BIOLOGY

Year 12

What are the aims and intentions of this curriculum?

The aim of our Post 16 Curriculum is to provide students with the opportunity to cover a wide range of Biological concepts and to adequately prepare Studentsfor matriculation into higher education. The teaching of practical skills is integrated with the theoretical topics and they are assessed through the written papers. For A level only, the Practical Endorsement will also support the development of practical skills and essential knowledge and understanding of different areas of the subject and how they relate to each other. The A Level in Biology A specification content is divided into six teaching modules and each module is further divided into key topics. The specification has been designed to be co-teachable with the standalone AS Level in Biology A qualification. The first four modules comprise the AS Level in Biology A course and learners studying the A level continue with the content of modules 5 and 6. The internally assessed Practical Endorsement skills also form part of the full A level.

Term	Topics	Knowledge and key terms	Skills developed	Assessment
Autumn 1	Module 1 Development of practical skills in Biology Module 2 Foundations in Biology • Basic components of living things • Biological molecules	Students will learn: • How to apply investigative approaches and methods to practical work. To safely and correctly use a range of practical equipment and materials • The significance of cell Biology • the ultrastructure of eukaryotic cells and the functions of the different cellular components • the concept of monomers and polymers and the importance of condensation and hydrolysis reactions in a range of biological molecules	Students are able to: • measure the size of cells using a light microscope with eyepiece graticule and stage micrometer • use microscopy to observe and investigate different types of cell and cell structure in a range of eukaryotic organisms • use and manipulate the magnification formula • draw and annotate diagrams of whole cells or cells in sections of tissue as seen under a light microscope • carry out and interpret the results of the following chemical tests: biuret test , Benedict's test iodine test and the emulsion test	• Practical work (PAG 5, 6, 9,10) • SMART test

Autumn 2	Module 2 Foundations in Biology • Enzymes • Plasma membrane • Cell division	Students will learn: • the role of enzymes in catalyzing reactions that affect metabolism at a cellular and whole organism level • the need for coenzymes, cofactors and prosthetic groups in some enzyme-controlled reactions • the fluid mosaic model of membrane structure and the roles of its components • how to describe the cell cycle and explain how it is regulated • the significance of mitosis and meiosis in life cycles	Students are able to: • Carry out practical investigations into the effects of pH, temperature, enzyme concentration and substrate concentration on enzyme activity • Carry out practical investigations into factors affecting membrane structure and permeability • Calculate the temperature coefficient (Q10).	• Practical work (PAG1, 4, 8) • SMART test
Spring 1	Module 3 Exchange and transport • Exchange surfaces and breathing • Transport in animals	Students will learn: • the need for specialized exchange surfaces and the features of an efficient exchange surface • the mechanisms of ventilation and gas exchange in mammals, bony fish and insects • the different types of circulatory systems • the external and internal structure and function of the mammalian heart	Student sare able to: • dissect, examine and draw of the gaseous exchange system of a bony fish and/or insect trachea • examine microscope slides to show the histology of exchange surfaces. • dissect, examine and draw the external and internal structure of the mammalian heart • use and interpret electrocardiogram (ECG) traces	• Practical work (PAG 1,2,10) • SMART test
Spring 2	Module 3 Exchange and transport • Transport in plants Module 4 Biodiversity, evolution and disease • Classification and evolution	Students will learn: • the structure and function of the vascular system in the roots, stems and leaves of herbaceous dicotyledonous plants • adaptations of plants to the availability of water in their environment • the biological classification of species • the mechanism by which natural selection can affect the characteristics of a population over time	Students are able to: • use standard deviation to measure the spread of a set of data and/or Student's t-test to compare means of data values of two populations and/or the Spearman's rank correlation coefficient to consider the relationship of the data.	• Practical work (PAG1, 5, 11) • SMART test

Summer 1	Module 4 Biodiversity, evolution and disease • Biodiversity • Communicable diseases	Students will learn: • how biodiversity may be considered at different levels • the factors affecting biodiversity • how genetic biodiversity may be assessed, including calculations • the different types of pathogen that can cause communicable diseases in plants and animals • the means of transmission of animal and plant communicable pathogens • the differences between active and passive immunity, and between natural and artificial immunity	Students are able to: • use and interpretation of Simpson's Index of Diversity (D) to calculate the biodiversity of a habitat • carry out practical investigations to collect random and non-random samples in the field • measure species richness and species evenness in a habitat • calculate the genetic diversity within isolated populations, for example the percentage of gene variants (alleles) in a genome. • examine and draw cells observed in blood smears	• Practical work (PAG 1) • SMART test