

Cross Curricular Science

Plants are Producers Extension Activity

Third Grade Science Extension by Brad Burnham

SCA Theme: Communities and Ecosystems

Focus Question

Where does the energy in a food chain come from?

Activity Synopsis

Students will conduct an experiment on the rate of plant growth in the presence of different amounts of light. They will germinate seeds and observe the rate of growth.

Time Frame

One-two hours to set up; 10 minutes every day for one week to record data

Objectives

The learner will be able to:

- Observe, measure and record the growth of plants
- Describe the changes that occur to plants as they grow
- Identify characteristics of plants that help them survive in their environment
- List resources that plants rely on for growth and survival
- Investigate the relationship between the needs of plants and whether an environment provides the needed resources

Standards

Science – 3-1.3, 3-1.4, 3-1.5, 3-2.1, 3-2.3, 3-2.4

Math – 3.MD.1, 5.G.2

ELA – Reading Information – 3.3

ELA – Writing – 3.1

Materials

- Clear glass jars or drinking glasses
- Sunflower seeds (or seeds from another plant, such as the state flower- jasmine)
- Cotton wool
- Blotting paper
- Rulers or meter sticks
- Black construction paper
- Graph paper
- Small to medium sized boxes
- Different light sources- fluorescent classroom lights, desk lamp, and sunlight
- Water

Procedure

1. Teacher preparation for this activity could include starting the germination process for the students. Some seeds take more than one week to germinate. Seed packets will often identify the amount of time needed for germination. The students will then create their own germination jars with the prepared seeds.
2. As an introduction to the topic, the class should think of three food chains that have plants as the first link.
3. The three food chains can be written on the chalkboard as the plants and animals are mentioned by the students.

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4. Ask the students to explain why a rabbit or mouse cannot be the first link in a typical food chain.
5. Begin a brief discussion with the students about photosynthesis and how energy flows through a food chain, including how the energy enters the food chains (photosynthesis).
6. Introduce the experiment to the student's and divide them up into groups of two to four, depending on class size and availability of materials.
7. Each group of students needs to set up their station before germinating the seeds:
 1. Each group should be designated an area in the classroom. Each area needs to have access to two different light levels (the same two for all groups if possible), such as sunlight, fluorescent lights or desk lamps.
 2. The students need to make a box for the dark test. Black construction paper should be taped to the inside of the box. This helps absorb any light that leaks in during the experiment.
 3. Next they should prepare three to four glass jars or glasses:
 - a) A piece of graph paper should be taped to the outside of each jar, running from top to bottom.
 - b) Blotting paper should be placed inside each jar so that it is against the inside of the glass jars, and then the jar should be filled with cotton wool.
 - c) Each jar should have a small label identifying the group's name, start date for the experiment, and what kind of light the jar will receive in the experiment: none, classroom fluorescent, desk lamp, or sunlight.
8. Each jar should receive one sunflower seed (or another chosen plant seed). The seed should be placed half way down the length of the jar pinned between the blotting paper and the inside surface of the glass jar.
9. Water should be slowly added to the jars, so that the final settling level of the water is below the seed.
10. Place the jars in the appropriate places so that they receive only the kind of light labeled on the jar.
11. Each day have the students measure and record any growth of the seeds and add water if necessary. Each group should keep a running record of growth data for each jar.
12. After five or more days have the students make a graph of plant growth compared to time. Each jar can have a different colored line on their graph.
13. Have each group calculate the average growth rate per day for their plants.
14. Review the data with the students. Where in the forest habitat would a sunflower grow well- in the forest interior where there is shade or along the forest edge where there is plenty of sunlight? Did each group have similar results? How are they different or the same? Why were they different?

Assessment

The students' understanding of the lesson can be assessed by having them write a brief set of instructions with notes and recommendations about how to grow plants in a classroom environment.

1. Have each student write a how-to-guide for growing plants in the classroom.
2. The students should include in the instructions:
 - Choices of different kinds of light, with an explanation of which works best
 - What a plant would need every day, every week, every month
 - How quickly the plant will germinate and grow
 - "Things to avoid" (notes about mistakes that the students made and learned from during their experiment)

Scoring rubric out of 5 points

Correctly identifying the best light source for plants in the classroom	2 points
Correctly listing the needed water over time	2 points
Listing any mistakes in the "things to avoid" section	1 point