



Photosynthesis and transpiration

Grade Level: 6-8

Overview It has been found that many students are not interested in science. They often think that the concepts taught in science are irrelevant to their needs. They think that science is boring and difficult. Until children experience science in a fun way, their attitude toward science won't change. Let all teachers try to win more children for Science. Plants provide a renewable source of food energy for many forms of life. Green plants utilize the sun's energy and the gases in the atmosphere to produce food through photosynthesis and exchange gases in the atmosphere in the associated process of transpiration.

Purpose The purpose of this lesson is to help students experience science in a different way, and to change students negative attitudes toward science into positive ones.

Objectives Students will be able to:

- i. Observe the effect of light on plants.
- ii. Illustrate the exchange of gases between the atmosphere and the plant.
- iii. Describe how green plants use the sun's energy to produce food through photosynthesis.
- iv. Show that plants are part of many natural cycles.

Resources/Materials

Two or more six inch pots,
Fifty or more pea seeds,
Potting soil,
A sprinkler (a jar with holes in the lid),
A dark area (a large cardboard box) or a cabinet,
Glass bottle or jar, Paper, pencils, crayons

Activities and Procedures

- i. Have the class divide into small groups (if not conducting this experiment as a demo.) Have each student make an illustrated log of events for germination of the seedlings to the end of the experiment.
- ii. Germinate pea seeds by placing them onto damp paper towels in a tray or shallow dish and covering them with warm tap water. Keep covering them with warm tap water. Keep covered with warm water and in an indirectly lit place. A "hook" should appear in two to three days. After the "hook" appears, the seeds are ready to be planted in the pots.
- iii. Prepare two pots by placing paper towels as a lining for each pot. Fill with the vermiculite soil mixture up to 2 1/2 inches from the top.

- iv. Place the seeds carefully on top of mixture. Cover with 1/4 to 1/2 inches of soil mix.
- v. Sprinkle water over the top of the soil until the soil is well saturated.
- vi. Place one of the pots in a well lit place.
- vii. Place the other pot in the designated dark area and leave it completely in the dark for one week to ten days.
- viii. At the end of one week or ten days, remove the pot from the designated dark area and compare it with the pot of seedlings that were grown in the light.
- ix. Have the class discuss the differences and make a drawing to illustrate the differences between the two sets of seedlings.
- x. Leave the pot that was in the dark in the light for a few days, and compare the results.
- xi. Remove one seedling from each pot and compare the root structure of the dark grown seedlings and the light grown seedlings.
- xii. Place a glass bottle over one of the seedlings, and place it in the sunlight.
- xiii. Notice the condensation that occurs on the inside of the bottle. The condensation is water vapor being given off by the plant when it exchanges oxygen for carbon dioxide. (transpiration)

EXTENSIONS

1. Take the class out to a grassy area on the school grounds. Dig up a shovel full of grass covered soil. Have the class examine the depth of the roots and their structure. How do they differ from the pea seedling roots? How does grass differ physiologically from the pea seedlings? (Stems, leaves, etc.) Do they have the same photosynthetic process?
2. Take the class to a treed or forested area. Compare the effect of light on identical seedlings growing in the shade of a tree and seedlings growing in sunlight.

Tying it all together This activity shows vividly, the conditions necessary for germination of good seeds. Let the children learn and recite this Poem.

Title: Plant Growth

Weak weak tiny plant
Why look so lean and feeble
Inside a box so dark?
I look so lean
I feel so weak
For I need three things for life:
Air, sunshine and water
But Tosan fed me only two.

ELSSA, 1997

Assessment

1. From the series of activities, let the children list in their note books the conditions necessary for germination of good seeds

2. Let each child recite before the class, the Poem on Plant Growth.
3. Encourage the children to recite the Poem at home to their family.

Suggestions/Modifications

- Students may draw and graph the progressive growth of the sunlight plant as it takes shape.
- Students may draw the plants they have in and around their homes and research the names of the plants.
- Students may invent fictional plants which may have medicinal, magical, or special powers.

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