KS5 Curriculum: Mathematics

Curriculum Vision

Edexcel A Level Mathematics (2017)

Edexcel A Level Further Mathematics (2017)

The intent of our mathematics curriculum is to inspire our students to continue to study mathematics or STEM subjects beyond A level. We do this by offering a coherently sequenced, continually adapted scheme of work that is designed to improve the depth of understanding and mastery a student achieves as their knowledge develops throughout the key stages.

To support this intent, we use our strong subject knowledge to impart intrigue and scholarship alongside method, by incorporating real life context into our lessons in addition to enrichment opportunities outside of the classroom. We use a variety of retrieval practices to support our teaching and to encourage long term memory transfer, giving our students the fundamental knowledge they need to finish their journey in mathematics as a confident problem solver.

We intend to challenge all our students with an ambitious scheme of work that supports strong outcomes for students and is continually adapted to ensure the same progress for all students. Through continual professional development within the school, we intend to use evidence informed teaching practices to drive developments in our curriculum to ensure it remains robust and inclusive.

Further Mathematics is taught in conjunction with Single Mathematics. All of the topics taught are built upon or extended in the Further Mathematics syllabus. We therefore teach the entirety of the Single Maths course in year 12, before moving on to the Further Maths Modules in Year 13.

Single Mathematics modules taught:-

- Pure (P1/P2)
- Statistics (S1/S2)
- Mechanics (M1/M2)

Further Mathematics modules taught:-

- Core Pure (CP1/CP2)

- Further Mechanics (FM1)
- Decision Mathematics (D1)
- Further Pure (FP1)

Note: There is no choice in Single Maths, or in sitting CP1 and CP2 in Further Mathematics. We teach our students 3 applied modules, FM1, D1 and FP1. They are given the choice in year 13, which 2 of those 3 they wish to study further. This will allow them to tailor their education to their subject choices at university.

Curriculum Profile

Year 12

Autumn Term 1	Autumn Term 2
P1, Ch1 – Indices and Surds. P1, Ch2 – Quadratics. P1, Ch3 – Simultaneous equations and inequalities. P1, Ch4 – Graphs. P1, Ch5 – Coordinate Geometry. P1, Ch6 – Equations of Circles. P1, Ch7 – Polynomials, Factor Theorem and proof. P1, Ch8 – Binomial Expansion. P1, Ch9/10 Trigonometry. P1, Ch12 – Differentiation. 1st Section Test.	S1, Ch1 – Sampling and large data set. S1, Ch2 – measures of location and spread. S1, Ch3 – Representation of data. S1, Ch4 – Correlation. S1, Ch5 – Probability. S2, Ch2 – Conditional Probability. P1, Ch 11 – Vectors. P1, Ch13 – Integration. P1, Ch14 – Logarithms and exponentials. P2, Ch1 – Partial fractions and Proof by contradiction. M1, Ch8 – Methods in mechanics. M1, Ch9 – Constant acceleration Equations. M1, Ch10 – Forces, Connected particles and pulleys. M1, Ch11 – Variable acceleration. 2nd Section test.

Spring Term 1	Spring Term 2
P2, Ch2 – Functions, Composite, inverse, domain and range. P2, Ch3 – Sequences and Series. P2, Ch4 – Binomial expansion. P2, Ch5 – Trigonometry, Small angle approximations and radians. P2, Ch6 – Reciprocal trig functions.	P2, Ch9 – Differentiation. Chain rule, Product rule, Quotient rule, Parametrics, Implicit differentiation, Connected rates of change. P2, Ch10 – Numerical methods.

P2, Ch7 – Double angle formulae and addition formulae for trigonometry. P2, Ch8 – Parametric equations. S1, Ch6 – Probability Distributions. S1, Ch7 – Binomial Distribution. M2, Ch4 – Moments. M2, Ch5 – Forces involving friction. M2, Ch6 – Projectiles.	P2, Ch11 - Integration. Substitution, Trigonometric, Inspection, Integration by parts. Modelling. M2, Ch7 – Resolving forces, pulleys, static rigid bodies. S2, Ch1 – Regression and hypothesis testing.
3rd Section Test	4th Section test

Summer Term 1	Summer Term 2
P2, Ch12 – Vectors in 3D. M2, Ch8 – Variable acceleration involving vectors. S2, Ch3 – Normal Distribution. EoY Exam CP1, Ch1 – Complex Numbers. CP1, Ch2 – Argand Diagrams. CP1, Ch3 – Series. CP1, Ch4 – Roots of Polynomials.	CP1, Ch5 – Volumes of revolution. CP1, Ch6 – Matrices. CP1, Ch7 – Transformations with matrices. CP1, Ch8 – Proof by induction. CP1, Ch9 – Vectors involving straight lines and planes. 5th Section test before summer holidays.

Year 13

Autumn Term 1	Autumn Term 2
CP2, Ch1 – Complex Numbers. CP2, Ch2 – Maclaurin Series. FM1, Ch1 – Momentum. FM1, Ch2 – Work, energy and power. D1, Ch1 - Introduction to algorithms and sorting algorithms. D1, Ch2 – Introduction to graph theory. D1, Ch3 – Minimum spanning trees and shortest path algorithms. FP1, Ch1 – Vectors. FP1, Ch4 – Algebraic methods.	CP2, Ch3 – Methods in calculus, differentiating and integration inverse trig functions. CP2, Ch4 – Volumes of revolution, including parametrics. FM1, Ch3 – Elastic Strings and springs. FM1, Ch4 – Elastic collisions in one dimension. D1, Ch4 – Route inspection problem. D1, Ch5 – Travelling salesman problem. FP1, Ch2 – Conic Sections 1. FP1, Ch3 – Conic sections 2.
6th Section test.	Preparation for Mocks in January.

Spring Term 1	Spring Term 2
CP2, Ch5 – Polar Coordinates. CP2, Ch6 – Hyperbolic functions. FM1, Ch5 – Collisions in two dimensions. D1, Ch6 – Linear programming. D1, Ch7 – Simplex algorithm. FP1, Ch5 – t-formulae, Trigonometry. FP1, Ch6 – Taylor Series. 7th Section test.	CP2, Ch7 – Methods with differential equations. CP2, Ch8 – Modelling with differential equations. D1, Ch8 – Critical path analysis. FP1, Ch8 – Numerical methods. FP1, Ch9 – Reducible differential equations. Optional modular tests.
Summer Term 1	**Summer Term 2**
Revision and Examination technique	Public Examinations

Please note that this timeline may be subject to change.

Assessment and Feedback

All students will:
• Have at least one piece of assessed work reviewed by their teacher per half-term (this increases to two pieces of assessed work if students receive five or more taught hours per fortnight).
• Receive feedback which outlines how they should develop their learning. This feedback should be summative, highlighting both key strengths and key areas for development in students' work.
• Be given the opportunity to act upon their feedback in a structured task. This task should then be reviewed again by the subject teacher. A review of this task can act as the second assessed task.
• Have at least one topic/section test per half term. These will be reviewed in lessons after each test.

Resources to support learning beyond the classroom

Pearson Edexcel AS and A level Mathematics (2017) | Pearson qualifications

All past exam papers can be found on the Pearson Website. You can also find copies of the Large data set and the A level formula book.

Physics Revision - PMT (physicsandmathstutor.com)

This is a useful website. Past exam papers from all exam boards can be found as well as extra resources. Past exam questions have also been organised into different topics to make it easier to revise.

DrFrostMaths.com

This is a free online resource. You can find many pre planned lessons and explanation videos on the website, as well as worksheets.