

SCIENCE
Science and the Environment
Grade 4
Outside Observers



Overview:

Scientists all have something in common—they love to study the world around them. Students can do the same thing. A student can throw a hoop onto the ground and then observe the world within the circle. What kinds of insects or other animal life (ants, ladybugs, worms, etc.) are there? What types of plants exist in the circle? Is the soil made of clay, sand, or rocks?

The students should form groups in which each will take the role of the geologist, zoologist, or botanist while observing within the circle. The students should record what they see. After returning to the classroom, the students can locate the items in an encyclopedia, on the Internet, or in other reference materials.

This activity will require children to observe, record, and describe, which are basic concepts of science.

Duration:

The lesson will take one class period (45 minutes to an hour). However, the research after the initial observation could be extended for several days.

Benchmarks:

- SI-E-A1 Asking appropriate questions about organisms and events in the environment
- SI-E-A3 Communicating that observations are made with one's senses
- SI-E-A4 Employing equipment and tools to gather data and extend the sensory observations
- SI-E-A5 Using data, including numbers and graphs, to explain observations and experiments
- SI-E-A6 Communicating observations and experiments in oral and written forms
- SI-E-A7 Utilizing safety procedures during experiments
- SE-E-A1 Understanding that an "ecosystem" is made of living and nonliving components

Teacher Preparation:

1. Prior to the lesson, take time to walk around outside at your school. Identify several areas where your students can observe that will elicit a variety of responses from each group (While participating in the lesson, the students will work in groups.). Although each group will select the place where they observe, you should guide them to those areas within the schoolyard where they might be able to observe a variety of organisms.
2. Speak with the Physical Education teacher and ask to borrow 6 Hula Hoops®.
3. If Hula Hoops® are not available, cut string into six lengths of 1.5 meters each.
4. Copy enough Outside Observer Activity sheets for each student.
5. Acquire six sheets of chart paper and crayons or markers.

Materials/Equipment list:

Six hoops or six pieces of string (1.5 meters in length)
Six large pieces of chart paper
Outside Observer Activity sheets (one per student)
Crayons or markers

Opener:

1. Lead a group discussion. Ask the following questions to the class.
2. Today we will learn how to observe like a scientist. We will learn about three different kinds of scientists. Some of you will take on the role of a specific kind of scientist. The rest of you will record data. The three kinds of scientists we will learn about are the botanists, the zoologists, and the geologists.
3. What is a botanist?
[a scientist who studies plants]
4. What is a zoologist?
[a scientist who studies animals]
5. What is a geologist?
[a scientist who studies rocks, minerals, and soils]

Body of the Lesson:

1. After the group discussion, divide the students into groups of four. Give each student the Outdoor Observer Activity Sheet.
2. Give the students an opportunity to get into their groups. Introduce the activity with the following directions.
3. Tell the students that each person will have a specific job during the time of observation.
4. Tell the students that each person needs to select a job. One person will be the botanist. One person will be the zoologist. One person will be the geologist. One person will be the random sampler/data recorder.
5. Accompany the class outside and direct the groups to four different areas in the schoolyard.
6. Tell the random sampler/data recorder to toss the Hula Hoop ® into the air. Wherever the hoop lands, that is the area that the group will observe. If each group is using a string, tell the random sampler/data recorder to place the string in a circle on the ground.
7. Tell the students that the geologist will observe rocks and soils of the area. The botanist will observe the plant life in the area, and the zoologist will observe the animal life within the area. The random sampler/data recorder will record the data.
8. Tell the students to count the number of organisms or rocks within the area they are observing. (Each group will graph the data later in class.)
9. Take the class outside to complete the activity. Ensure that each group stays within the area designated by the teacher. The students should observe for 10 minutes. Tell each student to write his or her observations on the Outside Observer Activity Sheet. Tell the random sampler/data recorder to record the number of living organisms and nonliving things found within the observed area.
10. After the 10 minute observation time, bring the students back inside. Tell each group to make a bar graph of the data they recorded. Remind the students to label the axes of the graph. Tell the students to use chart paper and crayons or markers. Give the students about 15 minutes to create their bar graph.
11. Each group will present their findings to the class (10 minutes). Hang the bar graphs on the wall.

Closing: (10 minutes)

Ask the students to take out their science journal. If the students do not have a science journal, give them a sheet of paper. Tell the students to think about the activity that they completed today, to think about the work that their group did, to look at the other groups' bar graphs and think about the data that each group reported.

Tell the students to write about their experience outside. Have them pick one other group and write about the differences in the data from that group compared with the data from their group. Try to explain why these differences occurred.

Extension Activity:

Have each group research the role of each kind of scientist. Tell the students to identify how the work of each kind of scientist helps plants, animals, and humans. Tell the students to identify the names of some famous scientists in each field.



Outside Observers

Activity Sheet

- Step 1: Divide into groups of four as your teacher directed. Decide which person will be the Geologist, the Botanist, the Zoologist, and the Random Sampler/Data Recorder.
- Step 2: Go outside. Stay within the area designated by the teacher.
- Step 3: The random sampler/data recorder will toss the hoop into the air. Wherever the hoop lands, that is the area that your group will observe. If using string, place the string in a circle on the ground.
- Step 4: The geologist will observe rocks and soils of the area. The botanist will observe the plant life in the area, and the zoologist will observe the animal life within the area. The random sampler/data recorder will record the data. Be sure to count the number of organisms or rocks within your area. We will graph the data later in class.

If you are the geologist, what did you observe?

If you are the botanist, what did you observe?

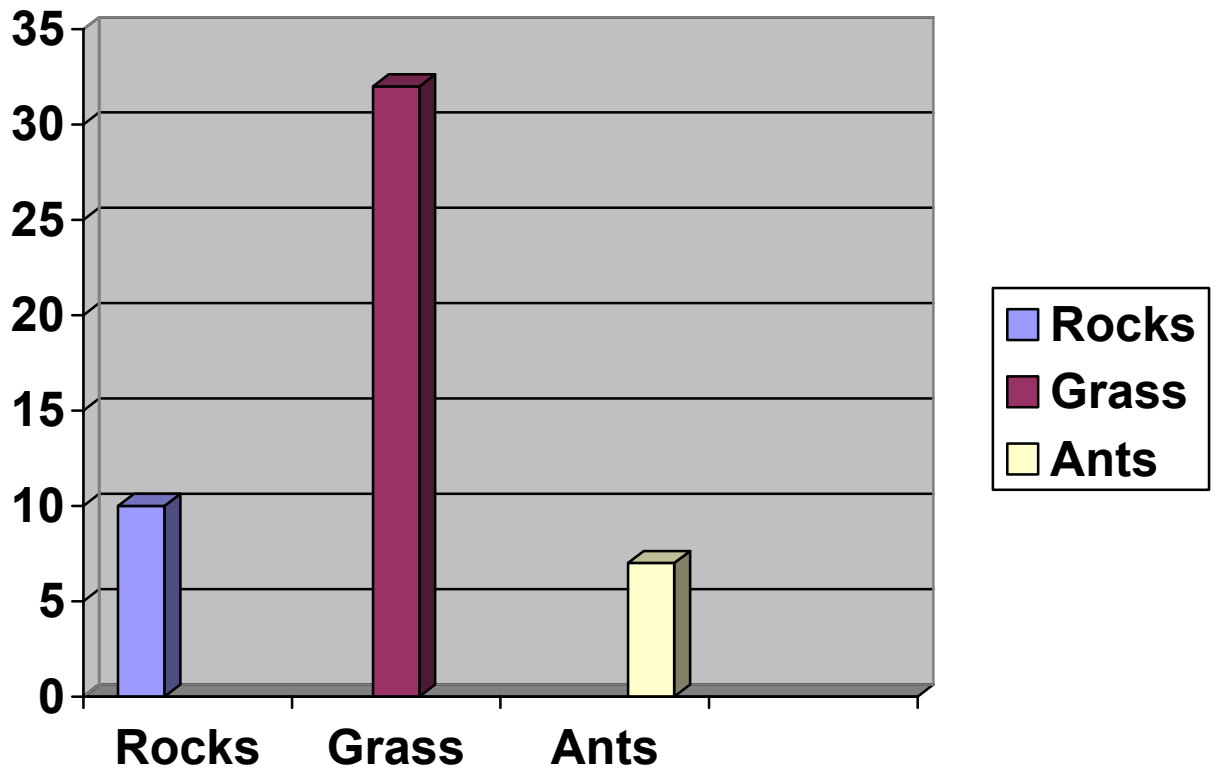
If you are the zoologist, what did you observe?



Outside Observers

Sample Graph

Number of Living or Nonliving Things



Observed Living and Nonliving Things

**Outside Observer Activity
Sample Assessment Items**

Multiple-choice items:

1. Susie finds a rock and wants to know what kind it is. Which piece of information about the rock will best help her to identify it?
 - a. The size of the rock.
 - b. The weight of the rock.
 - c. The temperature of the rock.
 - d. The minerals the rock contains.

2. Which of the following things makes its own food?
 - a. ant
 - b. rock
 - c. grass
 - d. ladybug

Constructed-response item

Ecosystems are made up of living and nonliving things. Choose one ecosystem from the list below. List one living thing and one nonliving thing from that ecosystem.

Ocean

Forest

Grassland

Ecosystem: _____

Living Thing: _____

Nonliving Thing: _____

Describe one way that nonliving things help living things to survive.

Answer Key (Assessment, page 37)

1. D

2. C

Possible Answers: (This chart provides some of the possible answers. A correct answer is not limited to what is represented in this chart.)

Ecosystems	Ocean	Forest	Grassland
Living Thing	fish, seaweed, shark	trees, squirrels, birds	grass, lizard, snake
Nonliving Thing	rocks, sand, water	rocks, soil, air	rocks, soil, air
Description	Rocks provide shelter for fish. Ocean animals need salt water to survive	The soil provides nutrients to the plants and trees. It helps to anchor the tree.	The lizard and snake breathe air. The grass uses oxygen.