

	Term 1		Term 2		Term 3	
<p>Content title</p> <p>Pure Statistics Mechanics</p>	P1. Algebraic expressions (7 hrs) P2. Quadratics (7 hrs) P3. Equations and Inequalities (8 hrs) P4. Graphs and transformations (8 hrs) S&M1. Data collection (6 hrs) S&M2. Measures of location and spread (6 hrs) S&M3. Representations of data (6 hrs)	P5. Straight line graphs (6 hrs) P6. Circles (6 hrs) S&M4. Correlation (3 hrs) S&M5. Probability (5 hrs) S&M6. Statistical distributions (4 hrs)	P7. Algebraic methods (6 hrs) P8. Binomial expansion (6 hrs) P9. Trig ratios (7 hrs) P10. Trig identities and equations (7 hrs) S&M7. Hypothesis testing (5 hrs) S&M8: Modelling in mechanics (5 hrs)	P11. Vectors (7 hrs) P12. Differentiation (12 hrs) S&M 9. Constant acceleration (4 hrs) S&M 10. Forces and motion (7 hrs)	P13. Integration (8 hrs) P14. Exponentials and logs (9 hrs) S&M 11. Variable acceleration (6 hrs)	Revision for mock Start year 2 work P1. Algebraic methods (6 hrs) P2. Functions and graphs (8 hrs) S&M2. Conditional probability (6 hrs)
<p>Purpose of the scheme</p>	The mathematics curriculum at Immanuel College is designed to ensure that all students have a secure knowledge base and cultivate a deep understanding of mathematical concepts and procedures, as well as the ability to apply these to a variety of problems, including those they may face in the real world.					
<p>Pre-read (suggested)</p>	Simplifying expressions, index laws expanding brackets, HCF, solving equations. Sketching graphs, solving inequality, factorising, Venn diagrams, Simultaneous equations, Surds, quadratic graphs, MMR, questionnaires, types of data, bar charts, pie charts, IQR, Mean and standard deviation.	Points of intersection, rearranging equation, surds, completing the square, equation of a straight line, discriminant, Scatter graphs, probability, outcomes	Indices, factorising, long division, equations of lines, expanding brackets indices, SOHCAHTOA, solving equations, completing the square, sketching graphs Probability Converting units Standard form	Translations, ratios, sine and cosine rules, gradients of straight lines, indices, equations of straight lines, equations of perpendiculars. Gradient and area under a graph, speed calculations, solving simultaneous equations. Vectors, Pythagoras, sohcahtoa, constant acceleration	Indices, differentiation, sketching curves, substitution, scatter graphs. Differentiation, turning points, area under curves	Factorising polynomials, simplifying algebraic fractions, recognising odd and even expressions, changing the subject of a formula, simplifying expressions, sketching graphs, substitution Logs, regression equations, <ul style="list-style-type: none"> hypothesis testing
<p>Key knowledge and skills</p>	<ul style="list-style-type: none"> Expanding brackets Factorising indices Surds Quadratic equations Functions Quadratic graphs Modelling with quadratic Simultaneous equations Inequalities Graphs of cubic, reciprocal, quartic Points of intersection Transforming graphs Populations and samples 	<ul style="list-style-type: none"> Equations of straight lines Parallel and perpendicular lines Length and area Modelling with straight lines Midpoints and perpendicular bisector Equation of a circle Intersection of straight lines and circles Tangent and chord. Circles and triangles Correlation Linear regression 	<ul style="list-style-type: none"> Algebraic fractions Dividing polynomials Factor theorem Proof Pascal’s triangle Factorial notation Binomial expansion Binomial problems Binomial estimation Cosine rule Sine rule Area of triangle Trig graphs Transforming trig graphs Find more than one solution to trig graphs 	<ul style="list-style-type: none"> Representing vectors Magnitude Direction Position vectors Solving geometric problems Modelling of vectors Gradients of curves Finding the derivative Differentiating functions Gradients, tangents and normal Increasing and decreasing functions Second order derivatives Stationary points Sketching gradient functions 	<ul style="list-style-type: none"> Integrating Indefinite integrals Finding functions Definite integrals Areas under curves Area under the x axis Area under curves and lines Exponential functions Exponential modelling Logs Laws of logs Solving equations using logs Natural logs Logs and non-linear data Functions of times 	<ul style="list-style-type: none"> Proof by contradiction Algebraic fraction Partial fractions Repeated factors Algebraic division Modulus function Function and mapping Composite functions Inverse functions Modulus functions and graphs Combining transformations and graphs Solving modulus problems Set notation Conditional probability



	<ul style="list-style-type: none"> Types of data Large data set Measures of spread Variance and standard deviation Coding Outliers Box plots Cumulative frequency Histograms Comparing data 	<ul style="list-style-type: none"> Probability Venn diagrams Mutually exclusive and independent events Tree diagrams Probability distributions Binomial distribution Cumulative probability 	<ul style="list-style-type: none"> Exact trig values Trig identities Trig equations Hypothesis testing Finding critical values One tail test Two tail tests Constructing models Modelling assumptions Quantities and units Working with vectors 	<ul style="list-style-type: none"> Modelling with differentiation Displacement/time graphs Velocity times graphs Constant acceleration formulae Vertical motion under gravity Force diagrams Forces as vectors Forces and acceleration Motion in 2 dimensions Connected partials Pulleys. 	<ul style="list-style-type: none"> Using differentiation Max/min problems Using integration Constant acceleration formulae 	<ul style="list-style-type: none"> Venn diagrams Probability formulae Tree diagrams
Key words / vocabulary	See above					
Exam board	Edexcel					
End point	Confidence in chapters covered					
Assessment method	Topic Assessments Homework Induction assessment Assessment point 1	Topic Assessments Homework	Topic Assessments Homework	Topic Assessments Homework Assessment point 2	Topic Assessments Homework	Topic Assessments Homework End of year assessment
Wider links	<p>Introduction to Mathematical Philosophy by Bertrand Russell</p> <p>A Mathematician's Apology by G. H. Hardy</p> <p>Thinking About Mathematics by Stewart Shapiro</p>	<p>Fermat's Last Theorem by Simon Singh</p> <p>The Millenium Problems by Keith Devlin</p> <p>Journey Through Genius: The Great Theorems of Mathematics by William Dunham</p> <p>The Equation That Couldn't Be Solved by Mario Livio</p>	<p>Kepler's Conjecture by George Szpiro</p> <p>Poincaré's Prize by George Szpiro</p> <p>The Music of the Primes by Marcus du Sautoy</p> <p>Four Colors Suffice by Robin Wilson</p>	<p>Concepts in Modern Mathematics by Ian Stewart</p> <p>Geometry for Dummies by Mark Ryan</p> <p>Concise Introduction to Pure Mathematics by Martin Liebeck</p> <p>Mathematical Methods for Science Students by G Stephenson</p>	<p>The Emperor's New Mind by Roger Penrose</p> <p>The Mathematical Universe by William Dunham</p> <p>The Wonders of Numbers by Clifford Pickover</p> <p>From Here to Infinity by Ian Stewart</p> <p>The Art of the Infinite: Our Lost Language of Numbers by Robert Kaplan</p>	<p>The Number Devil: A Mathematical Adventure by Hans Magnus Enzensberger</p> <p>Art of the Infinite by Kaplan</p> <p>Imagining Numbers: Particularly the Square Root of Minus Fifteen by Barry Mazur</p> <p>A Very Short Introduction to Mathematics by Timothy Gowers</p>
Career links	<p>https://www.mathscareers.org.uk/</p> <p>Visit the webpage above for links to careers involving Maths and Further Maths.</p>					