that fractions, decimals and percentages are different ways of representing the same proportion · Convert between mixed numbers and top-heavy fractions · Write one quantity as a fraction of another · Understand and use ratio notation · Divide an amount in a given ratio · Use a term-to-term rule to	· Use angles at a point, angles at a point on a line and vertically opposite angles to calculate missing angles in geometrical diagrams · Know that the angles in a triangle total 180° · Apply the four operations to proper fractions, improper fractions and mixed numbers · Use calculators to find a percentage of an amount using multiplicative methods	· Know how to use formulae to find the area of rectangles, parallelograms, triangles and trapezia · Know how to find the area of compound shapes · Use coordinates in all four quadrants · Write the equation of a line parallel to the x-axis or the y-axis · Draw a line parallel to the x-axis or the y-axis given its equation	· Convert between fractions, decimals and percentages · Understand the use of the 0-1 scale to measure probability · Work out theoretical probabilities for events with equally likely outcomes · Know how to represent a probability · Know that the sum of probabilities for all outcomes is 1

	significant figure in any number · Approximate by rounding to the first significant figure in any number · Fluently recall and apply multiplication facts up to 12 × 12 · Know and use column addition and subtraction · Know the formal written method of long multiplication · Know the formal written method of short division · Apply the four operations with fractions and mixed numbers · Convert between an improper	· Know how to multiply a single term over a bracket · Substitute positive numbers into expressions and formulae · Calculate with negative numbers	generate a sequence · Find the term-to-term rule for a sequence · Describe a sequence using the term-to-term rule	· Identify the multiplier for a percentage increase or decrease · Use calculators to increase (decrease) an amount by a percentage using multiplicative methods · Know that percentage change = actual change ÷ original amount · Choose the required inverse operation when solving an equation · Solve linear equations by balancing when the solution is a whole number or a fraction	· Identify the lines y = x and y = -x · Draw the lines y = x and y = -x · Substitute positive and negative numbers into formulae	· Know the meaning of discrete data · Interpret and construct frequency tables · Construct and interpret pictograms, bar charts, pie charts, tables and vertical line charts · Understand the mean, mode and median as measures of typicality (or location) · Find the mean, median, mode and range of a set of data · Find the mean, median, mode and range from a frequency table

	fraction and a mixed number · Know the order of operations for the four operations and brackets · Use a protractor to measure angles to the nearest degree · Use a ruler to measure lengths to the nearest millimetre · Understand coordinates in all four quadrants · Work out a multiplier given two numbers · Understand the concept of an enlargement (no scale factor)					

Skill set development	Problem solving Mathematical reasoning Number sense Quantitative reasoning Communication Spatial sense Independence Teamwork	Problem solving Mathematical reasoning Ability to manipulate Construct logical arguments Communication Representation Information ordering Independence Teamwork	Problem solving Mathematical reasoning Quantitative reasoning Communication Representation Pattern spotting Independence Teamwork	Problem solving Mathematical reasoning Ability to manipulate Number sense Quantitative reasoning Communication Spatial sense Measurement Independence Teamwork	Problem solving Mathematical reasoning Quantitative reasoning Communication Spatial sense Measurement Representation Communication Independence Teamwork	Problem solving Mathematical reasoning Quantitative reasoning Communication Interpretation Inference Information ordering Independence Teamwork
Key Vocabulary (Tier 2/ Tier 3)	Prime Prime factor Prime factorisation Product Venn diagram Highest common factor Lowest common multiple Standard form Significant figure Negative number Directed number Improper fraction Top-heavy fraction Mixed number Operation Inverse Long multiplication	Probability Theoretical probability Event Outcome Impossible Unlikely Evens, chance Likely Certain Equally likely Mutually exclusive Exhaustive Possibility space Experiment Product Variable Term Coefficient	Fraction Mixed number Top-heavy fraction Percentage Decimal Proportion Terminating Recurring Simplify Cancel Ratio Proportion Proportional Multiplier Speed Unitary method Units Compound unit	Degrees, Right angle, Acute angle, Obtuse angle, Reflex angle Vertically opposite Geometry Geometrical Parallel Alternate angles Corresponding angles Interior angle Exterior angle Regular polygon Proper fraction, Improper fraction, mixed number Simplify, cancel,	Circle Centre Radius, diameter, chord, circumference Pi (Right) prism Cross-section Cylinder Polygon, polygonal, Solid Plot Equation (of a graph) Function Formula Linear Coordinate plane Gradient	Outcome Event Experiment Combined experiment Frequency tree Enumerate Set Venn diagram Possibility space Sample space Equally likely outcomes Theoretical probability Random Bias Fairness Relative frequency

	Short division Power Indices Roots Similar Similarity Enlarge, Enlargement Scaling Scale factor Centre of enlargement Object Image Scale drawing Bearing Plan Elevation	Common factor Factorise Power Indices Formula Formulae Subject Change the subject	Sequence Linear Term Difference Term-to-term rule Position-to-term rule Ascending Descending	lowest terms Percent, percentage Percentage change Original amount Multiplier (Simple) interest Exact Algebra, algebraic, algebraically Unknown Equation Operation Solve Solution Brackets Symbol Substitute Graph Point of intersection	y-intercept Substitute Quadratic Piece-wise linear Model Kinematic Speed Distance	Data Categorical data, Discrete data Continuous data, Grouped data Table Frequency table Frequency Histogram Scale Graph Axis, axes Scatter graph (scatter diagram, scattergram, scatter plot) Bivariate data (Linear) Correlation Positive correlation, Negative correlation Average Spread Consistency Mean Median Mode Range Statistic Statistics Approximate Round

						Calculate an estimate Grouped frequency Midpoint
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	Multiplication Numbers – prime Numbers – standard form Estimation, approximation and rounding Numbers – negative Addition Subtraction Multiplication Division BIDMAS	Decimals Fractions Percentages Probability Algebra Negative numbers Positive numbers Symbols	Numbers – F, D, P Decimals Fractions Percentages Division Multiplication Proportion Fractions Proportion Ratio Division Real-world maths Algebra	Angles Geometry Measurement Polygons Numbers – F, D, P Decimals Fractions Percentages Division Multiplication Proportion Algebra Equations	Area Circumference Perimeter Volume Geometry Measurement Algebra Cartesian coordinate systems Graphs Real-life maths	Decimals Fractions Percentages Probability Tables Data, graphs and charts Presenting data Statistical analysis Comparing data Statistical analysis

	Angles Construction Diagrams - scale Measurement Ratio and proportion Shape – 2D and 3D					
Opportunities						
Careers	Coding Encryption Scientists Astronomers Weather forecasters Bankers & analysts Physical scientists Cartographers Architecture Landscaping Pilots and Captains Civil engineers Drafters	Computer programmers Market researchers Financial analysts Sales forecasters Bookmakers Engineers Scientists Bankers Accountants Cryptologist	Nursing Pharmacists Builders Carpenters Chefs Hairdressers Stock analysts Investors Actuaries Financial managers Production managers Computer software engineers	Architects Carpenters CAD engineers Interior designers Surveyors Banking Financial managers Sales agents Retail salespersons Business managers Financial analysts Computer programmers Scientists Engineers Resource managers Construction workers	Space scientists Engineers Artists and sculptors Architects Computers graphics programmers Economists Auditors Healthcare workers Biologists	Economists Business analysts Loan officers Physicists Statisticians Research analysts Management analysts Medical researchers Educational researchers Data analyst Business analyst Data consultant Actuaries Researchers Atmospheric 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.					