WHY STUDY PHYSICS?

Physicists play a vital role in many technology based industries such as optoelectronics, nanotechnology, computing and renewable energy. Others work on investigating the universe, searching for new planets or looking for the remnants of the big bang. Others still go on to apply their knowledge in healthcare (medical physics) studying the processes of the Earth (geophysics) or the climate (meteorology).

The knowledge and skills that studying physics develops are important in other areas as well. Predicting future market behaviour is vital in finance, and so a physicist's ability to model complex systems is particularly valued in this sector, while a logical approach and ability to understand new technology is useful in law, for example, when patenting new inventions.

Physics provides a broad training in skills that are valued by all employers; an ability to grasp concepts quickly, a determination to find coherent answers, along with problem-solving, analytical, mathematical and IT skills.

Even if you decide that you don't want to work in any physics-related industry, the skills and knowledge that you develop by studying physics will always help you in whichever area you go into.

This qualification is linear. Linear means that students will sit all the A-level exams at the end of their two year course.

Paper 1

- Measurements and their errors
- Particles and radiation
- Waves
- Mechanics and materials
- Electricity
- Periodic Motion

Written Exam: 2 hours 34% of A-level

Paper 2

- Thermal Physics
- Fields and their consequences
- Nuclear physics

Written Exam: 2 hours 34% of A-level

Paper 3

- Practical skills and data analysis
- Optional Unit

Written Exam: 2 hours 32% of A-level

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Collingwood College
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PHYSICS

AQA A-LEVEL PHYSICS

appreciate how science works and its relevance beyond the laboratory.....

Summary

This specification is designed to encourage candidates to:

- progress smoothly from previous GCSE studies in physics
- develop in-depth knowledge and understanding of the principles of physics
- gain hands-on practical skills and data analysis skills
- appreciate how science works and its relevance beyond the laboratory
- see how physics links to other sciences and how the subject underpins important technologies

Requirements

To study Physics at A-level you will need a minimum of 5 Grade 4+ (or equivalent) including Grade 6-6 in Combined Science or Grade 6 in GCSE Physics and Grade 6 in Mathematics. Experience shows that your chances of success are greater in this subject if you also study A-level Mathematics.

Year 1 Outline

During the first year, this specification introduces new topics as well as building on previous studies in physics:

Section 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 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.

Section 2: Particles and radiation
This section introduces students both to the fundamental properties of matter, and to electromagnetic radiation and quantum phenomena. Through a study of these topics, students become aware of the way these 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.

Section 3: Waves
GCSE studies of wave phenomena are extended through a development of knowledge of the characteristics, properties and applications of travelling and stationary waves. Topics treated include refraction, diffraction, superposition and interference.

Section 4: Mechanics and materials
Vectors and their treatment are introduced followed by the 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.

Section 5: Electricity
This section builds on and develops earlier study of these phenomena from GCSE. It provides opportunity 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.

Year 2 Outline

Section 6: Further mechanics and thermal physics
The earlier study of mechanics is further advanced through a consideration of circular motion and simple harmonic motion. A further section allows the thermal properties of material, the properties and nature of ideal gases, and the molecular kinetic theory to be studied in depth.

Section 7: Fields and their consequences
The concept of a field is one of the great unifying ideas in physics. The idea 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.

Section 8: Nuclear physics
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.

Section 9-13: Optional Unit
Students will have input into which unit is studied here, from a choice of Astrophysics, Medical physics, Engineering physics, Turning points in physics or Electronics. In the past we have studied Medical Physics or Astrophysics. Medical Physics involves the opportunity to study some of the applications of physical principles and techniques in medicine. In Astrophysics, fundamental physical principles are applied to the study and interpretation of the Universe.