Year 10P (Foundation): Curriculum Implementation Plan

OVERVIEW				
Knowledge and Skills – Students will be taught to…	Reading, Oracy, Literacy	Formative Assessment	Summative Assessment	Link to GCSE Content
Please see individual units below.	- Reading worded questions to understand the context and decide how to approach a problem - Paired discussion of problems - Writing responses to worded questions such as "Explain why…" - Expanding vocabulary of key mathematical terms - Giving verbal responses in class question-and-answer	- Questioning in class - Self-assessment - Peer-assessment - Starter and homework questions - Mini-tests - Show of hands and other forms of whole-class feedback - Review of student work during lessons - Mini-whiteboards	Whole-class assessments towards the end of each term, based on work completed during the year to date. Full GCSE mock examination in the summer term, in preparation for Year 11.	Please see individual units below.

Mathematics – Unit 1 – Powers & Roots	
Knowledge and Skills – Students will be taught to…	Links to KS4 National Curriculum (red) & Exam board specification (blue)
- Evaluate small powers without a calculator e.g. 5^3, 2^5 - Evaluate powers using a calculator - Identify square and cube roots without a calculator e.g. $\sqrt{49}$, $\sqrt[3]{8}$, $\sqrt{400}$ - Calculate square, cube and other roots using a calculator - Use the order of operations with powers and roots - Understand and evaluate negative powers with numerical bases - Review: Understand and use the index laws for multiplication and division, including where negative powers are involved - Understand and use the index law for power 0 - Use index laws to multiply and divide algebraic terms involving higher powers and multiple variables	Calculate with roots, and with integer indices Simplify expressions, including the laws of indices N6 use positive integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 N7 calculate with roots, and with integer indices
Mathematics – Unit 2 – Ratio & Scale	
Knowledge and Skills – Students will be taught to…	Links to KS4 National Curriculum (red) & Exam board specification (blue)
- Review: Write a ratio, using ratio notation, to describe a given situation Review: Simplify a 2-part or 3-part ratio, including with different units and decimals Review: Divide a quantity into a 2-part or 3-part ratio, including where one part, or the difference, is given Review: Express a ratio in the form 1:n or m:1 - Draw/interpret accurate scale diagrams, including using map scale factors (given as ratios or e.g. 1cm represents 4km) - Plot/interpret a bearing in a scale diagram	R4 use ratio notation, including reduction to simplest form R5 divide a given quantity into two parts in a given part:part or part:whole ratio; express the division of a quantity into two parts as a ratio R2 use scale factors, scale diagrams and maps R6 express a multiplicative relationship between quantities as a ratio or a fraction G15 measure line segments and angles in geometric figures, including interpreting maps and scale drawings and use of bearings

Mathematics – Unit 3 – Brackets	
Knowledge and Skills – Students will be taught to…	Links to KS4 National Curriculum (red) & Exam board specification (blue)
• Review: Multiply out a single bracket e.g. $y(5 - 2y)$ • Review: Recognise/use like and unlike terms, including terms involving a squared variable • Review: Multiply out and simplify a double bracket, including a perfect square e.g. $(3x + 4)^2$ • Review: Factorise an expression into a single bracket e.g. $15m^2 - 10m$	A1 use and interpret algebraic manipulation, including brackets A4 simplify and manipulate algebraic expressions by multiplying a single term over a bracket and by taking out common factors A3 understand and use the concepts and vocabulary of terms and factors A4 simplify & manipulate expressions by expanding products of two binomials
Mathematics – Unit 4 – Perimeter	
Knowledge and Skills – Students will be taught to…	Links to KS4 National Curriculum (red) & Exam board specification (blue)
• Review: Work out/use the perimeter of a simple shape • Solve perimeter problems involving more than one shape (e.g. the perimeter of the triangle is 5 times the perimeter of the rectangle) • Review: Work out/use the perimeter of a compound shape, including made from more than one shape • Identify/draw further parts of a circle (tangent, chord, sector, segment, arc) • Review: Calculate/use the circumference of a circle in terms of π • Review: Calculate/use the circumference of a circle using a calculator	Identify and apply circle definitions and properties, including: centre, radius, diameter and circumference Calculate exactly with multiples of π G16 know and apply formulae to calculate area of triangles, parallelograms, trapezia G17 calculate perimeters of 2D shapes G15 measure line segments in geometric figures G14 use standard units of measure and related concepts (length, area, etc.) A5 understand and use standard mathematical formulae G17 know the formulae for circumference and area of a circle; calculate: perimeters of 2D shapes including circles, areas of circles and composite shapes G9 identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference, tangent, arc, sector and segment N8 calculate exactly with multiples of π

Mathematics – Unit 5 – Algebra	
Knowledge and Skills – Students will be taught to…	Links to KS4 National Curriculum (red) & Exam board specification (blue)
• Review: Form expressions • Review: Substitute positive and negative values into expressions, including those involving square and square root • Review: Substitute positive and negative values into a simple formula, including in context • Review: Distinguish between expressions, identities, equations and formulas • Review: identify algebraic terms	Translate simple situations or procedures into algebraic expressions A2 substitute numerical values into expressions A3 understand and use the concepts and vocabulary of expressions, equations, formulae, identities, inequalities, terms and factors A6 know the difference between an equation and an identity A21 translate simple situations or procedures into algebraic expressions A2 substitute numerical values into formulae, including scientific formulae
Mathematics – Unit 6 – Area	
Knowledge and Skills – Students will be taught to…	Links to KS4 National Curriculum (red) & Exam board specification (blue)
• Review: Calculate the area of a rectangle, triangle or parallelogram • Review: Use the area of a rectangle or triangle to find missing lengths • Review: Calculate/use the area of a trapezium • Review: Calculate the area of a compound shape • Solve area problems involving more than one shape (e.g. the area of the triangle is 5 times the area of the rectangle) • Calculate/use the area of a circle in terms of π • Calculate/use the area of a circle, using a calculator	Identify and apply circle definitions and properties, including: centre, radius, diameter and circumference Calculate exactly with multiples of π G16 know and apply formulae to calculate area of triangles, parallelograms, trapezia G14 use standard units of measure and related concepts (length, area, etc.) A5 understand and use standard mathematical formulae G17 know the formula for area of a circle; calculate: areas of circles and composite shapes G9 identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference, tangent, arc, sector and segment N8 calculate exactly with multiples of π

Mathematics – Unit 7 – Equations & inequalities	
Knowledge and Skills – Students will be taught to…	Links to KS4 National Curriculum (red) & Exam board specification (blue)
• Review: Solve a 2-step linear equation, by balancing • Review: Form and solve a linear equation in the context of perimeter • Review: Solve a linear equation involving a single bracket • Review: Solve a linear equation involving 3+ operations • Review: Solve a linear equation with the unknown on both sides • Identify an inequality represented on a number line • Draw a number line to represent a given inequality • Review: Solve a 2-step linear inequality with a positive term in the unknown	Solve linear inequalities in one variable; represent the solution set on a number line A17 solve linear equations in one unknown algebraically (including those with the unknown on both sides of the equation) N3 recognise and use relationships between operations, including inverse A1 use and interpret algebraic manipulation, including brackets A3 understand and use the concepts and vocabulary of equations and terms N1 use the symbols =, ≠, <, >, ≤, ≥ A3 understand and use the concepts and vocabulary of inequalities A22 solve linear inequalities in one variable; represent the solution set on a number line
Mathematics – Unit 8 – Solids	
Knowledge and Skills – Students will be taught to…	Links to KS4 National Curriculum (red) & Exam board specification (blue)
• Review: Identify 3D solids from 2D representations • Review: Interpret/draw plans and elevations • Review: Identify faces, straight edges and vertices • Review: Draw/complete/identify nets of simple 3D solids • Review: Calculate the surface area of cubes and cuboids • Review: Calculate the surface area of a triangular prism • Solve simple problems involving the surface area of solids	Construct and interpret plans and elevations of 3D shapes G12 identify properties of the faces, surfaces, edges and vertices of: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres G13 construct and interpret plans and elevations of 3D shapes G16 know and apply formulae to calculate: area of triangles, parallelograms, trapezia; volume of cuboids and other right prisms (including cylinders) N13 use standard units of length, using decimal quantities where appropriate G14 use standard units of measure and related concepts (length, area, etc.)

Mathematics – Unit 9 – Fractions	
Knowledge and Skills – Students will be taught to…	Links to KS4 National Curriculum (red) & Exam board specification (blue)
• Review: Convert fluently between fractions, decimals and percentages • Review: Compare two fractions with different denominators • Review: Use the four operations with fractions • Solve problems involving calculating with fractions	Calculate exactly with fractions N2 apply the four operations, including formal written methods, to simple fractions (proper and improper), and mixed numbers – all both positive and negative N8 calculate exactly with fractions N12 Interpret fractions as operators R3 express one quantity as a fraction of another where the fraction is less than 1 or greater than 1

Mathematics – Unit 10 – Angles	
Knowledge and Skills – Students will be taught to…	Links to KS4 National Curriculum (red) & Exam board specification (blue)
• Review: Calculate missing angles using the rules for angles at a point, angles on a straight line, and vertically opposite angles • Review: Calculate missing angles in triangles, including isosceles triangles • Review: Calculate missing angles in quadrilaterals • Solve angle problems by applying more than one rule • Review: Form and solve a linear equation in the context of angles	Translate simple situations into an algebraic expression; derive an equation, solve, and interpret the solution G3 apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles; derive and use the sum of angles in a triangle G6 apply angle facts and properties of quadrilaterals to conjecture and derive results about angles and sides, including the fact that the base angles of an isosceles triangle are equal A21 derive an equation, solve, and interpret the solution

Mathematics – Unit 11 – Linear Graphs	
Knowledge and Skills – Students will be taught to…	Links to KS4 National Curriculum (red) & Exam board specification (blue)
• Review: Identify/plot lines parallel the axes e.g. $x = 3$ • Review: Identify/plot the lines $y = x$ and $y = -x$ • Review: Plot a line graph of the form $y = mx + c$, including using a table of values	Recognise, sketch and interpret graphs of linear functions Use the form y = mx + c to identify parallel lines A8 work with co-ordinates in all four quadrants G11 solve geometrical problems on coordinate axes A9 plot graphs of equations that correspond to straight-line graphs

Mathematics – Unit 12 – Decimals	
Knowledge and Skills – Students will be taught to…	Links to KS4 National Curriculum (red) & Exam board specification (blue)
• Review: Compare and order positive decimals • Review: Multiply two decimals • Review: Divide by a decimal by transformation to division by an integer • Solve problems involving decimals	N1 order positive and negative decimals N13 use standard units of money, using decimal quantities where appropriate

Mathematics – Unit 13 – Statistics 1	
Knowledge and Skills – Students will be taught to…	Links to KS4 National Curriculum (red) & Exam board specification (blue)
• Criticise a data collection method • Review: Identify the mean, median, mode and range for a simple list of data • Compare two distributions using an average (mean or median) and the range • Review: Calculate the mean or total from an ungrouped table • Review: Estimate the mean or total from a grouped table • Identify the mode from an ungrouped table • Identify the modal class interval from a grouped table • Identify the range from an ungrouped table • Review: Plot points on a scatter diagram, identify the type and strength of any correlation, describe the relationship shown, identify outliers • Review: Use a line of best fit on a scatter diagram to make predictions • Review: Understand that predictions will be unreliable for values outside the range of the original data (extrapolation)	Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency (including modal class) and spread (the range) Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate graphical representation involving discrete, continuous and grouped data Use and interpret scatter graphs of bivariate data; recognise correlation and know that it does not indicate causation; draw estimated lines of best fit; make predictions; interpolate and extrapolate apparent trends, whilst knowing the dangers of so doing S4 interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency (median, mean, mode and modal class) and spread (range) S6 use and interpret scatter graphs of bivariate data; recognise correlation and know that it does not indicate causation; draw estimated lines of best fit; make predictions; interpolate and extrapolate apparent trends while knowing the dangers of so doing

Mathematics – Unit 14 – Formulae & Functions	
Knowledge and Skills – Students will be taught to…	Links to KS4 National Curriculum (red) & Exam board specification (blue)
- Review: Find numerical inputs and outputs from function machines - Review: Find algebraic inputs and outputs from function machines - Find numerical and algebraic outputs using function notation - Review: Change the subject of a simple 2-step formula, that involves the four operations	Interpret simple expressions as functions with inputs and outputs A5 rearrange formulae to change the subject A7 interpret simple expressions as functions with inputs and outputs
Mathematics – Unit 15 – Pythagoras	
Knowledge and Skills – Students will be taught to…	Links to KS4 National Curriculum (red) & Exam board specification (blue)
- Review: Use Pythagoras' theorem to find missing lengths in right-angled triangles - Review: Understand that Pythagoras' theorem only applies where the triangle is right-angled - Review: Use Pythagoras' theorem to determine whether a given triangle is right-angled - Use Pythagoras' theorem to solve a range of problems in 2D - Use Pythagoras' theorem to solve problems involving two joined triangles	Apply Pythagoras' Theorem to find lengths in right-angled triangles in 2D G6 apply angle facts to conjecture and derive results about angles and sides, including Pythagoras' theorem, and use known results to obtain simple proofs G20 know the formula for Pythagoras' theorem and apply it to find lengths in right-angled triangles in two-dimensional figures
Mathematics – Unit 16 – Multiples, Factors & Primes	
Knowledge and Skills – Students will be taught to…	Links to KS4 National Curriculum (red) & Exam board specification (blue)
- Use a calculator to evaluate complex calculations involving integers and decimals - Review: Identify odd and even numbers, multiples and factors - Review: Identify the HCF and LCM of small numbers, by listing - Review: Identify prime numbers less than 100 - Review: Explain why a given number is, or is not, prime - Review: Express a number as a product of its prime factors - Review: Use prime factor form to identify the LCM and HCF of larger numbers	N4 use the concepts and vocabulary of prime numbers, factors (divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation theorem

Mathematics – Unit 17 – Volume	
Knowledge and Skills – Students will be taught to…	Links to KS4 National Curriculum (red) & Exam board specification (blue)
- Review: Calculate the volume of cubes and cuboids - Calculate the volume of triangular prisms - Calculate the volume of cylinders - Solve context problems involving the volume of solids	G16 know and apply formulae to calculate: area of triangles, parallelograms, trapezia; volume of cuboids and other right prisms (including cylinders) N13 use standard units of length, using decimal quantities where appropriate G14 use standard units of measure and related concepts (length, area, volume/capacity, etc.)

Mathematics – Unit 18 – Rounding	
Knowledge and Skills – Students will be taught to…	Links to KS4 National Curriculum (red) & Exam board specification (blue)
- Round integers and decimals to 1 significant figure - Estimate by rounding, including when multiplying by a decimal, including in context - Decide whether an estimate is an over-estimate or under-estimate in situations where the values were all rounded up, or all rounded down - Estimate when dividing by a decimal - Review: Identify the upper bound and lower bound for a number which has been rounded to the nearest 10, 100, 1000 or nearest integer - Review: Write an error interval for a number which has been rounded to the nearest 10, 100, 1000 or nearest integer - Truncate a decimal number to a given number of decimal places	Apply and interpret limits of accuracy when rounding or truncating N15 round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures) N14 estimate answers; check calculations using approximation and estimation, including answers obtained using technology N15 use inequality notation to specify simple error intervals due to rounding

Mathematics – Unit 19 – Units & Proportion	
Knowledge and Skills – Students will be taught to…	Links to KS4 National Curriculum (red) & Exam board specification (blue)
• Convert between standard metric units of length, mass and capacity • Solve simple problems involving speed, distance and time • Plot/interpret/complete a distance-time graph, including interpreting the gradient as speed • Solve simple problems involving density • Solve simple problems in context involving direct proportion • Solve best value / best buy problems	Convert between related compound units (speed, rates of pay, prices, density, pressure) in numerical and algebraic contexts N13 use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate R1 change freely between related standard units e.g. time, length, mass, capacity G14 use standard units of measure and related concepts (length, capacity, mass, time, etc.)
Mathematics – Unit 20 – Percentage	
Knowledge and Skills – Students will be taught to…	Links to KS4 National Curriculum (red) & Exam board specification (blue)
• Calculate percentages of quantities, without a calculator • Increase/decrease a quantity by a percentage, without a calculator • Calculate percentages of quantities using a calculator and decimal multiplier • Compare two quantities using calculators • Increase/decrease a quantity by a percentage, using a calculator and decimal multiplier • Find the result of a repeated percentage change, using a calculator and multiplier • Review: Solve problems involving compound interest • Identify the percentage of a given change, profit or loss	Set up, solve and interpret the answers in growth and decay problems, including compound interest R9 define percentage as 'number of parts per hundred' R9 interpret percentages as a fraction or a decimal and interpret these multiplicatively R9 compare two quantities using percentages R9 interpret percentage changes as a fraction or a decimal, and interpret these multiplicatively; work with percentages greater than 100%; solve problems involving percentage change, including percentage increase/decrease N12 Interpret percentages as operators R9 solve problems involving percentage change and simple interest including in financial mathematics

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Mathematics – Unit 21 – Statistics 2	
Knowledge and Skills – Students will be taught to…	Links to KS4 National Curriculum (red) & Exam board specification (blue)
• Use a sample to infer properties of a population, using proportional reasoning • Interpret/complete simple bar charts and bar-line charts • Interpret comparative bar charts (side-by-side and stacked) • Construct/interpret frequency polygons • Review: Interpret/complete pictograms • Identify misleading diagrams • Review: Interpret/complete frequency trees	Infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling Apply statistics to describe a population Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate graphical representation involving discrete, continuous and grouped data Interpret and construct tables S5 apply statistics to describe a population S1 infer properties of populations or distributions from a sample, while knowing the limitations of sampling S2 interpret and construct tables, charts and diagrams, including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data, tables and know their appropriate use S4 interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate graphical representation involving discrete, continuous and grouped data
Mathematics – Unit 22 – Sequences	
Knowledge and Skills – Students will be taught to…	Links to KS4 National Curriculum (red) & Exam board specification (blue)
• Review: Identify the next term(s) in a given sequence • Review: Identify/use the term-to-term rule for a sequence • Use a position-to-term rule (nth term rule) to identify terms of a sequence • Identify the nth term of an increasing linear sequence • Identify the nth term of a decreasing linear sequence	Recognise and use simple arithmetic progressions Deduce expressions to calculate the nth term of linear sequences Recognise and use Fibonacci type sequences A23 generate terms of a sequence from a term-to-term rule and position-to-term rule A24 recognise and use simple arithmetic progressions A25 deduce expressions to calculate the nth term of linear sequences A24 recognise and use Fibonacci type sequences

Mathematics – Unit 23 – Probability	
Knowledge and Skills – Students will be taught to…	Links to KS4 National Curriculum (red) & Exam board specification (blue)
- Review: Understand/use the 0-1 probability scale - Review: Identify a theoretical probability e.g. from a spinner - Use experimental data to identify relative frequencies and make predictions of theoretical probability - Calculate the expected outcomes of a probability experiment - Use a Venn diagram to identify theoretical probabilities - Use a two-way table to identify theoretical probabilities - Use a frequency tree to identify theoretical probabilities - List a sample space and use it to identify theoretical probabilities - Construct/use a sample space diagram - Find a missing probability in a table of numerical probabilities	Use a probability model to predict the outcomes of future experiments; understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size Apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one P3 relate relative expected frequencies to theoretical probability, using appropriate language and the 0-1 probability scale P5 understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size P2 apply ideas of randomness, fairness and equally likely events to calculate expected outcomes of multiple future experiments P4 apply the property that the probabilities of an exhaustive set of outcomes or mutually exclusive events sum to one P7 construct theoretical possibility spaces for single and combined experiments with equally likely outcomes and use these to calculate theoretical probabilities