

EDCI 5724
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Elodea Photosynthesis Lesson Plan

Purpose/Rationale: The purpose of this lesson is for students to investigate the process of photosynthesis following the 5-E Learning Model. By participating in discrepant events, students will learn that photosynthesis results in the use of Carbon Dioxide and the production of Oxygen. Students will explore plant growth, dissolved gasses (CO₂ and O₂), and photosynthesis processes.

SOL's:

SCI.LS.1 The student will plan and conduct investigations in which data are organized into tables showing repeated trials and means; variables are defined;

SI (metric) units are used;

criteria are established for evaluating a prediction;

models are constructed to illustrate and explain phenomena;

sources of experimental error are identified;

dependent variables, independent variables, and constants are identified;

variables are controlled to test hypotheses and trials are repeated;

continuous line graphs are constructed, interpreted, and used to make predictions; and interpretations from the same set of data are evaluated and defended.

SCI.LS.4 The student will investigate and understand that the basic needs of organisms must be met in order to carry out life processes. Key concepts include:

plant needs (light and energy sources, water, gases, nutrients);

SCI.LS.6 The student will investigate and understand the basic physical and chemical processes of photosynthesis and its importance to plant and animal life. Key concepts include: energy transfer between sunlight and chlorophyll; transformation of water and carbon dioxide into sugar, water, and oxygen; and photosynthesis as the foundation of food webs.

Materials:

Activity sheet	computer	Probeware software and apparatus
dissolved O ₂ and CO ₂ sensors		
Elodea plants	plastic cups	trays
Water	labels	50/100 mL Graduated Cylinders

Safety:

Do not eat plants or drink water.

Procedures:

First Day

Engage

1. The teacher will engage the students by asking prior knowledge questions about photosynthesis. What is photosynthesis? What is the purpose of photosynthesis? What does the plant need to do photosynthesis? What does the plant make with photosynthesis?

Explore

2. The teacher will guide the students to develop the procedures to be able to observe photosynthesis. The teacher will explain the resources available to the students, then offer prompts as to how they might develop an experiment, using the scientific method, observing and questioning.

Explain

3. The teacher and students will finalize the experimental procedures and with the aid of the activity sheet, explain the experiment.

Elaborate

4. The students will set up the Elodea experiment.

Second Day

Engage

1. The teacher and students will discuss the thought questions from the previous day, with an emphasis on connecting the importance of photosynthesis to Ecology.

Explore

2. The students will use Probeware and the dissolved O₂ and CO₂ sensors to detect the levels of each in their experiments, then record the data on the activity sheet.

Explain

3. The students will compare data obtained in the experiment. *Do we need to set this up in the activity sheet?*

Elaborate

4. The teacher and students will discuss different ways of handling the experiment and other variables that might be explored.

Evaluate

Data from Activity Sheet.

Evaluation Rubric

Need to do this...

Name: _____

Period: _____

Date: _____

Photosynthesis Activity Sheet

I. Purpose: In this activity, we will investigate the processes of photosynthesis.

What do we already know about photosynthesis?

1. What is required for photosynthesis to occur?

2. What is produced by photosynthesis?

II. Let's Explore!

Day 1

You will need:

2 plastic cups

2 labels

1 section of elodea (elodea is an aquatic plant)

graduated cylinder

3. What could we check to see if photosynthesis is happening?

4. What can we change (to increase or decrease) the rate of photosynthesis?

III. Procedure:

1. Measure and pour 50mL of water into each cup.
2. In one cup only place a section of elodea.
3. Look to see if there are any bubbles on your elodea plant.
4. Check the amount of dissolved oxygen in each cup and record your data in the table provided.
5. Label your cups with *date*, *name* and whether it is the *control* or *experimental* group.
6. Place your cups in the assigned areas.
7. Be sure to clean your area.

5. What change do you expect in the control group? In the experimental group?

6. What is the independent variable for your group?

IV. Data

Dissolved oxygen in mg/L

	Control Group		Experimental Group
Day 1			
Day 2			

Number of bubbles on Elodea

	Experimental Group
Day 1	
Day 2	

V. Procedure:

Day 2

1. Collect your two cups.
2. Be careful not to spill the water or shake the cup too much.
3. Observe both cups.
4. Look for bubbles on the leaves of the elodea and count them.
5. Check the dissolved oxygen levels of both cups and record your data.

VI. Analysis

7. On graphing paper, use your data to construct a bar graph of your control and experimental groups on day one and day two. Be sure to label the graph.
8. What are some factors that could change the rate of photosynthesis?
9. What are some ways we can check to see if photosynthesis is occurring?

VII. Conclusion

10. Why is photosynthesis so important?
11. What kinds of living things undergo photosynthesis?

12. Describe in writing or draw a diagram to explain where a plant might occur in a food chain. Your food chain must have at least 3 links.

Challenge

A. Briefly describe another experiment that could be done with elodea. Be sure to clearly state your control and experimental groups.

B. Draw a food web diagram with at least two producers.