MATHEMATICS

Year 13

What are the aims and intentions of this curriculum?

The aim of our Key Stage 5 Curriculum is to help students to understand mathematics and mathematical processes in a way that promotes confidence, fosters enjoyment and provides a strong foundation for progress to further study. Students will learn to use the mathematical knowledge gained to make logical and reasoned decisions in solving problems both within pure mathematics and in a variety of contexts, and communicate the mathematical rationale for these decisions clearly.

Term	Topics	Knowledge and key terms	Skills developed	Assessment
Autumn 1	Y2 Pure – Functions & Graphs Y2 Pure – Radian Measures Y2 Pure – Trigonometry Y2 Pure – Further Trigonometry	• Modulus function • Functions and Function notation • Range and mapping diagrams • Composite functions • Inverse function • Combinations of transformations • Solving modulus problems • Radian Measure • Length of an arc • Area of a sector & segment • Solving equations • Small angle approximations • Sec, cot and cosec functions and their graphs • Simplifying using sec, cosec and cot • Other Pythagorean identities • Using inverse trig graphs • Additional formula • Double angle formula • Rcosθ and Rsinθ • Solving using these	**A01: Use and apply standard techniques** Learners should be able to: ● select and correctly carry out routine procedures; and ● accurately recall facts, terminology and definitions **AO2: Reason, interpret and communicate mathematically** Learners should be able to: ● construct rigorous mathematical arguments (including proofs); ● make deductions and inferences; ● assess the validity of mathematical arguments; ● explain their reasoning; and ● use mathematical language and notation correctly. **A03: Solve problems within mathematics and in other contexts** Learners should be able to: ● translate problems in mathematical and non-mathematical contexts into mathematical processes; ● interpret solutions to problems in their original context, and, where appropriate, evaluate their accuracy and limitations; ● translate situations in context into mathematical models; ● Use mathematical models; and ● evaluate the outcomes of modelling in context, recognise the limitations	Topic Tests Maths watch End of term Assessments

	Statistics – Normal distribution Statistics – Hypothesis testing/regression	• Normal distribution •Find probabilities for a normal distribution • Inverse Normal distribution function • Standard Normal distribution • Finding μand σ • Approximating a binomial distribution •Hypothesis testing with the Normal distribution • Connecting variables • Independent and dependant variables • Scatter graphs • Modelling using a regression line • Exponential models • Hypothesis testing for zero correlation		
Autumn 2	Y2 Pure – Parametric equation Y2 Pure – Differentiation Mechanics – Moments	• Converting parametric equations into Cartesian equations • Differentiating sinx, cosx • Differentiating exponentials and Logarithms • Differentiation Rules (chain/product/ quotient) • Implicit differentiation • Differentiating functions given parametrically • Connected Rates of Change • Moments • Resultant moments • Equilibrium/Centres of mass • Tilting	**A01: Use and apply standard techniques** Learners should be able to: ● select and correctly carry out routine procedures; and ● accurately recall facts, terminology and definitions **AO2: Reason, interpret and communicate mathematically** Learners should be able to: ● construct rigorous mathematical arguments (including proofs); ● make deductions and inferences; ● assess the validity of mathematical arguments; ● explain their reasoning; and ● use mathematical language and notation correctly. **A03: Solve problems within mathematics and in other contexts** Learners should be able to: ● translate problems in mathematical and non-mathematical contexts into mathematical processes; ● interpret solutions to problems in their original context, and, where appropriate, evaluate their accuracy and limitations; ● translate situations in context into mathematical models; ● Use mathematical models; and	Topic Tests Maths watch End of term Assessments

	Mechanics – Forces & Friction Mechanics – Projectiles	• Resolving • Inclined planes • Friction • Horizontal projection • Horizontal & vertical components • Projection at any angle • Projectile motion formulas	● evaluate the outcomes of modelling in context, recognise the limitations	
Spring 1	Y2 Pure – Numerical methods Y2 Pure – Integration Y2 Pure – Exponentials and Logs Y2 Pure – Vectors	• Iteration • Approximate roots • Newton Raphson method • Applications to modelling • Reverse chain rule • Using trig functions • Using partial fractions • Integration by substitution • Integration by parts • Numerical Integration • Volumes of revolution • Differential equations •Areas under curves given parametrically • Introduction to graphs • And inverse function log •Differentiation and integration of exponen tials • Arithmetic and unit vector • Describe points in 2 or 3 dimensions • Cartesian components (up to 3D) • Scalar products • Equation of a vector • Intersecting straight line vectors • Angles between two vectors	**A01: Use and apply standard techniques** Learners should be able to: ● select and correctly carry out routine procedures; and ● accurately recall facts, terminology and definitions **AO2: Reason, interpret and communicate mathematically** Learners should be able to: ● construct rigorous mathematical arguments (including proofs); ● make deductions and inferences; ● assess the validity of mathematical arguments; ● explain their reasoning; and ● use mathematical language and notation correctly. **A03: Solve problems within mathematics and in other contexts** Learners should be able to: ● translate problems in mathematical and non-mathematical contexts into mathematical processes; ● interpret solutions to problems in their original context, and, where appropriate, evaluate their accuracy and limitations; ● translate situations in context into mathematical models; ● Use mathematical models; and ● evaluate the outcomes of modelling in context, recognise the limitations	Topic Tests Maths watch End of term Assessments

	Mechanics – Applications of forces Mechanics – Further Kinematics	• Static particles • Modelling with statics • Friction • Static rigid bodies • Dynamics& inclined planes • Connected particles • Vectors in Kinematics • Vector methods with projectiles • Variable acceleration in 1D • Differentiating vectors • Integrating vectors		
Spring 2	REVISION			
Summer 1	REVISION			