**BIOLOGY**

VCE Biology enables students to investigate the dynamic relationships between organisms, their interactions with the non-living environment, and the processes of life, from the molecular world of the cell to the whole organism, that maintain life and insure its continuity.

The study prepares students for careers involving: botany, genetics, immunology, microbiology, pharmacology, zoology, biotechnology, dentistry, ecology, education, food science, forestry, health care, horticulture, medicine, optometry, physiotherapy, veterinary science, environmental management and conservation, forensic science, geology, medical research and sports science. It provides valuable knowledge and skills for life and a respect for the environment, both living and non-living.

**UNIT 1: How do living things stay alive?**

In this unit students explain what is needed by an organism to stay alive. They are introduced to some of the challenges for organisms in sustaining life. Students examine the cell as the structural and functional unit of life and the requirements for sustaining cellular processes in terms of inputs and outputs. Types of adaptations that enhance the organism’s survival in a particular environment are analysed, and the role that homeostatic mechanisms play in maintaining the internal environment is studied. Students consider how the planet’s biodiversity is classified and investigate the factors that affect population growth.

**UNIT 2: How is continuity of life maintained?**

In this unit students focus on asexual and sexual cell reproduction and the transmission of biological information from generation to generation. The role of stem cells in the differentiation, growth, repair and replacement of cells in humans is examined, and their potential use in medical therapies considered. Students explain the inheritance of characteristics, analyse patterns of inheritance, interpret pedigree charts and predict outcomes of genetic crosses. They consider the role of genetic knowledge in decision-making about the inheritance of various genetic conditions. In this context the uses of genetic screening and its social and ethical issues are examined.

**UNIT 3: Signatures of Life**

This unit is the study of molecules and biochemical processes that are indicators of life and focuses on the structure of DNA, genes and the code for production of proteins. Students investigate cell communication and immune responses.

Areas covered include: structure of bio-macromolecules – lipids, carbohydrates, proteins and nucleic acids; cell membranes and organelles; biochemical processes – respiration and photosynthesis; enzymes; nervous and hormonal co-ordination; and immunity.

**UNIT 4: Continuity and Change**

This unit examines evidence for the molecular basis of heredity and patterns of inheritance. It focuses on the evidence for evolutionary change and evolutionary relationships as well as the effect of human intervention on evolutionary processes.

Areas covered include: cell reproduction; gene expression and regulation; DNA tools and techniques; inheritance; natural selection; the fossil record; evolutionary relationships; speciation and extinction; and human evolution.

**ASSESSMENT: Unit 3 and 4**

School assessed coursework, and an end of year examination.

Unit 3 School assessed Coursework: 20%

Unit 4 School assessed Coursework: 20%

End of year examination: 60%