BIOLOGY (AQA)

Biology at A-level is an exciting and in-depth look at how life works; how the molecules that make up all living things are constructed and work together and how whole organisms and communities are adapted to survive. This subject is ideal for students with a fascination with living things & a keen, enquiring and analytical mind. I will encourage you NOT to study this subject if you solely need Biology for university/career (e.g. medicine) without love or interest for it – therein lies failure and a fast route to repeating year 12.

This subject is complemented superbly by chemistry – all those serious about the A-level should consider this carefully as non-chemists **can be at a disadvantage. Biology also complements Psychology and Geography well.**

ENTRY REQUIREMENTS:

We require A-level biologists to have 2x "7" grades at GCSE dual science minimum. If separate sciences were studied then we require 2x "7" grades in biology and chemistry. This being said, due to the conceptual leap between GCSE and A-level, 8-9 grades at GCSE are preferred for taking on this subject. At St. Michaels we study the AQA Biology specification [7402 (A-level] the main topics of which are summarised below:

1. **Biological Molecules:**

Explore how chemical elements make up all the essential molecules that permit life! Analyse the structure and function of proteins and how they interact within the body. Investigate the chemical nature of DNA & explore how DNA replicates within cells. Describe the structure of lipids & carbohydrates and explain why water has such weird properties which make it essential for life.

2. **Cells:**

Observe, describe and draw living cells and their microscopic organelles. See the difference between eukaryotic and prokaryotic cells; investigating how each is able to reproduce. Analyse how microorganisms can infect a larger organism and how that organism's immune system is designed to deal with the invaders.

3. **Exchange of substances with the environment:**

Investigate how both plants and animals are built to be able to transport materials around their bodies effectively & efficiently including the function of the respiratory and circulatory systems in animals and the mass transport systems in plants. Explore how processes such as diffusion govern the structure of exchange organs including the digestive system and the lungs.

4. Genetic information, Variation & relationships between organisms:

Explore how DNA codes for features of all organisms and is able to construct proteins via ribosomes. Analyse how mutations arise and how this is essential for providing variation in life; thus explaining the mystery of how evolution occurs. Investigate evolution in its scope for sculpting new beings, providing the diversity of life and how biodiversity is important.

Energy transfers in and between organisms

Explore how life depends of the continuous transfer of energy, starting with the biochemical pathway of photosynthesis and being passed on to other organisms in the food chain. Explain how the process of respiration occurs in high detail and why energy transfer processes are not 100% efficient.

5. Responding to changes in environment

Explaining how and why organisms respond to changes in their internal & external environment, and how achieve this response. Investigating how a nerve transmits a signal, how hormones govern internal messaging and how the body achieves a constant internal environment.

6. Genetics, populations, evolution and ecosystems

Analysing the close link between the genetic and proteomic structures of organisms to investigate their degree of relatedness in evolutionary history. Identification of species and being able to say how populations change over time in order to evolve into separate species, and how competition between organisms can shape these interactions.

7. The control of gene expression

An in-depth look into how the genetic code can be manipulated in order to achieve different outcomes such as cell differentiation. Explore how epigenetic factors can modify which genes are expressed and how mutations alter the underlying genetic code. Apply this knowledge to see how DNA can be artificially manipulated in order to produce genetically modified organisms or to identify individuals through DNA analysis.

KEY SKILLS:

- A logical mind with an aptitude for thinking about the big picture.
- An ability to remember complex nomenclature
- A flair for creative planning.
- A resilient and dedicated approach to systematic study.
- An ability to assimilate a high volume of factual material & be able to express such material in context.

ASSESSMENT:

Assessment at A-level takes place over the course of 3 written papers sat at the end of year 13:
Paper 1 – 2 hours of questions from topics 1-4 including relevant practical knowledge. [35%]
Paper 2 – 2 hours of questions from topics 5-8 including relevant practical knowledge. [35%]
Paper 3 – 2 hours of synoptic questions from all topics of the course including a 25 mark essay question. [30%]

CAREER POSSIBILITIES:

Include, but are by no means limited to: all medical professions, biological research, ecology, education, television documentary making, business/finance, law, farming & animal husbandry, catering, even archaeology! When all is said and done, biology closes very few doors in life.