

6. Food Webs

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Summary

In this 2-3 day activity, students choose an organism and research its life cycle, food chain, and habitat. The student research is assembled in 2 ways. First, the classroom is cleared of tables and chairs while students use their organisms to create a food web stretching the length and width of the classroom. Second, the pages are assembled to create a field guide for your local area or for a field trip into a state or national park nearby. I found this to be an extremely effective way to get students interested and excited about an upcoming field trip. I choose insects, birds, fish, mammals, amphibians, and reptiles commonly sighted at Point Reyes National Seashore for students to research a week before the scheduled field trip. On the field trip itself, students were very excited to spot their animals and the student who did the research would usually come forward to tell his or her classmates all about their organism.

Objectives

Can conduct independent research.

Can use a field guide to research an organism's habitat, diet and life cycle.

Can identify insect, animal and plant species in the field.

Can define habitat.

Can identify the parts of a habitat and give examples.

Can predict how habitat change might affect the organisms living within it.

Vocabulary

Habitat

Food web

Endangered species

Threatened species

Attachment	Size
6food_webs.doc	53 KB
field_guide_page.doc	47 KB

6. Food Webs - Logistics

Time

10-20 min introduce activity

45-60 min complete research (some may be assigned for homework)

45-55 min construct food web on classroom floor

Grouping

Individual

Materials

For organism research

- Copies of Field Guide Pages for each student (downloadable below)
- A large assortment of field guides for insects, birds, mammals, fish, amphibians, reptiles, etc.
- Optional: Internet access

For food web activity

- 2-3 balls of yarn
- scissors
- index cards

Setting

Classroom, library or computer lab.

6. Food Webs - Background

Teacher Background

This is a superb activity if you are planning an ecology based field trip or restoration project in an area where local wildlife can be observed. The student research makes students immensely interested and excited about the organisms they might observe in the field. In many ways, this was the highlight of the ecology unit in my students eyes.

The general idea is that students create a field guide to use in the outdoors. Through the process, students gain experience using published field guides, learn about habitats, food webs, and discover threatened/endangered species in their local environment.

I created my list of organisms with a trip to Point Reyes National Seashore in mind. Thus, the creatures represent riparian and coastal California chaparral habitats. If you are planning a trip, the park you plan to visit will usually have a list of wildlife that you can use. I strongly recommend creating your list of organisms to represent local habitats or habitats you plan to visit. If you have too many students for just consumers, consider increasing the number of organisms by including producers as well.

The concluding activity in which a food web is constructed across the classroom floor is fun but often chaotic. I found that 20-30 students can create a complex, representative food web. Therefore it is recommended that you use one class worth of students to assemble a large food web, put away those organisms and start over with the next group of students. Some organisms, such as top carnivores and decomposers are more rare so you can keep those pages available to add to the following class's food web if you want.

Crowd control in this activity can be quite a challenge if you have an unruly class. In this case, you may want to consider putting the food web together on the board with students still in their seats.

Student Prerequisites

Knowledge of food chains and organisms' roles within a food chain.

It is helpful if students know what habitats are and how to use a field guide although this can be taught during the lesson.

6. Food Webs - Getting Ready

Getting Ready

For organism research

1. Create a list of organisms for your students to research.
2. If you plan to have students pick an organism out of a hat, create slips of paper for each organism.
3. Collect published field guides for students to use.
4. Make copies of the Field Guide pages for each student.
5. Make 1 copy of a Field Guide page for an overhead. This will be used to give the students an example of what you are looking for. If you want to save some time, this overhead can be created in advance.

For food web activity

1. Clear room of all tables and chairs so that if the students are sitting in a circle around the cleared area at least 10 feet by 10 feet remain.
2. Have yarn and scissors ready to hand out.
3. Create index cards representing the sun, decomposers, and the major producers in the environment. For instance, I created the following cards: sun, decomposers, grasses, seeds, berries, nuts, algae, plankton such as diatoms and copepods, leafy plants. Leave a few blank cards to write on during class as you need them.

6. Food Webs - Lesson Plan

Lesson Plan

For organism research

1. Tell students that they are going to spend the next day(s) researching an organism in preparation for a field trip. Their job is to become the resident expert on their organism and to be able to spot it and identify it when we are in the field. To gather information, they will be using field guides (and the Internet). Tell them how their organisms will be chosen.
2. Show them the overhead of the Field Guide page. Using an organism of your choice, lead

them through the field guide page, clarifying any questions and vocabulary words. This is a good opportunity to demonstrate using a published field guide to find information. For example, a "habitat" means the place or environment in which an organism is typically found. The habitat includes where that organism finds food, water, shelter and space. Particularly confusing for some students is concept of diagramming a life cycle. Use your example organism to diagram the life cycle since many students may not have used a life cycle diagram before.

3. Answer any final questions then allow students to pick their organisms and get started. I had my students pick their organism out of a hat and allowed them one extra pick if they did not like their first pick.
4. Circulate among the students as they research their animals, answering questions and helping students who are stuck.

For food web activity:

1. Have students sit in a large circle at the edge of the classroom. Ask for a volunteer to share their animal. Have that student go sit in the middle of the circle. Throughout this whole process, allow each student no more than 1 minute to share since time will run short very quickly otherwise. In the interest of time, I had each student share the animal's food chain, one interesting piece of information from the life cycle, and to describe whether there is anything currently threatening your organism's survival.
2. Ask if anyone has an organism that is part of the same food chain. Encourage that student to share in the middle of the circle. Give the 2 students a ball of yarn and stretch a length of yarn between them.
3. Continue getting students to join the length of yarn until the longest possible food chain is created. Have volunteers help add the sun, a producer, and a decomposer to the food chain using the appropriate index cards. Stretch the line the entire length of the circle and spread the students out evenly along the line.
4. Cut the yarn and set the yarn down on the floor, leaving the student's field guide pages and index cards arrayed along the yarn. The students can rejoin the circle. You should now have a 4-5 organism long food chain that stretches the length of the classroom.
5. Ask if anyone else could have been part of the food chain but was not. Discuss why a food chain is only the simplest representation of who eats who in an ecosystem. Introduce the idea of a food web - tangled food chains that represent the interdependence of organisms in an ecosystem.
6. Begin adding additional organisms to the food web. Give each student an opportunity to share briefly then use yarn to add his or her organism to the food web. Students will discover that some organisms share the same role in the food web, eating the same sources of food and being eaten by the same predators (such as all small mammals: rodents, squirrels, and rabbits). These organisms can all be placed beside one another in the food web and do not need to be connected to other organisms with separate pieces of yarn since they share the same connections as the others next to them.
7. When everyone has shared, ask students to make observations about what they see. Some questions you may want to consider:
 - o Why is a food web a better representation of who eats who in an ecosystem than a food chain? Is a food chain useful at all?

- Where are the producers in the food web? The herbivores? The carnivores? The omnivores? The detritivores?
 - How many different herbivores are there compared to carnivores?
 - If we had created pages for producers, would you expect there to be more producers or herbivores? Why?
 - How can several organisms share the same food sources and not have 1 organism outcompete the others?
 - Which organisms are endangered/threatened? What does that mean? Why are they endangered?
 - What would happen to the rest of the food web if an organism became extinct? Does it matter if the extinct species is a herbivore or a carnivore? Why?
 - What would happen to the rest of the food web if the habitat was damaged by pollution or construction?
8. Allow some time to gather up the field guide pages, the index cards, and the yarn before the next class enters.

6. Food Webs - Assessments

Assessment

1. Consider the food web you are a part of. Draw as much of that food web as possible.
2. Make a list of 3 ways that food chains are similar to food webs. Make another list of 3 ways that food chains are different from food webs.

Going Further

1. As I mentioned, it is very useful to take the field guide produced by the students on a field trip with you. On that field trip, students can be responsible for tracking the number of different organisms that were observed.
2. Conduct a detailed class investigation of a specific endangered or threatened species and the reasons behind the problem. See the [Fighting for Foxes lesson](#) or try the Plight of the Salmon activity available in [Monitoring Creek Health](#).

6. Food Webs - Sources and Standards

Sources

This activity was adapted from [Monitoring Creek Health](#) a 6-8th grade curriculum written by the Point Reyes National Seashore Association. Their lesson focused on the insects found in aquatic, creek habitats. I used resources from Point Reyes National Seashore to supplement the list of organisms to research with birds, mammals, reptiles, amphibians, and other species that are commonly encountered in the park. The [Point Reyes website](#) has great descriptions of the plant and animal life in the park.

The book [Life on the Edge - A guide to California's Endangered Natural Resources](#) by Biosystem

Books is a superb resource for identifying and researching endangered and threatened species.

Standards

Grade 6

Ecology (Life Sciences)

5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. As a basis for understanding this concept:

- a. Students know energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis and then from organism to organism through food webs.
- b. Students know matter is transferred over time from one organism to others in the food web and between organisms and the physical environment.
- c. Students know populations of organisms can be categorized by the functions they serve in an ecosystem.
- e. Students know the number and types of organisms an ecosystem can support depends on the resources available and on abiotic factors, such as quantities of light and water, a range of temperatures, and soil composition.