

# Biology

## Units 1-2

Biology explores the dynamic relationships that exist between organisms and their interactions with the non-living world. It also explores the processes of life, from the molecular world of the cell to that of the whole organism. Students examine classical and contemporary research to examine how our knowledge has evolved in response to new evidence and discoveries.

**Students need to have studied Units 1 and 2 Biology before attempting Units 3 and 4 Biology.**

### UNIT 1

How do living things stay alive? This unit focuses on the structure of cells and the processes that maintain life. Students will examine the adaptations organisms require for survival.

#### LEARNING ACTIVITIES

Practical reports, completion of worksheets, problem solving tasks, text reading and questions, maintaining class notes and summaries. Plant and animal dissections are a part of Unit 1. An excursion to the Melbourne Zoo or Melbourne Museum may be included.

#### KEY SKILLS REQUIRED

Multimedia skills, data analysis, problem solving, laboratory techniques, microscope use and dissection skills.

#### ASSESSED TASKS

SACs based on practical activities and class work.

### UNIT 2

How does reproduction maintain the continuity of life? Students compare the advantages and disadvantages of asexual and sexual reproduction, explain how cells reproduce and describe the medical research currently being undertaken in reproduction of organisms. Students will examine DNA and genetic inheritance. An investigation of genetic and reproductive technologies and the issues associated with these technologies will be undertaken.

#### LEARNING ACTIVITIES

Practical reports, research, completion of worksheets, problem solving tasks, text reading, text questions, maintenance of class notes and summaries and fieldwork excursions to a local bushland and coastal area.

#### KEY SKILLS REQUIRED

Data analysis, problem solving, laboratory techniques, microscope use, multimedia skills and an ability to prepare for tests and an examination.

#### ASSESSED TASKS

Field study report, SACs based on practical activities, class work and end of semester examination.

# Biology

## Units 3-4

Biology is a dynamic scientific discipline where it impacts on everyday life at the individual level. It can inform choices at the personal and at the societal level. It includes fields of biochemistry, neuroscience, genetics, evolutionary biology, behavioural science and cell and molecular biology including studies of genomics and proteomics.

### UNIT 3

Students investigate the activities of cells at the molecular level; the synthesis of biomacromolecules that form components of cells and the role of enzymes in catalysing biochemical processes. Students investigate energy transformations in photosynthesis and respiration, the role of DNA in the production of proteins and applications of molecular biology in medical diagnosis. Students will also investigate the stimulus-response model in coordination and regulation and how components of the human immune system respond to antigens and provide immunity.

#### LEARNING ACTIVITIES

Practical investigations, research, drawing and labelling diagrams, constructing tables and concept maps, text reading and answering questions

#### KEY SKILLS REQUIRED

Listening, reading biological texts, investigating and inquiring scientifically, applying biological information and understandings and communicating understanding (orally or in written form).

#### ASSESSED TASKS

Reports of three practical activities, a report of an investigation of an organism's response to a specific chemical or physical signal and a response to an issue or aspect related to the human immune response.

### UNIT 4

Students investigate molecular genetics and patterns of inheritance, the genome of individuals and species, tools and techniques used in the manipulation of DNA and study of inherited traits and cell reproduction. Students analyse and evaluate evidence for evolution and evolutionary relationships, and describe mechanisms for change, including the effect of human intervention on evolutionary processes through selective breeding and applications of biotechnology

#### LEARNING ACTIVITIES

Practical investigations, research, modeling, concept maps, posters, text reading and answering questions.

#### KEY SKILLS REQUIRED

Investigating and inquiring scientifically, applying biological understandings to familiar and new contexts, analysing issues and implications relating to scientific and technological developments and communicating biological information and understanding.

#### ASSESSED TASKS

Reports of three practical activities, a report on evolutionary relationships and a response to an issue related to human intervention in evolutionary processes.

#### VCAA ASSESSMENT – The overall Study Score will consist of:

School Assessed Coursework (40%) and 26 hour written examination in November (60%).