

**DID YOU HELP CREATE THIS
FIVE-LEGGED FROG?
GRADES: 4-5
LIFE SCIENCE-ORGANISMS AND HABITATS**
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Overview:

Students will question whether their actions are positively or negatively affecting organisms and their habitats.

Major Focus

Academic Expectations:

- 2.1 Students identify, analyze, and use patterns such as cycles, and trends to understand past and present events and predict possible future events.
- 2.2 Students identify and analyze systems and the ways their components work together or affect each other.
- 2.3 Students use the concept of scale and scientific models to explain the organization and functioning of living and nonliving things and predict other characteristics that might be observed.
- 2.4 Students understand that under certain conditions nature tends to remain the same or move toward a balance.
- 2.5 Students understand how living and nonliving things change over time and the factors that influence the changes.

Core Content:

SC-E-3.1.2 Organisms have basic needs. For example, animals need air, water, and food; plants need air, water, nutrients, and light. Organisms can survive only in environments in which their needs can be met.

SC-E-3.2.1 Plants and animals have life cycles that include the beginning of life, growth and development, reproduction, and death. The details of a life cycle are different for different organisms.

SC-E-3.3.2 The world has many different environments. Distinct environments support the lives of different types of organisms. When the environment changes, some plants and animals survive and reproduce, and others die or move to new locations.

SC-E-3.3.3 All organisms, including humans, cause changes in the environment where they live. Some of these changes are detrimental to the organism or to other organisms; other changes are beneficial (e.g., dams built by beaver benefit some aquatic organisms but are detrimental to others).

Program of Studies:

S-4-LS-1 Students will understand that organisms have basic needs (e.g., air, water, nutrients, and light) and can only survive when these needs are met.

S-4-LS-2 Students will understand that behavior of individual organisms is influenced by stimuli (e.g., touch, hunger).

S-4-LS-6 Students will understand that characteristics of organisms are inherited or learned.

S-4-LS-7 Students will understand that organisms' patterns of behavior are related to the nature of organism's environments. There are many different environments (e.g., deserts, rain forests) on Earth that support different types of organisms.

S-4-LS-9 Students will understand that organisms change the environment. These changes may be detrimental or beneficial.

Organizer:

My actions can positively or negatively affect organisms and their habitats.

Essential Questions:

- How are the basic needs of all organisms similar?
- How are organisms affected by environmental change?
- How do changes in the environment positively/negatively affect organisms?

Culminating Performance:

In groups of four or less, students will create a multimedia presentation including charts and graphs of data logger information and digital camera images of observations. The presentation will also include students' hypothesis and conclusions to demonstrate the effects their actions have on organisms and their habitats.

Taylor County Elementary School
Organisms and Habitats



Name: _____

Teacher: Bland & McQueary

Date : _____

Title of Work: _____

	Criteria				Points
	1	2	3	4	
Students will identify the basic components of habitat as food, water, shelter, and space in a suitable arrangement and generalize that all animals-including people and wildlife, need these components of habitat.	Students will not include a digital camera image of an animal. They will not identify or describe what the animal needs to survive OR how it's needs are met in the habitat.	Students will include a digital camera image of an animal. They will vaguely identify or describe what the animal needs to survive OR how it's needs are met in the habitat.	Students will include digital camera image of an animal in a suitable habitat. They will also accurately describe what the animal needs to survive OR how it's needs are met in the habitat.	Students will include digital camera images of an animal in a suitable habitat. They will also accurately identify and describe what the animal needs to survive AND how it's needs are met in the habitat.	—
Students will identify and describe 3 or more pollutants in a bog, marsh, stream or other wetland area and understand some pollutants cannot be seen.	Student will list one or less examples of pollution and does not describe how it affects the environment or how it can be prevented.	Students will list two examples of pollution and vaguely describe how each affects the environment and how it can be prevented.	Students will list three examples of pollution and generally describe how each affects the environment and how it can be prevented.	Students will list three examples of pollution and thoroughly describe how each affects the environment and how it can be prevented.	—
Students will utilize technology to create 2 graphs compiling data from water test kits.	Students will compile 1 graph or less which inaccurately represents results from water test kits.	Students will compile 1 graph which generally represents results from water test kits.	Students will compile 2 graphs which generally represents results from water test kits.	Students will compile 2 graphs which accurately represent results from water test kits.	—
					—
					—
				Total---->	—

Enabling Knowledge:

- Organisms have basic needs. For example, animals need air, water, and food; plants need air, water, nutrients, and light. Organisms can survive only in environments in which their needs can be met.
- Plants and animals have life cycles that include the beginning of life, growth and development, reproduction, and death. The details of a life cycle are different for different organisms.
- The world has many different environments. Distinct environments support the lives of different types of organisms. When the environment changes, some plants and animals survive and reproduce, and others die or move to new locations.
- All organisms, including humans, cause changes in the environment where they live. Some of these changes are detrimental to the organism or to other organisms; other changes are beneficial (e.g., dams build by beavers benefit some aquatic organisms but are detrimental to others)

Enabling Skills and Processes:

- Identifying similarities and differences
- Summarizing and note-taking
- Cooperative learning
- Generating and testing hypothesis
- Technology (PowerPoint, Excel, digital camera, Microsoft Word)
- Data loggers and Boxcar software
- Language skills (use of descriptive and figurative language, word usage, spelling, writing, reading)
- Organizing information.

Activity 1: Habitracks

Essential question:

How are the basic needs of all organisms similar?

Materials:

- Habitat maps
- Task cards
- Habitat components
- Glue or tape
- Scissors
- Pencils
- Chalkboard
- Small paper bags

Objective:

Students will identify the basic components of habitat as food, water, shelter, and space in a suitable arrangement and generalize that all animals – including people and wildlife, need these components of habitat.

Procedure:

1. Draw a simple map of the school grounds, nature center, or wherever this activity is conducted. Besides the natural features on the site, include sidewalks, buildings, and other human-made structures on the map. Duplicate enough copies of the map so that every group of three students has a copy.
2. On each map, choose an animal and design a route of travel for the animal. Indicate the route by drawing the tracks or the marks left by the animal. For example, one map may have the hoof print of a deer, while another map may have a footprint of a bird. Try to map the animals' travel as realistically as possible. For each map, write the name of the animal whose tracks appear on the map with the word "habitat" at the top of the page.
3. Next, make a task card for each mapped animal. Each card should have the survival needs of the particular animal represented. The four components that need to be on each card include food, water, shelter, and space.
4. Make a set of food, water, shelter, and space pieces that will fit over the shapes on each task card. Again, these "habitat component" pieces need to be the same color as the task card they go with. For example, if you chose brown for the bear task card, the bear habitat pieces also should be brown. Just before the activity begins, go outside and place the habitat component pieces along the trail for the appropriate animals. For example, food in the "BEAR HABITAT" might be found at a bush, water in a puddle near the drinking fountain, and space on a playground or vacant lot. For safety and convenience of the students, place several habitat pieces for different animals in the same general area. The color-coding works well to minimize confusion, because each group of students with a map and a task card is looking only for the habitat pieces that match that task card.

Activity:

1. Divide the class into teams of three students each.
2. Give each team a habitat map that indicates the name of the animal the students are tracking. Tell them that they have 15 minutes to track the animal they have been given, looking for the things their animal needs to survive. Give the teams the task card for their animal. Also, give them a paper bag or other container to put their habitat pieces in as they find them.
3. Have the teams go outside and track their animals. To share responsibilities, one student could hold the map, one the task card, and another the container for the habitat pieces. Tell the students they are going to find things that represent what their animals need to survive. When they find something that is the color of the task card they are holding, they should put it in their sack. They should find pieces that match what they see on their task cards.
4. Within 15 minutes, the students should all follow their maps back to the starting point.

5. Back in the room, give the students' tape or glue so that they can affix their habitat pieces to their task cards.
6. Once the habitat task cards are completed, invite the student groups to report on what they found and where they found it. Ask the student if everyone found "food". When they say, "Yes," write food on the chalkboard. Do the same with "water," "space," and "shelter". Ask one of the students in each group to draw a line connecting the four habitat pieces.
7. Tell the students that food, water, space, and shelter have to go together in a suitable arrangement for an animal to live. For example, animals need the right amount of space to survive. A bear needs more space than an insect. Animals must have the right amount and the right kind of food. Food, water, and shelter must be available when needed.

Assessment:

Each group will take digital camera photographs of an animal in a suitable habitat. Students will also identify and describe what the animal needs to survive, and show where and how its needs are met in the habitat. This information will be included in the final PowerPoint presentation.

ACTIVITY 2: Pollution Identification

Essential question:

How are organisms affected by environmental change?

Materials:

- Paper
- Pencils
- Clipboards
- Plastic garbage bags
- Chalkboard
- Sugar
- White vinegar
- Salt
- Citric acid
- Tap water
- Test water
- Cotton swabs

Overview:

There are a wide variety of pollutants that can affect organisms. This pollution can be divided into three groups: chemical pollution, thermal pollution, and ecological pollution. Since not all pollution is human produced students need to understand that there are sometimes "natural" reasons for some pollution.

Objective:

Students will be able to:

1. Identify three or more pollutants in a bog, marsh, stream or other wetland area.
2. Relate a pollution prevention message through words and art.
3. Understand that some pollutants cannot be seen.

Procedure:

Taking students to a wetland area helps them become more aware of the water around them. Take with you paper, pencils, clipboards, rubber gloves, plastic garbage bags and extra adults. When you get to your wetland site, divide students into groups of 3 or 4. Each group is to look around the wetland area and find as many sources/types of pollution as possible. On their paper, a designated recorder for each group will record the different types of pollution found. After 15 minutes, come together as a whole group and discuss the pollution that is seen. Since the visible pollution is often in the form of litter, discuss with your students the pollution that may be present, but not seen. When the group discussion is over, pass out gloves and bags. Divide students into groups and assign an adult to each group. Then have the students pick up the litter pollution and take back to school and put in dumpsters. Repeat throughout the year.

Activity:

1. For this activity you will need paper, crayons, markers, crayon pastels and other art supplies. Review with the students the types of pollution that they know about. Talk about the ways people can help prevent certain kinds of water pollution. List them on the chalkboard. Have students draw a picture showing how to prevent pollution of a wetland of other water source. Encourage students to think about the source of the pollution and ways to either prevent or ways to dispose of some pollutants.
2. To help students understand that clear water isn't necessarily free of pollutants, place 5 clear liquids in portion cups. Things to include should have a definite taste that students would recognize. Use sugar water, white vinegar, salt water, water mixed with citric acid, and tap water. Using cotton swabs, have students taste each liquid (dispose of swab after each taste) and record what they taste after each. After students have all had a chance to taste, discuss that some kinds of pollution can't be seen. If you have local creeks, streams, or other waterways that are unsafe for human use, this is a good jumping off point to discuss the problems these bodies of water have.

Assessment:

Students will list three examples of pollution and describe how each affects the environment and how it can be prevented. Students may wish to take digital images and include the information in their PowerPoint presentations.

Activity 3: Field Research

Essential Question:

How do changes in the environment positively/negatively affect organisms?

Materials:

- Safety goggles
- Rubber gloves
- Dissolved oxygen test kit
- Wide range pH test kit
- Nitrate test kit
- Phosphate test kit
- Coliform bacteria test kit
- Turbidity test kit
- Temperature test kit
- Benthic macroinvertebrates analysis kit

Objective:

Students will become familiar with water ecosystems and learn to recognize water quality problems and their sources. They will also understand relationships between land use and water quality in order to make responsible, action-oriented contributions toward protecting water resources.

Procedure:

1. In groups of 4 or less, collect a water sample that is representative of the area being tested. Collect samples away from the shore and avoid sampling from the water surface or from the bottom sediments. Several samples from each water-sampling site will assure the reliability of the data.
2. Wear protective gloves.
3. Remove the cap of the sampling container.
4. Rinse the container 2-3 times with the river water.
5. Hold the container near its base and plunge it (opening downward) below the surface of the water.
6. Turn the submerged container into the current and away from you.
7. Allow the water to flow into the container for 30 seconds.
8. Cap the container while it is still submerged.
9. Remove the full container from the river immediately.
10. Copy the individual results from each test kit data sheet into a single summary table.

Questions for discussion:

1. Was there any pattern to the differences in the test results? Explain.
2. Did the test results seem to correspond to land-use? Explain.
3. Do the results indicate important water quality issues facing your community and the entire watershed? Explain.
4. Did the benthic macroinvertebrate sampling at each site indicate a pattern in water quality? Did the land-use seem to influence Pollution Tolerance Index values? How?
5. Do the Pollution Tolerance Index and chemical test results agree as indicators of water quality?
6. What can benthic macroinvertebrate sampling reveal that is not reflected in physical and chemical testing?
7. What new questions are raised by your study? Consider which of these questions you might want to investigate further.

Evaluation:

Students will construct multimedia charts/graphs compiling data from their summary tables. They will also show any patterns to the differences in the test results. This information should also be included in the PowerPoint presentation.

References

- Gilliam, D. A., (May 1994). *Water Pollution*, AskERIC. Retrieved July 1, 2002, from http://ericir.syr.edu/cgibin/printlessons.cgi/Virtual/Lessons/Science/Environmental_Education...
- Green Standards Water Monitoring Kit. (Instructional Booklet). Earthforce. LaMotte Company.
- Project Wild. K-12 Curriculum and Activity Guide. Council for Environmental Education. 2001. Houston, Texas.