Unit 4 Photosynthesis and Respiration

Content Area: **Science**
Course(s): **Biology CP, Biology Honors, STEM Biology Honors**
Time Period: **November**
Length: **4 weeks**
Status: **Published**

Transfer Skills

All organisms require energy to perform the cellular functions necessary to support life

Enduring Understandings

Big Idea: All organisms require energy to perform the cellular functions necessary to support life

- Continual input of energy from sunlight keeps matter and energy flowing through ecosystems
- Plants have the capability to take energy from light to form sugar molecules containing carbon, hydrogen, and oxygen.
- In both plant and animal cells, sugar is a source of energy and can be used to make other carbon-containing (organic) molecules
- All organisms must break the high-energy chemical bonds in food molecules during cellular respiration to obtain the energy needed for life processes.

Essential Questions

- What do living things need energy for?
- What is the source of energy for all life on earth?
- How does sunlight energy get converted into food for plants?
- How is the energy stored in food converted into a usable form for the cell?

Content

Chapters 8 and 9

Vocabulary:

- Adenosine Triphosphate
- heterotroph
- autotroph
- photosynthesis

- light-dependent reactions
- light-independent reactions
- Calvin Cycle
- pigment
- chlorophyll
- NADP
- aerobic
- anaerobic
- respiration
- glycolysis
- Krebs Cycle
- electron transport chain
- electron carriers
- NAD
- FAD
- fermentation

Skills

- Describe the structure and function of the ATP molecule
- Explain how the fundamental life processes of organisms depend on a variety of chemical reactions that occur in specialized areas of the organism's cells
- Recognize that the process of photosynthesis as provides a vital connection between the sun and the energy needs of living systems
- Explain how 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
- Describe how plants capture energy by absorbing light and use it to form strong chemical bonds between the atoms of carbon-containing molecules
- Design independent investigations to determine the effects of changing environmental factors on photosynthesis
- Recognize that the chemical bonds of food molecules contain energy, which is released when the bonds of food molecules are broken and new compounds with lower energy bonds are formed
- Examine how the breakdown of some food molecules enables the cell to store energy in specific molecules that are used to carry out the many functions of the cell
- Trace the process in which nutrients are transported to cells to serve as building blocks for the synthesis of structures and as reactants for cellular respiration

Resources

Standards