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**A-Level Physics A level Guide**

**How Physics will be taught:**

A-level Physics combines practical skills, observations, theories and knowledge of mathematics. Key concepts are taught face to face though a mixture of video clips, presentations and practical work. There will be a lot of questioning to ensure comprehension, discussion and practical work. All students have access to an online textbook, support sheets, checklists and support with exam questions (on your marks). The course culminates in 3 exams with an option module making up 100% of the assessed course; therefore, the method of assessment will be a practise exam at the end of each topic.

**Working expectations:**

You are expected to put as many hours into A level Physics outside of lessons as you would in lessons; this amounts to approximately 4.5 hours including homework. A level Physics is primarily about applying your Physics knowledge and maths skills to novel situations, thus you need to be reading and writing in the subject; firstly in your free periods you should be going back over the lesson using the guide given to you at the start of the year and then using the textbook on Kerboodle making more detailed notes. Then complete any homework questions.

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

* Working for the same amount of time in and out of lessons.
* Always re-write your lesson notes using the online textbook.
* Use the Kerboodle checklists to ensure thorough notes.
* Any areas that you are not sure on go onto Kerboodle and get the support sheets.
* Use website with past paper questions, such as Maths and Physics tutor to supplement your notes and practise exam questions.
* Wider reading in the subject, such as reading Physics review.

**Folder Policy:**

*Your folder should have:*

* Organised into chapters and units shown in the KS5 guide, NOT by teacher.
* Glossary printed off.
* All marked work should be at the front of each chapter they relate to as when revising it is better to focus on the areas which you are not as sure of.
* All end of topic tests and unit tests which are marked will be kept at a school folder and will be given at the end of the year before the exam period.

**Laboratory Book Policy:**

At the end of Year 2 you will either pass or fail your Common Practical Assessment Criteria (CPAC) which is based on the practical work you complete in Physics.

*Your lab book should have minimum:*

* Number EVERY page.
* PROUD science expectations (inside cover).
* Lab book expectations (page 1).
* Health and safety agreement – safety rules (page 2).
* Contents page (pages 3-4).

*From access to the school shared drive in the back of the lab book:*

* References.
* Tables and Graphs.
* AQA Glossary of terms.
* Physics apparatus techniques and required practical (Physics AT and RP).
* NUAST common practical assessment criteria (CPAC) evidence.

It is the students responsibility however teachers will support these by sharing which CPAC criteria will be examined and feedback, these are built upon throughout the 2 years.

**What Marking looks like:**

* Ordinary class notes are not marked, as there is nothing to assess.
* Some homeworks that are gathering of information will be checked visually but not graded or specifically marked.
* Homeworks that involve your thinking and analysis will be marked with scores/grades.
* Lab books will be assessed on the CPAC criteria as either red (missed a section) /amber (working towards) or green (met the criteria).
* End of topic tests and unit tests will be marked and a directed improvement reflective task (DIRT) associated to help improve knowledge/understanding.

**What Homework looks like:**

* Exam questions
* Group poster presentation
* Research tasks
* Modelling
* Group or pair assignment

**Specification at a glance:**

8 units over 2 years:

1. Measurements and their errors

Content in this section is a continuing study for a student of physics. A working knowledge of the specified fundamental (base) units of measurement is vital. Likewise, practical work in the subject needs to be underpinned by an awareness of the nature of measurement errors and of their numerical treatment. The ability to carry through reasonable estimations is a skill that is required throughout the course and beyond.

1. Particles and radiation

This section introduces students both to the fundamental properties of matter, and to electromagnetic radiation and quantum phenomena. Teachers may wish to begin with this topic to provide a new interest and knowledge dimension beyond GCSE. Through a study of these topics, students become aware of the way ideas develop and evolve in physics. They will appreciate the importance of international collaboration in the development of new experiments and theories in this area of fundamental research.

1. Waves

GCSE studies of wave phenomena are extended through a development of knowledge of the characteristics, properties, and applications of travelling waves and stationary waves. Topics treated include refraction, diffraction, superposition and interference.

1. Mechanics and materials

Vectors and their treatment are introduced followed by development of the student’s knowledge and understanding of forces, energy and momentum. The section continues with a study of materials considered in terms of their bulk properties and tensile strength. As with earlier topics, this section and also the following section Electricity would provide a good starting point for students who prefer to begin by consolidating work.

1. Electricity

This section builds on and develops earlier study of these phenomena from GCSE. It provides opportunities for the development of practical skills at an early stage in the course and lays the groundwork for later study of the many electrical applications that are important to society

1. Further mechanics and thermal physics (A-level only)7. Genetics, populations, evolution and ecosystems (A-level only)

The earlier study of mechanics is further advanced through a consideration of circular motion and simple harmonic motion (the harmonic oscillator). A further section allows the thermal properties of materials, the properties and nature of ideal gases, and the molecular kinetic theory to be studied in depth.

1. Fields and their consequences (A-level only)

The concept of field is one of the great unifying ideas in physics. The ideas of gravitation, electrostatics and magnetic field theory are developed within the topic to emphasise this unification. Many ideas from mechanics and electricity from earlier in the course support this and are further developed. Practical applications considered include: planetary and satellite orbits, capacitance and capacitors, their charge and discharge through resistors, and electromagnetic induction. These topics have considerable impact on modern society.

1. Nuclear physics (A-level only)

This section builds on the work of Particles and radiation to link the properties of the nucleus to the production of nuclear power through the characteristics of the nucleus, the properties of unstable nuclei, and the link between energy and mass. Students should become aware of the physics that underpins nuclear energy production and also of the impact that it can have on society.

**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. iii. To encourage you to develop your work ethic and commitment to study. iv. To measure your suitability for the course and assess your initial levels of achievement.

**Task 1**:

**Physics Induction**

**Using Symbols**

An **equation** is a mathematical model that sums up how a system behaves. For example, we know that, if we have a current flowing through a wire and double the voltage, the current will double as well. We know that the quantities of current and voltage are related by the simple rule:

*V = IR*

In physics problems we are given certain quantities and use them to find an unknown quantity with an equation. Always in every problem you will have only one unknown. At AS level you will never be expected to tackle a problem with two or more unknowns. That said you may need to look up some quantities from the data sheet.

There are some basic equations that you will have to learn for the exams. These are written down for you at the back of the **Physics Guide**.

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| 1. Write down three equations that you can remember from GCSE (3) |
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**Symbols**

In GCSE you were often given equations in words:

Distance (m) = speed (m/s) × time (s)

You will notice from the data sheet at the end of these notes that the equations are given in **symbols**, which in my notes I refer to as **Physics Code**. The symbols all mean something; they are abbreviations. The symbols used in exams and most textbooks are those agreed by the Association of Science Education.

Some symbols are easy; *V* stands for voltage. Some are not so easy. *I* for current comes from the French *intensité du courant*, since it was a French physicist who first worked on it. In print you will always find the codes written in *italics*. In my notes, I do try to, but sometimes I miss it. As you can’t do italics in normal handwriting, then don’t worry.

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| 2. What are the meanings for these symbols? (7) |
| *a* |
| *A* |
| *F* |
| *m* |
| *I* |
| *p* |
| *Q* |

**Task 2:**

Visit, explore and save the following YouTube channels for future reference:

* Veritasium
* DrPhysicsA
* Minutephysics
* iitutor.com
* Kurzgesagt
* PBS Spacetime
* Physics Girl
* Sixty Symbols

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

**Potentially useful websites:**

<https://www.senecalearning.com/>

[https://www.physicsandmathstutor.com/Physics-revision/a-level-aqa/](https://www.physicsandmathstutor.com/biology-revision/a-level-aqa/)

**Link to the AQA Physics Specification:**

<https://filestore.aqa.org.uk/resources/physics/specifications/AQA-7407-7408-SP-2015.PDF>