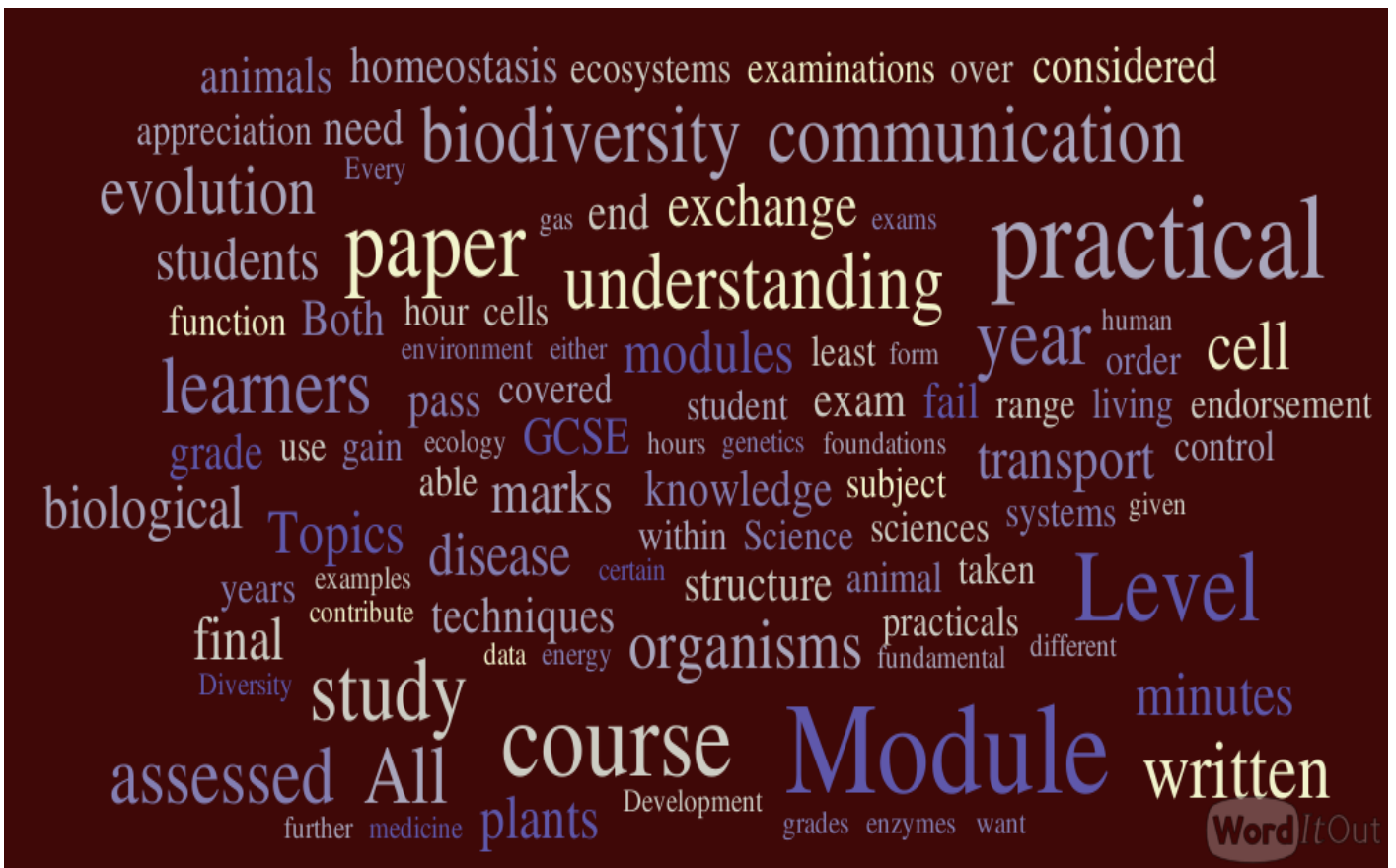




# Hartismere College



# Biology



# **A STUDENT'S GUIDE TO THE A LEVEL IN BIOLOGY**

AS is short for Advanced Subsidiary. This is a standalone qualification studied for one year. All Hartismere students will sit AS exams so that they can have as much choice as possible about the subjects they continue with in year 13. All work in year 12 is preparation for the full A level qualification which is taken at the end of year 13.

## **What do I need to know or be able to do before taking this course?**

In order to study this subject, you are required to achieve either a 7 in GCSE Biology (Triple Science) or at least one 7 in a GCSE Combined Science. We do consider every case on an individual basis, however and if you are concerned about these grades, please contact Dr Sparshott or Ms Gray.

The course focuses on the study of foundations in biology, exchange, biodiversity, disease, communication, homeostasis and genetics.

## **What will I learn on this A level course?**

The course will enable you to:

- develop essential knowledge and understanding of different areas of the subject and how they 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 your interest in and enthusiasm for the subject
- understand how society makes decisions about scientific issues and how the sciences contribute to the success of the economy and society

## **What kind of student is this course suitable for?**

This course will appeal to students who:

- have an interest in biology and the living world
- enjoy collecting and analysing experimental data
- want to keep their options open for further study or who want to study medicine, veterinary medicine, biology sciences, natural sciences, sports science, biochemistry, ecology.

## **What about practical assessment?**

All candidates are assessed over the two years for a subsidiary grade and mark for practical skills. The students will log all practicals in a lab book, meet certain criteria and develop certain skills in order to be given a pass or fail mark.

## **Year 12**

### **Module 1 – Development of practical skills in biology**

- Practical skills will be assessed in the final written examinations  
Students should be able to plan, implement, analyse and evaluate a range of practicals from information supplied in the exam paper.
- Practical skills will be assessed in the practical endorsement (separate reported pass/fail grade)

Students are to complete a series of at least 12 different practicals over the course of the 2 years. All planning, results, analysis and evaluations will be recorded in a lab book which will form the basis for their practical endorsement grade of either pass or fail.

### **Module 2 – Foundations in biology**

Biology is the study of living organisms. Every living organism is made up of one or more cells, therefore understanding the structure and function of the cell is a fundamental concept in the study of biology. Since Robert Hooke coined the phrase 'cells' in 1665, careful observation using microscopes has revealed details of cell structure and ultrastructure and provided evidence to support hypotheses regarding the roles of cells and their organelles.

Topics include:

- cell structure
- biological molecules
- nucleotides and nucleic acids
- enzymes
- biological membranes
- cell division, cell diversity and cellular organisation

## **Module 3 – Exchange and transport**

In this module, learners 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.

Learners are expected to apply knowledge, understanding and other skills developed in this module to new situations and/or to solve related problems.

Topics include:

- exchange surfaces
- transport in animals
- transport in plants

## **Module 4 – Biodiversity, evolution and disease**

In this module the learners 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 learners 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.

Topics include:

- communicable diseases, disease prevention and the immune system
- biodiversity
- classification and evolution

This forms the AS qualification. All students will be entered for AS examinations and all of the AS content is also tested at the end of the second year for the full A Level qualification.

## **Year 13**

### **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 the emphasis on the formation and use of ATP as the source of energy for biochemical processes and synthesis of biological molecules.

Topics include:

- communication and homeostasis
- excretion as an example of homeostatic control
- neuronal communication
- hormonal communication
- plant and animal responses
- photosynthesis
- respiration

### **Module 6 – Genetics, evolution and ecosystems**

This module covers the role of genes in regulating and controlling cell function and development. Hereditary 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 learners develop a balanced understanding of such issues.

Learners 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. Learners also consider the impacts of human activities on the natural environment and biodiversity.

Topics include:

- cellular control
- patterns of inheritance
- manipulating genomes
- cloning and biotechnology
- ecosystems
- populations and sustainability

## **AS Level assessment overview**

A total of 2 papers will be sat in order to gain the stand alone AS qualification.

**Paper 1: Breadth in Biology 50%** - 70 marks, 1 hour 30 minutes written paper

**Paper 2: Depth in Biology 50%** - 70 marks, 1 hour 30 minutes written paper

All 4 modules from year 12 will be assessed. (1,2,3 and 4)

## **A Level assessment overview**

A total of three papers are taken at the end of the 2 year course. These consist of the following:

**Biological Processes 37%** - 100 marks, 2 hours 15 minutes written paper.

Modules 1,2,3 and 5 will be assessed

**Biological Diversity 37%** - 100 marks, 2 hours 15 minutes written paper.

Modules 1,2,4 and 6 will be assessed

**Unified Biology 26%** - 70 marks, 1 hour 30 minutes written paper.

All modules will be assessed in this paper



## **Practical Endorsement:**

No separate pass or fail given at AS, only for the A Level.

The requirement is for at least 12 practical activities to be completed from a list of categories, these include:

- microscopy
- dissection
- sampling techniques
- enzymes reactions
- chromatography or electrophoresis
- microbiological techniques
- qualitative testing
- investigations using data loggers or computer modelling
- measuring plant and animal responses
- research skills

An external moderator will visit towards the end of the second year to validate the portfolio the student has kept throughout the course. A pass or fail will then be submitted to the exam board in preparation for final grades being issued after the written exam.



## **What could I go on to do at the end of my course?**

In the past, students have gone on to study:

- Medicine at the Universities of York, Sheffield, Exeter and UCL
- Veterinary Science at the Universities of Nottingham, Bristol, Liverpool
- Biological or Natural Sciences at University of Cambridge & UEA
- Sport Science at the University of Birmingham & Exeter
- Marine Biology at the Universities of Essex & Plymouth
- Forensic Science at Nottingham Trent University

Biology is a subject that complements many other courses, as well as more varied careers too, for example publishing and intellectual property law.

**Examination Board:** OCR

**Syllabus:** H020

**Duration:** AS stand alone qualification 1 year, A level qualification, full content examined at the end of the second year.



## Contact

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