Bishop Stopford's School

Curriculum Map Year 12

	Autumn 1		Autumn 2		Spring 1		Spring 2			Summer 1		Summer 2	
	Pure 1	Mechanics 1	Pure 1	Mechanics 1	Pure 1	Mechanics 1	Pure 1	Statistics 1	Pure 2	Mechanics / Statistics 1	Pure 2	Mechanics 2

Unit of work

Pure 1	Mechanics 1	Pure 1	Mechanics 1	Pure 1	Mechanics 1	Pure 1	Statistics 1	Pure 2	Statistics 1	Pure 2	Mechanics 2
1. Algebra and functions 4. Trigonometry Part 1	6. Quantities and units in mechanics	2. Coordinate geometry in the (x, y) plane 4. Trigonometry Part 2 5. Vectors	7. Kinematics 1 (constant acceleration)	3. Further Algebra 6. Differentiation 7. Integration	8. Forces & Newton's laws	8. Exponentials and logarithms Revisit gaps on Year 1 and practice exam papers	9. Kinematics 2 (variable acceleration)	1. Statistical sampling 2. Data presentation and interpretation 3. Probability	1. Proof 2. Algebraic and partial fractions Interleaving topics from AS	Revisit gaps on Year 1 and practice exam papers	4. Statistical distributions 5. Statistical hypothesis testing	3. Functions and modelling 6. Trigonometry	Moments

Core Skills

Collecting like terms and factorising; Surds; Solving linear simultaneous equations; Solving quadratic equations (by factorising and completing the square); Working with inequalities; Solving quadratic inequalities; Functional notation and shapes of standard graphs; Rules of indices; Simultaneous equations; Completing the square; Quadratics; Graph transformations

Change freely between related standard units (e.g. time, length, area, volume/capacity, mass) and compound units (e.g. speed, rates of pay, prices, density, pressure) in numerical and algebraic contexts; Use compound units such as speed, rates of pay, unit pricing, density and pressure; Plot and interpret graphs (including reciprocal graphs and exponential graphs) and graphs of non-standard functions in real contexts to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration; Calculate or estimate gradients of graphs and area under graphs

Basic algebraic manipulation; Quadratics; Graph transformations; Simultaneous equations; Completing the square; Basic algebraic manipulation; Quadratics; Graph transformations; Surds

Change freely between related standard units (e.g. time, length, area, volume/capacity, mass) and compound units (e.g. speed, rates of pay, prices, density, pressure) in numerical and algebraic contexts; Use compound units such as speed, rates of pay, unit pricing, density and pressure; Substitute numerical values into formulae and expressions, including scientific formulae; Understand and use standard mathematical formulae;

Factorising quadratics; Notation; Solving quadratics; Coordinate geometry; Proof; Function notation; Indices; Algebraic manipulation

Modelling and definitions/assumptions from the introduction in Unit 6; Solve two simultaneous equations in two variables (linear/linear or linear/quadratic) algebraically; find approximate solutions using a graph; Vectors in 2D

Indices; Compound interest

Identify and interpret roots, intercepts, turning points of quadratic functions graphically; deduce roots algebraically and turning points by completing the square A14 Plot and interpret graphs (including reciprocal graphs and exponential graphs) and graphs of non-standard functions in real contexts to find approximate solutions to problems such as simple kinematic problems

Sampling; Tables, charts and diagrams, including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data and know their appropriate use; Histograms with equal and unequal class intervals and cumulative frequency graphs, and know their appropriate use; Interpret, analyse and compare the distributions of data set; Scatter diagrams and line of best fit; Record, describe and analyse the frequency of outcomes of probability experiments using tables and frequency trees; Relative expected frequencies and

AS Proof; Algebraic fractions AS; Algebraic division, factor theorem

Order positive and negative integers, decimals and fractions; use the symbols =, ≠, <, >, ≤, and ≥; An understanding of how to calculate binomial probabilities and using samples from populations from previous units

Vocabulary and f(x) notation for functions; Composite, inverse and transformations of polynomial functions; Knowledge of polynomial, trigonometric, exponential and logarithmic functions, including their graphs AS; Transforming graphs; Sine and cosine function; Length of arc and area of sector; Algebraic division, factor theorem; Solving trigonometric equations (sin² x+cos²x=1 and (sin x)/(cos x)=tan x; Properties of graphs of y = sin x, y = cos x and y = tan x

Solving linear and simultaneous equations; Basic equilibrium

Core knowledge

Pure 1	Mechanics 1		Pure 1	Mechanics 1	Pure 1	Mechanics 1	Pure 1	Mechanics 1	Statistics 1	Pure 2	Mechanics 1	Statistics 1	Pure 2	Mechanics 2

Algebraic expressions; Quadratic functions; Equations; Graphs; Transformations; Trigonometric ratios and graphs

Introduction to mathematical modelling and standard S.I. units of length, time and mass; Definitions of force, velocity, speed, acceleration and weight and displacement; Vector and scalar quantities

Trigonometric identities and equations; Straight-line graphs; Circles

Graphical representation of velocity, acceleration and displacement; Motion in a straight line under constant acceleration; suvat formulae for constant acceleration; Vertical motion under gravity

Algebraic division, factor theorem and proof; The binomial expansion; Definition, differentiating polynomials, second derivatives; Gradients, tangents, normals, maxima and minima; Definition as opposite of differentiation, indefinite integrals of x^n; Definite integrals and areas under curves

Newton's first law, force diagrams, introduction to i, j system; Newton's second law, 'F = ma', connected particles (no resolving forces or use of F = μR); Newton's third law: equilibrium, problems involving smooth pulleys

Exponential functions; Natural logarithms

Variable force; Calculus to determine rates of change for kinematics; Use of integration for kinematics problems i.e. Differentiation and integration of polynomials

Introduction to sampling terminology; Advantages and disadvantages of sampling; Understand and use sampling techniques; Compare sampling techniques in context; Calculation and interpretation of measures of location; Calculation and interpretation of measures of variation; Understand and use coding; Interpret diagrams for single-variable data; Interpret scatter diagrams and regression lines; Recognise and interpret outliers; Draw simple conclusions from statistical problems; Mutually exclusive events; Independent events

Examples including proof by deduction* and proof by contradiction; Simplifying algebraic fractions; Partial fractions

Use discrete distributions to model real-world situations; Identify the discrete uniform distribution; Calculate probabilities using the binomial distribution (calculator use expected); Language of hypothesis testing; Significance levels; Carry out hypothesis tests involving the binomial distribution

Arithmetic and geometric progressions (proofs of 'sum formulae'); Sigma notation; Recurrence and iterations; Radians (exact values), arcs and sectors; Small angles; Secant, cosecant and cotangent (definitions, identities and graphs); Inverse trigonometrical functions; Inverse trigonometrical functions; Compound* and double (and half) angle formulae *geometric proofs expected R cos (x ± α) or R sin (x ± α); Proving trigonometric identities; Solving problems in context (e.g. mechanics)

Forces' turning

Assessment & Feedback

Mini assessments at the end of each unit. Green feedback sheets with next step question for students to complete. The assessments and feedback sheets are kept in students' folder. *(repeated across all terms)*

Link to prior learning

Core skills are reviewed as starters and set as homework to reinforce core knowledge *(repeated across all terms)*