Years 12 & 13 Curriculum
A Level: Further Mathematics

	Further Maths			
Topic	**Complex numbers**	**Matrices**	**Further algebra**	**Further calculus**
Key Concepts	• Argand diagrams, including loci • Roots of unity • De Moivre's theorem • Complex plane transformations	• Matrix manipulation • Inverse matrices • Transformations • Matrix equations	• Roots of polynomials • Method of differences • Series sums • Maclaurin series	• Volumes of revolution • Improper integrals • Mean value of a function • Differentiate and integrate inverse trig functions

Topic	**Further vectors**	**Polar coordinates**	**Hyperbolic functions**	**Differential equations**
Key Concepts	• Equations of lines and planes • Scalar product • Intersection of lines and planes	• Conversion between polar and Cartesian forms • Areas of curves • Sketching polar curves	• Exponential form • Differentiation and integration • Solving hyperbolic equations	• First order equations using integrating factor • Separation of variables • Second order equations • Related differential equations

	Further Statistics					
Topic	**Discrete probability**	**Poisson and normal distributions**	**Negative binomial distribution**	**Hypothesis testing**	**Central limit theorem**	**Chi squared tests**
Key Concepts	• Use of discrete probability • Pdf and pgf • Modelling	• Use and limitations of distributions • Modelling and interpretation	• Use and interpretation • Modelling using distribution	• One and two tailed tests • P values • Confidence limits	• Distribution of sample mean • Link to population mean	• Test between observed and expected frequencies • Testing of hypotheses

	Further Mechanics			
Topic	**Momentum & Impulse**	**Work, Energy & Power**	**Elastic Strings**	**Elastic Collisions**
Key Concepts	• Conservation of momentum • Impulse-change in momentum laws • Angles of separation	• Work-energy principle • Power equations • Power = rate of work	• Hooke's law • Modulus of elasticity • Simple harmonic motion	• 2 and 3 dimensions • Loss of energy • Momentum

	Decision Maths			
Topic	**Algorithms & Graph Theory**	**Algorithms on Graphs**	**Critical Path Analysis**	**Linear Programming**
Key Concepts	• Nature of algorithms • Definitions of networks and graphs • Sorting algorithms	• Dijkstra's and Prim's methods • Bin packing • Chinese postman and travelling salesman problems	• Event dependency • Forward and backward pass • Float and criticality • Scheduling and resourcing	• Formulation of inequalities • Objective functions • Critical regions • Resource allocation • Simplex Algorithm

Years 10 & 11 Assessment
Level 2: Further Mathematics

Both Year 10 & 11 pupils will sit one mock examination.

	Year 10		Year 11		
	Mock Exam		**Mock Exam**		**Revision Resources**
	Spring Term		**Spring Term**		*Kennet Resources* • Core Questions • Knowledge Organisers • Learning Habits *External Resources* • www.mathsapp.pixl.org.uk • www.mymaths.co.uk • www.bbc.com/bitesize You can also find additional revision material on Frog
Style of Assessment	**Paper 1:** Non-Calculator	**Paper 2:** Calculator	**Paper 1:** Non- Calculator	**Paper 2:** Calculator	
Topics Assessed	A selection of topics covered since the beginning of Year 10. These will be taken from the following list but **may not include all topics** from the list: • The product rule for counting, co-ordinate geometry (straight lines), index laws sequences, circle theorems, expanding and factorising, linear and quadratic inequalities, functions, factor theorem • Any topic may be assessed on either paper. The topic may be assessed more than once in different scenarios e.g. knowledge recall in one question and as a proof in a different question		A selection of topics covered since the beginning of Year 10. These may be taken from the **previous list** and from the following: • Drawing and sketching functions (including straight lines, quadratics, cubics, exponentials & reciprocal), completing the square, algebraic fractions, surds, solving linear and quadratic equations using a variety of methods, simultaneous equations (up to three unknowns), co-ordinate geometry (including circles), Pythagoras and trigonometry (including in non-right-angled triangles), 3D trigonometry and 3D Pythagoras • Any topic may be assessed on either paper. The topic may be assessed more than once in different scenarios, e.g. knowledge recall in one question and as a proof in a different question		

Exam Board: AQA

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