VCE Biology 2016–2021

Study Summary

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| **Please Note: This study summary includes excerpts from the VCE Biology Study Design. The summary is not a substitute for the VCE Study Design. Users are advised to consult the VCAA website to view the full accredited study design and other resources.** |

Staged implementation

The accreditation period for the revised study design for Units 1 and 2 begins 1 January 2016.

The accreditation period for the revised study design for Units 3 and 4 begins 1 January 2017.

Scope of study

Biology seeks to understand and explore the nature of life, past and present.

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 that of the whole organism, that maintain life and ensure its continuity

An important feature of VCE Biology is the opportunity for students to undertake a range of inquiry tasks both collaboratively and independently. Inquiry methodologies can include laboratory experimentation, fieldwork, microscopy, local and remote data logging, simulations, animations, literature reviews and the use of global databases and bioinformatics tools. Students pose questions, formulate hypotheses, collect and analyse data, evaluate methodologies and results, justify conclusions, make recommendations and communicate their findings.

As well as an increased understanding of scientific processes, students develop capacities that enable them to critically assess the strengths and limitations of science, respect evidence-based conclusions and gain an awareness of the ethical, social and political contexts of scientific endeavours.

Rationale

VCE Biology enables students to investigate the processes involved in sustaining life at cellular, system, species and ecosystem levels. In undertaking this study, students examine how life has evolved over time and understand that in the dynamic and interconnected system of life all change has a consequence that may affect an individual, a species or the collective biodiversity of Earth.

In VCE Biology students develop their inquiry, analytical and communication skills. They apply critical and creative thinking to analyse contemporary biology-related issues, and communicate their views from an informed position.

Structure

The study is made up of four units:

Unit 1: How do living things stay alive?

Unit 2: How is continuity of life maintained?

Unit 3: How do cells maintain life?

Unit 4: How does life change and respond to challenges over time?

Each unit contains two or three areas of study.

Entry

There are no prerequisites for entry to Units 1, 2 and 3. Students must undertake Unit 3 prior to undertaking Unit 4. Students entering Unit 3 without Units 1 and/or 2 may be required to undertake additional preparation as prescribed by their teacher. Units 1 to 4 are designed to a standard equivalent to the final two years of secondary education. All VCE studies are benchmarked against comparable national and international curriculum.

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.

A student investigation related to the survival of an organism or species is undertaken in Area of
Study 3. The investigation draws on content from Area of Study 1 and/or Area of Study 2.

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 is 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.

A student investigation into, and communication of, an issue related to genetics and/or reproductive science is undertaken in Area of Study 3. The investigation draws on content from Area of Study 1 and/or Area of Study 2.

Unit 3: How do cells maintain life?

In this unit students investigate the workings of the cell from several perspectives. These different perspectives enable consideration of both the capabilities and the limitations of living organisms whether animal, plant, fungus or microorganism. Students examine the key molecules and biochemical pathways involved in cellular processes both within the cell and between cells. At this molecular level students study the human immune system and the interactions between its components to provide immunity to a specific antigen.

A student investigation related to biological change and/or continuity is undertaken in either Unit 3 or Unit 4, or across both Unit 3 and Unit 4. The findings of the investigation are presented in a scientific poster format.

Unit 4: How does life change and respond to challenges over time?

In this unit students consider the continual change and challenges to which life on Earth has been subjected. They examine change in life forms, investigate the relatedness between species and consider the impact of various change events on a population’s gene pool. Students explore 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 are explored for both the individual and the species.

A student investigation related to biological change and/or continuity is undertaken in either Unit 3 or Unit 4, or across both Unit 3 and Unit 4. The findings of the investigation are presented in a scientific poster format.

Assessment

Satisfactory completion

The award of satisfactory completion for a unit is based on a decision that the student has demonstrated achievement of the set of outcomes specified for the unit. This decision will be based on the teacher’s assessment of the student’s performance on assessment tasks designated for the unit.

Levels of achievement

*Units 1 and 2*

Procedures for the assessment of levels of achievement in Units 1 and 2 are a matter for school decision.

*Units 3 and 4*

The Victorian Curriculum and Assessment Authority will supervise the assessment of all students undertaking Units 3 and 4. In the study of VCE Biology the student’s level of achievement will be determined by School-assessed Coursework as specified in the VCE Biology study design and external assessment.

Percentage contributions to the study score in VCE Biology are as follows:

* Unit 3 School-assessed Coursework: 16 per cent
* Unit 4 School-assessed Coursework: 24 per cent
* End-of-year examination: 60 per cent.