Subject :	Maths		Year Group:

Scheme title	Half term 1 - September	Half term 2 - October	Half term 3 - January
Purpose of scheme	To develop fluency, problem solving and reasoning skills across the 6 key areas of number, algebra, geometry and measures, statistics, probability and ratio and proportion	To develop fluency, problem solving and reasoning skills across the 6 key areas of number, algebra, geometry and measures, statistics, probability and ratio and proportion	To develop fluency, problem solving and reasoning skills across the 6 key areas of number, algebra, geometry and measures, statistics, probability and ratio and proportion
Skills	Teacher 1: Algebra • Proof - Understand and use the structure of mathematical proof, proceeding from given assumptions through a series of logical steps to a conclusion; use methods of proof, including proof by deduction, proof by exhaustion. Disproof by counter example. • Algebraic expressions • Laws of indices - Understand and use the laws of indices for all rational exponents. • Surds - Use and manipulate surds, including rationalising the denominator. • Remainder and Factor Theorem • Algebraic division Inequalities and Simultaneous equations • Inequalities - Solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically, including inequalities with brackets and fractions. Express solutions through correct use of 'and' and 'or', or through set notation. Represent linear and quadratic inequalities such as y > x + 1 and graphically. • Simultaneous Equations - Solve simultaneous equations in two variables by elimination and by substitution, including one linear and one quadratic equation. Teacher 2: Quadratics and Cubics • Quadratic Equations – Manipulate polynomials algebraically, including expanding brackets and collecting like terms, factorisation and simple algebraic division; use of the factor theorem. • Quadratic Functions and Roots - Work with quadratic functions and their graphs; the discriminant of a quadratic function, including the conditions for real and repeated roots; completing the square; solution of quadratic equations including solving quadratic equations in a function of the unknown. • Quadratic Graphs - Understand and use graphs of functions; sketch curves defined by simple equations including polynomials, the modulus of a linear function, and (including their vertical and horizontal asymptotes); interpret algebraic solution of equations graphically; use intersection points of graphs to solve equations. • Understand and use proportional relationships and their graphs. • Factorising Cubics The Binomial Expansion • Binomial Expansions - Understand and use the binomial expansion of for positive integer n; the notations n!, nCr and ; link to binomial probabilities.	Teacher 1: Co-ordinate geometry, Graphs and Circles • The Equation of a Straight Line - Understand and use the equation of a straight line, including the forms and ax + by + c = 0; gradient conditions for two straight lines to be parallel or perpendicular. • Be able to use straight line models in a variety of contexts. • Parallel and Perpendicular Lines and proportion • Curve Sketching and Graph Transformations - Understand the effect of simple transformations on the graph of y = f(x) including sketching associated graphs: y = af(x) , y = f(x) + a , y = f(x + a) , y = f(ax), • Circles - Understand and use the coordinate geometry of the circle including using the equation of a circle in the form ; completing the square to find the centre and radius of a circle; use of the following properties: he angle in a semicircle is a right angle • the perpendicular from the centre to a chord bisects the chord • the radius of a circle at a given point on its circumference is perpendicular to the tangent to the circle at that point. Teacher 2: Trigonometry • The Sine and Cosine Rules - Understand and use the definitions of sine, cosine and tangent for all arguments; the sine and cosine rules; the area of a triangle in the form • Trig Identities - Understand and use Understand and use ; • Trig Graphs - Understand and use the sine, cosine and tangent functions; their graphs, symmetries and periodicity. Solving Trig Equations - Solve simple trigonometric equations in a given interval, including quadratic equations in sin, cos and tan and equations involving multiples of the unknown angle. Exponentials and Logarithms • Exponentials - Know and use the function and its graph, where a is positive. . Know and use the function and its graph. . Know that the gradient of is equal to and hence understand why the exponential model is suitable in many applications. • Logarithms - Know and use the definition of as the inverse of , where a is positive and . Know and use the function Lnx and its graph. Know and use lnx as the inverse function of . • Laws of Logarithms - Understand and use the laws of logarithms: , • Solving Equations - Solve equations of the form • Modelling Exponential Growth and Decay - Understand and use exponential growth and decay; use in modelling (examples may include the use of e in continuous compound interest, radioactive decay, drug concentration decay, exponential growth as a model for population growth); consideration of limitations and refinements of exponential models • Using Logarithmic Graphs - Use logarithmic graphs to estimate parameters in relationships of the form and , given data for x and y, and .	Teacher 1: Differentiation • The Gradient of a Curve - Understand and use the derivative of f(x) as the gradient of the tangent to the graph of y = f(x) at a general point (x, y); the gradient of the tangent as a limit; interpretation as a rate of change; sketching the gradient function for a given curve; second derivatives; differentiation from first principles for small positive integer powers of x • Differentiating y = f(x) – Differentiate , for rational values of n, and related constant multiples, sums and differences. • Second Order Derivatives - Understand and use the second derivative as the rate of change of gradient; • Derivatives of Graphs - Apply differentiation to find gradients, tangents and normals, maxima and minima and stationary points, • Identify where functions are increasing or decreasing. Real Life Problems Integration • Indefinite Integration - Know and use the Fundamental Theorem of Calculus. • Definite Integration - Integrate (excluding n = –1), and related sums, differences and constant multiples. • Evaluate definite integrals; use a definite integral to find the area under a curve Teacher 2: Vectors • Vectors - Use vectors in two dimensions • Calculating with Vectors - Calculate the magnitude and direction of a vector and convert between component form and magnitude/direction form. • Add vectors diagrammatically and perform the algebraic operations of vector addition and multiplication by scalars, and understand their geometrical interpretations. • Understand and use position vectors; calculate the distance between two points represented by position vectors. • Use vectors to solve problems in pure mathematics and in context, including forces • Modelling with Vectors Kinematics • Motion Graphs - Understand and use the language of kinematics: position; displacement; distance travelled; velocity; speed; acceleration. • Constant Acceleration Equations - Understand, use and interpret graphs in kinematics for motion in a straight line: displacement against time and interpretation of gradient; velocity against time and interpretation of gradient and area under the graph. • Non-Uniform Acceleration - Understand, use and derive the formulae for constant acceleration for motion in a straight line;
Key Words	Proof Counter example Surds Indices Rationalise Denominator Quadratic Roots Proportional Inequalities Binomial Probability	Parallel Perpendicular Transformation Bisect Chord Set notation Simultaneous Geometry Sine Cosine Trigonometry Symmetries Periodicity Modelling Exponential Logarithm Function Growth Decay	Vector Magnitude Context Geometrical Modelling Forces Direction Gradient Rational Tangent Interpretation Decreasing Increasing Normals Maxima Minima Differential Integration Kinematics Motion Displacement Velocity Speed Acceleration Derive
End Point	Students are able to understand and apply the skills identified above.	Students are able to understand and apply the skills identified above.	Students are able to understand and apply the skills identified above.
Assessment method	After each topic in bold (listed opposite), students complete a mini assessment. This may be done as part of home learning and sometimes done in class in test conditions. This is then teacher marked and recorded on the central tracking spreadsheet to inform progress and intervention. Students complete full A level assessments in line with the AQA specification at progress points in the year in line with the school calendar. Assessments are cumulative and grade boundaries reflect actual A Level Maths grade boundaries	After each topic in bold (listed opposite), students complete a mini assessment. This may be done as part of home learning and sometimes done in class in test conditions. This is then teacher marked and recorded on the central tracking spreadsheet to inform progress and intervention. Students complete full A level assessments in line with the AQA specification at progress points in the year in line with the school calendar. Assessments are cumulative and grade boundaries reflect actual A Level Maths grade boundaries	After each topic in bold (listed opposite), students complete a mini assessment. This may be done as part of home learning and sometimes done in class in test conditions. This is then teacher marked and recorded on the central tracking spreadsheet to inform progress and intervention. Students complete full A level assessments in line with the AQA specification at progress points in the year in line with the school calendar. Assessments are cumulative and grade boundaries reflect actual A Level Maths grade boundaries

Half term 4 - February	Half term 5 - April
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Teacher 1: Sampling, Data Presentation and Interpretation • Population Sampling - Understand and use the terms 'population' and 'sample'. Use samples to make informal inferences about the population. • Understand and use sampling techniques, including simple random sampling and opportunity sampling. • Select or critique sampling techniques in the context of solving a statistical problem, including understanding that different samples can lead to different conclusions about the population. • LARGE DATA SET LESSON - Sampling • Representing Data - Interpret diagrams for single-variable data, including understanding that area in a histogram represents frequency. • Location: Mean, Median and Mode - Interpret measures of central tendency and variation, extending to standard deviation. Be able to calculate standard deviation, including from summary statistics. • LARGE DATA SET LESSON – Ungrouped/Grouped Data • Dispersion - Recognise and interpret possible outliers in data sets and statistical diagrams. • Select or critique data presentation techniques in the context of a statistical problem. • Be able to clean data, including dealing with missing data, errors and outliers. • LARGE DATA SET LESSON – Grouped Data • Correlation and Regression - Interpret scatter diagrams and regression lines for bivariate data, including recognition of scatter diagrams which include distinct sections of the population (calculations involving regression lines are excluded). • Understand informal interpretation of correlation. • Understand that correlation does not imply causation. • LARGE DATA SET LESSON – Time Series Teacher 2: Forces and Newton's Law • Understanding Units - Understand and use fundamental quantities and units in the SI system: length, time, mass. Understand and use derived quantities and units: velocity, acceleration, force, weight, • Use calculus in kinematics for motion in a straight line: • Models and Mechanics - Understand and use Newton's second law for motion in a straight line (restricted to forces in two perpendicular directions or simple cases of forces given as 2D vectors); • Forces - Understand the concept of a force; understand and use Newton's first law. • Newton's Law of Motion - Understand and use weight and motion in a straight line under gravity; gravitational acceleration, g, and its value in SI units to varying degrees of accuracy. • (The inverse square law for gravitation is not required and g may be assumed to be constant, but students should be aware that g is not a universal constant but depends on location.) • Understand and use Newton's third law; equilibrium of forces on a particle and motion in a straight line (restricted to forces in two perpendicular directions or simple cases of forces given as 2D vectors); application to problems involving smooth pulleys and connected particles;	Teacher 1: Probability • Elementary Probability - Understand and use mutually exclusive and independent events when calculating probabilities. • Link to discrete and continuous distributions. • Solving Probability Problems • Laws of Probability Statistical Distributions • Probability Distributions - Understand and use simple, discrete probability distributions (calculation of mean and variance of discrete random variables is excluded), including the binomial distribution, as a model; calculate probabilities using the binomial distribution. • Binomial Distributions • The Binomial Cumulative • Modelling Real Problems Statistical Hypothesis Testing • Hypothesis Testing - Understand and apply the language of statistical hypothesis testing, developed through a binomial model: null hypothesis, alternative hypothesis, significance level, test statistic, 1-tail test, 2-tail test, critical value, critical region, acceptance region, p-value; • Hypothesis Tests for Binomial Distribution - Conduct a statistical hypothesis test for the proportion in the binomial distribution and interpret the results in context. • Understand that a sample is being used to make an inference about the population and appreciate that the significance level is the probability of incorrectly rejecting the null hypothesis. Teacher 2: Support catch up work where needed and focus on revision with a specific link to the January QLA assessment: • Alpha Books 1-3 • Integral Revision and Summary Sheets: https://integralmaths.org/ This has a wealth of resources for both maths and further maths including student access to videos. Please see our website list for the latest login details. • Practice Exam Papers from AQA and CGP • Materials from the Resource Bank on T drive: T:\bec\Curriculum.Enrichment.Inclusion\Curriculum\Maths and Computer Science\Maths\Curriculum and SOW NEW\Sixth Form\RESOURCE BANK • Websites such as Maths and Physics Tutor, Mr Barton and Integral Maths • Make use of the CGP A Level Maths Revision Guide available from SFO • Use of knowledge organisers
Sampling Interpretation Single variable Correlation Causation Units Force Motion Models Mechanics Equilibrium Perpendicular	Probability Independent Discrete Continuous Laws Probability Cumulative Modelling Hypothesis Critical value Critical region Binomial Significance Null hypothesis Alternate hypothesis
Students are able to understand and apply the skills identified above.	Students are able to understand and apply the skills identified above.
After each topic in bold (listed opposite), students complete a mini assessment. This may be done as part of home learning and sometimes done in class in test conditions. This is then teacher marked and recorded on the central tracking spreadsheet to inform progress and intervention. Students complete full A level assessments in line with the AQA specification at progress points in the year in line with the school calendar. Assessments are cumulative and grade boundaries reflect actual A Level Maths grade boundaries	After each topic in bold (listed opposite), students complete a mini assessment. This may be done as part of home learning and sometimes done in class in test conditions. This is then teacher marked and recorded on the central tracking spreadsheet to inform progress and intervention. Students complete full A level assessments in line with the AQA specification at progress points in the year in line with the school calendar. Assessments are cumulative and grade boundaries reflect actual A Level Maths grade boundaries