A Level Mathematics Aims at KS5

A Level Mathematics provides a framework within which students continue the subject beyond GCSE (9–1). It supports their mathematical needs across a broad range of subjects at this level and provides a basis for subsequent quantitative work in a very wide range of higher education courses and in employment. A Level Mathematics builds from GCSE (9–1) level mathematics and introduces calculus and its applications. It emphasises how mathematical ideas are interconnected and how mathematics can be applied to model situations using algebra and other representations, to help make sense of data, to understand the physical world and to solve problems in a variety of contexts, including social sciences and business. It prepares students for further study and employment in a wide range of disciplines involving the use of mathematics.

Teacher A (Mechanics)

	Content	Skills	Rationale / Link to NC
Unit 2 Quadratic Functions HT1 Weeks 1-3	Quadratic Graphs and Equations, Completed square form, Quadratic Formula.	See SOW objectives column	This unit build on work covered at GCSE and is a useful skill for all further work at A Level. It a prerequisite for units 9, 10 and 20.
Unit 3 Equations and Inequalities HT1 Weeks 4	Simultaneous Equations, Inequalities.		Again, this work build on GCSE studies and provides useful skills for further work at A Level.
Unit 6 Polynomials HT1 Weeks 6-7	Expressions, Dividing polynomials, equations.		The first part builds on GCSE work but quickly moves on to multiply and more importantly dividing polynomials and its use in the factor theorem.
Unit 18 Kinematics HT2 Weeks 8-10	Speed, velocity, acceleration, graphs, formulae.		Students are introduced to this topic at GCSE and this unit reinforces work completed there. There is more emphasis on real life applications of suvat equations, including the use of simultaneous equations to solve problems.

Unit 11 Vectors HT2 Weeks 11-12	Working with Vectors, Vector Geometry.		Vectors was initially introduced at GCSE and this topic is designed to build on the concepts learnt there. It serves as a topic which is necessary for looking at forces and N2L in unit 19. It also serves as a prerequisite for work done in further maths.
Unit 19 Forces and Newton's Law of motion HT3 Weeks 13-17	Force diagrams, forces and motion, pulleys, Newton's Second Law.		Building on work completed in Unit 11, initially this topic builds on statics and looks at the ideas of equilibrium and resolving forces. It also serves at an introduction to N2L in 1 dimension. It is further built upon in Y13.
Unit 9 Differentiation HT4 Weeks 18-23	Gradient of a tangent, tangents and normals, turning points, higher order derivatives, practical problems, first principles		This is students' first introduction to differentiation; they should be aware of how to calculate the gradient of a curve by drawing tangents. This is a fundamental unit upon which so much of Y13 work in maths and further maths is dependent.
Unit 10 Integration HT5 Weeks 24-26	Finding areas, areas below x axis, further integration		Following differentiation, integration is the next logical step. It looks at how to calculate areas under a curve, areas between curves and positive and negative areas. It is a fundamental topic that has application in a wide range of areas such as differential equations and kinematics.
Unit 20 Variable Acceleration HT5 Weeks 27	Using differentiation, using integration, constant acceleration formulae.		A first introduction to variable acceleration is introduced here to build on skills that have been taught in units 9 and 10 of differentiation and integration. This has many area of application in physics.

Teacher B (Statistics)

Unit 1 Surds and Indices HT1 Weeks 1-2	Manipulation of surds, Working with indices.		This is a unit which builds on the techniques introduced at GCSE. It serves as a fundamental skill which is needed in other areas such as quadratic equations.
Unit 5 Trigonometry HT1 Weeks 3-6	Functions, triangles and trigonometric equations.		This topic builds on work covered at GCSE and introduces solving trigonometrical equations which have application to real life problems as well as a prerequisite for further work in Year 13.

Unit 13 Data Collection HT1 Weeks 7	Using statistics, sampling.		An introduction to data collection techniques often used in other subject areas such as Geography and social sciences.
Unit 14 Data, processing, presentation and interpretation HT2 Weeks 8-12	Presenting data, Discrete and continuous numerical data, bivariate data, standard deviation.		This work continues from unit 13. This topic introduces the idea of types of data and calculations using the statistical mode of a calculator. It is a prerequisite for much statistical work.
Unit 7 Graphs and Transformations HT2 Weeks 13-14	Shapes of curves, transformation of curves.		This topic looks at transformations of curves of both quadratic and trigonometric functions.
Unit 8 Binomial Expansions HT2 Weeks 15	Binomial expansions, selections.		Introduction to binomial expansions using algebra, also looking at permutations and combinations; this is a prerequisite for Unit 16.
Unit 15 Probability HT3 Weeks 16	Working with probability.		Probability builds on work from GCSE level and looks at mutually exclusive and exhaustive events. It is a prerequisite for binomial distributions and hypothesis testing.
Unit 16 The binomial distribution HT3 Weeks 17-18	Introduction to binomial, using the binomial distribution.		This unit builds on unit 8, binomial, and further develops the idea of using a distribution to calculate a probability.
Unit 4 Co-ordinate Geometry HT4 Weeks 19-20	Equations of a straight line, intersection of two lines and a line and a curve. Circles.		Work here build on topics studied at GCSE and is introduced at the same time as differentiation from Teacher A. This provides useful skills for geometric problem solving.
Unit 17 Statistical Hypothesis Testing HT4 Weeks 20-21	One and two tailed tests using the binomial. Critical regions.		This is students' first introduction to hypothesis testing. The topic looks at how to form a null and alternative hypothesis and how to accept or reject. This build further in Year 13 with normal distributions.

Unit 12 Exponentials and Logarithms HT5 Weeks 26-30	Exponential and logarithms functions. The natural log and e functions. Modelling curves		The use of exponential and logs occurs in many real life applications such as measuring the strength an earthquake using the Richter Scale. The use of ln(x) and e^x is introduced as a prerequisite for further differentiation and integration. Modelling curves has application in science.