

**A-Level Further Maths A level Guide**

**How Maths will be taught:**

You will have 5 lessons a week with one teacher.

Initially we will be focusing on the Pure units, once this is complete we will teach the option modules of Mechanics and Discrete.

Lessons will consist of explanations and examples of the chapter being taught. Lessons will have some time available for exercise completion; however, the majority of this will be done outside of lessons as homework. There will also be lesson time available to consolidate and go through the exercises done outside of classroom where needed.

At the end of each chapter an assessment will happen in class, you will be expected to revise for this and there will be time to go through any issues after if required.

**Working expectations:**

In class you will be expected to follow the examples and complete the course notes. You will then be set exercises of work to complete; these should be done with full working solutions shown clearly and all work should be handed in neatly with a title and marking completed.

**What 100% effort in this subject looks like:**

Completing all exercises set on time, do not fall behind it can get out of hand in maths very quickly due to the amount of practice expected. Marking of work and correcting errors in green pen will happen prior to handing in. Seeking help when you are struggling and not leaving questions in exercises incomplete, maths is a series of building blocks, leaving gaps in your knowledge early on leads to difficulties later.

**Folder Policy:**

You will be provided with a pocket folder to keep your course notes and examples in. This should be with you every lesson as you may need to look back on previous topic notes as you progress through the course.

You may then keep you completed exercises in a separate folder, you provide yourself, this should be clearly labelled into the sections, it does not need to be with you every lesson.

**What marking looks like:**

You will be expected to mark the exercises yourself before handing them in. The class teacher will then look through your work, ensure all required working steps are seen and correct and then identify any class issues to go through.

Assessments, either chapter assessments or unit assessments, will be marked by the teacher and allocated a grade.

**What homework looks like:**

You will be set exercises of work to complete which consolidate the topics taught in class. These will range in length; however, they are designed to emphasise understanding and interpretation rather than mere routine calculations. The exercise questions are split into 3 sections. Band 1 questions are designed to reinforce basic understanding, Band 2 questions are broadly typical of what might be expected in an examination, some of them cover routine techniques other are designed to provide some stretch and challenge. Band 3 questions explore round the topic and some are more demanding.

**Specification at a glance:**

|  |  |  |
| --- | --- | --- |
| **Pure Maths** | **Mechanics**  | **Mechanics** |
| * Matrices
* Introduction to Complex Numbers
* Roots of Polynomials
* Conics
* Hyperbolic Functions
* Sequences, Series, Induction and Limits
* Further Calculus
* Complex Numbers and Geometry
* Polar Coordinates
* Rational Functions and Further Algebra
* Vectors and 3D space
* Numerical Methods
* 1st and 2nd order Differential Equations
 | * Kinematics
* Motion in More Than One Dimension
* Forces and Motion
* A Model for Friction
* Work, Energy and Power
* Impulse and Momentum
* Circular Motion
* Hooke’s Law
* Dimensional Analysis
* Moments of Forces
* Centre of Mass
 | * Graphs
* Networks
* Linear Programming
* Critical Path Analysis
* Network Flows
* Game Theory
* Binary Operations and Group Theory
 |

**Summer preparation**

The purpose of giving you a summer bridging task is:

1. To provide a bridge from level 2 to level 3 study, and lead into the early stages of the course.
2. To engage you in independent learning which is required at level 3.
3. To encourage you to develop your work ethic and commitment to study.
4. To measure your suitability for the course and assess your initial levels of achievement.

**Task 1**:
There are many mathematicians you will meet throughout the course and it will be important to know which area of Mathematics they developed and how they interlink. You will need to research each of the Mathematicians included in the table below. Find out the following:

* When did they live?
* Where are they from?
* What Mathematics did they develop?
* What developments did their contributions lead to?
* Any other interesting facts about them?

|  |  |  |  |
| --- | --- | --- | --- |
| James Sylvester | Arthur Cayley | Leonhard Euler | Josiah Willard Gibbs |
| Oliver Heaviside | Euclid | Car Friedrich Gauss | Blaise Pascal |
| Liebniz | Descartes | Isaac Newton | Charles Babbage and Ada Lovelace |

**Task 2:**

It is essential that you have a love for solving maths problems, try completing the following puzzle numbers in Professor Povey’s Perplexing problems:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1.1 | 1.2 | 1.6 | 1.7 | 1.12 | 1.16 | 2.2 | 2.3 | 2.11 | 14.1 |

You can find the book here: <https://mrvahora.files.wordpress.com/2015/07/poveys-perplexing-problems.pdf>

Keep this link handy throughout your time taking Further Maths and you will be able to try some of the other problems too.

**Please bring your work with you to your first lesson.**

**Books you may consider reading:**

There are lots of popular maths books out there, these will allow you to explore Mathematics and appreciate the beauty of the subject.

A very short introduction to Mathematics – Timothy Gowers

There are a number of books by Ian Stewart - Any of them I would recommend

 The Simpsons and their Mathematical Secrets – Simon Singh

Humble Pi – Matt Parker

**Link to the Specification:**

<https://filestore.aqa.org.uk/resources/mathematics/specifications/AQA-7367-SP-2017.PDF>