



## Physics

Physics is the experimental study of the physical world. It covers a wide spectrum of the simple phenomena and mathematics that make our universe what it is. Students are taught to think critically about the world and there is a great emphasis on problem solving in the course. Students will learn the fundamentals that govern the behaviour of matter and energy, and will be able to find mathematical solutions to problems.

Where there is no mathematical model, students will develop their ability to interpret physical models and build their explanatory skills in being able to articulate the reason behind physical phenomena.

## Key Stage 3 Science

Physics is divided into a number of topics which span Years 7 to 9. The emphasis is on scientific enquiry, such as scientific evidence and investigative skills, as well as biological knowledge, skills and understanding.

### Year 7

Students in Year 7 will be taught Science by one (or in some cases two) members of staff. Through the Year they will study units in Biology, Chemistry and Physics. Roughly equal lengths of time will be spent studying each discipline over the year.

Many of the skills required to study Biology, Chemistry or Physics are common to all three subjects and so at the start of the year students will study an Introduction to completing investigations.

The Topics that the students will study in Year 7 will be:

Biology	Physics	Chemistry
Cells, tissues and organs Reproduction Ecology	Sound Light Forces	Particles 1 Materials 1 - separating substances Chemical reactions 1

### Year 8

Students in Year 8 continue their study of Science as three separate subjects from now onwards and will have three teachers: one each for Biology, Chemistry and Physics. They will have two Physics lessons per fortnight.

The Topics that the students will study in Year 8 will be:

- Space - which covers the seasons, planets (and their moons) and the laws of gravitation
- Circuits - including serial/parallel arrangements and the particle model of current
- Magnetism and springs
- Energy Basics and the universal understanding of work.

### Year 9

Year 9 Physics includes the completion of the study of Key Stage 3 Science and the start of studying GCSE Physics topics.

Students will be given the opportunity to develop their investigative science skills and start preparing themselves for completing practical work in a formal way. Most of the Key Stage 3 Physics course is completed in years 7 and 8, but some of the topics in Energy Basics which complement the GCSE syllabus, are taught at the beginning of year 9 in the first of topic Understanding Energy.



## Key Stage 4 GCSE Physics

Students will study the AQA GCSE Physics Specification in Years 9, 10 and 11. The specification provides the basis for a wide range of studies which include Forces, Energy, Waves, Electricity, Magnetism and electromagnetism, Particle model of matter, Atomic structure and Space physics. The development of a sound understanding of How Science Works will also be essential to success in the GCSE Sciences. Practical work will be integrated into the teaching of the content of the course and indeed some of the practical tasks carried out are required by the examination board.

The content of the course and practical skills will be assessed through written examinations at the end of Year. More information can be obtained from [www.aqa.org.uk](http://www.aqa.org.uk). The course code is 8463.

## Sixth Form Studies

A level Physics from the OCR Physics A specification) is taught at CCHS, course code H556.

The study of Physics in the sixth form is a good preparation for nearly every career because it teaches you to how to become an adept problem solver and critical thinker.

At Sixth Form level, Physics is very different from GCSE; the increased study time means we can discuss topics in much more detail which makes the subject more interesting but also more demanding due to the large amount of content covered, as well as the demands for greater mathematical competency. Students will only need to learn a small amount of post-GCSE mathematics, most of the problem solving is based around the use of trigonometry and algebra. We have specialised Sixth Form equipment so that experiments can be more detailed and are fortunate enough to hold equipment that many other schools do not, to further aid the learning.

## A level Physics

At A-level students study the OCR Physics A specification. Students taking the subject are encouraged to :

- develop a thorough understanding of the Physics they are studying and an interest in the subject that goes beyond the curriculum.
- appreciate how society makes decisions about scientific issues and how the sciences contribute to the success of the economy, society and the pursuit of scientific knowledge;
- develop and demonstrate a deeper appreciation of the skills, knowledge and understanding of *How Science Works*;
- develop knowledge and understanding of different areas of Physics and how they relate to each other.

The course is a linear in nature and contains content designed to be taught in Year 12 that then builds to support the content taught in Year 13. The only external assessment of the course will come at the end of Year 13 where pupils will sit 3 written examinations that will cover both the theoretical content of the course and also the practical skills they will have developed throughout their 2 years of study. The first 2 written papers tests content and application as well as practical skills. The third paper is a synoptic paper that will bring together many areas of Physics and test the students' ability to apply knowledge to new and unseen scenarios (this will contribute 26% of the final grade).

The course is composed of 6 modules with a prescribed practical component which is called the practical endorsement. There is no traditional internally assessed coursework within the course; however, practical skills can and will be assessed within the written papers and make up to 15% of the marks available in the final examinations.



The practical endorsement is awarded in addition to the A level grade and is rated as pass or not classified. The list below shows an outline of the content of the course. For more information access [www.ocr.org.uk](http://www.ocr.org.uk)

Module	Key content
1: Development of practical skills in Physics	1.1 Practical skills assessed in a written examination (15%) 1.2 <i>Practical skills assessed in the practical endorsement</i>
2: Foundations of Physics	2.1 Physical quantities and units 2.2 Making measurements and analysing data 2.3 Nature of quantities
3: Forces and Motion	3.1 Motion 3.2 Forces in action 3.3 Work, energy and power 3.4 Materials 3.5 Momentum
4: Electrons Waves and Photons	4.1 Charge and current 4.2 Energy, power and resistance 4.3 Electrical circuits 4.4 Waves 4.5 Quantum physics
5: The Newtonian world and Astrophysics	5.1 Thermal physics 5.2 Circular motion 5.3 Oscillations 5.4 Gravitational fields 5.5 Astrophysics and cosmology
6: Particles and Medical Physics	6.1 Capacitors 6.2 Electric fields 6.3 Electromagnetism 6.4 Nuclear and particle physics 6.5 Medical imaging

## Extra-Curricular Physics

The department offers a number of extra-curricular activities including:

- Physics Society (run by Sixth Form prefects).
- Year 10 Science Enrichment day (Scrap heap challenge).
- Year 12 Field trip to Adventure Island (practical applications of mechanics).
- Physics Olympiad (Year 12/13)
- Physics AS Challenge (Year 12)
- Particle Physics trip to Rutherford Appleton Laboratory (Year 13)