

UNIT OF STUDY

Title: Photosynthesis	Subject/Course: Biology	Length: 1 week
Topic: Molecules and Cells 3	Grade: 10 th grade	Designer: Woods
UNIT GOALS AND EXPECTATIONS		
<p>IMPORTANT CONCEPTS/UNDERSTANDINGS: Plant cells contain chloroplasts, the site of photosynthesis. Plants and many microorganisms use solar energy to combine molecules of carbon dioxide and water into complex, energy rich organic compounds and release oxygen to the environment. This process of photosynthesis provides a vital connection between the sun and the energy needs of living systems. The energy for life primarily derives from the sun. Plants capture energy by absorbing light and using it to form strong (covalent) chemical bonds between the atoms of carbon-containing (organic) molecules. These molecules can be used to assemble larger molecules with biological activity (including proteins, DNA, sugars, and fats). In addition, the energy stored in bonds between the atoms (chemical energy) can be used as sources of energy for life processes. The chemical bonds of food molecules contain energy. Energy is released when the bonds of food molecules are broken and new compounds with lower energy bonds are formed. Cells usually store their energy temporarily in phosphate bonds of a small high-energy compound called ATP.</p>	<p>ESSENTIAL QUESTIONS: What is the primary source of energy for life on Earth? How is the sun's energy converted from solar energy into the chemical energy used by other organisms on Earth? What is the equation for photosynthesis?</p>	
<p>STUDENT LEARNING EXPECTATIONS: MC.2.B.5 Compare and contrast the structures of an animal cell to a plant cell by analyzing</p> <ul style="list-style-type: none"> ▪ Cell walls vs. cell membrane ▪ Chlorophyll ▪ Chloroplasts vs. mitochondria <p>MC.3.B.1 Compare and contrast the structure and function of the mitochondria and chloroplast.</p>	<p>MC.3.B.4 Describe and model the conversion of light energy to chemical energy by photosynthetic reactions:</p> <ul style="list-style-type: none"> • Light-dependent reactions • Light-independent reactions <p>MC.3.B.5 Compare and contrast cellular respiration and photosynthesis as energy conversion pathways.</p>	
<p>SPECIFIC DECLARATIVE KNOWLEDGE –know Explain where plants get the energy they need to produce food. Describe the role of ATP in cellular activities. State the overall equation for photosynthesis. Describe the role of light and chlorophyll in photosynthesis. Describe the structure and function of a chloroplast. Describe what happens in the light-dependent reactions. Explain what the Calvin Cycle is. Identify factors that affect the rate at which photosynthesis occurs.</p>	<p>SPECIFIC PROCEDURAL KNOWLEDGE –do Identify the products and reactants of the photosynthetic reaction while writing balanced equations.</p>	
UNIT ASSESSMENTS		
(Include tasks related to Dimensions 3 and 4 and Bloom's Taxonomy)		

<p>Students will identify the connection between changes in seasons, climate, and temperature, with changes in the rate of photosynthesis.</p> <p>“How does Photosynthesis vary with Light Intensity?”- Problem Solving Lab 9-2</p> <p>“Please Re-Leaf Me”- Group Work using TI-83</p> <p>“Photosynthesis: Oxygen as By-product”-Group Lab – Traditional, Experimental Demonstration using TI-83 with CO2 Probes</p> <p>Current Event Open Response</p>		
<p>Traditional Assessments:</p> <p>Photosynthesis Pre-Test and Post-Test(Quiz grade)</p> <p>Photosynthesis/Respiration/Fermentation Test</p> <p>Section Quizzes</p>	<p>Other Evidence of Learning:</p> <p>Bellringers</p> <p>Class discussion</p> <p>Informal Questioning</p> <p>Guest Speaker/Field Trip</p>	
ACTIVITIES AND LEARNING EXPERIENCES		Resources
<p>KWL Photosynthesis</p> <p>Powerpoint Discussion</p> <p>Establish Habits of Mind for Science in Critical Thinking, Creative thinking, and Self Regulated Thinking</p> <p>Notetaking</p>		<p>Prentice Hall Textbook: Biology</p> <p>TI-83's with CO2 probes</p> <p>Internet</p> <p>Powerpoint</p> <p>Lab Equipment</p> <p>Plants</p>
Career Connections		
Plant Pathologist		