

## Understand



**Course:** Life Science 11

**Teacher:** Alistair Eggo

**Unit:** Metabolic Processes

**Date:** 03/30/2020

**Duration:** 5 Weeks

**Description:**

This transition to online learning we will begin by finishing our last unit on Phylogeny. We will then move on to studying metabolic processes, in particular respiration and photosynthesis. I will link these two units together by discussing the evolution of different respiration types, and having students analyse cladograms that show the evolution of different types of photosynthesis. This is a short unit, as we will not take a ‘deep dive’ into the biochemistry of either respiration or photosynthesis - rather I will try to build the students scientific skills, and help them to develop a good general idea of the biochemistry. This is a very inquiry-focused unit which will involve small experiments done in kitchens. We will also examine real food webs to understand how energy is transferred between organisms and ecosystems.

	Big Ideas	Essential Questions
<b>Understand</b>	<p><i>Which Big Ideas will be the focus of this unit?</i></p> <p>Life is a result of interactions at the molecular and cellular levels.</p>	<p><i>What questions will be guiding your students' inquiry?</i></p> <ul style="list-style-type: none"> <li>- What do we need to live? How does that vary across different taxa?</li> <li>- How are animals and plants connected? How are we all connected through energy transfer? How are trophic levels arranged?</li> <li>- How does thermodynamics relate to Biology?</li> </ul>

<b>Do</b>	<b>Core Competencies</b>	
	<p><i>Choose one or more Core Competencies that will be focused on and developed in this unit: (1) Communication; (2) Creative Thinking; (3) Critical Thinking; (4) Positive Personal and Cultural Identity; (5) Personal Awareness and Responsibility; and (6) Social Responsibility.</i></p> <ul style="list-style-type: none"> <li>- Communication</li> <li>- Creative Thinking</li> <li>- Critical Thinking</li> </ul>	<p><i>Which activities, projects, exercises or discussions will teach this Core Competency? How will they implement the First Peoples Principles of Learning? How will they be inquiry-based?</i></p> <p>Creating procedures for their laboratory experiments requires creativity and imagination, especially with the confines of COVID-19 to deal with. Explaining the results and creating diagrams etc. utilises students' communication skills, while evaluating the experiment after the fact will build our scientific critical thinking.</p>
<b>Curricular Competencies</b>		
	<p><i>Which Curricular Competencies (specific to your course) will students learn and be assessed on in this unit?</i></p> <p><b>Questioning and predicting</b></p> <ul style="list-style-type: none"> <li>- Formulate multiple hypotheses and predict multiple outcomes</li> </ul> <p><b>Processing and analyzing data and information</b></p> <ul style="list-style-type: none"> <li>- Apply First Peoples perspectives and knowledge, other ways of knowing, and local knowledge as sources of information</li> <li>- Seek and analyze patterns, trends, and connections in data, including describing relationships between variables, performing calculations, and identifying inconsistencies</li> <li>- Construct, analyze, and interpret graphs, models, and/or diagrams</li> <li>- Use knowledge of scientific concepts to draw conclusions that are consistent with evidence</li> <li>- Analyze cause-and-effect relationships</li> </ul> <p><b>Evaluating</b></p> <ul style="list-style-type: none"> <li>- Evaluate their methods and experimental conditions, including identifying sources of error or uncertainty, confounding variables, and possible alternative explanations and conclusions</li> <li>- Describe specific ways to improve their investigation methods and the quality of their data</li> <li>- Express and reflect on a variety of experiences, perspectives, and worldviews through place</li> </ul>	<p><i>Which activities, projects, exercises or discussions will teach these Curricular Competencies? How will they implement the First Peoples Principles of Learning? How will they be inquiry-based? How will the Curricular Competencies be assessed?</i></p> <p>The laboratory exercises we will complete, involve initial hypothesising and planning, completing the experiment, deciphering the results and evaluating successes and failures. These processes involve the curricular competencies listed here, which students will complete with guidance. We will apply our experimental findings to the content from teacher-led instruction. Students will also be given the opportunity to look at real scientific data about BC food webs which use Indigenous Knowledge. We will talk about this and the value of incorporating Indigenous perspectives.</p>

<b>Curricular Content</b>	
<b>Know</b>	<p><i>Which Curricular Content (specific to your course) will students learn and be assessed on this unit?</i></p> <p>Energy transformations in cells:</p> <ul style="list-style-type: none"> <li>- cellular respiration: glucose broken down in the presence of water yields energy (ATP) and carbon dioxide</li> <li>- photosynthesis: consumes carbon dioxide and water, produces oxygen and sugars</li> </ul>
	<p><i>Which activities, projects, exercises or discussions will teach this Curricular Content? How will they implement the First Peoples Principles of Learning? How will they be inquiry-based? How will the Curricular Content be assessed?</i></p> <p>Through a variety of laboratory activities students will appreciate the enzymes that control these reactions, and how these pathways affect life. Some content will be delivered by the instructor, with students researching the importance of, and structure of different molecules, but the main impetus of this unit will be to experimentally ‘prove’ how important these processes are.</p> <p>Analysis of food webs will be through worksheets and readings. Assessment of these learning objectives will be through laboratory reports, worksheets, quizzes and a final unit test.</p>

<b>Required Resources</b>
<p><i>What resources (textbooks, computer programmes, website subscriptions) will students need to complete this unit?</i></p> <p>Functioning computer with internet access  Kitchen supplies  Plants/Garden</p>