

1.1 A Research Request








Action Synopsis

Students receive a request to survey animals and their food resources on a local site, then talk about what they already know and how they could find out more.

One Session

40 minutes

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| 1. Present the challenge of becoming ecologists to study a nearby site. |  posing a challenge |
| 2. Talk about why knowing what animals eat is important. |  linking to real world |
| 3. Create a visual image of the study site. |  familiarizing |
| 4. Share thoughts about what animals live on the study site, and what they eat. |  examining prior ideas |
| 5. Brainstorm ideas of evidence that will give clues about animals that live on the site. |  generating ideas & questions |

Desired Outcomes

Throughout the lesson, check that students:

- ✓ Realize that people can harm or protect the food resources animals need to survive.
- ✓ Have a mental image of the study site, and some ideas about what animals live there.
- ✓ Are curious and have questions about animals and their food.
- ✓ Have ideas of how to look for animals and animal signs.

What You'll Need



For the class:

- items to help students preview their study site (see "Getting Ready")

Vocabulary



ECOLOGIST- A scientist who studies how living things interact with each other and their physical environment.

ORGANISM - A living thing (plant, animal, or microbe).

PHYSICAL ENVIRONMENT - The non-living surroundings (air, water, rocks, soil) and conditions (light, heat, wind) that something lives in.

Getting Ready

- ◆ Choose a project focus (see page 48). Invite a project sponsor — a local landowner, a member of an environmental group, or a school representative — to present the research request to the class. Explain that you want students to develop an understanding of food webs, and discuss how the sponsor can infuse a need for knowing what animals eat into the study request. See page xx for a sample letter from a project sponsor.
- ◆ Gather materials that will give students a preview of their study site. If they'll be studying a park or nature preserve you might be able to get brochures that describe the area. Otherwise, take some photographs, or collect some natural artifacts, such as a pine cone, a leaf, a soil sample, dead leaves and twigs from the ground, or a piece of trash. If you've taught this module in past years, gather lists, reports, and maps previous classes have left in the school "archives."
- ◆ Plan pairs of students.

Action Narrative

Over the next few weeks, each person in this class will be a type of scientist called an ECOLOGIST. What does an ecologist study?

Students are likely to mention plants, animals, and the environment. Confirm that ecologists study all of these parts of nature, but most importantly they try to figure out how these things — both living and non-living — interact.

Sometimes people ask ecologists to study a place they want to learn more about or protect. Our guest is here to tell us about a study s/he would like us to do.

Introduce your project sponsor, who might present an invitation letter to students (optional) and talk about the goals of the requested study. Continue with the following discussion after this presentation, involving your guest in familiarizing students with their study site.

So your job as ecologists will be to figure out what animals live in an outdoor area, and then figure out what those animals eat to survive. Why is it important to know what animals in a certain location use as food?

One reason students might suggest is that if an animal's food disappears or becomes toxic, the animal might die or have to find someplace else to live.

Endangered Food, Endangered Species



There is a direct link between wild animals, their food, and human activities. Species can become endangered when their food source changes, often as the result of people's actions. The giant panda, who eats only bamboo, has come close to extinction because people developed and disturbed the land where the bamboo once grew.

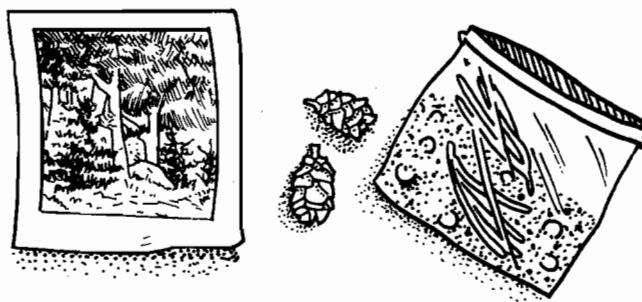
The whooping crane is also endangered because people harmed its food source, but in quite a different way. Hunters in marshes used lead bullets. Lead from their discarded bullets leaked into the soil, where it was taken up by plants. When the whooping crane ate these plants, the lead got into their bodies, reducing their ability to reproduce.

In both of these cases, people did not understand the link between their actions and the livelihood of animals. Research that uncovers ecological linkages can help people evaluate the consequences of their actions, and when necessary modify their plans.

Scientists always begin an investigation by thinking about what they and other people already know about the subject they're going to study. What do we already know about (name of the study site)? Has anyone ever been there? What is it like?

If students are familiar with the site (e.g., the schoolyard) make a list of the characteristics they mention.

If the site is not familiar, describe what you saw when you visited it, or have your guest describe it. Show them brochures, photographs, natural artifacts, or information that previous classes have gathered about the site. If you have enough items, divide the class into small groups and give each an object. Then have groups report to the class what they learned about the site.



Scientists use the word **ORGANISM** for all living things — plants, animals, and other life forms such as bacteria and fungi. They use the term **PHYSICAL ENVIRONMENT** for non-living things such as rocks, soil, water, pavement, hills, and holes.

Reinforce the new vocabulary words by having students label the site characteristics they've mentioned as organisms or physical environment.


Now that we know a little bit about the site, what animals that we haven't mentioned do you think might live there?

Students will most likely think only of mammals and other vertebrates at first, so remind them that the term *animal* is used for all creatures, large and small, with and without backbones. This will help them consider common insects such as mosquitoes, flies, termites, and ants, as well as other familiar creatures such as snails, spiders, and earthworms.



What do you think those animals might eat?

Make a list of students' suggestions. Encourage them to talk about where their ideas came from — direct observations, books, television, other people. Ask them which sources of information they most trust to be accurate, and why.

 Invite students to record questions on a class chart. You might want to add some questions such as:

Do most animals eat just one thing or many different things?

Does more than one kind of animal eat the same thing?

Will we find more animals that eat plants, or more that eat other animals?

How are we going to figure out what animals live on our site? Then how will we figure out what they eat? Work with a partner for a few minutes to come up with some ideas of what we should look for outside to tell us what animals live there and what they eat. Remember that it's not always easy to see animals directly, so we'll also have to find evidence that they live there. Think about using all of your senses, not just sight.

Have pairs share some of their ideas with the whole class. Some animal evidence they might mention: seeing feathers, fur, bones, droppings, snakeskins, insect eggs, galls, nests, holes, tracks, trails, dens, burrows, woodpecker holes, chewed plants, scratchings, piles of pine cones; hearing bird calls, insects buzzing, dogs barking, squirrels and chipmunks scolding, scurrying sounds in bushes; smelling skunks and fox dens.

The idea of looking for animal signs outdoors might be foreign to some students, particularly if they live in a city. Using a human analogy might help. Ask students to imagine that they are visiting another country, and they want to figure out what the people there eat. Since they cannot speak or understand the language, they have to look for *evidence* of what the people eat. List students' ideas of where they would look to gather evidence. They might suggest cupboards, refrigerators, garbage cans, restaurants, grocery stores, and markets. They could go to dinner at someone's house, or watch people to see what food they buy or gather, observe if they have gardens or major crops, and if they raise and slaughter animals.

Once you have a list of suggestions, draw analogies:

Humans

Cupboards or refrigerator

Leftovers

Garbage

Grocery shopping

Visit for dinner

Eating utensils

Wildlife

Stashes of acorns, nuts, berries, etc.

Partially chewed or bored nuts, berries, leaves, etc.

Piles of pine cone scales left by squirrels, chewed
corncobs left by raccoons, etc.

Animals gathering food

Watch animals eat

Animal mouthparts, claws, etc.

Ongoing Assessment

Student Reflections



Have students send a C-Mail message or record thoughts in their journals. Optional writing prompts include:

What would it be like to have to find my own food in nature instead of going to a grocery store? What would I eat?

What animal signs have I seen before? What could have made them?

Teacher Reflections

- How rich is students' knowledge about what animals live in the local area?
- How familiar are they with different kinds of animal signs?
- Do they have realistic or imaginative notions about what wild animals eat?

Extension

Endangered Species. Challenge students to find out about an animal that is endangered and what circumstances led to its current situation. Encourage them to contact Congressional representatives for their perspectives on the federal Endangered Species Act.