

KS5 Curriculum Overview: Y12 Maths

Rationale: In year 12 students gain a deeper understanding of key concepts in Algebra, statistics and Geometry as well as new concepts in the pure and applied side. Students use skills learnt to apply them to modelling type questions.

Term / Length of Unit		Outline	Assessment	Home Learning	Resources	Knowledge/Skills End Points	Reading
Autumn 1	Pure	C1 Algebraic expressions	Headstart test			1.1 Index Laws 1.2 Expanding brackets 1.3 Factorising 1.4 Negative and fractional indices 1.5 Surds 1.6 Rationalising denominators	The Proving Ground (Jonny Griffiths) Six Books of Euclid (Oliver Byrne & Werner Oechslin)
		C2 Quadratic functions	Test: Chapters 1 & 2	Set after every lesson. Assessed set every 2 weeks.	Textbooks, Dr Frost powerpoints, bank of assessed HL Qs.	2.1 Solving quadratic equations 2.2 Completing the square 2.3 Functions 2.4 Quadratic graphs 2.5 The discriminant 2.6 Modelling with quadratics	Proofs without Words: Exercises in Visual Thinking: v. 1 (Classroom Resource Materials) (Roger B.Nelsen) Proofs without Words II: v. 2 (Classroom Resource Materials) (Roger B.Nelsen)
		C3 Equations and inequalities				3.1 Linear simultaneous equations 3.2 Quadratic simultaneous equations 3.3 Simultaneous equations on graphs 3.4 Linear inequalities 3.5 Quadratic inequalities 3.6 Inequalities on graphs 3.7 Regions	The Changing Shape of Geometry: Celebrating a Century of Geometry and Geometry Teaching (Chris Pritchard) Mathematician's Delight (Dover Science Books) (W.W. Sawyer)
		C4 Graphs and transformations				4.1 Cubic graphs 4.2 Quartic graphs 4.3 Reciprocal graphs 4.4 Points of intersection	The Art of Logic in an Illogical World (Eugenia Cheng) Key words: Discriminant Linear Transformation
			Test: Chapters 3 & 4				

						<p>4.5 Translating graphs 4.6 Stretching graphs 4.7 Transforming functions</p>	<p>Reading strategy: Go through key words and annotate worded problems.</p>
	Statistics	<p>C1 Data Collection</p> <p>C2 Measures of location and spread</p> <p>C5 Probability</p>	<p>Test: Chapters 1, 2 & 5</p>	<p>Set after every lesson. Assessed set every 3 weeks.</p>	<p>Textbooks, Dr Frost powerpoints, bank of assessed HL Qs.</p>	<p>1.1 Populations and samples 1.2 Sampling 1.3 Non-random sampling 1.4 Types of data 1.5 The large data set</p> <p>2.1 Measures of central tendency 2.2 Other measures of location 2.3 Measures of spread 2.4 Variance and standard deviation 2.5 Coding</p> <p>5.1 Calculating probabilities 5.2 Venn diagrams 5.3 Mutually exclusive and independent events 5.4 Tree diagrams</p>	<p>Key words: Population Sampling Census</p> <p>Reading strategy: Go through key words and annotate worded problems.</p>

Autumn 2	Pure	<p>C5 Straight line graphs</p> <p>C6 Circles</p> <p>C7 Algebraic Methods</p> <p>C8 The binomial expansion</p> <p>C9 Trigonometric ratios</p>	<p>Test: Chapters 5, 6, 7 & 8</p>	<p>Set after every lesson. Assessed set every 2 weeks.</p>	<p>Textbooks, Dr Frost powerpoints, bank of assessed HL Qs.</p>	<p>5.1 $y = mx + c$ 5.2 Equations of straight lines 5.3 Parallel and perpendicular lines 5.4 Length and area 5.5 Modelling with straight lines</p> <p>6.1 Midpoints and perpendicular bisectors 6.2 Equation of a circle 6.3 Intersections of straight lines and circles 6.4 Use tangent and chord properties 6.5 Circles and triangles</p> <p>7.1 Algebraic fractions 7.2 Dividing polynomials 7.3 The factor theorem 7.4 Mathematical proof 7.5 Methods of proof</p>	<p>Key words: Equation Midpoint Bisector Perpendicular</p> <p>Reading strategy: Go through key words and annotate worded problems.</p>
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	Statistics	<p>C3 Representation of data</p> <p>C4 Correlation</p> <p>C6 Statistical Distributions</p> <p>C7 Hypothesis Testing</p>	<p>Test: Chapters 3, 4, 6 & 7</p>	<p>Set after every lesson. Assessed set every 3 weeks.</p>	<p>Textbooks, Dr Frost powerpoints, bank of assessed HL Qs.</p>	<p>3.1 Outliers 3.2 Boxplots 3.3 Cumulative frequency 3.4 Histograms 3.5 Comparing data</p> <p>4.1 Correlation 4.2 Linear regression</p> <p>6.1 Probability distributions 6.2 The binomial distribution 6.3 Cumulative probabilities</p> <p>7.1 Hypothesis testing 7.2 Finding critical values 7.3 One-tailed tests 7.4 Two-tailed tests</p>	<p>Key words: Outlier Hypothesis Critical</p> <p>Reading strategy: Go through key words and annotate worded problems.</p>
Spring 1	Pure	<p>C10 Trigonometric identities and equations</p> <p>C11 Vectors</p>	<p>Test: Chapters 9, 10 & 11</p>	<p>Set after every lesson. Assessed set every 2 weeks.</p>	<p>Textbooks, Dr Frost powerpoints, bank of assessed HL Qs.</p>	<p>10.1 Angles in all four quadrants 10.2 Exact values of trigonometric ratios 10.3 Trigonometric identities 10.4 Simple trigonometric equations 10.5 Harder trigonometric equations 10.6 Equations and identities</p> <p>11.1 Vectors 11.2 Representing vectors 11.3 Magnitude and direction 11.4 Position vectors 11.5 Solving geometric problems 11.6 Modelling with vectors</p>	<p>Key words: Quadrant Trigonometry Modelling</p> <p>Reading strategy: Go through key words and annotate worded problems.</p>

	Mechanics	C8 Modelling in mechanics C9 Constant acceleration	Test: Chapters 8 & 9	Set after every lesson. Assessed set every 3 weeks.	Textbooks, Dr Frost powerpoints, bank of assessed HL Qs.	8.1 Constructing a model 8.2 Modelling assumptions 8.3 Quantities and units 8.4 Working with vectors 9.1 Displacement-time graphs 9.2 Velocity-time graphs 9.3 Constant acceleration formulae 1 9.4 Constant acceleration formulae 2 9.5 Vertical motion under gravity	<p>Key words: Acceleration Displacement Constant</p> <p>Reading strategy: Go through key words and annotate worded problems.</p>
Spring 2	Pure	C12 Differentiation C13 Integration	Test: Chapters 12 & 13	Set after every lesson. Assessed set every 2 weeks.	Textbooks, Dr Frost powerpoints, bank of assessed HL Qs.	12.1 Gradients of curves 12.2 Finding the derivative 12.3 Differentiating x^n 12.4 Differentiating quadratics 12.5 Differentiating functions with two or more terms 12.6 Gradients, tangents and normals 12.7 Increasing and decreasing functions	<p>Key words: Differentiation Integration Stationary</p> <p>Reading strategy: Go through key words and annotate worded problems.</p>

						<p>12.8 Second order derivatives</p> <p>12.9 Stationary points</p> <p>12.10 Sketching gradient functions</p> <p>12.11 Modelling with differentiation</p> <p>13.1 Integrating x^n</p> <p>13.2 Indefinite integrals</p> <p>13.3 Finding functions</p> <p>13.4 Definite integrals</p> <p>13.5 Areas under curves</p> <p>13.6 Areas under curves</p> <p>13.7 Areas between curves and lines</p>	
Mechanics	C10 Forces and motion		Set after every lesson. Assessed set every 3 weeks.	Textbooks, Dr Frost powerpoints, bank of assessed HL Qs.	<p>10.1 Force and diagrams</p> <p>10.2 Forces and vectors</p> <p>10.3 Forces and acceleration</p> <p>10.4 Motion in 2-dimensions</p> <p>10.5 Connected particles</p> <p>10.6 Pulleys</p>	<p>Key words:</p> <p>Motion</p> <p>Connected</p> <p>Pulley</p> <p>Reading strategy:</p> <p>Go through key words and annotate worded problems.</p>	

Summer 1	Pure	C14 Exponentials and logarithms Revision	Department PPEs (full papers)	Set after every lesson. Assessed set every 2 weeks.	Textbooks, Dr Frost powerpoints, bank of assessed HL Qs, past papers	14.1 Exponential functions 14.2 $y = e^x$ 14.3 Exponential modelling 14.4 Logarithms 14.5 Laws of logarithms 14.6 Solving equations using logarithms 14.7 Working with natural logarithms 14.8 Logarithms and non-linear data	Key words: Exponential Logarithm Law Reading strategy: Go through key words and annotate worded problems.
	Mechanics	C11 Variable acceleration Revision	Test: Chapters 10 & 11 Department PPEs (full papers)	Set after every lesson. Assessed set every 3 weeks.	Textbooks, Dr Frost powerpoints, bank of assessed HL Qs, past papers	11.1 Functions of time 11.2 Using differentiation 11.3 Maxima and minima	Key words: Function Maxima Minima Reading strategy: Go through key words and annotate worded problems.
Summer 2		Y13 Pure C1 Algebraic methods		Set after every lesson. Assessed set every 2 weeks.	Textbooks, Dr Frost powerpoints, bank of assessed HL Qs.	1.1 Proof by contradiction 1.2 Algebraic fractions 1.3 Partial fractions 1.4 Repeated factors 1.5 Algebraic Division	Key words: Contradiction Partial Modulus Reading strategy:

	<p>C2 Functions and graphs</p> <p>C3 Sequences and series</p>				<p>2.1 The modulus function</p> <p>2.2 Functions and mapping</p> <p>2.3 Composite functions</p> <p>2.4 Inverse functions</p> <p>2.5 $y = f(x)$ and $y = f(x)$</p> <p>2.6 Modelling with quadratics</p> <p>3.1 Arithmetic sequences</p> <p>3.2 Arithmetic series</p> <p>3.3 Geometric sequences</p> <p>3.4 Geometric series</p> <p>3.5 Sum to infinity</p> <p>3.6 Sigma notation</p> <p>3.7 Recurrence relations</p> <p>3.8 Modelling with series</p>	<p>Go through key words and annotate worded problems.</p>
		<p>Test: Chapters 1, 2 & 3 (Sept)</p>				