Year 12 Biology Curriculum Map

Overview	All life on Earth shares a common chemistry. Despite their great variety, the cells of all living organisms contain only a few groups of carbon-based compounds that interact in similar ways. These are Carbohydrates, Lipids, Proteins and Nucleic acids, which carry the genetic code for the production of proteins. Students learn the structure and function of these molecules. The course then introduces the cell. All cells have basic features in common. Differences between cells are due to the addition of extra features. All cells have a cell-surface membrane and, in addition, eukaryotic cells have internal membranes. The basic structure of these plasma membranes is the same and enables control of the passage of substances across exchange surfaces by passive or active transport. 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. The Year 12 curriculum then starts to look at how the internal environment of a cell or organism is different from its external environment. The concepts of exchange and transport within organisms is covered. The exchange of substances between the internal and external environments takes place at exchange surfaces. 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. The Year 12 course finishes by looking at 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. Students learn about the nature of genes and how information in genes is translated into proteins. The genetic code used is the same in all organisms, providing evidence for evolution. 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.					
Year 12	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic	Biological molecules	Cells and Immunity	Exchange and Mass transport	Biodiversity	Revision and assessment	Populations
Knowledge	Structure and function of biological molecules including: Monomers and polymers, Carbohydrates, Lipids, Proteins, Enzymes, and the structure of DNA and RNA DNA replication	Cell structure Transport across cell membranes Cell recognition and the immune system	Gas exchange Digestion and absorption Mass transport	DNA, genes and chromosomes DNA and protein synthesis Genetic diversity and adaptation Species and taxonomy Investigating diversity	This half term is spent consolidating the first 4 half term's work and preparing for internal assessment.	Populations in ecosystems

Skills	Students produce a dilution series of glucose solution and use colorimetric techniques to produce a calibration curve Students use a tangent to find the initial rate of an enzyme-controlled reaction.	Students determine the water potential of plant tissues using the intercept of a graph of, eg, water potential of solution against gain/loss of mass.	Students calculate the surface area to volume ratios of these Cells. Students use the equation: PVR = tidal volume × breathing rate Students use the equation: CO = stroke volume × heart rate	Students use the expression 2n to calculate the possible number of different combinations of chromosomes following meiosis, Students use a logarithmic scale when dealing with data relating to large numbers Students use data from which to calculate an index of diversity		Students investigate the distribution of organisms in a named habitat using randomly placed frame quadrats, or a belt transect Students use both percentage cover and frequency as measures of abundance of a sessile species.