Department: Mathematics	Year 12

Plan Of Learning For The Year

Half Term 1
- Pure Mathematics: algebraic manipulation including quadratics, surds and indices; equations and inequalities; coordinate geometry with lines and circles; graphs and transformations; polynomials; methods of proof; binomial expansion

Half Term 2
- Pure Mathematics: further development of binomial expansion and graph transformations; trigonometry skills including graph work, exact values, and simple trigonometric identities; vectors; differentiation skills and application; integration skills and application

Half Term 3
- Pure Mathematics: further development of vectors; exponential and logarithmic functions; further development of integration skills;
- Applied Mathematics: introduction to mechanics

Half Term 4
- Pure Mathematics: further development of exponential and logarithmic function skills
- Applied Mathematics: displacement and velocity time graphs; constant acceleration formulae; using force diagrams; Newton's laws of motion; introduction to Statistics and the Large Data Set; statistical terminology; measures of variation and measures of central location;

Half Term 5
- Applied Mathematics: further development of Newton's laws of motion; variable acceleration; statistical diagrams including histograms, box plots, cumulative frequency diagrams; correlation and linear regression models; probability skills including use of Venn diagrams, tree diagrams and working with conditional probability; probability distributions including the Binomial distribution; hypothesis testing

Half Term 6
- Preparation for mock examination
- Pure Mathematics from Year 13 course: partial fractions; further development of the use of the binomial expansion; iterative numerical methods for solving non-standard equations

Feedback, Retrieval & Assessment	Super curriculum opportunities / extra-curricular activities	Cultural Capital, SMSC, Careers and Futures
- Self and peer assessment in class and independently - On-going formative assessment during lessons by teacher - Student/teacher one-to-one discussions - Retrieval starters or feedback every lesson - Dr Frost maths weekly independent work on skills and exam questions provides instant feedback to the work you do and highlights gaps to close (Approximately) Termly formal assessments - Exit Ticket every two weeks resit opportunities provided during maths support at lunchtimes - Throughout, a focus on closing gaps after each assessment with the focus being on	- https://plus.maths.org/content/ - https://www.newscientist.com/ - https://nrich.maths.org/post-16 - http://www.undergroundmathematics.org super curriculum problems, often from entry exams from the prestigious universities Cambridge and Oxford - www.cambridgemaths.org - http://desmos.com/ online graphing software - http://geogebra.org online graphing software - www.amsp.org.uk hub for maths resources and links to future career options - www.Drfrostmaths.com (has resources linked to Further Maths curriculum or "just because" maths) - https://www.youtube.com/c/BicenMaths/videos a great resource for online lessons in case you miss any content	- Teamwork within the class. - Regular independent problem-solving opportunities - Understanding the real-life situations that mechanics can be used for. - Opportunities to discuss with teachers about careers linked to mathematics or engineering - Use of technology and how it is used in science and technological sectors - Development of strong independent learning and organisational skills, preparing you for further study at university level - Recommended Wider Reading: "Alex's Adventures in Numberland" Alex Bellos [a chance to read deeper into mathematics and its applications in the real world]

understanding the gap, rather than copying worked solutions		

Common misconceptions	Connecting New Knowledge	Challenge for all
- Working with indices – negative or fractional powers applied incorrectly - Completing the square incorrectly (use your calculator to check the accuracy of your work) - Equation of a circle quotes radius incorrectly - Using the binomial expansion for $(a + bx)^n$ but forgetting to raise b to the power n - Carrying out differentiation and integration processes the wrong way around - Solving a trigonometric equation: finding the principal value but not listing all of the other possible values before carrying out any necessary transformations …and many others!	- Understand why the formulas are used. - Regular opportunities to use proof - Opportunities to explore theories and issues in further depth are signposted in lessons. - Developing an appreciation of how different areas of mathematics link together e.g. equations and graphs; differentiation and optimisation problems - Using technology to enhance learning	- Proof used throughout the course to underpin why particular statements or approaches are true - Knowledge Organisers used to give an overview of the learning that will take place and a chance to review the learning that has taken place prior to assessments - A focus on quality of presentation of solutions rather than getting the correct answer - Model solutions made available after assessments - Regular use of scaffolds and structured practice - Clearly defined success criteria and use of clear feedback model to show next steps to improve - Stretch activities built into each lesson