

TRB 3:2 - Investigation 2 - Greenhouses

Summary

Students will set up a miniature greenhouse to help them understand how nonliving things affect the growth of living things.

Group Size

Small Groups

Materials

Materials for Pre-Assessment / Invitation to Learn

:

Wide variety of flower and vegetable seeds in zip-lock bags for each item.

One coconut (to show the class the world's largest seed)

Rulers

Materials for Instructional Procedures:

Handouts:

- [Greenhouse Instruction Sheet](#) (pdf)
- [Greenhouse Observation Sheet](#) (pdf)

Per student plus 2 extra for each team

1 sheet of dark construction paper 9" X 12"

1 pint sized zip-lock bag

cotton balls

seeds

scissors

Per team of 3-5 students

spray bottle of water

stapler

Additional Resources

Books:

- *Magic School Bus: Inside the Human Body*
by Joanna Cole

Background for Teachers

The nonliving parts of an environment interact with the living parts. The main nonliving parts of an environment include sunlight, soil, air, water, and temperature. The nonliving things also interact with each other. For example, soil can be moved from place to place by air and water. We can observe nonliving parts interacting with the living parts of an environment. By changing the amount of light, temperature, or water, students will be able to discover the effects that nonliving elements have on the growth of a seed.

When planning this activity, you will need to decide what kinds of seeds to plant and where to display the finished greenhouses. Any type of seed will work, but larger seeds such as corn, beans, or peas are easier for students to handle and observe plant growth. If larger seeds are used, have the students plant 5 seeds. If smaller seeds are used, they could plant 10 seeds. Students will then be able to use a fraction to record how many of their total seeds grew. Greenhouses can be displayed in several different ways. Using strings and paper clips for hooks, they can be hung from the ceiling above the student's desk, tacked to a bulletin board, or taped to a wall, cupboard doors, or windows.

Intended Learning Outcomes

Science

1. Use a Science Process and Thinking Skills
3. Understand Science Concepts and Principles
4. Communicate Effectively Using Science Language and Reasoning

Math

5. Make mathematical connections
6. Represent mathematical situations

Instructional Procedures

Pre-Assessment/Invitation to Learn

Provide each team of 3-5 students with a variety of seeds in a zip-lock bag. Students should use a hand lens and make notes and drawings of the seeds. Have students write what they think each seed is. For each type of seed, have students estimate how many seeds they think it would take, lined end-to-end, to make a centimeter and an inch. Team members should share their observations with their teams. Allow teams to share with the class.

Have students discuss the question, "Are seeds living or nonliving?" Point out that seeds have the potential for life but to grow they need to have the right things provided by their environment. Have students suggest what nonliving things they think a seed needs before it will start to grow. List their responses on the board. They should include water, light, warm temperature, soil, and minerals. Explain that different types of plants need different amounts of these nonliving things. What kinds of plants need lots of water? What kinds need very little water? Do some plants grow better where it is very hot? Do some plants do better in colder places? Do all plants need the same amount of light?

Instructional Procedures

Materials

Per student plus 2 extra for each team

- 1 sheet of dark construction paper 9" X 12"
- 1 pint sized zip-lock bag
- cotton balls
- seeds
- scissors

Per team of 3-5 students

- spray bottle of water
- stapler

Tell the class that today they are going to set up a miniature greenhouse for some seeds. The greenhouses will provide all the things that seeds need to grow. Ask students to share what they know about greenhouses. Emphasize that greenhouses are specially controlled environments to help plants grow. In a greenhouse, all of the nonliving elements are provided and controlled so that the plants will grow very well.

Lay out the materials for the greenhouses and provide students with a [Greenhouse Instruction Sheet](#) (pdf). Tell them to carefully follow the directions on the sheet.

After students have completed their greenhouse, have each team work together and make one of two extra greenhouses. These extra greenhouses will be used to test what effect changing the nonliving elements will have on the seed's growth. Teams should discuss what they want to differently with their extra greenhouses, such as not adding as much water, adding a lot more water, putting the greenhouse in a dark closet or in a sunny window, putting the greenhouse in a cold place (outside) or a hot place (over the heater), etc. Students should also write down what

they think will happen because of the changes they made to their extra greenhouses. Each team should carefully label their extra greenhouses and set them up. Students should also label and display their personal greenhouses. Bring the class back together and have each team tell what they did with their extra greenhouse and how they think the changes will affect the seed's growth. Tell the class that they will observe their personal and team greenhouses three times a week to make measurements and record growth and changes in the plants. Show the class the [Greenhouse Observation Sheet](#) (pdf) and explain that they will use this sheet to carefully record their observations. Allow students time during the week to make and record observations. Have students share their observations with their teams and the whole class. What differences do they notice between their personal plants and the team plants? Discuss with the class the interactions they see between the living and nonliving things in their greenhouse environments. Have them look for these interactions in the environments around them.

Extensions

Math-

Students will record the number of seeds that sprouted by making a fraction. For example if 5 seeds are placed in the greenhouse and 3 started to grow the student would record $\frac{3}{5}$ of the seeds sprouted. (*Standard I, Objective 4*)

Students will use measurement to record the growth of their seedlings over time. (*Standard IV, Objective 2*)

Science-

Have students transplant a few of their seedlings from their greenhouses into containers of potting soil and continue to make observations. (*ILO 1*)

Homework & Family Connections

Send seeds or seedlings home with students and have them plant them in a garden, flowerbed, or a pot. Discuss with the students what they will need to do to help the plant grow and stay healthy. Have students report to their teams and the class how their plants are doing. If some of the student's plants die, ask students to try to explain what might have caused the plants to die.

Assessment Plan

Check the observation notes periodically to see that the students are making correct observations. They may need help in their descriptions of what they observe.

As the students share their observations make sure their information is accurate and complete.

Have the children assess what living and nonliving things are in their terrariums.

Have the students write how the living and nonliving interact with each other in their terrariums.

Authors

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