Government of **Western Australia**
**School Curriculum and Standards Authority**

# Integrated Science General Course Year 12

# Selected Unit 3 syllabus content for the

# Externally set task 2019

This document is an extract from the *Integrated Science General Course Year 12 syllabus*, featuring all of the content for Unit 3. The content that has been highlighted in the document is the content on which the Externally set task (EST) for 2019 will be based.

All students enrolled in the course are required to complete an EST. The EST is an assessment task which is set by the Authority and distributed to schools for administering to students. The EST will be administered in schools during Term 2, 2019 under standard test conditions. The EST will take 50 minutes.

The EST will be marked by teachers in each school using a marking key provided by the Authority. The EST is included in the assessment table in the syllabus as a separate assessment type with a weighting of 15% for the pair of units.

# Unit 3

## Unit description

In this unit, students integrate ideas relating to the processes involved in the movement of energy and matter in ecosystems. They investigate and describe a number of diverse ecosystems, exploring the range of living and non-living components, to understand the dynamics, diversity and interrelationships of these systems.

They investigate ecosystem dynamics, including interactions within and between species, and interactions between living and non-living components of ecosystems. They also investigate how measurements of population numbers, species diversity, and descriptions of species interactions, can form the basis for comparisons between ecosystems.

Fieldwork is an important part of this course. Fieldwork provides valuable opportunities for students to work together to collect first-hand data and to experience local ecosystem interactions. In order to understand the interconnectedness of organisms, the physical environment and human activity, students analyse and interpret data collected through investigation of a local environment. They will also use sources relating to other Australian, regional and global environments.

## Suggested contexts

Possible contexts (this list is not exhaustive) which may be used for teaching the content of this unit could be:

- local ecosystem studies
- wetland ecology
- marine ecology
- aquaculture
- viticulture
- horticulture.

## Unit content

This unit includes the knowledge, understandings and skills described below. The order and detail in which the key concepts are organised into teaching/learning programs are decisions to be made by the teacher.

### Science Inquiry Skills

- identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes
- plan, select and use appropriate investigation methods, including pre-testing, to collect reliable data; assess risk and address ethical issues associated with these methods
- conduct investigations safely, competently and methodically for the collection of valid and reliable data

- represent data in meaningful and useful ways; organise and analyse data to identify trends, patterns and relationships; qualitatively describe sources of measurement error and use evidence to make and justify conclusions
- interpret a range of scientific and media texts and evaluate the conclusions by considering the quality of available evidence
- use appropriate scientific representations, including diagrams of structures and processes, to communicate conceptual understanding, solve problems and make predictions
- communicate scientific ideas and information for a particular purpose, using appropriate scientific language, conventions and representations

## Science as a Human Endeavour

- the use of scientific knowledge is influenced by social, economic, cultural and ethical considerations
- the use of scientific knowledge may have beneficial and/or harmful and/or unintended consequences
- scientific knowledge can enable scientists to offer valid explanations and make reliable predictions
- scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts, and to design action for sustainability

## Science Understanding

**Earth systems/cycles in nature**

- differences in geographical and physical conditions result in a wide variety of ecosystems
- abiotic factors, including temperature, pH, salinity, light, water and atmospheric gases, impact on the survival of organisms within the environment
- there is interaction between organisms, biological communities and the abiotic environment in which they live
- the biotic components of an ecosystem transfer and transform energy, originating primarily from the sun, into biomass
- biotic components interact with abiotic components to facilitate biogeochemical cycling
- producers, consumers and decomposers have a role in the transfer of energy in an ecosystem
- food chains and food webs show the feeding relationships between organisms within a community
- the amount of energy transferred between trophic levels in food chains and food webs diminishes as the trophic level increases

**Structure and function of biological systems**

- modes of interactions between species in ecosystems include competition, predation and symbiosis (mutualism, commensalism and parasitism)
- species interactions affect population densities and are important in determining community structure and composition

**Ecosystems and sustainability**

- changes to abiotic and biotic factors, including climatic events, impact on the carrying capacity of ecosystems
- biodiversity includes the diversity of genetics, species and ecosystems; biodiversity changes naturally over time, and varies due to differences in location
- human interference is threatening biodiversity through deterioration of ecosystems and diminishing habitat areas

**Species continuity and change**

- changes in ecosystems affect the survival of organisms within the ecosystem; individual variation assists survival, which over time results in changes in characteristics of the species
- variation in the form of suitable characteristics assists survival of individuals
- environmental changes may lead to selection of advantageous biological characteristics within a species