VCE UNITS INFORMATION

VCE Biology Units 3 and 4

CONTENT

Unit 3

In this unit, students investigate the molecules and biochemical processes that sustain life.

They explore the importance the plasma membrane and its differential permeability to specific solutes in defining the cell, its internal spaces and the control of the movement of molecules and ions in and out of such spaces. Students consider base pairing specificity, the binding of enzymes and substrates, the response of receptors to signaling molecules and reactions between antigens and antibodies to highlight the importance of molecular interactions. They study the synthesis, structure and function of nucleic acids and proteins as key molecules in cellular processes and explore the chemistry of cells by examining the nature of biochemical pathways, their components and energy transformations. Students consider the types of signals, the transduction of information within the cell and cellular responses.

Unit 4

In this unit, students consider the continual change and challenges to which life on Earth has been subjected.

They investigate the relatedness between species and the impact of various change events on a population's gene pool and how the accumulation of changes over time is considered as a mechanism for biological evolution by natural selection. Evidence from paleontology, biogeography, developmental biology and structural morphology is used to support this theory. They explore how technological developments in the fields of comparative genomics, molecular homology and bioinformatics have resulted in evidence of change through measurements of relatedness between species. Students examine the structural and cognitive trends in the human fossil record and the interrelationships between human biological and cultural evolution. The biological consequences, and social and ethical implications, of manipulating the DNA molecule and applying biotechnologies is explored for both the individual and the species.

OUTCOMES

Unit 3

- Students should be able to explain the dynamic nature of the cell in terms of key cellular processes including regulation, photosynthesis and cellular respiration, and analyse factors that affect the rate of biochemical reactions
- Students should be able to apply a stimulus-response model to explain how cells communicate with each other, outline human responses to invading pathogens, distinguish between the different ways that immunity may be acquired, and explain how malfunctions of the immune system cause disease

Unit 4

- Students should be able to analyse evidence for evolutionary change, explain how relatedness between species is determined, and elaborate on the consequences of biological change in human evolution
- Students should be able to examine the impact of human culture and technological applications on biological processes. They should be able to apply their knowledge of the structure and function of the DNA molecule to examine how molecular tools and techniques can be used to manipulate the molecule for a particular purpose
- Students should be able to describe the gene technologies used to address human issues and consider their social and ethical implications