

# Erindale College

<b>Assessment Period:</b>	<b>2021 S2</b>
<b>Course:</b>	<b>BIOLOGY</b>
<b>Unit:</b>	<b>Unit 1: Biodiversity and Connectedness (1.0)</b>
<b>Accreditation:</b>	<b>T</b>
<b>Year:</b>	<b>12</b>

## Unit Goals

- understand how classification helps to organise, analyse and communicate data about biodiversity
- understand that ecosystem diversity and dynamics can be described and compared with reference to biotic and abiotic components and their interactions
- understand how theories and models have developed based on evidence from multiple disciplines; and the uses and limitations of biological knowledge in a range of contexts
- use science inquiry skills to design, conduct, evaluate and communicate investigations into biodiversity and flows of matter and energy in a range of ecosystems
- evaluate, with reference to empirical evidence, claims about relationships between and within species, diversity of and within ecosystems, and energy and matter flows
- communicate biological understanding using qualitative and quantitative representations in appropriate modes and genres

## Content Description

### Science Inquiry Skills

- identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes
- design investigations, including the procedure/s to be followed, the materials required, and the type and amount of primary and/or secondary data to be collected; conduct risk assessments; and consider research ethics, including animal ethics
- conduct investigations, including using ecosystem surveying techniques, 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 uncertainty and limitations in data; and select, synthesise and use evidence to make and justify conclusions
- interpret a range of scientific and media texts, and evaluate processes, claims and conclusions by considering the quality of available evidence; and use reasoning to construct scientific arguments
- select, construct and use appropriate representations, including classification keys, food webs and biomass pyramids, to communicate conceptual understanding, solve problems and make predictions
- communicate to specific audiences and for specific purposes using appropriate language, nomenclature, genres and modes, including scientific reports

### Science as a Human Endeavour

- science is a global enterprise that relies on clear communication, international conventions, peer review and reproducibility
- development of complex models and/or theories often requires a wide range of evidence from multiple individuals and across disciplines
- advances in science understanding in one field can influence other areas of science, technology and

engineering

- 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 - Describing biodiversity**

- biodiversity includes the diversity of species and ecosystems; measures of biodiversity rely on classification and are used to make comparisons across spatial and temporal scales
- biological classification is hierarchical and based on different levels of similarity of physical features, methods of reproduction and molecular sequences
- biological classification systems reflect evolutionary relatedness between groups of organisms
- most common definitions of species rely on morphological or genetic similarity or the ability to interbreed to produce fertile offspring in natural conditions – but, in all cases, exceptions are found
- ecosystems are diverse, composed of varied habitats and can be described in terms of their component species, species interactions and the abiotic factors that make up the environment
- relationships and interactions between species in ecosystems include predation, competition, symbiosis and disease
- in addition to biotic factors, abiotic factors including climate and substrate can be used to describe and classify environments

### **Science Understanding - Ecosystem dynamics**

- the biotic components of an ecosystem transfer and transform energy originating primarily from the sun to produce biomass, and interact with abiotic components to facilitate biogeochemical cycling, including carbon and nitrogen cycling; these interactions can be represented using food webs, biomass pyramids, water and nutrient cycles
- species or populations, including those of microorganisms, fill specific ecological niches; the competitive exclusion principle postulates that no two species can occupy the same niche in the same environment for an extended period of time
- keystone species play a critical role in maintaining the structure of the community; the impact of a reduction in numbers or the disappearance of keystone species on an ecosystem is greater than would be expected based on their relative abundance or total biomass
- ecosystems have carrying capacities that limit the number of organisms (within populations) they support, and can be impacted by changes to abiotic and biotic factors, including climatic events
- ecological succession involves changes in the populations of species present in a habitat; these changes impact the abiotic and biotic interactions in the community, which in turn influence further changes in the species present and their population size
- ecosystems can change dramatically over time; the fossil record and sedimentary rock characteristics provide evidence of past ecosystems and changes in biotic and abiotic components
- human activities (for example, over-exploitation, habitat destruction, monocultures, pollution) can reduce biodiversity and can impact on the magnitude, duration and speed of ecosystem change
- models of ecosystem interactions (for example, food webs, successional models) can be used to predict the impact of change and are based on interpretation of and extrapolation from sample data (for example, data derived from ecosystem surveying techniques); the reliability of the model is determined by the representativeness of the sampling

## Assessment Tasks

Name	Due Date	Weighting
Assignment	9 August - 13 August	40%
Exam 1	24 August - 8 September	30%
Exam 2	16 November - 19 November	30%

## School Assessment Information

### For penalties for late and non-submission of work

See [BSSS Policy and Procedure Manual 4.3.10](#) for further information.

### For academic integrity

See [BSSS Policy and Procedure Manual 4.3.12](#) for further information.

### For appeals processes

See [BSSS Policy and Procedure Manual 7.2](#) for further information.

### For moderation procedures (internal and external)

See [BSSS Policy and Procedure Manual 5](#) for further information.

### For meshing procedures

See [BSSS Policy and Procedure Manual 5.4.1](#) for further information.

### For method of unit score calculation

See [BSSS Policy and Procedure Manual 4.3.6.2](#) for further information.

### For procedures for calculating course scores

See [BSSS Policy and Procedure Manual 4.3.13.2](#) for further information.

## Achievement Standards for BIOLOGY T - Year 12

	<i>A student who achieves an A grade typically</i>	<i>A student who achieves a B grade typically</i>	<i>A student who achieves a C grade typically</i>	<i>A student who achieves a D grade typically</i>	<i>A student who achieves an E grade typically</i>
<b>Concepts, Models &amp; Applications</b>	<ul style="list-style-type: none"> <li>critically analyses the properties and functions of system components, processes and interactions, and the interplay and effects of factors across a range of scales</li> <li>evaluates applications, limitations, and predictions of theories and models to explain systems and create solutions, with evidence, in unfamiliar contexts</li> <li>evaluates evidence with reference to critical analysis of models and/or theories, and develops evidence-based conclusions and evaluates limitations</li> </ul>	<ul style="list-style-type: none"> <li>analyses the properties and functions of system components, processes and interactions, and the interplay and effects of factors across a range of scales</li> <li>analyses applications, limitations, and predictions of theories and models to explain systems and create plausible solutions, with evidence in familiar contexts</li> <li>analyses evidence with reference to models and/or theories, and develops evidence-based conclusions and discusses limitations</li> </ul>	<ul style="list-style-type: none"> <li>explains the fundamental properties and functions of system components, processes and interactions, and the effects of factors across a range of scales</li> <li>explains applications, limitations, and predictions of theories and models to explain systems and create plausible solutions in familiar contexts</li> <li>describes evidence with reference to models and/or theories, and develops evidence-based conclusions and identifies limitations</li> </ul>	<ul style="list-style-type: none"> <li>describes the fundamental properties and functions of system components, processes and interactions, and the effects of one or more factors</li> <li>describes the nature, functions, limitations and applications of theories and models to create solutions to problems with supporting evidence</li> <li>describes evidence, and develops conclusions with some reference to models and/or theories</li> </ul>	<ul style="list-style-type: none"> <li>identifies the fundamental properties and functions of system components, processes and interactions, and some affective factors</li> <li>identifies the nature, functions, limitations and applications of theories and models, and suggest solutions to problems with supporting evidence</li> <li>identifies evidence, and asserts conclusions with little or no reference to models and/or theories</li> </ul>
<b>Contexts</b>	<ul style="list-style-type: none"> <li>critically analyses epistemology, role of peer review, collaboration, and technology in developing knowledge</li> <li>critically analyses the influence of social, economic, ethical and cultural factors on Science</li> </ul>	<ul style="list-style-type: none"> <li>analyses epistemology, role of peer review and technology in developing knowledge</li> <li>analyses the influence of social, economic, ethical and cultural factors on Science</li> </ul>	<ul style="list-style-type: none"> <li>explains epistemology, role of peer review and technology in developing knowledge</li> <li>explains the influence of social, economic, ethical and cultural factors on Science</li> </ul>	<ul style="list-style-type: none"> <li>describes role of peer review and technology in developing knowledge</li> <li>describes the influence of social, economic, ethical and cultural factors on Science</li> </ul>	<ul style="list-style-type: none"> <li>identifies that scientific knowledge has changed over time</li> <li>identifies the influence of social, economic, ethical and cultural factors on Science</li> </ul>
<b>Inquiry Skills</b>	<ul style="list-style-type: none"> <li>designs, conducts and improves safe, ethical and original inquiries individually and collaboratively, that collect valid, reliable data in response to a complex question</li> <li>critically analyses cause and correlation, anomalies, reliability and validity of data and representations, and critically analyses errors</li> <li>evaluates processes and claims, and provides a critique based on evidence, and critically analyses alternatives</li> <li>reflects on own thinking and evaluates planning, time management, use of appropriate work strategies</li> <li>communicates concisely, effectively and accurately, with scientific literacy in a range of modes, representations, and genres for specific audiences and purposes, and accurate referencing</li> </ul>	<ul style="list-style-type: none"> <li>designs, conducts and improves safe, ethical inquiries individually and collaboratively, that collect valid, reliable data in response to a question</li> <li>analyses cause and correlation, anomalies, reliability and validity of data and representations, and analyses errors</li> <li>explains processes and claims, and provides a critique with reference to evidence, and analyses alternatives</li> <li>reflects on their own thinking and analyses planning, time management, use of appropriate work strategies</li> <li>communicates clearly and accurately, with scientific literacy in a range of modes, representations and genres for specific audiences and purposes, and accurate referencing</li> </ul>	<ul style="list-style-type: none"> <li>plans and conducts safe, ethical inquiries individually and collaboratively, that collect valid data in response to a familiar question</li> <li>describes causal and correlational relationships, anomalies, reliability and validity of data and representations, and discusses common errors</li> <li>describes processes and claims, and identifies alternatives with reference to reliable evidence</li> <li>reflects on their own thinking and explains planning, time management, use of appropriate work strategies</li> <li>communicates accurately demonstrating scientific literacy, in a range of modes, representations, and genres for specific purposes, and mostly consistent referencing</li> </ul>	<ul style="list-style-type: none"> <li>follows a procedure to conduct safe, ethical inquiries individually and collaboratively, to collect data in response to a simple question with varying success</li> <li>describes trends, relationships and anomalies in data, identifies anomalies, and cites sources of error</li> <li>describes processes and claims, and identifies the need for improvements with some reference to evidence</li> <li>reflects on their own thinking, with reference to planning and the use of appropriate work strategies</li> <li>communicates demonstrating some scientific literacy, in a range of modes, representations, and genres with some evidence and inconsistent referencing</li> </ul>	<ul style="list-style-type: none"> <li>follows a procedure to conduct safe, ethical inquiries individually and collaboratively, to collect data with little or no connection to a question</li> <li>identifies trends and relationships in data with reference to sources of error</li> <li>identifies processes and the need for some improvements, with little or no reference to evidence</li> <li>reflects on their own thinking with little or no reference to planning, time management, and use of work strategies</li> <li>communicates demonstrating limited scientific literacy, in a range of modes and representations, with inconsistent and inaccurate referencing</li> </ul>