Overall Curriculum Aim:

To develop all students as creative mathematicians who can apply, reason, question, challenge and be successful.

Scheme for Learning

Curriculum Area – Maths

Overview – Year 10 Maths (Higher) 2021-22

Personnel Responsibility – Mr D Albon (Curriculum Director)

Quality Assured by – Chris Mills (VP)

Exam Board/Qualification at KS4 – Edexcel 1MA1

Assessment Cycle	Topic/Unit Title – *Big Question*	Rationale/Skill Development	Link to Assessment Objectives/Progression Scales Skills The following areas will be assessed
1	How can an equation have a shape?	Students will explore the connection between equations and their graphical representations, which is an often poorly understood but essential concept. Students will consolidate their basic algebra skills before applying them to problems involving linear and nonlinear functions. Throughout this cycle students will be directed represent problems graphically as much as possible to encourage a deeper understanding of how features of equations affect the shape of their graph. There will be a particular emphasis on quadratic functions, as these have such a wide variety of applications.	***Consolidating basic algebra skills and linking to graphical representations*** • Revisiting basic algebra skills such as simplifying, substitution, expanding, factorising, solving linear equations and rearranging formulae. • Understanding the equation of a straight line graph. • Using a range of strategies to solve quadratics and sketching their graphs. • Solving linear and nonlinear simultaneous equations, including circles.
2	How exact can mathematicians be?	Students will gain an appreciation of the practical nature of mathematics and when different levels of precision and accuracy are appropriate. The aim is to create mathematicians who can sensibly interpret their solutions in the context of a problem, rather than blindly using levels of precision that do not correspond to the accuracy of their solutions. They will be directed to use exact representations for recurring decimals (fractions) and irrational numbers (surds, π etc.) to enable accurate calculations. This will be essential for Cycle Three, in which they will need to use irrational numbers within multi-step area and volume problems. They will also explore the limitations of the values used in 'real world' calculations by calculating error intervals and bounds. They will apply this understanding to finding approximate solutions to equations by iteration.	***Applying number and algebra skills to topics involving accuracy and precision*** • Understanding the difference between rational and irrational numbers, as well as the other subsets of the set of real numbers. • Using index laws and standard form. • Simplifying and manipulating surds. • Solving linear and quadratic inequalities and identifying regions. • Calculating error intervals and bounds. • Solving equations by iteration.
3	What makes a shape unique?	Students will develop their understanding of geometry. They will focus on improving their fluency in angle facts, as well as area and volume formulae and the properties of 2D and 3D shapes. Using this knowledge, students will also use their algebra skills to solve a range of geometry problems. There will be a strong literacy focus due to the large amount of terminology student need to learn, and the angle problems require students to give detailed reasons for their answers, in which case they will be required to write in full, coherent sentences.	***Consolidating various geometry skills*** • Properties of 2D shapes including angle facts. • Finding missing angles on parallel lines and give complete reasons. • Finding the area of 2D shapes including circles and compound shapes. • Finding the volume of prisms, including cylinders and composite solids. • Transforming shapes and describing transformations.
4	Can algebra describe everything?	Students will gain an appreciation of algebra as a powerful tool that can be employed to solve problems in just about any topic, rather than seeing it as a stand-alone area of mathematics. Students will revisit familiar topics such as ratio and proportion, probability, and percentages, but attempt much harder problems that often lend themselves to an algebraic approach. Many of these problems will require a high level of fluency in algebraic methods, and particularly in dealing with algebraic fractions, so this will be taught early in the cycle. Students will also explore the different types of sequences and will especially see that compound interest, depreciation, exponential growth/decay, are in essence the same thing: geometric progressions, which can of course be described algebraically.	***Applying advanced algebra skills to a range of other topics*** • Expressing proportional relationships algebraically. • Plotting and identifying the graphs of cubic, reciprocal, and exponential equations. • Manipulating algebraic fractions. • Solving advanced probability problems algebraically. • Using a range of techniques, including algebra, to solve ratio problems. • Understand the algebraic representations of linear, quadratic, and geometric sequences and recognise Fibonacci sequences. • Represent compound interest and other exponential growth/decay algebraically.