Subject: Maths and Further Mathematics

Year 12

William Hulme's Grammar School
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Overview	In year 12 we cover the material for the Edexcel A Mathematics and introduce some of the topics from OCR B (MEI) Further Mathematics A Level. The rest of the further maths course will be covered in year 13. Developed in collaboration with Mathematics in Education and Industry (MEI), the new A Level Further Mathematics B (MEI) qualification offers a coherent course of study to develop students' mathematical understanding and skills, encouraging them to think, act and communicate mathematically. It provides a solid foundation for further study in mathematics and also for those studying Computer Science, Finance, Engineering and the Physical Sciences other disciplines that make extensive use of mathematical skills We start with ensuring the content required from A2 Pure Maths is fully covered before accessing the Further Maths content.

	Half Term 1	Half Term 2	Assessment
Autumn Term	**Pure** ■ A level Pure maths starts by reviewing some of the key topics from higher GCSE then quickly moves onto look at some of the new topics. ■ Algebraic Expressions ■ Quadratics ■ Equations & Inequalities ■ Graphs and transformations ■ Straight line graphs ■ Trigonometry and the Unit circle ■ Trigonometric ratios ■ Trigonometric Identities and Equations ■ Exponentials and logs ■ Arithmetic and Geometric Sequences and series ■ Introduction to Vectors **Mechanics** ■ Mechanics starts with how the pure maths techniques in calculus can be used to model variable acceleration. ■ Variable acceleration ■ Differentiation ■ Integration. **Statistics** ■ Statistics starts with samples and populations then moves on to probability. ■ Data Collection and the large data set ■ Measures of location & spread ■ Representation of data ■ Probability Conditional probability	**Pure** ■ Circles ■ Algebraic Methods ■ Functions and graphs ■ Binomial expansion ■ Radians ■ Reciprocal trigonometric functions ■ Trigonometric modelling **Mechanics** ■ Constant acceleration formulae ■ Forces and motion ■ Introduction to Moments **Statistics** ■ Discrete random variables ■ Probability distribution functions ■ Binomial distribution ■ Poisson distribution ■ Geometric	A formal assessment takes place in the first week of HT2 with two papers one pure and one applied.

Spring Term	Half Term 3	Half Term 4	Assessment
	Pure ■ Partial fractions ■ Generalised Binomial expansion ■ Proof by contradiction ■ Parametric Equations ■ Further differentiation (Product rule and quotient rule) **Mechanics** ■ Friction and inclined planes. **Statistics** ■ Other Discrete distributions from further maths statistics (Poisson distribution, Geometric distribution and the Uniform distribution). ■ Normal Distribution ■ Hypothesis testing with the Normal distribution.	**Pure** ■ Numerical Methods ■ Further integration (reverse chain rule, integration by parts et c.) **Mechanics** ■ Projectiles ■ Application of forces (moments friction and inclined planes combined) **Statistics** ■ In Bivariate Data we blend the content needed for A level maths with the extra content for further maths statistics) ■ Pearson's and Spearman's hypothesis tests. ■ Regression. **Further maths pure** ■ Depending on timing we may start the further maths pure with an introduction to complex numbers	A formal assessment takes place in the first week of HT3 with two papers one pure and one applied.

Summer Term	Half Term 5	Half Term 6	Assessment
	Further maths pure ■ Complex numbers and loci on the Argand diagram. ■ Polynomials and roots of equations ■ Vectors in 3D and scalar product. ■ Planes and lines in 3D. **Further maths Statistics** ■ Chi squared test for association. ■ Recap of discrete distributions ■ Chi Squared test for goodness of fit.	**Further maths pure** ■ Matrices and Transformations ■ Inverse and determinant of a matrix ■ Using matrices to investigate the intersections of planes. ■ Series and proof by induction. **Further maths Mechanics** ■ Dimensional Analysis ■ Further moments (toppling and sliding)	A formal assessment takes place in the first week of HT5 with two papers one pure and one applied. The main assessment of year 12 takes place shortly after the start of half term six. This will consist of a total of 5 papers. A level maths will be assessed just as it would be for the final external exam with three full papers (two pure and one statistics and mechanics paper). There will be two further maths papers one pure and one applied (mainly statistics).

Useful Resources for Supporting Your Child at Home:	Homework:
https://integralmaths.org/ https://padlet.com/andrewharrison6/ks5-resources-uej0gwybac1nnc9f	Homework is much more extensive, and we expect students to take control of their own work and spend longer on It (a minimum of 300 mins per week). Minimum Expectations are: ■ Most of the questions, especially "P" & "E" questions from exercises in the textbooks are to be completed self-marked and corrected. ■ All MEI Section test to be completed online this is marked by the online program

Useful Resources for Supporting Your Child at Home:	Homework:
	■ When requested Topic Assessment tests and exam practice questions might be set by teachers. Other Topic specific questions are available in Class Material in Teams.