



IBS Level Biology – L6

Curriculum Intent

Biology is the study of life and biologists attempt to understand the living world at all levels using many different approaches and techniques. At one end of the scale is the cell, its molecular construction and complex metabolic reactions. At the other end of the scale biologists investigate the interactions that make whole ecosystems. The IBS Biology curriculum gives students the opportunity to:

- acquire and apply knowledge, methods and techniques that characterize Biology and technology
- develop an ability to analyse, evaluate and synthesize biological information
- develop experimental and investigative scientific skills including the use of current technologies
- become critically aware, as global citizens, of the ethical implications of using science and technology
- develop an appreciation of the possibilities and limitations of science and technology

“Nothing in life is to be feared, it is only to be understood. Now is the time to understand more, so that we fear less” Marie Curie

Students will learn: -

Autumn Term – Term 1

- ✓ About the origin, structure and functioning of cells.
- ✓ About the structure and function of some biologically important molecules.

Spring Term – Term 2

- ✓ About the structure and function of DNA and RNA
- ✓ About the process of cell respiration
- ✓ About the process of Photosynthesis
- ✓ Ecology

Summer Term – Term 3

- ✓ About the organisation of genetic material
- ✓ How gametes are formed.
- ✓ About the mechanism of genetics.
- ✓ About genetic modification and biotechnology.

What does excellence look like?

- ✓ Having a good proficiency in solving biological problems, including those that are challenging or unfamiliar.
- ✓ Being able to select and apply relevant information, concepts and principles in a wide variety of contexts including the unfamiliar e.g.

Term 1:

- Applying knowledge about membrane transport to kidney dialysis.
- Explaining the use of various enzymes in industry and the importance of immobilised enzymes e.g. in washing powders

Knowledge, understanding & Skills

Term 1:

- ✓ Structure of eukaryotic and prokaryotic cells.
- ✓ The function of the organelles present in eukaryotic cells.
- ✓ The fluid mosaic model of membrane structure and the evidence that has led to the falsification of previous models.
- ✓ The processes by which substances cross membranes.
- ✓ The origins of the first cells and how these developed into eukaryotic cells.
- ✓ The process of mitosis.
- ✓ The structure and function of carbohydrates, lipids and proteins.
- ✓ How enzymes function and factors which affect their functioning.

Term 2:

- The process of DNA replication and protein synthesis, including the role of some of the enzymes involved.
- ✓ The reactions involved in aerobic and anaerobic respiration, in outline.
- ✓ The reactions involved in photosynthesis, in outline.
- ✓ The effect of limiting factors on the rate of photosynthesis.
- ✓ The interdependence of living organisms.
- ✓ How energy flow occurs in ecosystems and how it can be represented using pyramids of energy.
- ✓ Energy loss between trophic levels.
- ✓ The carbon cycle.
- ✓ The causes and consequences of the enhanced greenhouse effect.

Term 3:

- ✓ The structure and function of genes and chromosomes.
- ✓ The difference in genetic material between prokaryotes and eukaryotes.
- ✓ The formation of new alleles by mutation.
- ✓ The stages of meiosis.
- ✓ How meiosis brings about variation.
- ✓ How the principles of inheritance were discovered.
- ✓ How characteristics are passed from one generation to the next.
- ✓ The inheritance of some genetic diseases.
- ✓ The methods used for exploring and manipulating DNA and the current and potential uses for these techniques.
- ✓ The ethical considerations linked to these biotechnologies.

What does excellence look like? (contd)

Term 2:

- Explain why green algae need to live higher up the shore than red and brown algae.
- Explain how *Spirogyra* and motile bacteria can be used to demonstrate how photosynthesis occurs in chloroplasts.
- Explain why an increase in carbon dioxide levels may not lead to an increase in crop production.

Term 3:

- Explain how it would be possible to produce a male tortoiseshell cat.
- Explain the inheritance of genetic diseases due to mutations in mitochondrial DNA.
- Explain the use of gene therapy.

How will we assess impact?

- Peer, self and teacher assessment in lessons
- Previous lesson recap quiz
- Teacher questioning
- Landmark tasks
- End of Topic tests
- PPE examinations at the end of the L6, mid U6, combined with mini-PPEs during the year



How can you enhance your learning at home?

- ✓ Bioninja
- ✓ Bioknowledgy
- ✓ AES student science website
- ✓ Royal Society of Biology

Suggested homework tasks

- Learn spelling and definitions of key terms.
- Group and independent research projects
- Past examination questions practice
- Practical activity preparation, simulations
- Processing and analysis of data from practical activities



International Opportunities

Visits Programme

Potential opportunities to engage in science in exchange partner schools exploring different approaches to science and teaching methods

Weeklong visit to FSC Orielton, Wales for fieldwork

Community lectures on International themes

International day across the school

Primary research using student cultural diversity

Within the curriculum

The Biology IBS Level curriculum is designed to deepen understanding and appreciation of how our International society makes decisions about world scientific issues. Students can compete in the International Biology Olympiad.

Students are encouraged to research each theme beyond lessons and set work to ensure that they can draw on a worldwide knowledge of the skills, techniques and theoretical understanding required for the further study of Biological Sciences at an International level at global universities