KS5 Mathematics Curriculum Map

Pure mathematics

Statistics

Mechanics

KS5 Mathematics Curriculum Map

	Year 12 – Autumn 1		
Algebraic Expressions	☐ Collecting Like Terms ☐ Indices ☐ Expanding an Expression ☐ Factorising Expressions ☐ Factorising Quadratic Expressions ☐ Negative & Fractional Indices ☐ Surds ☐ Rationalising the Denominator	**Straight Line Graphs**	☐ Equation of a straight line ☐ Equations of parallel & perpendicular lines ☐ Length & Area ☐ Modelling with Straight Lines
Quadratics	☐ ~~Solving Quadratics by Factorisation~~ ☐ ~~Completing the Square~~ ☐ The Discriminant ☐ ~~Quadratic Formula~~ ☐ ~~Sketching Quadratic Functions~~ ☐ ~~Using Function Notation~~ ☐ Modelling with quadratics	**Data Collection**	☐ Populations & Samples ☐ Sampling ☐ Non-Random Sampling ☐ Types of Data ☐ Large Data Set
Equations & Inequalities	☐ Linear Simultaneous Equations ☐ Quadratic Simultaneous Equations ☐ Simultaneous Equations on Graphs ☐ Solving Linear Inequalities ☐ Solving Quadratic Inequalities ☐ Inequalities on Graphs ☐ Regions on Graphs	**Measures of Location & Spread**	☐ Measures of Central Tendency ☐ Other Measures of Location ☐ Measures of Spread ☐ Variance & Standard Deviation ☐ Coding
Graphs & Transformations	☐ Cubic Functions ☐ Reciprocal Functions ☐ Quartic Graphs ☐ Solving Equations using the Intersection ☐ Transformations ☐ Transforming Functions	**Representations of Data**	☐ Outliers ☐ Box plots
	Year 12 – Autumn 2		
Circles	☐ Midpoints & Perpendicular Bisectors ☐ Equation of a Circle ☐ Intersections of Straight Lines & Circles ☐ Using Tangents & Chords ☐ Using Triangles within Circles	**Representations of Data**	☐ Cumulative Frequency ☐ Histogram ☐ Comparing Data Sets
Algebraic Methods	☐ Working with Algebraic Fractions ☐ Dividing Polynomials ☐ Using the Factor Theorem ☐ Mathematical Proof ☐ Methods of Proof	**Correlation**	☐ Correlation ☐ Linear Regression
The Binomial Expansion	☐ Pascal's Triangle ☐ Combinations and Factorial Notation ☐ Using the Binomial Expansion ☐ Expanding $(a + bx)^n$ using the Binomial Expansion ☐ Solving Binomial Problems ☐ Solving using Binomial Estimation	**Probability**	☐ Calculating Probabilities ☐ Venn Diagrams ☐ Mutually Exclusive & Independent Events ☐ Tree Diagrams

Trigonometric Ratios	● ☐ The cosine rule ● ☐ The sine rule ● ☐ Area of triangles ● ☐ Solving triangle problems		

Year 12 – Spring 1			
Trigonometric Ratios	● ☐ Graphs of sine, cosine and tangent ● ☐ Transforming trigonometric graphs	**Modelling in mechanics**	● ☐ Constructing a model ● ☐ Modelling assumptions ● ☐ Quantities and units ● ☐ Working with vectors ●
Trigonometric Identities & Equations	● ☐ The values of trigonometric functions in the four quadrants ● ☐ Exact values and surds for trigonometric functions ● ☐ Simple Trigonometric Identities ● ☐ Harder Trigonometric Identities ● ☐ Equations & Identities	**Constant acceleration**	● ☐ Displacement-time graphs ● ☐ Velocity-time graphs ● ☐ Constant acceleration formulae 1 ● ☐ Constant acceleration formulae 2 ● ☐ Vertical motion under gravity
Vectors	● ☐ Vectors ● ☐ Representing Vectors ● ☐ Magnitude & Direction ● ☐ Position Vectors ● ☐ Solving Geometric Problems ● ☐ Modelling With Vectors	**Forces and motion**	● ☐ Force diagrams ● ☐ Forces as vectors
Differentiation	● ☐ Gradients of Curves ● ☐ Finding the Derivative ● ☐ Differentiating x^n ● ☐ Differentiating Quadratics ● ☐ Differentiating Functions with 2+ Terms		

Year 12 – Spring 2			
Differentiation	● ☐ Gradients, Tangents & Normals ● ☐ Increasing & Decreasing Functions ● ☐ Second Order Derivatives ● ☐ Stationary Points ● ☐ Sketching Gradient Functions ● ☐ Modelling with Differentiation	**Forces and motion**	● ☐ Forces and acceleration ● ☐ Motion in 2 dimensions ● ☐ Connected particles ● ☐ Pulleys ●
Integration	● ● ☐ Integrating x^n ● ☐ Indefinite Integrals ● ☐ Definite Integrals ● ☐ Finding Functions ● ☐ Areas Under Curves ● ☐ Areas Under the X-Axis ● ☐ Areas Between Curves & Lines	**Statistical Distributions**	● ☐ Probability Distributions ● ☐ The Binomial Distribution ● ☐ Cumulative Probabilities
Exponentials & Logarithms	● ☐ Exponential Functions ● ☐ y = e^x ● ☐ Exponential Modelling		

Year 12 – Summer 1			
Exponentials & Logarithms	● ☐ Logarithms ● ☐ Laws of Logarithms	**Hypothesis testing**	● ☐ Hypothesis testing ● ☐ Finding critical values ● ☐ One-tailed tests

	● ☐ Solving Equations using Logarithms ● ☐ Working with Natural Logarithms ● ☐ Logarithms & Non-linear data		● ☐ Two-tailed tests
Pure Maths	● Revision for 2 weeks	**Variable acceleration**	● ☐ Functions of time ● ☐ Using differentiation ● ☐ Maxima and minima problems ● ☐ Using integration ● ☐ Constant acceleration formula
Algebraic Methods	● ☐ Proof by contradiction ● ☐ Algebraic fractions ● ☐ Partial fractions ● ☐ Repeated factors ● ☐ Algebraic division	**Regression, correlation and hypothesis testing**	● ☐ Exponential models ● ☐ Measuring correlation ● ☐ Hypothesis testing for zero correlation
Pure Maths	● Revision and exam practice	**Conditional probability**	● ☐ Set notation ● ☐ Conditional probability ● ☐ Conditional probabilities in Venn diagrams ● ☐ Probability formulae ● ☐ Tree diagrams
Functions and graphs	● ☐ The modulus function ● ☐ Functions and mappings ● ☐ Composite functions ● ☐ Inverse functions ● ☐ $y = \|f(x)\|$ and $y = f(\|x\|)$ ● ☐ Combining transformations ● ☐ Solving modulus problems	**Radians**	● ☐ Radian measure ● ☐ Arc length ● ☐ Areas of sections and segments ● ☐ Solving trigonometric equations ● ☐ Small angle approximations
Sequences and series	● ☐ Arithmetic sequences ● ☐ Arithmetic series ● ☐ Geometric sequences ● ☐ Geometric series ● ☐ Sum to infinity ● ☐ Sigma notation ● ☐ Recurrence relations ● ☐ Modelling with series	**The normal distribution**	● ☐ The normal distribution ● ☐ Finding probabilities for normal distributions ● ☐ The inverse normal distribution function ● ☐ The standard normal distribution ● ☐ Finding μ and σ ● ☐ Approximating a binomial distribution ● ☐ Hypothesis testing with the normal distribution
Binomial expansion	● ☐ Expanding $(1 + x)^n$ ● ☐ Expanding $(a + bx)^n$ ● ☐ Using partial fractions		
Trigonometric functions	● ☐ Secant, cosecant and tangent ● ☐ Graphs of sec x, cosec x and cot x ● ☐ Using sec x, cosec x and cot x ● ☐ Trigonometric identities ● ☐ Inverse trigonometric functions	**Moments**	● ☐ Moments ● ☐ Resultant moments ● ☐ Equilibrium ● ☐ Centres of mass ● ☐ Tilting
Trigonometry and modelling	● ☐ Addition formulae ● ☐ Using the angle addition formulae ● ☐ Double-angle formulae ● ☐ Solving trigonometric equations	**Forces and friction**	● ☐ Resolving forces ● ☐ Inclined planes ● ☐ Friction

Year 12 – Summer 2

Year 13 – Autumn 1

Year 13 – Autumn 2

	● ☐ Simplify $a \cos \cos x \pm b \sin \sin x$ ● ☐ Proving trigonometric identities ● ☐ Modelling with trigonometric functions		
Parametric equations	● ☐ Parametric equations ● ☐ Using trigonometric identities ● ☐ Curve sketching ● ☐ Points of intersection ● ☐ Modelling with parametric equations ●		

Year 13 – Spring 1			
Differentiation 2	● ☐ Differentiation sin x and cos x ● ☐ Differentiating exponentials and logarithms ● ☐ The chain rule ● ☐ The product rule ● ☐ The quotient rule ● ☐ Differentiating trigonometric functions ● ☐ Parametric differentiation ● ☐ Implicit differentiation ● ☐ Using second derivatives ● ☐ Rates of change	**Projectiles**	● ☐ Horizontal projection ● ☐ Horizontal and vertical components ● ☐ Projection at any angle ● ☐ Projectile motion formulae
Numerical methods	● ☐ Locating roots ● ☐ Iteration ● ☐ The Newton-Raphson method ● ☐ Applications to modelling	**Applications of forces**	● ☐ Static particles ● ☐ Modelling with statics ● ☐ Friction and static particles ● ☐ Static rigid bodies ● ☐ Dynamics and inclined planes ● ☐ Connected particles ●

Year 13 – Spring 2			
Integration 2	● ☐ Integrating standard functions ● ☐ Integrating $f(ax + b)$ ● ☐ Using trigonometric identities ● ☐ Reverse chain rule ● ☐ Integration by substitution ● ☐ Integration by parts ● ☐ Partial fractions ● ☐ Finding areas ● ☐ The trapezium rule ● ☐ Solving differential equations ● ☐ Modelling with differential equations	**Further kinematics**	● ☐ Vectors in kinematics ● ☐ Vector methods with projectiles ● ☐ Variable acceleration in one dimension ● ☐ Differentiating vectors
Vectors 2	● ☐ 3D coordinates ● ☐ Vectors in 3D ● ☐ Solving geometric problems ● ☐ Application to mechanics		

Year 13 – Summer 1			
Revision			

Year 13 – Summer 2			
Examinations			