MATHEMATICS CURRICULUM STATEMENT

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. The Mathematics curriculum at The Trafalgar School at Downton will provide a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

CURRICULUM INTENT – *CURRICULUM IMPACT

a. Students will develop competency and fluency for using number *so that* ***they do not fear using number to solve problems in other subjects and areas of life beyond the classroom.**

b. Students will learn the principles of algebra *so that* ***students can use logical methods and analytical thinking to solve multi part problems**.

c. Students will learn how to handle and represent data *so that* ***they can communicate and summarise information.**

d. Students will understand how to use statistics and probability *so that* ***students can interpret real life scenarios and make predictions.**

e. Students will gain an understanding of Geometry *so that* ***students can participate in designing and developing the world around us.**

CURRICULUM IMPLEMENTATION (SEQUENCING)

Terms	1	2	3	4	5	6
Yr7 Units	Algebra	Number	Number	Number/Algebra	Geometry	Numerical reasoning and Statistics
Key learning	Students learn about: Patterns and sequences (arithmetic and geometric) and how they are represented numerically, algebraically and graphically. They will develop an understanding of algebraic notation, collecting like terms and forming and solving equations and using inverse operations.	Students learn about: Place Value and ordering numbers including decimals. They will explore fraction, decimal and percentage equivalence, being able to compare, see the relationships ad move freely between them. They will be able to express one number as a fraction of another.	Students learn about: efficient methods for all operations (add, subtract, multiply and divide) in the context of solving problems relating to perimeter, money, charts and tables. They will be able to derive and apply formula including inverse operations. BIDMAS for the order of operations and calculations.	Students will continue to work with operations on fractions including addition, subtraction, fractions and percentage of amounts. Using mixed number improper fractions. Directed number and operations with negative integers, an introduction to problem solving using substitution into 2 step equations.	Students develop skills for measuring, drawing and estimating angles, constructions of regular polygons using protractors and using compasses. They will use the correct geometric language and notation to develop geometric reasoning. Pie Charts are introduced in the context of using protractors and proportion.	Students will extend their mental strategies to simplify complex calculations. Factors and Multiples will be used to look at concepts around prime numbers, LCM and HCF. They will revisit FDP in the context of sets and probability. Understanding of the probability scale, outcomes and using Venn diagrams to represent and calculate.
Assessment	End of Topic Tests	End of Topic Tests - End of term Exam	End of Topic Tests	End of Topic Tests - End of term Exam	End of Topic Test	End of Year Exam
Homework	Sparx Maths on these topics	Sparx Maths on these topics	Sparx Maths on these topics	Sparx Maths on these topics	Sparx Maths on these topics	Sparx Maths on these topics

Terms	1	2	3	4	5	6
Yr8 Units	Ratio and Proportion	Algebra /Data Handling	Algebra	Number	Geometry	Statistics/Data Handling
Key learning	Students will learn about: Ratio and proportion. Simplifying and expressing using ratio notation and the link with proportion notation. Sharing using ratio. They will learn multiplicative change through scale and direct proportion and using in context of converting currencies and problem solving. They will explore fractions in this context of dividing and multiplying.	Students will learn about working on the Cartesian plane. Using algebra to describe straight lines, gradient and intercepts. Investigate connections between sequences, number relationships and their graphical representation. Students will learn about data types, and representation in tables, grouping data, and scatter graphs/lines of best fit and correlation. We look at data tables and probability and Venn diagrams.	Students will extend their understanding of factorising and expanding expressions. They will manipulate equations and formula and use substitution, solving 2 step equations. They will explore sequences, Nth term expression and recognise both arithmetic and geometric sequences and will represent them graphically. Students will study the laws of indices.	Students will return to the topic fractions, decimals & percentages, Standard form and index notation. We continue to develop number sense and problem solving with units of measure and money.	Students will learn about the angle facts in parallel lines and polygons. They will investigate properties of shape relating to lines of symmetry, rotational symmetry and reflections. Students will explore concepts of area & perimeter of shapes and extend to including circles and trapezia.	- Students will learn to set up a statistical enquiry, to draw and interpret bar charts, pie charts and scatter graphs. To describe linear correlation, draw lines of best fit and recognise non-linear relationships. We will revisit continuous and discrete data and investigate grouped and ungrouped data sets and how we represent them. They will understand measures used to interpret data
Assessment	End of Topic Test	End of Topic Test	End of Topic Test - End of term Exam	End of Topic Test - End of term Exam	End of Topic Test	End of Year Exam
Homework	Sparx Maths on these topics	Sparx Maths on these topics	Sparx Maths on these topics	Sparx Maths on these topics	Sparx Maths on these topics	Sparx Maths on these topics

Terms	1	2	3	4	5	6
Yr9 Units	Algebra	Geometry	Number	Geometry	Ratio/Proportion	Probability / Algebra
Key learning	Students learn about straight line graphs and to interpret and find the equation of a straight line. Understanding gradient and intercepts and use with real life graphs. They will form and solve equations with unknowns on both sides and explore inequalities and substitution into and rearranging formulas.	We learn about 2D/3D shapes, prisms and their properties. Nets, plans and elevations. Area of 2D and surface area of 3D shapes, including cylinders. Volume of cubes, cuboids and prisms. We will explore construction techniques, bisecting angles and Loci. This will extend to triangles and congruency in shape.	Students will understand real and rational and irrational numbers, using surds and work with directed number, revisiting HCF and LCM, operations with fractions and standard form. We will look at percentage increase and decrease and calculator methods to solve as well as money and interest rate/tax problems	We study angles in parallel lines and angle problems looking at conjectures and reasoning with shape. Rotational symmetry in shape and the transformations of rotation, reflection and translation. Pythagoras' theorem and right angle triangles.	We start with Enlargement in the context of proportion and scale factors and explore similarity in triangles and problems with missing information. Higher students will look at ratio in the context of right-angled triangles. Direct proportion and conversion graphs /ratio problems including speed distance time and Mass density volume, rates of change and inverse proportion explored.	Understanding probability of single events an relative frequency and expected outcomes. Using diagrams and sample space to work out probability with independent events. Algebraic representation, looking at quadratic graphs and simultaneous equations. Representing inequalities.
Assessment	End of Topic Test	End of Topic Test - End of term Exam	End of Topic Test	End of Topic Test - End of term Exam	End of Topic Test	End of Year Exam
Homework	Sparx Maths on these topics	Sparx Maths on these topics	Sparx Maths on these topics	Sparx Maths on these topics	Sparx Maths on these topics	Sparx Maths on these topics

Terms	1	2	3	4	5	6
Yr10 Units	Geometry	Algebra	Statistic /Algebra	Algebra / Ratio and Proportion	Algebra and Geometry	Geometry
Key learning	Working with 2D shape: Area and perimeter of quadrilaterals and composite shapes, kites and trapezia Area and perimeter of circles and semi-circles, arcs and sectors. Transformation of shapes, including enlargements and scale factors, translation and vectors	Linear Equations and inequalities and how to solve them. Double inequalities and representing them on a number line. Simultaneous equations and solving them algebraically and graphically. Plotting linear equations and understanding gradients and intercepts. Parallel and perpendicular lines	Probability and using data to find experimental probability. Mutually exclusive events, sample space diagrams, Venn diagrams and probability trees to solve problems and calculate probabilities. Dependent and conditional probability. Sequences and nth term rules	Describing proportion using fractions and percentages. Simplifying and expressing using ratio notation and dividing quantities in a given ratio. Maps and scale ratios. Percentage increase and decrease, compound interest and depreciation. Compound measure and converting between units. Recognising proportion and inverse proportion.	Quadratic functions and equations Solving using methods including completing the square and the quadratic formula. Plotting functions and finding solutions graphically. Calculating turning points, roots and discriminant. Solving simultaneous equations with linear and quadratic functions. Pythagoras including in 3D and Trigonometric functions and equations including sine and cosine rule	Circle vocabulary and formula, Circle theorems and learning of proof. Constructions with compass and problems involving loci scale and bearings. Revision preparation
STARc Assessment	End of Topic Test	End of Topic Test - End of term Exam	End of Topic Test	End of Topic Test -End of term Exam	End of Topic Test	End of Year Exam
Homework	Sparx Maths on these topics	Sparx Maths on these topics	Sparx Maths on these topics	Sparx Maths on these topics	Sparx Maths on these topics	Sparx Maths on these topics

Terms	1	2	3	4	5	6
Yr11 Units	Number	Geometry	Data Handling/ Algebra and Graphs			
Key learning	Estimation, approximation, and using to calculate efficiently compound measures, error intervals and bounds. Factors, Powers, roots and index laws including negative and fractional. Calculating with and rationalising surds. Standards Forms	Identifying 3D shapes. Nets and use of isometric paper. Plans and elevations Volume and Surface Area of cylinders, pyramids and cones and spheres. Higher groups will look at volume and surface area of frustrum.	Sampling methods, representing data in tables and graphs including frequency & cumulative frequency tables. Measuring and comparing data averages and spread. Students will learn about the roots and turning point of quadratic graphs and recognise cubic reciprocal and exponential. Higher students will recognise trigonometry functions, graphs and equation of circle and tangents	Revision and Review		
Assessment	End of Topic Test	PPE Exam	PPE Exams	Culminates in the GCSE Exams		
Homework	Sparx Maths / Past Papers	Sparx Maths/Past Papers	Sparx Maths /Past Papers	Past Papers		

CORE KNOWLEDGE, SKILLS AND PROGRESSION MAPPING - MATHS							
CONCEPT	**INTERVENTION**	**EMERGING**	**DEVELOPING**	**MASTERING**	**EXTENDING**		**BEYOND**
Number	Students know their times tables.	Students can add and subtract integers. Students can multiply and divide integers. Students can order numbers and understand place value.	Students can add and subtract integers including negatives and decimals. Students can calculate using BIDMAS. Students can multiply and divide integers and decimals. Students can recognise different types of numbers. Prime numbers, square and cube numbers.	Students can estimate calculations using rounding. Students can check calculations. Students can convert between fractions and percentages. Students can interpret calculator displays. Students can find factors and prime factors of numbers.	Students can convert using standard form. Students can understand and use terminating decimals and fractions. Students can understand the equivalence of fractions and percentages. Students can use LCM and HCF. Students can use all four operations with fractions. Students can find fraction and percentage of amounts.	Students can calculate using standard form. Students can understand error intervals (upper and lower bounds) Students can understand index laws. Students can convert recurring decimals to fractions Students can use Surds when performing calculations. Students can use the product rule for counting. Students can find percentage increase and decrease and reverse percentages.	
Algebra	Understand algebraic notation	Students can collect positive like terms. Students can continue an arithmetic sequence. Students can plot coordinates in one quadrant.	Students can collect positive and negative like terms. Students can plot coordinates in four quadrants. Students can plot vertical and horizontal lines. Students can substitute positive values into simple expressions. Students can write position-to-term rules.	Students can collect and simplify expressions Students can continue a geometric, triangular, and cubic sequence. Students can multiply single brackets. Students can plot straight line graphs. Students can solve simple linear equations and substitute positive and negative values into expressions & formulae.	Students can apply expressions to perimeter, area, and angles. Students can change the subject of a formula. Students can expand two linear expressions. Students can factorise single brackets. Students can plot graphs of linear functions and quadratic functions. Students can plot real life graphs. Students can solve linear equations with variables on both sides. Students can simplify indices – basics and write the Nth term.	Students can derive an equation. Students understand the index laws, including fractional indices. Students can factorise quadratic expressions. Students can recognise and continue Fibonacci, quadratic and simple geometric sequences. Students can plot cubic functions and reciprocal functions. Students can solve problems with Algebraic Fractions.	Students can use algebra as methods for "Proof"

Geometry and Measures	Students can name basic shapes, squares rectangles and identify some of the properties	Students can measure lines and angles. Students can name 2D and 3D shapes. Students can identify the properties of 2D and 3D shape. Students can find the area of rectangles.	Students can find the area of triangles and parallelograms. Students can find the perimeter of 2D shapes. Students can recognise congruent shapes. Students can state the properties of triangles and quadrilaterals and use metric units. Students can construct shapes.	Students can enlarge, reflect, translate and rotate a shape. Students can find alternate & corresponding angles. Students can find the area of circles and trapezia. Students can find the circumference of a circle. Students can recognise similar 2D shapes. Students can use circle terminology and use geometrical terminology & diagrams. Students can recognise and calculate Bearings. .	Students can convert between compound measures. Students can enlarge a shape using a fractional scale factor. Students can find the area of compound shapes. Students can find the volume of prisms. Students can recognise congruent triangles. Students understand and use Pythagoras theorem. Students can recognise plans and elevations and use them to construct 3D shapes. Students can use compasses to construct shapes and angles.	Students can find arc lengths and sectors. Students can find the surface area of a 3D shape. Students can find the volume of spheres and cones. Students can enlarge shapes using negative scale factors . Students can use the properties of similar 2D and 3D shapes Students can find calculate area and volume when shapes are enlarged by scale factor. Students can apply trigonometry to right angle triangles. Students can use Pythagoras with 3D shapes. Students can use constructions skills to loci problems.	Students can use the sine and cosine rule with non-right-angle triangles. Students can find the area of a triangle using Sine. Students can use circle theorems to solve problems. Students understand vectors and can combine them with algebra to show geometric proof. Students can transform graphs. Students can plot and transform Sine and Cosine Graphs
Probability	Students understand that outcomes can be down to chance.	Students can list outcomes of events.	Students can describe probabilities using words. Students can use the probability scale.	Students can find probabilities of equally likely outcomes. Students can use frequency trees. Students can use two way tables. Students can use Venn Diagrams to work out probability	Students can find probabilities using sample space diagrams. Students can find relative frequency and theoretical probability. Students can understand mutually exclusive events.	Students can find probability using a probability tree for dependant and independent events.	
Ratio and Proportion		Students can add and subtract fractions with the same denominator. Students can convert 100%, 50%, 25%, 75% into decimals and fractions. Students can simplify fractions and ratio.	Students can compare fractions, decimals, percentages. Students can convert between mixed numbers and improper fractions. Students can express a test score as a fraction.	Students can convert standard units. Students can express one quantity as a percentage or fraction of another. Students can share in a given ratio. Students can use ratio notation. Students can use scale factors with diagrams and maps.	Students can compare lengths, areas and volumes scale factors. Students can solve problems involving ratio and fractions. Students can work out percentage changes.	Students can compare quantities as a ratio. Students can calculate gradient and the rate of change. Students can calculate growth and decay. Students can solve problems with compound units. Students can solve problems involving proportion. Students can work out scale factors and similarity. Students understand compound interest.	

| Statistics | | Students can create tally and frequency charts.
Students can draw a bar chart.
Students can draw pictograms. | Students can draw compound bar charts.
Students can draw frequency polygons.
Students can find all four averages from a list. | Students can draw and interpret pie charts.
Students can draw and interpret scatter diagrams.
Students can recognise and describe correlation.
Students can interpret two-way tables.
Students can understand types of data (continuous, discrete).
Students can draw and interpret vertical line charts. | Students can compare data using graphs.
Students can compare distributions using mean, median, mode and range.
Students can draw time series graphs.
Students can take a sample and evaluate from a population.
Students can work with grouped data and find the mean and median with classes. | Students can draw and interpret histograms with unequal class widths.
Students understand cumulative frequency and can plot a cumulative frequency graph.
Students understand quartiles and quartile range and can find the median.
Students can interpret box plots. | |