# Marsh Market

**Grade Level**
2-8

**Subject Areas**
Ecology, Biology

**Duration**
Part I: 40 minutes;
Part II: 40-60 minutes

**Setting**
Classroom

**Skills**
Gathering, analyzing, and interpreting information

**Charting the Course**
Advanced students may do "Marsh Mystery," a lesson on bioaccumulation. You may also play the "Marsh Munchies" game to learn more about nutrients and energy flow.

**Vocabulary**
herbivore, carnivore, omnivore, insectivore, predator, prey, producer, consumer, decomposer, food web

## Summary

Students construct a "living" wetland food web, then create their own web by tracing components of their lunches.

## Objectives

Students will:

- appreciate the interdependence of the organisms, including humans, involved in a food web.
- make the connection between the importance of natural resources and the ways we impact them.

## Materials

- *large ball of string or yarn*
- *large file cards or strips of paper*
- *students' lunches or lists of every item each student ate in a recent meal*
- *drawing paper and markers*
- *tape*

## Making Connections

Wetland habitats provide the necessities of life: abundant food source, adequate water supply, space to live and grow, safe cover for resting and nurturing young. Without wetlands, we would not have many of our own sources of food and income. Your students may be surprised to find out how many familiar things we derive from wetland resources.

This activity introduces the importance of wetland community. This study of interactions of organisms in a habitat leads to an understanding of our own roles in, and potential effects on, the environment.

## Background

A wetland is a great marketplace of food sources. The vast number of plants growing in a healthy wetland form the basis of this food web. (A food web is a complex system of many food chains.) Resident and visiting animals can find a wide array of food choices in a wetland, whether they eat plants, animals, or both. A wetland with a great diversity of plant life will attract higher numbers and more species of animals.

Plants are called primary producers because they supply food at the lowest level of a food chain. It takes an enormous number of individual plants to support the other parts of the web. Wetland habitats are extremely productive in terms of plant life.

At the next level of a food chain are primary consumers: plant-eaters or herbivores. Primary consumers include rabbits, mice, deer, and certain other mammals, some insects and fish, and ducks, geese, and certain other birds.

Primary consumers are eaten by secondary consumers, or carnivores (meat-eaters). This group includes predators such as birds of prey, some snakes, foxes, wild cats, and people. Secondary consumers are eaten by tertiary consumers, which may be predators or scavengers such as turkey vultures, crabs, and sometimes people. Note that these categories are very broad and general. Many animals fit into more than one group, and there are more complex levels of the web.

Any of the food web components mentioned above can be broken down by decomposers, organisms such as bacteria and fungi that reduce dead plant or animal matter into smaller particles. A decaying plant, for example, will

be broken down into nutrients that enrich the soil. This process supports the growth of more plants.

People are also part of the wetland food web! Many regional economies depend upon wetland foods. Are you a seafood lover? Oysters, shrimp, bluefish, flounder, and other popular, commercially important fish and shellfish are produced in wetlands, especially coastal marshes. Waterfowl, deer, and other game species that visit wetlands provide a source of food and income. Wetland mammals such as beaver, mink, and muskrat are valued for their fur—and muskrat is even becoming a popular gourmet dish. Cattail shoots, wild rice, and many other wetland plants that grow in wetlands are edible. Next time you get the munchies, visit a wetland for a snack!

## Procedure

### *Warm Up*

Have the class discuss the concept of a food web—what animals eat and who eats them. Introduce or review the terms herbivore, carnivore, omnivore, insectivore, predator, prey, producer, and consumer. Have older students discuss the flow of energy from primary producers through tertiary consumers and decomposers (see diagram).

### *The Activity*

**Part I:** ***Make a "Living" Wetland Food Web***

1. **Make a list of plants and animals (birds, mammals, reptiles, amphibians, fish, insects, and other invertebrates) that live in or use wetlands. Assign items on the list to students and have them research the animals' food habits and predators. Then place the animals in a chart of "carnivores," "herbivores," etc.**

2. **Write the name of each plant and animal on the list on a separate card or strip of paper. Tape the cards or strips on the board and ask students to select one name. Have students stick their selection on their clothing.**

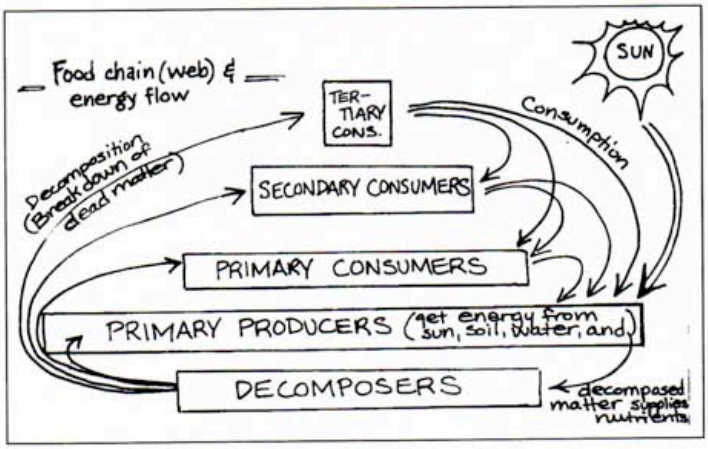
3. **Have the class stand in a circle. Select a "plant" to begin the web and give that student a ball of string. Ask him to wrap the end once around his hand, then pass the ball to an organism that eats his plant, connecting the one who is consumed to the consumer. This student should wrap the string around her hand and pass the ball either to an organism that eats her organism or to her own organism's food source.** Remember that many of the plants and animals should be connected to several others; if a student receives the ball of string a second time (or more), he should pass it to a student he hasn't already passed it to. As the activity progresses, those who researched the organisms involved can help decide where to pass the string. Continue in this manner to create a "living" wetland food web.

4. **Once the web has been completed (all possible connections have been made), have the students shift around until the web is taut. Have students discuss the fact that sometimes a plant or animal's role in the web may change, or disappear entirely.** What effect would this have on the web?

Use the following scenarios to describe what can happen to parts of the web when the wetland habitat is disturbed. With each description, have the students decide which organism would be affected by the change first (suggested answers appear in parentheses). Have the student wearing this sign tug on the string. Anyone who feels the tug should raise her or his free hand. Have each of these students tug on the string, and so on. When the third scenario has been covered, have the class sit down and discuss the web.

### *Scenarios:*

• It is raining. A lawn-care company's truck skids and crashes near the wetland, spilling hundreds of gallons of weed killer. The rain washes the chemicals into the wetland (plants).

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• A stream is blocked by a huge pile of dumped garbage. The part of the stream that usually flows through the wetland dries up (fish).

• The wetland is destroyed when someone buys the land and builds a shopping mall there (everything).

**Part II: *What's For Lunch?***

1. **Ask the students to take out their lunches (don't eat them now!) or list foods eaten at a recent meal. Have students draw self-portraits at the top of a piece of paper. Below this, have them draw and label pictures of each item in their meal and label each one (or draw a circle for each item and write the item's name inside).** Be sure to include all items; i.e., instead of "sandwich," list or draw "ham," "cheese," "mayonnaise," "whole wheat bread," and so forth.

2. **Decide what each item is made from.** What is cheese? Where do frozen peas come from? What went into the can of soup? Break down each component of the meal, tracing each ingredient to its most fundamental sources. For example, mayonnaise is made of eggs and vinegar. Eggs come from chickens, which eat grain, which grows in the soil. Chickens come from eggs which come from chickens . . . let's not get into that. Vinegar can be made from apples, which grow on trees, which need air, soil, sun, and water.

3. **Students should label the consumers and the producers in the diagram. Ask which category shows up most.** There should be more primary producers, since the foods were probably made from or raised on primary producers. Explain that it takes a lot of grain to raise one cow, and many primary producers to support the higher levels of a food web!

4. **Ask students to imagine that one of the natural resources in the diagram has been depleted. Have them choose one and put an *X* beside it. Then go through the food web and put an *X* beside each item they would not have without that resource.** Would their meals have been the same? Would they lose things they need, things they just like to have, or both?

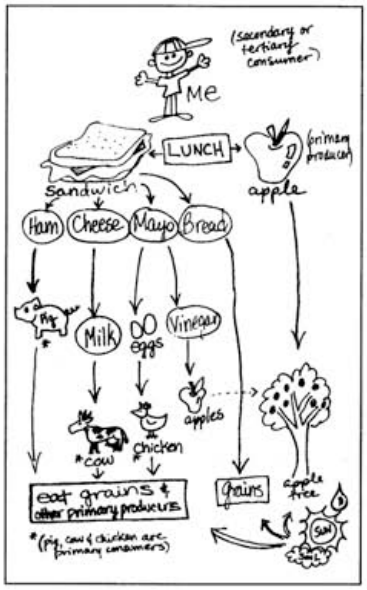
### *Wrap Up and Action*

Ask students to describe ways that the food web might be affected by a change in one of its links. Help students understand that a change in the availability of even one food source could affect many wetland residents. Stress that parts of an ecosystem are interconnected and interdependent, and every link is vital to the health of the whole.

## Assessment

Have students:

- identify animals and plants in a wetland food web and describe their role (carnivores, herbivores, omnivores, insectivores, etc.).
- describe interrelationships among wetland organisms (consumers, producers, decomposers, predator, prey).
- demonstrate how several components in a wetland food web can be affected when even one is disturbed.
- draw a diagram identifying how their own lunches fit in a food chain.




## Extensions

### *Nature in Your Neighborhood*

Take a trip to a nearby wetland or other natural area. Observe, list, and diagram the components of the area's food web. You may not see many animals, but look for signs that they were there—droppings, footprints, feathers, nibbled leaves and twigs, remnants of a meal (bones, fur, etc.), even a tunnel or other pathway.

You may find signs that people are part of this food chain. Fishing line caught in trees or shrubs and empty shotgun shells on the ground can be signs of human predation. Does this area offer other natural resources that people need, use, or want? Are there signs that resources here are being misused, or cared for? Do you see ways in which the food web in this area might be harmed? What can you do to help preserve the resources and the food web? See chapter 6, or "Helping Wetland Habitats," p. 288, for some ideas.