

## Key Stage 5 Curriculum Map - Maths

The maths curriculum provides the most general A-level possible. The intention is to give students the best possible chances to progress to their chosen career or higher education path. Two thirds of the content is pure mathematics and the remaining content is equally divided between Statistics and Mechanics. This gives students a spring board for progressing in a variety of directions. Examinations have the same structure. Mechanics is useful if their interest is in the sciences or engineering. Statistics is useful if their interest is in social sciences. Data analytics is a growing area in the jobs market and we are starting to see some interest from some students in this direction. The further maths curriculum gives students a chance to study all these areas in much more depth and also optionally to study Decision mathematics. This is a collection of topics of mathematics that crop up in many sciences, social sciences and also in business management.

The mapping below shows roughly when topics are taught and is subject to changes for each individual class progresses. Flexibility allows classes to progress at a suitable pace.

**Each topic has an assessment** completed by students as independent study. Each assessment is equivalent to an exam paper on that topic usually using questions at 3 levels of difficulty.

|         |        | AUTUMN 1   | AUTUMN 2  | SPRING 1   | SPRING 2  | SUMMER 1   | SUMMER 2  |
|---------|--------|--|---|--|---|--|---|
| Year 12 | Topic  | <p><b>Algebra: Indices and surds: substitution; rearranging to index form; laws of indices, solving index equations; Calculations with surds</b></p> <p><b>Coordinate geometry: linear model; circles model; Graphs and equations: transformations; factor theorem; graphs and roots of cubics, quartics, reciprocal functions</b></p> | <p><b>Algebra: solving quadratics; disguised quadratics</b></p> <p><b>Algebra: Inequalities and equations; Discriminant problems;</b></p> <p><b>Trigonometry: graphs; equations; identities; Binomial expansion: integer powers; applications</b></p> <p><b>Proof: methods of proof</b></p> | <p><b>Differentiation 1: Tangents and normal; The second derivative</b></p> <p><b>Integration 1: constant of integration; trapezium rule</b></p> <p><b>Graphs of trig functions; Solving multi-step Trig equations</b></p> <p><b>Logarithms and growth functions</b></p> <p><b>Trial exam revision</b></p> | <p><b>- Differentiation 2 optimisation</b></p> <p><b>- Integration 2 Areas under graphs; Modelling with Calculus</b></p> <p><b>Mechanics:</b></p> <p><b>- Kinematics graphs</b></p> <p><b>- SUVAT model of constant acceleration</b></p> <p><b>- 2D motion under gravity (A2 content)</b></p> <p><b>Statistics</b></p> <p><b>- Sampling methods</b></p> <p><b>- Presenting and summarising data</b></p> | <p><b>Mechanics:</b></p> <p><b>Forces; Resolving forces in equilibrium; Resolving forces in dynamic problems</b></p> <p><b>Statistics:</b></p> <p><b>- Probability</b></p> <p><b>- Binomial distribution model</b></p> | <p><b>- catch up</b></p> <p><b>Mechanics:</b></p> <p><b>- Connected particle problems</b></p> <p><b>- Kinematics variable acceleration model</b></p> <p><b>Statistics:</b></p> <p><b>- Hypothesis testing</b></p> <p><b>Trial exam revision</b></p> |
|         | Assess | Topic tests  | Topic tests   | Topic tests<br>Trial exams   | Topic tests<br>Practice AS exam   | Topic tests<br>Practice AS exam  | Topic tests<br>Trial exams  |

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|         |        | AUTUMN 1  | AUTUMN 2   | SPRING 1  | SPRING 2  | SUMMER 1   | SUMMER 2 |
|---------|--------|---|--|---|---|--|----------|
| Year 13 | Topic  | <b>Mechanics:</b><br>- moments; moments at an angle<br>- Friction and forces; connected particles<br><br><b>Statistics:</b><br>- Correlation and regression; hypothesis testing<br>- normal distribution model; approximate modelling; hypothesis testing<br><br>- Functions; domain and range; transformations; modulus functions; inequalities; graphs; | - Trigonometry: Radians; Reciprocal trigonometric functions; trigonometric equations and graphs<br><br>- Series and sequences: arithmetic model; geometric model; infinite series; sigma notation; real world modelling<br><br>Trial exam revision | <b>Calculus:</b><br>- Differentiation rules; Rates of change; substitution methods for integration; calculus with trigonometric and logarithm functions<br><br>Binomial expansion with infinite series; methods of proof<br><br>Parametric equations: calculus and parametric equations | <b>Calculus:</b><br>- Integration: with trigonometric and logarithm functions; Integration by parts; trapezium rule<br><br>- 3D vectors<br><br>- Numerical methods: Newton Rapson rule for finding roots<br><br>Trial exam revision | Catch up<br><br>- Differential Equations<br><br>Revision lessons where time allows | N/A      |
|         | Assess | Topic tests<br>Practice A2 exam paper   | Topic tests<br>Trial exams   | Topic tests<br>Practice A2 exam paper   | Trial exams   | Actual Exams   |          |