

Year: 12

Subject: A-level Maths

Autumn Term			
What has come before and what comes later:	GCSE Maths Trigonometry, Vectors, Calculus, Probability, hypothesis testing, Forces and Newton's laws		
	Pure	Statistics	Mechanics
The Big Questions (What questions will students be able to answer upon mastery of the topic?)	<ul style="list-style-type: none"> Do you know all of your index laws? Can you expand up to 3 sets of brackets? Can you factorise linear, quadratic and cubic expressions? Can you solve problems involving negative and fractional indices? Can you simplify surds? Can you expand brackets involving surds? Can you rationalise the denominator? Can you solve quadratic equations? Can you complete the square? Can you state the domain and range for functions? Can you sketch quadratic graphs? Can you use the discriminant to test for roots? Can you solve simultaneous equations for linear and where one is quadratic? Can you use graphs to solve simultaneous equations? Can you solve linear and quadratic inequalities? Can you solve inequalities using graphs and regions? Can you sketch cubic, quartic and reciprocal graphs? Can you solve problems involving points of intersections and graphs? Can you translate and stretch graphs? Can you solve problems involving transforming functions? Do you understand the general equation of a straight line $y=mx+c$? 	<ul style="list-style-type: none"> Can you understand key words of sampling and give advantages and disadvantages of each? Can you define qualitative, quantitative, discrete and continuous data and understand grouped data? Can you use the large data set to calculate simple statistic? Can you calculate measures of central tendency such as the mean, median and mode? Can you calculate measure of location? Can you calculate measure of spread? Can you calculate the variance and standard deviation? Can you understand and use coding of data? 	<ul style="list-style-type: none"> Can you understand how mathematical models apply to mechanics? Can you apply some of the common assumptions used in mechanical models? Do you know SI units for quantities and derived quantities used in mechanics? Do you know the difference between scalar and vector quantities? Can you understand and interpret displacement-time graphs? Can you understand and interpret velocity-time graphs? Can you derive constant acceleration formulae and use them to solve problems? Can you use constant acceleration formulae to solve problems involving vertical motion under gravity?

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	<ul style="list-style-type: none"> • Can you find the equation of a straight line using gradients and coordinates?> • Can you solve problems involving parallel and perpendicular lines? • Can you calculate the length of a line? • Can you solve problems involving areas and $y=mx+c$? • Can you calculate the midpoint between two coordinates? • Do you know the equation of a circle when the centre is the origin and not? • Can you solve problems involving intersections of lines and circles? • Can you use tangent and chord properties? • Can you solve problems involving circles and triangles? • Can you simplify algebraic fractions? • Can you divide polynomials? • Do you know how to use the factor theorem? • Can you structure mathematical proofs? • Do you know how to create Pascal's triangle? • Do you understand factorial notation? • Can you use the binomial expansion? • Can you use the binomial expansion to calculate estimations? 		
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