

	Year 12 Mathematics – Statistics and Mechanics					
	Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
BIG Q Content Statistics	Can we understand the different types of data and methods to collect them? - Understanding the different types of random and non-random sampling - Understanding qualitative and quantitative data	Can we apply methods of averages and spread to different data? - To understand variance and standard deviation and apply it to data sets - To perform linear interpolation to find the best possible estimate for a value	Can we represent data in the best possible way? - Calculate and classify an outlier - Understand and compare box plots, histograms and cumulative frequency diagrams - Understand linear regression and its link to correlation	How can we best show the different possible outcomes of an event? - Use sample spaces, Venn diagrams and tree diagrams to show possible event options - Understand how to calculate the probability of these events happening	What is a probability distribution, and how do we decide which best to use? - Understand probability distributions - Understand why and how we would use a binomial distribution in certain scenarios	How can we decide if something that has happened is by fluke, or there is something wrong with the original data? Understand hypothesis testing, and test scenarios to decide if the data given is accurate or not, based on a given outcome
Mechanics	Can we apply a mathematical model to simulate real-life? - Understand all the different assumptions we make in mechanics - Understand the international system of units - Know the difference between scalar and vector	Can we predict scenarios when the acceleration is constant? - Understand and plot displacement and velocity against time - Derive and use the constant acceleration formulae - Solve problems involving vertical motion under gravity	Can we understand all the forces acting on an object? - Draw forces diagrams - Understand and use newton's 1st, 2nd and 3rd laws of motion - Understand forces when particles are connected together	Can we predict scenarios when the acceleration is not constant? - Understand displacement, velocity and acceleration with respect to time - Be able to use differentiation to get from displacement, to velocity, to acceleration.	Can we predict scenarios when the acceleration is not constant? - Be able to use integration to get from acceleration, to velocity, to displacement. - Apply differentiation and integration to find the minima and maxima of problems	Can we predict scenarios when a turning effect is being applied? - Understand about moments and the rotational force on an object - Understand if a body is in equilibrium or the centre of mass is not central, how that affects the object.
Vocabulary; Key words for each half term	1. Census 2. Population 3. Systematic 4. Stratified 5. Quota 6. Opportunity 7. Quantitative 8. Qualitative 9. Continuous 10. Discrete	1. Standard Deviation 2. Variance 3. Interquartile 4. Linear Interpolation 5. Displacement 6. Velocity 7. 'SUVAT' 8. Gradient 9. Gravity 10.	1. Outlier 2. Frequency Density 3. Bivariate Data 4. Regression 5. Newton's Laws 6. Weight/Mass 7. Particles	1. Venn 2. Tree 3. Sample Space 4. Independent 5. Mutually Exclusive 6. Kinematics 7. Integration 8. Differentiation 9. Maxima 10. Minima	1. Distribution 2. Binomial 3. Independent 4. Kinematics 5. Integration 6. Differentiation 7. Maxima 8. Minima	1. Hypothesis 2. Null 3. Alternative 4. Critical Region 5. Tailed test 6. Moments 7. Equilibrium 8. Rigid Body 9. Tilting
Catholic Link	- Blaise Pascal was a profound Catholic theologian and mathematician, when we use Binomial Expansion, it is Pascal's Triangle that gives us the coefficients. - Marin Mersenne was a Minim friar who conducted early, highly accurate experiments on the acceleration of falling bodies, paving the way for classical mechanics. He is also famous for Mersenne Primes used in prime number theory.					
Careers Link	Software Engineer, Cryptographer, Medical Statistician, Games Programmer, Sports Data Analyst.					

Ways to enrich the year 12 curriculum at home

- Next time you are playing a board game that uses dice rolls, try to work out the possible number of combinations that could happen to get the exact roll you want, using Pascals's Triangle and the nCr button on your calculators. Then, work out the probability of it happening, and then complete the roll of your dice, did it happen? This needs to be done with 2 or more dice, as 1 dice is too easy. This can also be applied to card games, so what is the probability of you drawing the card you want, **given** you have X cards in your hand?