



Germinating Seeds in the Dark

SYNOPSIS

Students will germinate seeds in a dark and a light area and then compare the plants' growth and appearance.

OBJECTIVES

Students will be able to describe the effect of lack of exposure to sunlight on plant growth.

VOCABULARY

- etiolation
 - Occurs when plants are grown in either partial or complete absence of light, and is characterized by long, weak stems; smaller, sparser leaves due to longer internodes; and a pale yellow color (from Wikipedia)

MATERIALS

- bean seeds (e.g., peas)
- containers for growing plants (e.g., plastic pots, cups, biodegradable)
- dark room or drawer
- measuring cups
- rulers
- science notebooks
- soil
- tape
- water
- writing utensils

DISCUSSION PRIOR TO EXPERIMENT

Your discussion with the students will vary depending on the age/grade level of the students and their knowledge. If they are unfamiliar with the effects on lack of light on plant growth, it might be interesting for them to experience it first without talking about what will happen.

You may choose to talk about the concept of *multiple trials* to help the students understand why multiple seeds will be germinated in each of the conditions. Other concepts that can be addressed include *independent variable*, *dependent variable*, and *controlling variables*.

RESEARCH PRIOR TO EXPERIMENT

Students should be familiar with the watering requirements for germinating the seeds they are growing and how long it usually takes this species of seed to sprout. They should also know how deep each seed should be planted and the space requirement between seeds.

PROCEDURES

1. Explain to the students they will germinate seeds under two different conditions: exposed to sunlight and in the dark.
2. In their science notebooks, have the students either *predict* or *hypothesize* what they think will happen in each of the conditions or which plant will appear healthier.
3. Divide students into cooperative learning groups of three to four students or have them work individually.
4. Give each group of students their supplies: seeds, containers, soil, tape, science notebook, and writing utensils.
5. Have them use the tape to label their two plant containers. One should read “dark” and the other “light.”
6. Tell the students to place soil into both of their plant containers. They should place the seed in the appropriate soil depth. Once the soil and seed are in the plant container, the students should measure an appropriate amount of water and pour the same amount into each plant container.
7. Students can document their experimental methods in their notebook.
8. They should also create a chart, such as the one below, to collect data on their plants. Students should pre-determine the data they will collect. For instance: plant height, color, and number of leaves.

Data Collection Period	Seeds in Dark	Seeds in Light
Day 1		
Day 7		
Day 14		
Day 21		

9. As needed, the plants should all be watered using the measuring cup to ensure consistency. If possible, when watering the plants growing in the dark, they should be kept in the dark. However, if needed they can be exposed to the light very quickly while the students water the plants.
10. Once the seeds germinate, students should begin to collect data, as pre-determined, on the appearance of their plants. They may choose to take photographs of their plants to include in their science journals.
11. Once the designated data collection time has been reached, have the students review their results, and compare and discuss within their groups as well as with their classmates.
12. Have them reflect on their predictions/hypotheses (made in #2) and determine if what they thought would happen did in fact happen.
13. Discuss or have them write down the results of the experiment.
14. Discuss or have them write down their conclusions and reflections. Why did the plants' growth vary so dramatically? Why are they different colors?
15. Tell the students that plants grown in the dark show *etiolation*. Depending on the students' knowledge base, you can discuss photosynthesis and chlorophyll and help them understand why the plants look the way they do.

CHECK FOR UNDERSTANDING

Have the students write a paragraph describing the effect of lack of exposure to sunlight on plant growth.

EXTENSION

Place all the plants in a sunlit area. Do the etiolated plants recover?