

Physics B (Advancing Physics) – Student Guide for Advanced Subsidiary/Advanced GCE Specifications

Physics is the study of the properties and interactions of matter and energy. Our understanding of many features of the everyday world relies on knowledge drawn from the ideas and methods of physics. In this course the basic principles of physics are introduced and, through example, placed in the context of the world in which physics is used. At a later stage you will be considering the different scales of physicist's interests, from planets to atoms. Advancing Physics is a new course supported by text books, CD-ROMs and a website for both students and teachers. It can be taken at AS level as part of a broad programme following GCSE. This also forms a solid foundation for continuation to the Advanced GCE award. Advancing Physics is a science course and therefore has a practical component.

Before starting this course

You should have studied Science to Intermediate level (either Double Award Science GCSE or Science GNVQ Intermediate) or Physics to GCSE.

Subjects that go well with Physics at AS or Advanced Level include Mathematics, Chemistry, Biology, Economics or Geography. You may wish to broaden your studies and combine AS Advancing Physics with Humanities or Modern Languages.

With a qualification in Physics you could go onto Further or Higher Education, studying Physics or Engineering, one of the other sciences or a variety of other subjects; or you could go on to work in a science-based industry or business.

This subject has 6 Units of Assessment:

- To get a certificate for Advanced Subsidiary (AS), you will need to have studied and been assessed on three AS units.
- To get a certificate for Advanced GCE, you will need to have studied and been assessed on the three AS Units, together with three further units, known as A2 units.

Before taking the AS units of assessment you will study the following modules of work:

Module A Physics in action

This module is in two parts. Communication looks at collecting, presenting, shaping, analysing and transmitting information. Imaging is considered in a

variety of contexts including medicine and astronomy. Ideas about electricity are used to look at sensing – the way in which data is collected for use in a wide variety of applications. Information is frequently transmitted digitally and through electromagnetic waves.

The second half of the module, Designer materials, covers a wide range of kinds of materials and of uses of materials. You will look at selecting natural and human-made materials for a job, including: metals, ceramics, glasses, polymers, fibres, wood. You will think about how materials behave and why.

A 90 minute written examination (unit of assessment) will test your understanding of this module.

Module B Understanding processes

This second part of the AS course turns towards understanding the different ways that we think about change in physics.

Wave and quantum behaviour is about trying to understand the true nature of light – a story from history, passing from the ideas of Huygens and Newton via Young and Fresnel, to the modern quantum perspective.

Space and time starts by thinking about journeys and how we describe them using graphs and charts. Vectors are introduced and used to think about what happens when moving objects accelerate.

A 90 minute written examination (unit of assessment) will test your understanding of this module.

Practical and investigative work and Key Skills

Throughout the AS course you will have been developing your practical and investigative skills as well as other key skills. The assessed coursework will reward these skills. You will be asked to carry out three short tasks: a project to investigate a sensor, a presentation about a material that interests you and an analysis of some experimental data. You may find that these tasks can also be counted towards your Key Skills Portfolio.

Before taking the A2 units of assessment you will study the following modules of work:

Module D Rise and fall of the clockwork Universe

Models and rules introduces some simple computer models to show how mathematical rules can be used

to predict the future. The section then goes on to the story of our exploration of the planets and we look at evidence for the idea of an expanding Universe. Finally, we think about where ideas about relativity come from.

Matter in extremes begins with a simple model of a gas and uses the predictions of simple chaos to think about energy and energy conservation. The module ends by looking at extreme temperatures from the very cold to the very hot.

A 70 minute written examination (unit of assessment) will test your understanding of this module.

Module E Field and particle pictures

Fields covers both magnetic and electric fields. You will find out how electromagnetic machines work and deliver power. You will consider the design of the accelerators that use electric and magnetic fields to move charges.

Fundamental particles of matter begins by looking at how physicists 'see' inside atoms and molecules to develop our ideas about the fundamental particles. Moving out slightly, the Module finishes by thinking about the ways in which we use ionising radiation and how we manage the risks that use implies.

A 70 minute written examination (unit of assessment) will test your understanding of this module.

Module F Advances in physics

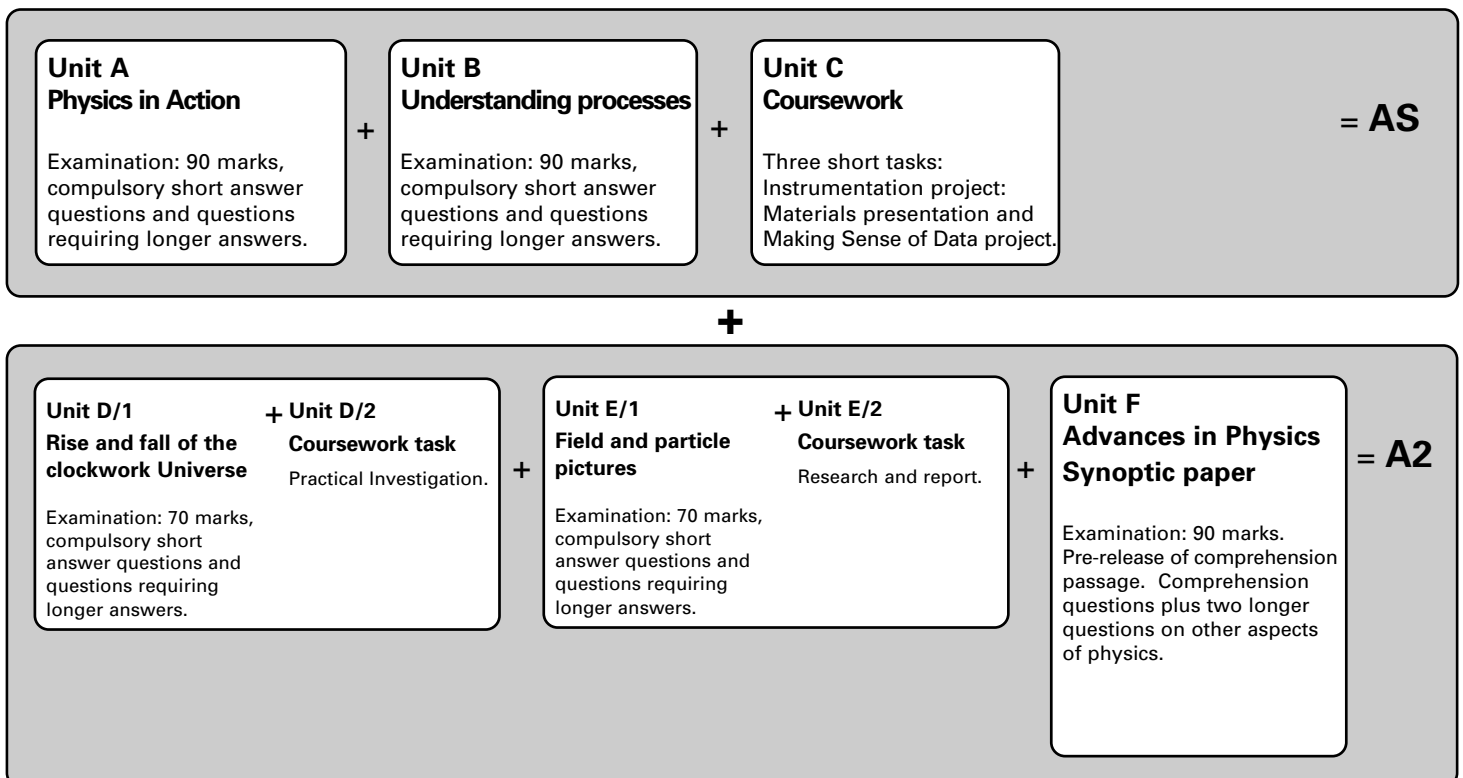
You will look at a variety of case studies in which ideas from physics work together to solve a problem.

A 90 minute written examination will test the knowledge, understanding and skills you have learnt throughout the course. The paper will include a comprehension passage which you will receive some weeks before the examination, so that you have an opportunity to prepare for the paper.

Practical and investigative work

Your practical, investigative and research skills will have developed further during the second year of the course. The assessed coursework will reward these skills. You will be asked to carry out two tasks: a practical project to investigate a Physics problem of your choice and a Research Report into an aspect of Physics which interests you. You may find that these tasks can also be counted towards your Key Skills Portfolio.

The assessment structure for Advancing Physics is:



For more information, please view the OCR website: www.ocr.org.uk

or contact OCR Information Bureau 01223 553998 at OCR Head Office, 1 Hills Road, Cambridge CB1 2EU.