



VCE BIOLOGY

INFORMATION GUIDE



120 CELEBRATING 120 YEARS
1904-2024

Kilbreda College

VCE BIOLOGY

RATIONALE

VCE Biology enables students to investigate the processes involved in sustaining life at cellular, system and species levels. In undertaking this study, students develop an understanding that, in the dynamic and interconnected system of life, all change has consequences that may affect an individual, a species or the collective biodiversity of Earth. Students gain insights into how molecular and evolutionary concepts and key science skills underpin much of contemporary biology, and how society applies such skills and concepts to resolve problems and make scientific advancements.

UNIT 1

Area of Study 1

How do cells function?

In this area of study students examine the structure and functioning of prokaryotic and eukaryotic cells, and how the plasma membrane contributes to survival by controlling the movement of substances into and out of the cell. Students explore cellular growth, replacement and death. They become familiar with the key events and regulation of the cell cycle and the processes for cell division, including disruptions to the cell cycle and deviant cell behaviour. Students consider the properties of stem cells and their role in differentiation, specialisation and renewal of cells and tissues.

Area of Study 2

How do plant and animal systems function?

In this area of study students explore how systems function through cell specialisation in vascular plants and in digestive, endocrine and excretory systems in animals, focusing on regulation of water balance in plants, and temperature, blood glucose and water balance in animals. Students examine how homeostatic mechanisms in animals help maintain their internal environment within a narrow range of tolerance levels, and consider malfunctions in homeostatic mechanisms.

Area of Study 3

How do scientific investigations develop understandings of how organisms regulate their functions?

In this area of study students adapt or design and then conduct a scientific investigation to generate appropriate qualitative and/or quantitative data, organise and interpret the data, and reach a conclusion in response to the research question.



UNIT 2

Area of Study 1

How is inheritance explained?

In this area of study students describe the production of gametes in sexual reproduction through the key events in meiosis. They explore the nature of chromosomes and the use of genetic language to read and interpret patterns of inheritance and predict outcomes of genetic crosses.

Area of Study 2

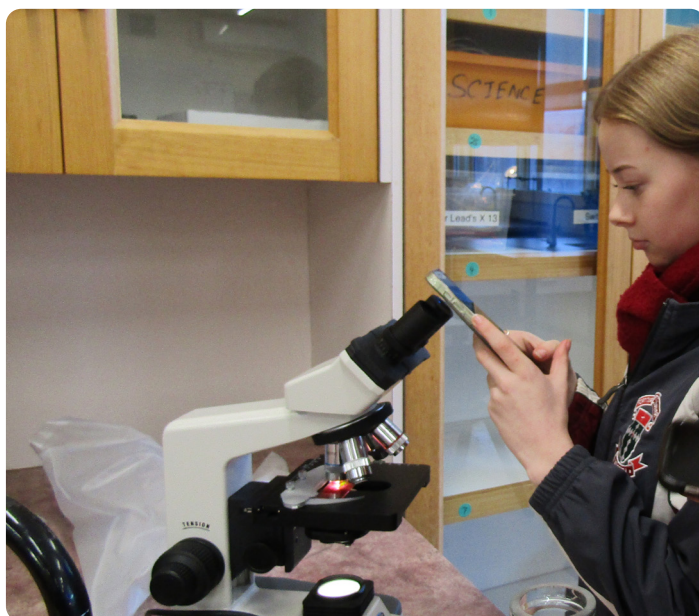
How do inherited adaptation impact on diversity?

In this area of study students analyse the advantages and disadvantages of asexual and sexual reproduction and investigate the use and application of reproductive cloning technologies. Students explore the biological importance of genetic diversity and the structural, physiological and behavioural adaptations that enable species to survive in an ecosystem.

Area of Study 3

How do humans use science to explore and communicate contemporary bioethical issues?

In this area of study students explore a contemporary bioethical issue relating to the application of genetic knowledge, reproductive science, inheritance or adaptations and interdependencies beneficial for survival.



CAREER OPTIONS

- Biologist
- Biomedical Scientist
- Botanist
- Chiropractor
- Dental Hygienist
- Dentist
- Doctor
- Environmental Science
- Forensic Scientist
- Geneticist
- Immunologist
- IVF Scientist
- Lab Research Assistant
- Midwifery
- Nursing
- Nutrition Science
- Paramedicine
- Pathologist
- Pharmacologist
- Physiotherapist
- Speech Therapist
- Sport Science
- Zoologist

UNIT 3

Area of Study 1

What is the role of nucleic acids and proteins in maintaining life?

On completion of this unit the student should be able to analyse the relationship between nucleic acids and proteins, and evaluate how tools and techniques can be used and applied in the manipulation of DNA.

Area of Study 2

How are biochemical pathways regulated

In this area of study students focus on the structure and regulation of biochemical pathways. They examine how biochemical pathways, specifically photosynthesis and cellular respiration, involve many steps that are controlled by enzymes and assisted by coenzymes. Students investigate factors that affect the rate of cellular reactions and explore applications of biotechnology that focus on the regulation of biochemical pathways.



UNIT 4

Area of Study 1

How do organisms respond to pathogens?

In this area of study students focus on the immune response of organisms to specific pathogens. Students examine unique molecules called antigens and how they illicit an immune response, the nature of immunity and the role of vaccinations in providing immunity. They explain how technological advances assist in managing immune system disorders and how immunotherapies can be applied to the treatment of other diseases.

Area of Study 2

How are species related over time?

On completion of this unit the student should be able to analyse the evidence for genetic changes in populations and changes in species over time, analyse the evidence for relatedness between species, and evaluate the evidence for human change over time.

Area of Study 3

How is scientific inquiry used to investigate cellular processes and/or biological change?

Students undertake a student-designed scientific investigation in either Unit 3 or Unit 4, or across both Units 3 and 4. The investigation involves the generation of primary data relating to cellular processes and/or how life changes and responds to challenges. The investigation draws on knowledge and related key science skills developed across Units 3 and 4 and is undertaken by students in the laboratory and/or in the field.



To find out more information about VCE Biology
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This flyer is correct as of July 2024, however may be subject to change.

