

Topic: Photosynthesis Lab - Plant Growth in Light & Dark

Summary: Students will learn how photosynthesis is used by a plant to make sugars. These sugars are then used to perform cellular respiration to make energy. The sugars are converted into larger molecules like cellulose to help build the structure of plant cells. Students should also recognize that plants grow by cell division.

Goals & Objectives: Students will be able to integrate how many processes are involved for plants to grow. Students will be able to design a guided inquiry experiment.

NGSS Standards: HS-LS1-4, LS1-5, LS1-6, LS1-7
Common Core: RST 9.10.3, 9.10.5, 9.10.7
Common Core: WST 9.10.1b, 9.10.1e, 9.10.2a, 9.10.7, 9.10.9

Time Length: 2 weeks, including 2 partial periods.

Prerequisite Knowledge: Students should have already been introduced to the following concepts: photosynthesis, sugars, cellular respiration, cell division, and metabolism.

Materials:

- Grow light
- Graduated cylinder for measuring amount of water
- 4 Germinated seeds per group, preferably seeds that grow fast like the Mung Bean
- Ruler
- Pot / beaker or other container to hold soil
- Cabinet to place plants to grow in the dark

Procedures:

1. Germinate your seeds
2. Day 1: finish the front page of the lab report along with planting the germinated seed.
3. Give students a good number for the amount of water they should be giving the plants per day; 20 mL is usually good enough.
4. 2 weeks later, have students measure the height (length) of each plant. Since they started with a buried germinated seed, the initial height was 0 cm.
5. Students complete the lab report

Accommodations: Students with an IEP should work in a group with strong experimental design skills. Notes about the main concepts can be provided so they have easy access to science concepts.

Editable DOCX File and Answer Key:

Available at www.ngsslifescience.com

Data Table: Include labels and units.

Experimental Group:

	Date	Plant 1 _____ ()	Plant 2 _____ ()
Initial Date			
Final Date			

Control Group:

	Date	Plant 3 _____ ()	Plant 4 _____ ()
Initial Date			
Final Date			

Experimental Errors:

Conclusion:

Do you confirm or reject your hypothesis? _____

What *evidence* supports why you confirmed or rejected your hypothesis?

Analysis Questions:

1. What is the main purpose of photosynthesis? _____

2. Predict the main process plants use to grow taller? _____

3. What molecule do plants use to get energy in order to grow? _____

4. What process does the plant use to get usable energy? _____

5. Most of the time, the plant in the dark grew taller. Where did that plant get the glucose needed to get energy to grow if it could not do photosynthesis? _____

6. Why do plants need to perform photosynthesis in order to grow? _____

7. What else were the sugars used for besides cellular respiration? _____

8. *Using the information above*, predict why the plants in the dark have yellow leaves while the plants in the light have green leaves. _____