

Science: KS5: A Level Biology

Subject:

This is a 2 year course that further develops the concepts learnt in GCSE Biology. Students develop an understanding of the major biological concepts and an awareness of the role of Biology within the sciences and in the wider world. Biology is a wide-ranging subject, overlapping into many other disciplines such as Chemistry, Physics, Mathematics, Geography and Psychology. Research and development in the Biological Sciences is rapid and so for students, this is an exciting and up to date subject with many new advances.

There are 5 lesson of Biology per week following the OCR Biology A specification. Module 1 – Development of Practical Skills in Biology will be taught and assessed throughout the course.

Purpose and aims

The aims of the specification we are following, are to encourage candidates to:

- develop an essential knowledge and understanding of different areas of Biology and how these areas relate to each other,
- develop and demonstrate a deep appreciation of the skills knowledge and understanding of scientific methods,
- develop competence and confidence in a variety of practical mathematical and problem solving skills,
- develop an interest in and enthusiasm for Biology, including developing an interest in further study and careers associated with the subject,
- develop an understanding of how society makes decisions about scientific issues and how the sciences contribute to the success of the economy and society.

Content overview

Content is split into six teaching modules (These are detailed below)

Component 01 assesses modules 1, 2, 3 and 5.

Component 02 assesses modules 1, 2, 4 and 6

Component 03 assesses all modules.

Assessment Overview

Biological Processes (01)

100 marks

2 Hours 15 minutes

Written exam

Biological diversity (02)

100 marks

2 hours 15 minutes

Written exam

Unified Biology (03)

70 marks

1 hour 30 minutes

Written exam

Practical Endorsement in Biology (Non exam)

Team members:

Teaching Team:

Mr C Williams (Head of Science) - Biology and vocational specialist.

Mrs H Kaushal (Lead Teacher) - Biology Specialist and BTEC Lead Verifier.

Miss N Sohail - Chemistry and Biology specialist.

Support Team:

Mrs M Bibi - Curriculum Area Teaching Assistant.

Mrs J Redfern - Biology specialist technician.

Facilities:

We have seven laboratories spread across the two buildings that form the Main Block and Trent Building. These are serviced by three specialist technicians who also support extra curricula activities.

Curriculum Summary: (KS5)

The course is split into different theoretical topics with practical skills integrated throughout.

Module 1 – Development of practical skills in biology The development of practical skills is a fundamental and integral aspect of the study of any scientific subject. These skills not only enhance learners' understanding of the subject but also serve as a suitable preparation for the demands of studying biology at a higher level.

Module 2 – Foundations in biology All living organisms have similarities in cellular structure, biochemistry and function. An understanding of these similarities is fundamental to the study of the subject. This module gives students the opportunity to use microscopy to study the cell structure of a variety of organisms. Biologically important molecules such as carbohydrates, proteins, water and nucleic acids are studied with respect to their structure and function. The structure and mode of action of enzymes in catalysing biochemical reactions is studied. Membranes form barriers within, and at the surface of, cells. This module also considers the way in which the structure of membranes relates to the different methods by which molecules enter and leave cells and organelles. The division and subsequent specialisation of cells is studied, together with the potential for the therapeutic use of stem cells.

Module 3 – Exchange and transport In this module, students study the structure and function of gas exchange and transport systems in a range of animals and in terrestrial plants. The significance of surface area to volume ratio in determining the need for ventilation, gas exchange and transport systems in multicellular organisms is emphasised. The examples of terrestrial green plants and a range of animal phyla are used to illustrate the principle.

Module 4 – Biodiversity, evolution and disease In this module the students study the biodiversity of organisms; how they are classified and the ways in which biodiversity can be measured. It serves as an introduction to ecology, emphasising practical techniques and an appreciation of the need to maintain biodiversity. The students also gain an understanding of the variety of organisms that are pathogenic and the way in which plants and animals have evolved defences to deal with disease. The impact of the evolution of pathogens on the treatment of disease is also considered. The relationships between organisms are studied, considering variation, evolution and phylogeny.

Module 5 – Communication, homeostasis and energy It is important that organisms, both plants and animals are able to respond to stimuli. This is achieved by communication within the body, which may be chemical and/or electrical. Both systems are covered in detail in this module. Communication is also fundamental to homeostasis with control of temperature, blood sugar and blood water potential being studied as examples. In this module, the biochemical pathways of photosynthesis and respiration are considered, with an emphasis on the formation and use of ATP as the source of energy for biochemical processes and synthesis of biological molecules.

Module 6 – Genetics, evolution and ecosystems This module covers the role of genes in regulating and controlling cell function and development. Heredity and the mechanisms of evolution and speciation are also covered. Some of the practical techniques used to manipulate DNA such as sequencing and amplification are considered, along with their therapeutic medical use. The use of microorganisms in biotechnology is also covered. Both of these have associated ethical considerations and it is important that students develop a balanced understanding of such issues. Students gain an appreciation of the role of microorganisms in recycling materials within the environment and maintaining balance within ecosystems. The need to conserve environmental resources in a sustainable fashion is considered, whilst appreciating the potential conflict arising from the needs of an increasing human population. Students also consider the impacts of human activities on the natural environment and biodiversity.



Links to useful sites:

www.ronaldrichardsonresources.co.uk (weekly online lessons and support for AS/A2 Biology students)
http://www.biology.arizona.edu/cell_bio/cell_bio.html (The Reith lectures on the BBC website)
<http://www.cellsalive.com/index.htm>
<http://www.bbc.co.uk/radio4/reith/>
http://www.bionetonline.org/English/Content/sc_intro.htm
<http://www.mrothery.co.uk/>
<http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/C/CellularRespiration.html>
<http://www.s-cool.co.uk>
<http://www.biologybrowser.org/>
<http://www.bbc.co.uk/education/asguru/biology/>

Extra-curricular activities available in the CA:

Staff provide lunch time and after school support sessions, which students are encouraged to attend. This is when students can go through errors in homework, misconceptions or just general support. Students at Key Stage 5 are also invited to Saturday school between 10am and 12pm for additional support in Core subjects.