

A Student's Guide to the AS and A level in

Physics

What do I need to know or be able to do before taking this course?

The qualification builds on the knowledge, understanding and process skills that you will have developed in GCSE Science. Students are expected to have achieved at least a GCSE Grade C in Physics or CC in Science (Double Award) or an equivalent National Curriculum level Intermediate GNVQ. It will be very helpful to have at least a grade C in GCSE Mathematics as numeracy and mathematical skills are important in Physics. Communication is also important in Physics so you will need to be able to communicate effectively, be able to research and critically think about problems.

You will learn theory and develop relevant practical skills throughout the course.

What will I learn on this A Level course?

A level physics aims for students to:

- ◆ sustain and develop their enjoyment of, and interest in, physics
- ◆ develop essential knowledge and understanding in physics
- ◆ develop the skills needed for the use of this knowledge and understanding in new and changing situations where appropriate
- ◆ develop an understanding of the link between theory and experiment
- ◆ appreciate how physics has developed and is used in present day society
- ◆ show how physics links with social, philosophical, economic, industrial and environmental matters
- ◆ recognise the quantitative nature of physics
- ◆ understand how mathematical expressions relate to physical principles
- ◆ bring together knowledge of ways in which different areas of physics relate to each other
- ◆ study how scientific models develop.



What kind of student is this qualification suitable for?

A level physics is suitable for students who:

- ◆ have an interest in, and enjoy physics;
- ◆ want to find out about how things in the physical world work;
- ◆ enjoy applying their mind to solving problems;
- ◆ enjoy carrying out investigations by the application of imaginative, logical thinking;
- ◆ want to use physics to support other qualifications or progress onto further studies or employment.

AS physics is also suitable for students who:

- ◆ want to go on to the full A level;
- ◆ want a grounding in a relevant worthwhile qualification of recognised value;
- ◆ want to broaden their educational experience before making a decision about which A levels to take;
- ◆ are taking A levels in the other Sciences and/or Mathematics or other relevant courses such as Design and Technology and want to take another course that will support their studies.

What examinations will I have to take to get my qualification?

The AS is a qualification in its own right. You study three units in the AS.

The full A level is made up from the AS level and three more units.

You can take the full A level in three ways:

1. Taking first the AS and then the A level
2. Taking all the units at the end of the course
3. Taking some units during the course and some at the end.

You have to take the synoptic unit at the end of the A level course.

This table shows you the examinations you will take and the % each unit is worth of either the AS or the A level:

Component			Duration	AS	A level
1	Unit Test	AS and A level	1 h 20 min	30%	15%
2	Unit Test	AS and A level	1 h 20 min	30%	15%
3	Topics Test and Practical Test	AS and A level	45 min	20%	10%
			1 h 30 min	20%	10%
4	Unit Test	A level	1 h 20 min	-	15%
5	Unit Test and Practical Test	A level	1 h 00 min	-	7.5%
			1 h 30 min	-	7.5%
6	Synoptic Test (Terminal Unit)	A level	2 h 00 min	-	20%

What is in the units?

AS

AS is short for Advanced Subsidiary. This is the first half of the A Level course. It is a stepping-stone to the full A Level qualification. You can take just the AS on its own, if you and your teacher agree that this is best for you. You can even decide at the end of the AS course whether to continue to take the full A Level qualification. You study three units in the AS:

Unit 1 – Mechanics and Radioactivity

This unit leads on from GCSE studies and covers rectilinear motion, forces and moments, Newton's first and third laws, dynamics, momentum, Newton's second law, mechanical energy, radioactive decay and the nuclear atom.

Unit 2 – Electricity and Thermal Physics

This unit includes electric current and potential difference, electrical circuits, heating matter, specific heat capacity, specific latent heat, temperature, kinetic model of matter, conservation of energy, the first law of thermodynamics and efficiency.

Unit 3 – Topics and Practical Test

You will study from a choice of topics for this unit. One topic is chosen from: astrophysics, solid materials, nuclear and particle physics and medical physics.

Also, you sit a practical test. The practical test and the assessment of the topics will take place on different days.

A Level

The full A Level qualification is made up of the AS units plus three more units which are studied at a higher level. You don't necessarily have to take the full A Level qualification; you can still get a certificate just for the AS, and your teacher will advise you on what is best. If you do decide to take the second half of the course it will cover the three units described below.

Unit 4 – Waves and Our Universe

This unit includes circular motion and oscillations, simple harmonic motion, waves, superposition of waves, quantum phenomena and the expanding Universe.

Unit 5 – Fields and Forces and Practical Test

The first part of this unit covers gravitational fields, electric fields, capacitance, magnetic fields, and electromagnetic induction.

The second part of this unit is a practical test. The practical test and the unit test will take place on different days.

Unit 6 – Synoptic Unit

A synoptic unit means you draw together knowledge and understand and skills from throughout the course.

It contains the following content which is assessed synoptically: analogies in Physics - comparison of springs and capacitors, comparison of electric and gravitational fields, comparison between capacitor discharge and radioactive decay; accelerators - conservation of mass-energy, linear accelerators, ring accelerators and detecting particles.

Also, there are synoptic questions which tests content from anywhere in the specification (but not from the Topics).

How can I develop my full range of skills by doing this qualification?

As well as studying A level Physics, this course will enable you to develop some Key Skills. These Key Skills will be essential to you whatever you go on to do afterwards. You can develop all the Key Skills when you study physics.

The Key Skills are in two groups:

1. three that form the Key Skills qualification which is worth the same as an AS
2. three more that are called wider Key Skills – these are very important to show skills that are valued by Higher education and by employers

The Key Skills Qualification	The Wider Key skills
Communication	Working with others
Application of number	Improving own learning and performance
Information technology	Problem solving

Examples of Key Skills Development in Physics

Communication

- ◆ Taking part in discussions about investigations or issues
- ◆ Preparing written documents for your practical work
- ◆ Researching from books, CD-ROMs and the Internet

Application of number

- ◆ Planning to collect results from your experiments and investigations and analysing and presenting them in a suitable way
- ◆ Carrying out calculations on the data collected in experiments and investigations
- ◆ Interpreting the results from experiments and seeing how this relates to your plan

Information technology

- ◆ Researching from CD-ROMs and the Internet
- ◆ Using word processing software to present written reports and prepare presentations about an investigation or an issue you have researched
- ◆ Plan and design a spreadsheet to support your experiments, be able to select a suitable graphical format to show trends and patterns in your data

Working with others

- ◆ Discussing in a group to plan a task such as a plan for an investigation or a presentation to the group
- ◆ Deciding who does what in the group and successfully completing the task by working co-operatively
- ◆ Reviewing the task and agreeing ways that you could have co-operated even better in your group

Improving own learning and performance

- ◆ Setting targets with a timetable to improve your learning or skills
- ◆ Seek support and use different ways of learning
- ◆ Monitoring the marks awarded for your work and taking action to improve them

Problem solving

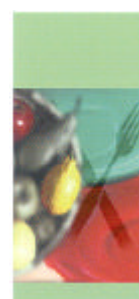
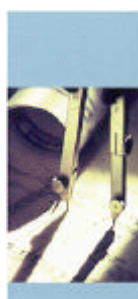
- ◆ Planning an investigations into some aspect of physics to answer a question
- ◆ Working out at least two different ways to solve a problem
- ◆ Carrying out one of your plans and consider how well it is going so far
- ◆ Deciding how to evaluate your plan and doing so

What could I go on to do at the end of my course?

Physics leads on to a wide range of courses and careers. You could go on to use Physics to support other qualifications or progress onto further studies or employment. This could be:

- ◆ from a Higher National programme (HNC & HND) to degree level;
- ◆ courses ranging from Physics, the Sciences, Medicine to Engineering;
- ◆ Chemical Engineering and related programmes;
- ◆ employment in the area of radiography, and biotechnology as possible examples.

In fact Physics is recognised as an entry qualification for a wide range of Higher Education courses and employment.



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