

HU GK-12 Activity

TITLE: Converting Light Energy to Chemical Energy by Photosynthesis

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DCPS STANDARDS: E.7.4

GOALS:

1. Scholars will be able to describe how energy is passed from the sun to plants through the process of photosynthesis.

OBJECTIVES:

1. Given a plant, a light source, and a piece of rubber tubing, Scholars will build an apparatus that will simulate the generation of electricity through the process of photosynthesis.
2. Given a diagram, scholars will label the parts of the photosynthetic process.

PREREQUISITE KNOWLEDGE:

Background

Photosynthesis is the process by which light energy in the form of photons are converted into chemical energy (carbohydrates) by plants. Light energy travels from the sun to plants in the form of invisible wavelengths. Photosynthesis takes place by means of light absorbing pigments called chlorophyll. Pigments are substances found in plants that allow the absorption of light energy. The color of the pigment comes from the wavelengths of light reflected (not absorbed). Chlorophyll a is the green pigment common to all photosynthetic cells of plants and they absorb all wavelengths of visible light except green, which it reflects. This reflection of green light is what makes many plants appear green to the human eye. Not all plants are green because there are many other pigments that absorb and reflect other colors in the visible spectrum of light.

ESSENTIAL QUESTIONS:

1. How is energy passed from the sun to plants through the process of photosynthesis?
2. How can you prove photosynthesis converts light energy to chemical energy?

LABORATORY MATERIALS:

Colored pencils, an aquatic plant, light source, electric wiring, electrical tape, small light bulb, 1 cm thick rubber tubing, test tubes, and blank white paper.

DIFFERENTIATING INSTRUCTION:

English language limited scholars may have difficulty understanding this activity if the directions are not translated into Spanish. In order to better accommodate the Spanish-speaking scholars, Thomas Hardy will translate the directions and present a small

explanation of the lab in Spanish. There should be no need to separate learning disabled from accelerated learning scholars as this lab is entirely based on the scholars creativity.

RATIONALE:

This activity is designed to be inquiry-based and develop the scholar's critical thinking skills. The purpose of this lab is to determine how energy derived from the sun is used by green plants to produce the chemical energy in the form of sugar by the mechanism of photosynthesis. A secondary goal is to link this laboratory to the transfer of energy along the food chain from producers (plants) to consumers to decomposers.

RESEARCH ACTIVITY:

Teacher preparation:

1. Give an introduction to the process of photosynthesis and its global importance.
2. Separate the class into three sections
3. Provide each section with the materials listed above

Laboratory exercise:

1. Each scholar will be given a set of colored pencils and a blank sheet of paper.
2. Scholars will work independently to design an experiment that will demonstrate the conversion of light energy to electricity that will be used to light a light bulb.

EVALUATION AND ASSESMENT:

1. Scholars will illustrate and label the process of photosynthesis.
2. Scholars will draw and label how their experimental design will test the occurrence of photosynthesis.