A Level Biology – U6

Curriculum Intent

Biology is the study of living organisms and plays a crucial role in everyday life. It affects everyone, and biologists work to find solutions to many of the world's problems. Advances in technology have made Biology more exciting and relevant than ever. The A Level Biology curriculum gives students the opportunity 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
- understand how society makes decisions about scientific issues and how the sciences contribute to the success of the economy and society
- develop their interest in and enthusiasm for the subject, including developing an interest in further study and careers associated with the subject

"The important thing is to never stop questioning"

Students will learn: -

Term 1: Populations and their interactions. Excretion as an example of homeostatic control. Neuronal and hormonal communication. Plant and animal responses, photosynthesis, and respiration.

Term 2: Cellular control. Patterns of inheritance. Manipulating genomes and cloning.

Term 3: The evolution of species. Biotechnology.

What does excellence look like?

✓Linking ideas from different aspects of the specification to answer real life Biology problems

✓Being able to apply knowledge and understanding to unfamiliar situations

e.g.

- The link between auxins and gene expression
- The role of efflux pumps in tropisms
- Carbon fixation in C4 and CAM plants.
- Use knowledge of hox genes to suggest their possible roles in the development of certain tumours
- Explain the possible use of artificial chromosomes in gene therapy
- Explaining why plants can be used as bioremediators
- Advantages and disadvantages of using immobilised enzymes in biosensors

Knowledge, understanding & Skills

Term 1: Populations and sustainability, Communication, homeostasis, energy, and development of practical skills. Factors which determine population size. Sustainable management of ecosystems. The structure and function of the mammalian liver. The structure, mechanism of action and functions of the mammalian kidney. The structure and function of various neurones. The generation and transmission of nerve impulses. The structure and function of the adrenal glands and the pancreas. The role of plant hormones in plant responses and other processes in flowering plants. Organisation of the mammalian nervous system. Coordination of responses by nervous and endocrine systems in animals. The structure of mammalian muscles and the mechanism of muscular contraction. An outline of the processes which occur during the light-dependent and light independent stages of photosynthesis. An outline of the events which occur during the various stages of cellular respiration.

Term 2: Genetics, manipulating genomes and the development of practical skills: Regulatory mechanisms that control gene expression. How sexual reproduction can lead to genetic variation within a species. Predict outcomes of genetic crosses involving monogenic and dihybrid inheritance. Use phenotypic ratios to identify linkage and epistasis. The principles of DNA sequencing and DNA profiling and their uses. The principles of genetic engineering and its uses. The principles of and potential for gene therapy in medicine. The production of artificial clones in plants and animals. Arguments for and against cloning.

Term 3: Evolution, cloning and biotechnology and the development of practical skills: Factors that can affect evolution of a species. The role of isolating mechanisms in the evolution of new species. The principles of artificial selection and its uses. The use of microorganisms in biotechnological processes. The use of aseptic techniques to culture microorganisms. The production and use of immobilised enzymes in biotechnology.

How will we assess impact?

- Peer, self and teacher assessment in lessons
- Previous lesson recap quiz
- Teacher questioning
- Landmark tasks
- End of Topic tests
- Cumulative linear knowledge tests
- End of L6 and mid- U6 PPE examinations using unseen exam board papers

How can you enhance your learning at home?

- ✓ **Kerboodle**
- ✓ **Lovebiology**
- ✓ **Physicsandmathstutor**
- ✓ **Seneca learning**
- ✓ **AES student science website**

Suggested homework tasks

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

International Opportunities

Visits Programme

- **Community lectures on International themes**
- **International day across the school**
- **Primary research using student cultural diversity**

Within the curriculum

The Biology A Level curriculum is designed to deepen understanding and appreciation of how our International society makes decisions about world scientific issues.

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.

Subject Impact

- develop a secure knowledge and ability to use specialist biological vocabulary appropriately
- develop a confident understanding of biological knowledge and an ability to apply this knowledge to familiar and unfamiliar situations
- develop an ability to draw together knowledge, understanding and skills learned in different parts of the course
- acquire competence in appropriate areas of maths relevant to Biology
- demonstrate competence in a range of practical skills and techniques
- acquire a secure base for the further study of Biological Sciences
- understand how society makes decisions about scientific issues.