Is There Really a Food Web Out There?

Activity Overview:
Students observe a step in a food chain and begin to reconstruct the ecosystem's food web.

Objectives: Students will
- Investigate a real food web in the field
- Discover how organisms meet their individual needs for nutrients and energy
- Show how organisms both depend on and contribute to the balance or imbalance of populations and/or ecosystems.
- Understand the strengths and limitations of an abstract model

Subjects Covered: Science and Language Arts

Grades: 3 through 8

Activity Time: In the field: 30-45 minutes.
Classroom discussion: 30-45 minutes.

Season: Late spring, Summer, Fall

Materials:
Outdoor natural site, index cards or small paper, chalkboard or large paper

State Standards:
Science:

Describe limits of science systems (A.8.2)

Decide which data should be collected (A.4.3)

Collect and organize data that explains or critiques models (A.8.3)

Identify and replace inaccurate models (A.12.6)

Reexamine evidence & reasoning (A.12.7)

Ask new questions (C.4.8)

Explain data & conclusions (C.8.7)

Background

Students generally learn about food webs through the use of models. That is, we show an abstract diagram that represents energy flow through the ecosystem, but we do not consider or observe the real interactions that are represented by the model. Due to the food web model being used so universally to represent the ecosystem dynamics of who eats what, we tend to forget that it is only a model, an abstraction of the reality. This can lead to assumptions and misconceptions about what is really happening out there.

For instance, most food web diagrams will illustrate, with an arrow, an interaction between two individuals in an ecosystem. An arrow between a mouse and a fox generally means that the fox eats the mouse. Does the fox eat the entire mouse? If not, what happens to the rest? How often does a fox eat a mouse? Does this relationship ever change and, if so, how, when and why? Are there the same number of foxes and mice? We learn nothing about the nature of the interaction. While this is no fault of the model, if students do not have the opportunity to think carefully and perhaps examine the reality upon which the model is based, they may begin to build assumptions and misconceptions.

Activity Description

Go out in the natural area and find evidence of an interaction between two organisms that involved eating or being eaten. These steps can involve the plants, insects, birds, mammals or decomposers. Draw or describe the interaction on a card.

Back in the classroom, lay out all cards on a chalkboard or large piece of paper. Each person or group should describe their interaction and the evidence that they found. Are any of these two steps connected to one another? Draw lines between cards as appropriate to create the start of your food web. Alternatively, hook cards together with pipe cleaners or string. Discuss which parts are missing and put those in. Why were the missing parts not observed? What evidence might you find for the missing interactions if you went back outside?

Make a list of three questions that you have about the interaction you observed.

Extensions

- Compare food web interactions you have observed at different seasons. How might the food web for your ecosystem vary throughout the year? How might it be different ten years from now?
- Consider how humans affect the food web of your ecosystem.

Additional Resources

- Cannon, Annie and Victoria Crenson. (2003). *Horseshoe crabs and shorebirds: The story of a food web*. Marshall Cavendish Corporation.
- Kalman, Bobbie and Jacqueline Langille. (1998). *What are food chains and webs?* Crabtree Publishing Company.
- Keller, Holly and Patricia Lauber. (1995). *Who eats what? food chains and food webs.* Harper Trophy.
- Nadeau, Isaac. (2002). *Food chains in a backyard habitat*. Rosen Publishing Group.
- Nardi, J.B. (1993) *Once upon a tree: life from treetop to root tips.* Ames, Iowa. Iowa State University Press.
- Silver, D.M. (1993). *One square backyard.* New York, NY. Scientific American Books for Children.

Websites:

- Chain Reaction- Build a Food http://www.ecokids.ca/pub/eco_info/topics/frogs/chain_reaction/index.cfm
- Goul League- Food web http://www.gould.edu.au/foodwebs/kids_web.htm
- Oceanlink food web http://oceanlink.island.net/oinfo/foodweb/foodweb.html

Assessments

- Describe what might happen to the ecosystem if one of the interactions is removed.
- Describe the strengths and limitations of a food web diagram using examples from your classroom model.
- Using the classroom food web model, substitute organisms that live in a different ecosystem such as a lake or desert.