The Hart School - Faculty of Science
A Level Biology (Year 12 and 13) Curriculum Overview

Curriculum Intent: Science encompasses everything that we are and allows us to make sense of the world around us. Science at The Hart School is more than just a core subject. We believe an outstanding science education should develop students' curiosity and scientific knowledge to question the world in which we live, enable critical-thinking and encourage students to become socially aware global citizens.

Our Science faculty has planned an inspiring, inclusive, and diverse curriculum that is designed to engage and enthuse students with the real-life applications of the subject whilst promoting ambition and aspirations for their future.

In an ever-changing world, in which STEAM subjects are at the forefront of advancements for the future, we want to prepare our students for this by not only looking at the knowledge of the subject, but also the methods, processing skills and applications associated with it. This ensures that our students are scientifically literate, able to evaluate what they see in the news and the world around them and make informed decisions that will affect their future lives and the planet.

Useful Links:

Specification: AQA A Level Biology	Past Exam Papers & Mark Schemes
Practise Exam Questions	Revision Notes

Yr12	Topic	Knowledge Overview	Topic	Knowledge Overview
Autumn	**3.2.3 Transport Across Membranes**	All cells have a cell-surface membrane and, in addition, eukaryotic cells have internal membranes. The basic structure of these membranes is the same and enables control of the passage of substances across exchange surfaces by passive or active transport.	**3.1.1-4 Biological Molecules**	All life on Earth shares a common chemistry. This provides indirect evidence for evolution. Despite their great variety, the cells of all living organisms contain only a few groups of carbon-based compounds that interact in similar ways. Carbohydrates are commonly used by cells as respiratory substrates. They also form structural components in plasma membranes and cell walls. Lipids have many uses, including the bilayer of plasma membranes, certain hormones and as respiratory substrates. Proteins form many cell structures. They are also important as enzymes, chemical messengers and components of the blood.
	3.2.4 Cell Recognition and The Immune System	Cell-surface membranes contain embedded proteins. Some of these are involved in cell signalling – communication between cells. Others act as antigens, allowing recognition of 'self' and 'foreign' cells by the immune system. Interactions between different types of cell are involved in disease, recovery from disease and prevention of symptoms occurring at a later date if exposed to the same antigen, or antigen-bearing pathogen.	**3.2.1/2 Cell Structure and Division**	All life on Earth exists as cells. These have basic features in common. Differences between cells are due to the addition of extra features. This provides indirect evidence for evolution. All cells arise from other cells, by binary fission in prokaryotic cells and by mitosis and meiosis in eukaryotic cells.
Spring	**3.3.1-3 Exchange**	The internal environment of a cell or organism is different from its external environment. The exchange of substances between the internal and external environments takes place at exchange surfaces. To truly enter or leave an organism, most substances must cross cell plasma membranes. In large multicellular organisms, the immediate environment of cells is some form of tissue fluid. Most cells are too far away from exchange surfaces, and from each other, for simple diffusion alone to maintain the composition of tissue fluid within a suitable metabolic range.	**3.1.4 Biological Molecules - Enzymes**	Enzymes control almost all chemical reactions in Biology. They are essential protein molecules for life. Numerous factors affect the activity of enzymes including the concentration of substrate, as well as the enzyme itself. And other factors including inhibitor molecules.
	3.4.4-6 Biodiversity	Biological diversity – biodiversity – is reflected in the vast number of species of organisms, in the variation of individual characteristics within a single species and in the variation of cell types within a single multicellular organism. Differences between species reflect genetic differences. Differences between individuals within a species could be the result of genetic factors, of environmental factors, or a combination of both. Biodiversity within a community can be measured using species richness and an index of diversity.	**3.1.5-8 Biological Molecules - Nucleic Acids and Inorganics**	Nucleic acids carry the genetic code for the production of proteins. The genetic code is common to viruses and to all living organisms, providing evidence for evolution. The most common component of cells is water; hence our search for life elsewhere in the universe involves a search for liquid water.
			3.4.1/2 DNA and Protein Synthesis	A gene is a section of DNA located at a particular site on a DNA molecule, called its locus. The base sequence of each gene carries the coded genetic information that determines the sequence of amino acids during protein synthesis. The genetic code used is the same in all organisms, providing indirect evidence for evolution.
Summer	**3.3.3/4 Mass Transport**	In large organisms, exchange surfaces are associated with mass transport systems that carry substances between the exchange surfaces and the rest of the body and between parts of the body. Mass transport maintains the final diffusion gradients that bring substances to and from the cell membranes of individual cells. It also helps to maintain the relatively stable environment that is tissue fluid.	**3.4.3/4 Genetic Diversity**	Genetic diversity within a species can be caused by gene mutation, chromosome mutation or random factors associated with meiosis and fertilisation. This genetic diversity is acted upon by natural selection, resulting in species becoming better adapted to their environment. Variation within a species can be measured using differences in the base sequence of DNA or in the amino acid sequence of proteins.