

A LEVEL BIOLOGY (OCR)

ENTRY REQUIREMENTS

Biology is a challenging subject at A level and so entry to this course depends on the student gaining a grade B or better at GCSE biology or in both GCSE Science and GCSE additional Science.

COURSE CONTENT

The study of A-level biology allows the students to explore a deep understanding of topics fundamental to our evolution and future survival - from the DNA in our nuclei to the proteins they make; from the heart as a life-giving pump to the fine structure of haemoglobin in the red blood cells. There is also the opportunity to study the inter-dependence of animals and plants in ecology as well as the control of all our vital bodily functions including: breathing and respiration, the kidney and the nervous system.

AS: We follow the **OCR GCE Biology** course which consists of three units, two of which are examined by a written examination paper (Module 1 – 1 hr and Module 2 – 1 3/4 hrs) and a coursework unit which is assessed by three practical tasks.

F211 : Cells, Exchange and Transport

This module looks at the structure of cells and their organelles, the significance of membranes and the transport of substances into and out of cells, as well as the main features of exchange surfaces. It also contains work on the transport systems of mammals and flowering plants in addition to the structure of the mammalian heart and the role of haemoglobin.

F212 : Molecules, Biodiversity, Food and Health

This unit begins with the study of biological molecules, in particular, DNA and enzymes. It also covers biodiversity as well as the principles of taxonomy and the fundamental importance of natural selection to the mechanism of evolution.

F213 : Practical skills (INTERNAL TASKS)

In this unit the examination board provides a range of tasks investigating your ability to carry out practical tasks in lessons, to collect some data and be able to analyse and evaluate it and draw relevant conclusions.

Each of the units presents many opportunities for developing practical and analytical skills as well as inter-personal and group discussion skills. You will be expected to produce individual and group presentations and there will be considerable expectation of wider reading and preparation for lessons and follow-up work at home.

Extension classes are available throughout the course

A2: The course consists of three further units, examined by two synoptic written papers (Module 1 – 1 hour, 15 minutes. Module 2 – 2 hours) and a further series of practical tasks.

F214 : Communication, Homeostasis and Energy

This module has all the best bits of biology – how our nervous and hormonal systems keep our body in control, the role of respiration and photosynthesis in animals and plants, genetics and the rules of inheritance as well as the working of the kidney as an organ of excretion.

F215 : Control, Genomes and Environment

The module examines the importance of animals and plants and their dependence on each other for survival. The ecological aspect of this module offers the development of a huge range of scientific skill both practical and analytical – including the application of statistics to scientific questions.

There is also the opportunity to look at the cellular division basis of variation as well as looking at some of the latest developments in biotechnology and genetic engineering.

Both of the written papers at A2 level require you to be familiar with the content of the previous AS modules examining synoptic content and requiring data-handling and problem-solving skills

F216 : Practical Skills 2 (INTERNAL TASKS)

COMMENTS FROM STUDENTS STUDYING BIOLOGY

“The Biology department have a real passion for teaching the subject and this is transferred us as students. There are a range of teaching styles with teachers using a range of media to bring the subject to life”

“I have found Biology challenging but rewarding. I have enjoyed the dissections and practical tasks. And we have been involved in an extracurricular revision weekend in the Lake District that was really good fun”

A Level Physics (OCR)

What is Physics all about?

Physics is fascinating, stimulating and mind-blowing...it's about how literally everything in the natural world works; it's the ultimate problem solving science. From the Big Bang to the Far Future - to what's inside the atom, from quarks to strings to... who knows?

Physics is literally rocket science: huge telescopes; black holes; aiming to tie up the loose ends between Einstein and quantum physics; it throws up some startling concepts, including the theory that there may actually be eleven dimensions (we just can't see most of them) and particles travelling 'faster' than the speed of light (2011)!

Physics is the fundamental science, looking at the building blocks of matter below atomic level and their weird quantum behaviour. There's plenty of overlap with the other sciences, especially biology, chemistry and medicine, as illustrated by nanotechnology (or miniaturisation).

Am I suited to this course?

Physics is an academic subject and as such you need to have at least a B at GCSE. You should also have good ability in Mathematics. Students with lower grades may be accepted, although they may find the course very challenging.

What will A level Physics give me?

Physics is the basic science of technology and engineering - it drives our modern society - and it is also the most fundamental of the sciences. It also gives you

- A logical, analytical and numerate mind
- The ability to solve problems
- Communication skills
- Computing and practical skills
- Teamwork and flexibility (essential for lab work)

Because of this wide range of skills gained during study, physicists are highly employable and are employed in engineering, medicine, IT, finance (20% of City fund managers are Physics graduates), production management, consultancy, architecture and many other areas. If you are considering a career in any technically related area, then Physics is for you. Even if your interest is purely about how or why nature is the way it is, then you should study Physics.

What will I study?

The A level builds on what you have learnt at GCSE, with a few completely new topics as well. The course has three modules in each year:

AS

Unit 1 (15%) is all about mechanics - the study of motion and forces.

Unit 2 (25%) contains material on electricity, waves and quantum physics (a topic looking at unexpected symmetries of matter and light)

Unit 3 (10%) is a practical module, with no exam, but a series of three tasks based on experiments done in the laboratory.

A2

Unit 4 (15%) contains further mechanics and thermal properties of matter.

Unit 5 (25%) looks at fields, radioactivity, the family of fundamental particles of nature, and frontiers in Physics.

Unit 6 (10%) is another practical module similar to module 3.

What will my lessons be like?

Teaching methods vary and use is made of IT where appropriate. This will give you an excellent grounding in the principles of Physics. Lessons will be in fully equipped laboratories, where you will do lots of experiments with our sixth form apparatus, including using data-loggers and laptops for collecting and manipulating data. Homework will commonly be applying new knowledge, researching new topics and completing past paper material.

How will my performance be assessed?

The four theory units will be assessed by written exam, one 1hr paper and one 1¾ hr paper each year.

The two practical units are assessed with three tasks, set by the exam board and marked by the teacher.

There is no coursework in A level Physics.

AS APPLIED SCIENCE (AQA)

The Applied Science course will allow you to study how science is applied in many different types of professions and industries. The focus of the course is scientific usage, concentrating on how scientists and others use science in their work. You will also learn how science contributes to our lifestyle and the environment in which we live.

You must have a practical interest in, and enthusiasm for, science and you must be able to work independently in order to undertake the amount of portfolio work required to fulfil the demands of the course.

The course will enable you to:

- develop and sustain an interest in, and enjoyment of, science
- appreciate how science develops and the impacts such developments may have in present day society
- develop essential knowledge and understanding relating to science and, where appropriate, the applications of science, and the skills needed for the use of this in new and changing situations
- develop practical skills relevant to science

Entry Criteria

Standard College entry requirements including grade C in GCSE Science (Core and Additional), Maths, and English Language.

AS Course Content

All the units are compulsory. This will ensure that you have a good grounding in biology, chemistry and physics.

The course contains three units:-

Unit 1: Portfolio: Investigating Science at Work

This unit gives you a general introduction to the use of science in the workplace and also details of those people who will use science in their daily work. You will research local organisations that use science and be encouraged to visit a workplace.

- The types of organisations that use science
- How science is used in organisations
- How health and safety regulations are used in the workplace
- How the organisation impacts on the local community

Introduction

AS Applied Science

Unit 2: External Exam: Energy Transfer Systems

In this joint physics and biology unit you will consider some essential knowledge regarding the uses and transfer of energy in physical and human biological systems. The unit also looks at some of the ethical issues that may be considered when diagnosing and treating illnesses.

- the structure and function of the circulatory and respiratory systems
- how to find out about physiological status through monitoring the process of respiration
- ethical issues relating to monitoring, diagnosis and treatment of the circulatory and respiratory systems
- imaging methods used in monitoring and diagnosis
- applications of energy transfer

Unit 3: Portfolio: Finding out about Substances

This chemistry unit explores the work of the analytical chemist and the types of work that they may undertake.

- how to obtain and prepare samples for analysis

- qualitative chemical analysis
- volumetric analysis
- chromatographic techniques
- colorimetric techniques
- energy changes that take place when substances react

AS Examination

This course differs from other Science AS/A2 courses in that 2/3 of the assessment is based on internally assessed portfolio work (research, projects and reports that you complete throughout the course).

Unit 1: Coursework 33.3% of total AS mark

Unit 2: Examination 33.3% of total AS mark

Unit 3: Coursework 33.3% of total AS mark

Progression

To progress to A2 you will need to achieve grade E in the AS examination.

To obtain a full A level qualification 3 further units will be completed in a second year:

Unit 7: Planning and carrying out a Scientific Investigation: assessed by portfolio.

One other portfolio assessed unit (e.g. Unit 15 the Role of the Pathology Service)

One externally examined unit (e.g. Unit 14 the Healthy Body)

A level in Applied Science will prepare you for a career in the science industry or industries that use scientific knowledge and skills *e.g.* the chemical industry, health care, leisure and associated industries, medical and laboratory based science, food and catering industries. It will also prepare you to take on learning and training in higher education.

A LEVEL CHEMISTRY (OCR)

Course description:

Chemistry is the study of the substances that make both us and the things that surround us. If we did not understand what these substances were or how they work we could not cure diseases, develop new materials or respond to and correct changes in our environment. The clothes we wear, the homes in which we live and the cars that we drive would not exist without chemists.

The study of chemistry gives you the opportunity to develop a wide range of key skills, including oral and written communication, working in teams, problem-solving and the use of IT. Chemistry is a very challenging subject but it can also be exciting, stimulating and enjoyable.

A good 'A' level qualification in Chemistry is **highly** regarded by employers and universities because it demonstrates a very wide range of competences, both academic and personal. It is an essential qualification for progression into careers such as Medicine, Veterinary Science, Biomedical Science and Pharmacy. In addition it is desirable for the study of Engineering, Geology, Archaeology, Environmental Science, Dietetics, Nursing and Agriculture.

Course content:

The course is subdivided into units, each having a coherent theme. Through the study of these topics you will be introduced to the concepts associated with traditional Chemistry courses. These include: atomic structure, the Periodic Table, rates of reaction, acids and bases, equilibrium and the study of carbon compounds, such as alkanes and alkenes.

Course assessment:

AS Units:

Unit F321 Atoms, bonds and groups

1 hour written exam - 30%

Unit F322 Chains, energy and resources

1 hour 45 min written exam - 50%

Unit F323 Practical Skills in Chemistry 1

Internal Assessment - 20%

A2 Units:

Unit F324 Atoms, bonds and groups

1 ¼ hour written exam - 30%

Unit F325 Chains, energy and resources

2 hour written exam - 50%

Unit F326 Practical Skills in Chemistry 2 Internal assessment - 20%

Entry requirements:

The OCR 'A' Level course forms a natural progression from GCSE Science and we would normally expect you to have achieved Grade B or above in GCSE Science and Maths and grade C or above in English.

Progression opportunities:

Most students who successfully complete the full A-level course (AS + A2) progress to study for degrees in a wide variety of subjects, including Chemistry, Physics, Engineering, Biology, Marine Biology, Environmental Science, Medicine and Physiotherapy.