

The Effects of Nonliving Elements on Plants

3rd Grade Science

Standard II: Students will understand that organisms depend on living and nonliving thing within their environment.

Objective 2: Describe the interactions between living and nonliving things in a small environment.

Indicator a: Identify living and nonliving things in a small environment (e.g., terrarium, aquarium, flowerbed) composed of living and nonliving things.

Science Intended Learning Outcomes

1 Use Science Process and Thinking Skills

a Observe simple objects and patterns and report their observations.

e Use instruments to measure length, temperature, volume, and weight using appropriate units.

f Conduct a simple investigation when given directions.

h Use observations to construct a reasonable explanation.

2 Manifest Scientific Attitudes and Interest

a Demonstrate a sense of curiosity about nature.

3 Understand Science Concepts and Principles

c Explain science concepts and principles using their own words and explanations.

4 Communicate effectively using Science Language and Reasoning

a Record data accurately when given the appropriate form and format (e.g., table, graph, chart).

3rd Grade Social Studies Connection

Standard I: Students will understand how geography influences community location and development.

Objective 3: Analyze ways cultures use, maintain, and preserve the physical environment.

Indicator a: Identify ways people use the physical environment e.g., agriculture, recreation, energy, industry).

Background Information:

The first thing scientists look for when they are classifying something is to see if it is living or nonliving. Next, if it living then they will classify it as a plant or animal. The first thing they look at is to determine if it makes its own food or if it hunts for food. If it makes its own food it is a plant.

For plants to make food they need rich soil with a lot of nutrients and minerals. Also, they need water, carbon dioxide, light and heat. With the mixture of these nonliving elements, plants are able to make food in their leaves for themselves for survival. In the end, they produce seeds that can be used next year for planting.

We are able to eat these plants for nutrition for our own bodies. Every thing we eat, virtually, comes from plants—even meat and milk.

Materials

- Poster, Trend: *Photosynthesis*, ISBN: 978-1-58792-378-4 (Utah/Idaho Supplies), \$2.00
- Poster, Schaffer Publications: *How Plants Make Food*, ISBN: 0-7682-1356-8 (Utah/Idaho Supplies), \$2.00
- Poster, Carson-Dellosa Publishing: *The Life Cycle of a Plant*, ISBN: 0-44222-15761-6 (Utah/Idaho Supplies), \$2.00
- Worksheet, “How Plants Make Food” (Found on the back of *Photosynthesis* Poster)
- Worksheet, “Nonliving Things Needed by Plants To Make Their Own Food”
- 2 two-liter bottles (pre-cut to make a terrarium)
- 1 small cup for each child or group
- Top soil
- 2 cups for scooping the soil and putting in the water
- Water
- Seeds
- Cereal nutrient tables cut out from boxes
- Hand lenses
- Two-inch wide, clear packaging tape

Procedure

Pre-activity

1. Talk about the four elements that nature gives us free each day for survival—air, water, soil, and sunlight/heat.
2. Talk about each one why they are so important to us for our survival.
3. Talk about how they are given to us free each day.
4. Discuss with the students that the earth gives us one more thing free yearly for people and animals to survive—seeds.
5. Give each student or group of students a cup with four seeds in them. Have them examine them with their hand lenses. Let them describe what they see.
6. Discuss with them about seeds and their made up. They are organic, but not living at this time. And, they are not nonliving either. They are in a dormant stage.
7. You may want to cut one open and discover what is inside by using a document camera.
8. Something happens to seeds when they get wet and the temperature is just right. They turn into living organisms.
9. Today, we are going to do an experiment to see why they are living organisms.

Activity One

1. Give each student the worksheets “Nonliving Things Needed by Plants To Make Their Own Food” (#1) and “How Plants Make Food” (#2).
2. By using the poster, *How Plants Make Food*, fill out together worksheet #1, by discussion, the importance of each nonliving plants need to grow. As you talk about each one, write down the information of worksheet #2 where each one is found and where it enters the plant.
3. How do plants help us? They provide vitamins and minerals. The minerals are found naturally in the soil and the vitamins are what the plants make. (See the vitamin and mineral data sheet.)

Activity Two

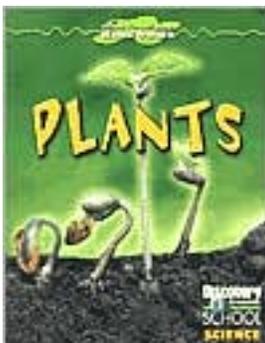
1. Tell the students that they are going to make a terrarium and watch the plant grow over the next four to six weeks. They are also going to record in a journal what they see happening each day or two.
2. Talk to them what a terrarium is and how it will not need any water, but it will need sunlight.
3. Give each student or group two prepared two-liter bottles.
4. Give each student or group four seeds in a cup.
5. Have the soil and water ready for the students.
6. First, have each student or a student from each group get some soil and put it into one of the plastic bottles. Fill up the whole bottom of the plastic bottle to about four or five inches.
7. Secondly, have each student or a student from each group put about a half-cup of water in the soil. Make sure it isn't muddy, but that it is damp. If it is muddy add more dirt.
8. Next, have each student or a student from each group make four holes about an inch deep with a pencil for the seeds. Have the student put the four seeds in the four holes and then fill up the holes with dirt. Have them pack the dirt a bit with their hands.
9. Lastly, have each student or a student from each group put the other plastic bottle on top of the other plastic bottle. You may need to demonstrate this. This is now a terrarium.
10. Give each group a piece of packaging tape that is long enough to go around the bottle. Have a student put the tape around the part where the two bottles meet so water doesn't evaporate from the terrarium.
11. Give each student a sheet of paper that gives them instructions as to what to do for the four to six weeks. Go over the paper to make sure they understand what they are to do.

Activity Three

1. Show the poster *Life Cycle of a Plant* and what they could expect to see while their plants are growing.
2. Tell them that they will not get as far as the flowering and seed stage. Have them look back into their memories about flowers they have seen and seeds that have come from flowers such as dandelions.

Post Activity

1. After four to six weeks have the students share what they learned either by report or a presentation.
2. Have the students brainstorm other uses of plants for human and animal survival.



***Plants* by Jackie Ball, Denise Vega, Uechi Ng**

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Vitamins and Minerals

Your body needs vitamins and minerals. Even though they are tiny and you can't see them with your eyes, they do a lot of work in your body to keep you healthy and strong. If you didn't get vitamins and minerals, your body would come to a complete stop.

Vitamins

Vitamins are made up of many chemicals that are made in plants that control many processes in your body.

Vitamin	What it Does	Where to Get It
A	Keeps eyes healthy; builds healthy bones and skin	Orange fruits and veggies, dark green veggies like spinach and kale
D	Builds strong bones and teeth	Fortified milk, liver, fish, cereals
B group	Helps body use energy; helps heart, nerves, and blood work	Whole grains, fish, eggs, leafy green veggies, mild products, beans, peas
C	Keeps gums and muscles healthy; fight infections	Oranges, tomatoes, broccoli, strawberries, green peppers
E	Protects eyes, liver, skin, and lungs	Whole grains, egg yolks, nuts, leafy green veggies
K	Helps stop bleeding	Dairy products, broccoli, leafy green veggies

Minerals

Minerals are elements found in the earth. The plants take some of them up through the roots. Your body uses them to build tissues and to keep your body working properly. Here are some minerals found in plants.

- Calcium builds strong bones and teeth. It also helps your muscles work. It is found in milk.
- Magnesium and Potassium help your muscles work.
- Potassium also helps your heart keep a steady beat.
- Iron is important because your body needs it to make the protein. Without this protein, your red blood can't carry oxygen from your lungs to the rest of your body.
- Zinc helps your bones form properly, have smooth skin, have a healthy appetite, heals wounds rapidly, builds strong teeth, helps sustain a strong immune system.
- Fluorine is used to prevent cavities in your teeth.

Nutrition

& the Food Pyramid

