

CERTIFICATE IV IN ADULT TERTIARY PREPARATION (10765NAT)

BIOLOGY

The Biology Specialisation applies to those who require foundation Biology knowledge and skills for entrance to tertiary study in a relevant discipline or field.

There are two units of study within the Biology Specialisation.

ATPBIO001 - Unit 1:

Apply science inquiry to solve biology problems relating to cells and multicellular organisms.

This unit describes the performance outcomes, skills and knowledge required to solve biology problems relating to cells and multicellular organisms using science inquiry process. It requires the ability to understand facts and theory and conduct practical investigations on biology fundamentals that include the nature of life, cells and plant and animal physiology. Organising and representing ideas and information using scientific language and conventions is required.

ATPBIO001 - Performance Criteria:

1. Identify cellular structures	<p>1.1 Identify and describe the components, structure and function of cells and multicellular organisms.</p> <p>1.2 Explain the relationship between structure and function of cells and multicellular organisms.</p> <p>1.3 Draw, label and explain observations of cells and multicellular organisms using scientific diagrams.</p>
2. Prepare and conduct laboratory operations	<p>2.1 Select and use laboratory equipment appropriately to conduct biological inquiry.</p> <p>2.2 Comply with safe laboratory practices.</p> <p>2.3 Follow instructions to perform laboratory operations and record observations.</p>
3. Solve biology problems using a science inquiry process	<p>3.1 Define the problem to be solved.</p> <p>3.2 Identify and select data and evidence from primary and secondary sources.</p> <p>3.3 Analyse and evaluate the data and evidence to provide a solution or conclusion.</p> <p>3.4 Report findings using scientific format, language, conventions and technology.</p>

ATPBIO001 – Performance Evidence:

- Compiled at least one scientific report based on a biology problems/hypothesis, demonstrating collection of primary data resulting from a laboratory operations that involve:
 - Sectioning & mounting specimens under a microscope
 - Observing & recording quantitatively and qualitatively
 - Transferring substances between containers

ATPBIO001 – Knowledge Evidence:

- Characteristics of organisms
- Cells
 - cell theory and structure
 - prokaryotic and eukaryotic cell types
 - the structure and function of cell organelles
 - names and nature of organic compounds present in cells
 - cellular respiration
 - cell processes of diffusion & osmosis
- Structures and functions of flowering plants
 - photosynthesis
 - transport in plants
 - gas exchange in plants
 - names of cell types in plants
 - photosynthesis reaction
 - transpiration
 - reproduction in flowering plants
- The structure and functions of human physiology systems
 - digestive
 - circulatory
 - respiratory
 - excretory
 - reproductive system
 - nervous and endocrine systems
- Drawing , labelling and reading Scientific diagrams
- Laboratory procedures that includes
 - use of basic laboratory equipment
 - sectioning & mounting specimens
 - staining sections
 - observing, recording, and evaluating quantitatively and qualitatively
 - transferring substances between containers
- Working safely
- Science inquiry process
- Primary and secondary sources of credible data and information
- Scientific terminology , language and conventions used in biology
- Format, style and structure of an academic report in a scientific context

ATPBIO002 - Unit 2:

Apply theory of ecosystems and genetics in biology.

This unit describes the performance outcomes, skills and knowledge required to apply biology theory relating to ecosystems and genetics. It requires the ability to understand facts and theory on biodiversity, classifications, genetics and evolution, conduct practical investigations, and solve problems using data. Organising and representing ideas and information using scientific language and conventions is required.

ATPBIO002 - Performance Criteria:

<p>1. Investigate ecosystems and genetics relationships</p>	<p>1.1 Describe biodiversity and ecosystem dynamics. 1.2 Identify and explain the cellular processes and mechanisms of genetics and evolution. 1.3 Draw and label scientific diagrams to explain structures, cycles, processes and relationships.</p>
<p>2. Describe biodiversity and ecosystem dynamics</p>	<p>2.1 Determine the aim of the study using research from secondary sources. 2.2 Outline method and materials for collecting the data. 2.3 Select site and mark out sample area. 2.4 Use scientific equipment to take measurements. 2.5 Identify and classify biotic factors into groups. 2.6 Evaluate data and collate results. 2.7 Discuss findings, draw conclusions and make recommendations for future studies of the site.</p>
<p>3. Identify and explain the cellular processes and mechanisms of genetics and evolution</p>	<p>3.1 Collect and organise data in graphical and tabular form. 3.2 Analyse data, apply relevant biology facts and theory and carry out scientific calculations as required. 3.3 Evaluate the results to identify variations and trends.</p>
<p>4. Draw and label scientific diagrams to explain structures, cycles, processes and relationships</p>	<p>4.1 Report findings and conclusions using, format, style and structure of a scientific report. 4.2 Organise and represent biology ideas, information and data using scientific language, conventions and technology appropriate to the audience and purpose.</p>

ATPBIO002 – Performance Evidence:

- Completed a basic scientific field report on the flora and fauna in an ecosystem on at least one occasion.
Report must include:
 - Results of an on-site field study
 - representation of data visually in tables and diagrams
 - list of secondary sources
- Solved at least one genetics heredity problem using tables and diagrams
- Constructed and applied dichotomous keys for classification of organisms at different levels

ATPBIO002 – Knowledge Evidence:

- The meaning of the term “ecology” in science
- The scientific relationship between species of flora and fauna in an ecosystem
 - adaptations
 - relationships within populations
 - feeding relationships within communities
 - non feeding relationships within communities
 - energy cycle of matter
- Classification of organisms
 - characteristics of the five kingdoms
 - binomial naming system for species
 - classification problems
 - classification keys
- Genetics and heredity
 - DNA structure, function, replication
 - protein synthesis, RNA
 - variation by mutations
 - chromosome theory of inheritance
 - mitosis, meiosis
 - dominant/recessive inheritance, incomplete dominance/co-dominance
- Evolutionary theory and concepts
- How to conduct a Field Study
- Calculating and presenting information and data in variety of formats manually and utilising technology
- Scientific terminology and language conventions used in biology
- Format, style and structure of a basic scientific report