

# Biology

## (ATAR)

**Pre-requisite:** a 'B' grade or better in Year 10 Science is highly recommended

A unique appreciation of life and a better understanding of the living world are gained through studying the Biology ATAR course. This course encourages students to be analytical, to participate in problem-solving and to systematically explore fascinating and intriguing aspects of living systems, from the microscopic level through to ecosystems.

Students develop a range of practical skills and techniques through investigations and fieldwork in authentic contexts, such as marine reefs, endangered species, urban ecology, or biotechnology. Scientific evidence is used to make informed decisions about controversial issues.

## Course Structure

### Year 11

#### Unit 1

- In this unit, students investigate and describe a number of diverse ecosystems, exploring the range of biotic and abiotic components to understand the dynamics, diversity and underlying unity of these systems.
- Students develop an understanding of the processes involved in the movement of energy and matter in ecosystems. They investigate ecosystem dynamics, including interactions within and between species, and interactions between abiotic and biotic components of ecosystems.
- Students use classification keys to identify organisms, describe the biodiversity in ecosystems, investigate patterns in relationships between organisms, and aid scientific communication.
- Fieldwork is an important part of this unit. Fieldwork provides valuable opportunities for students to work together to collect first-hand data and to experience local ecosystem interactions.

#### Unit 2

- In this unit, students examine inputs and outputs of cells to develop an understanding of the chemical nature of cellular systems, both structurally and functionally, and the processes required for cell survival.
- Students investigate the ways in which matter moves and energy is transformed and transferred in the processes of photosynthesis and respiration, and the role of enzymes in controlling biochemical systems.
- Students examine the structure and function of plant and animal systems at cell and tissue levels.
- Students use science inquiry skills to explore the relationship between structure and function by conducting real or virtual dissections and carrying out microscopic examination of cells and tissues.

## Year 12

### Unit 3

- In this unit, students investigate the biochemical and cellular systems and processes involved in the transmission of genetic material to the next generation of cells and to offspring.
- Students investigate the genetic basis for the theory of evolution by natural selection through constructing, using and evaluating explanatory and predictive models for gene pool diversity of populations.
- Students use science inquiry skills to design and conduct investigations into how different factors affect cellular processes and gene pools; they construct and use models to analyse the data gathered; and they continue to develop their skills in constructing plausible predictions and valid, reliable conclusions.

### Unit 4

- In this unit, students investigate how homeostatic response systems control organisms' responses to environmental change – internal and external – in order to survive in a variety of environments, as long as the conditions are within their tolerance limits.
- Students study changes in the global distribution of vector-borne infectious diseases. They consider the factors that contribute to the spread of infectious disease and how outbreaks of infectious disease can be predicted, monitored and contained.
- Students use science inquiry skills to investigate a range of responses by plants and animals to changes in their environments; they construct and use appropriate representations to analyse the data gathered; and they continue to develop their skills in constructing plausible predictions and valid conclusions.