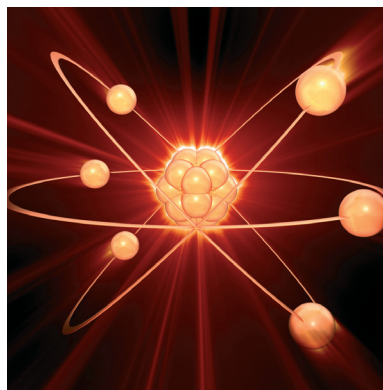


Physics



Examination Board: AQA



■ What is the course about?

The course is designed to encourage students to progress smoothly from previous GCSE studies in Physics and develop an in-depth knowledge and understanding of the principles of physics. Students gain hands-on practical skills and data-analysis skills as well as an appreciation of how science works and its relevance beyond the laboratory. The course develops links to other sciences and shows how the subject underpins important technologies.

■ In Year 12 you will study:

1. Particles and Quantum Phenomena: The course starts with the exciting topic of particle physics. Students learn about the classification of matter into hadrons (baryons, mesons) and leptons (particularly electrons, muons, neutrinos) and how the four fundamental forces hold the Universe together. Quark theory and quantum mechanics are also included, giving students an up-to-date knowledge and understanding of cutting-edge developments in particle physics.

2. Waves: Students study the properties of waves including polarization, reflection, refraction, diffraction and interference patterns – the applications of which are vast and far reaching in this modern information era.

3. Mechanics: This topic includes Newtonian mechanics so students study velocity, acceleration, forces, momentum and energy. The P2 module from GCSE physics provides an excellent starting point to develop these concepts further, while turning moments and projectile motion are introduced as well.

4. Materials: The properties of materials section explores elasticity, ductility, the Young Modulus and the use of materials in the world around us.

5. Electricity: In this section the circuit work at GCSE is developed further and includes series and parallel circuits, resistance, resistivity, Emf and internal resistance as well as alternating-current theory.

■ In Year 13 you will study:

6. Further Mechanics and Thermal Physics: The first section introduces circular and oscillatory motion. This is followed by the thermal properties of materials, concentrating on the properties and nature of gases in particular.

7. Fields and their Consequences: Gravitational, electric and magnetic fields are covered, together with basic electromagnetic induction. Gravitational fields are linked into the orbits of satellites while electric fields lead into capacitors. Magnetic fields is developed into the generation and transmission of alternating current.

8. Nuclear Physics: This section looks at the characteristics of the nucleus, the properties of unstable nuclei and how energy is obtained from the nucleus.

9. Options:

This final section offers an opportunity to study one of the following optional topics to gain deeper understanding and awareness of a particular branch of interest in physics:

- A) Astrophysics
- B) Medical physics
- C) Engineering physics
- D) Turning Points in physics
- E) Electronics

■ How is the course assessed?

Three written papers, each two hours in length.

Paper 1 and Paper 2: two hours each, 60 marks of short- and long-answer questions and 25 multiple choice questions on content.

Paper 3: two hours splits into two sections:
Section A (compulsory): practical skills and data analysis
Section B: Students enter for medical physics (45 marks of short- and long-answer questions on practical experiments and data analysis, and 35 marks of short- and long-answer questions on optional topic).

■ What skills will I need and develop in this course?

Desirable skills are: an open and inquisitive approach to learning; problem solving and the confidence to take risks; IT skills; numerical skills, practical skills and an ability to express complex scientific ideas in straightforward ways. All these skills are encouraged and developed over the duration of the course.

■ Subject combination advice

We recommend maths A Level as this helps with the mechanics sections as well as the manipulation of equations. Candidates can, however, successfully study physics with a range of other subjects, e.g. chemistry, biology, psychology, geography, computer science, business studies.

■ What can the course lead to in terms of higher education and future careers?

Physics A Level develops a range of skills that are transferable to a number of careers. As well as learning about how the universe works, you will gain a broad training in skills that all employers value – an ability to grasp concepts quickly, a determination to find coherent answers, not to mention problem-solving, analytical, mathematical and IT skills. Possible career paths include: scientific research, geophysics and the oil industry, energy and in particular renewable energy development, IT data analysis, programming, web design, banking and accountancy, medical physics, and radiology. It is excellent preparation for any career in engineering.

■ What are the formal entry requirements?

Physics GCSE Grade 6, combined science Grade 7 and GCSE maths Grade 6.

■ What activities enrich this subject?

Biannual physics trip to the Large Hadron Collider in CERN Geneva.