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Food Webs

The Science of Food: Activity 5

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BioEd Online

Food Webs

This activity's objectives are aligned with the National Science Education Standards, specifically those related to Science as Inquiry and Physical Science. In this activity, students will construct possible food webs for six different ecosystems, as they learn about the roles of different kinds of living organisms. Students will make inferences, integrate information, and draw conclusions.

Key science concepts addressed in this activity include the following.

- Producers make all the molecules they need from simple substances and energy from the sun.
- All other living things depend on producers for food.
- Living things that must eat other organisms as food are known as consumers.
- Food webs show all of the different interactions among producers and consumers in an ecosystem.

Student Worksheets
Student pages in the teacher's guide are provided in English and in Spanish.

Reference

Moreno N., and B. Tharp. (2011). *The Science of Food: Teacher's Guide.* Fourth edition. Baylor College of Medicine. ISBN: 978-1-888997-76-7. Development of this student activity was supported, in part, by grant numbers R25 ES06932 and R2510698 from the National Institute of Environmental Health Sciences of the National Institutes of Health to Baylor College of Medicine.

Image Reference

Photo © Richard Ling CC-BY-SA 3.0.
http://en.wikipedia.org/wiki/File:Blue_Linckia_Starfish.JPG

Key Words

food web, food chain, environment, plant, animal,

Materials

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Materials

Have students work in groups of 2-4 to conduct the activity.

Per Group of Students

- Set of four crayons: one each of blue, green, red and yellow
- Set of Ecosystem Cards representing one ecosystem
- Sheet of white construction or drawing paper, 9 in. x 12 in.

Setup

Make all necessary copies of the Ecosystem Cards in advance (each group of students will receive one set of cards). The six sets of Ecosystem Cards are on pages 24–29 of the printed teacher's guide. They are also included in the lesson guide for The Science of Food: Food Webs, downloadable from www.K8Science.org.

Reference

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Image Reference
Photo by Christopher Burnett © Baylor College of Medicine.

Key Words
materials list, material needs,

Science Safety Considerations

Students always must think about safety when conducting science investigations. This slide may be used to review safety with your class prior to beginning the activity.

Safety first!

•Always school district and school science laboratory safety guidelines.

•Have a clear understanding of the investigation in advance.

•Practice any investigation with which you are not familiar before conducting it with the class.

•Make sure appropriate safety equipment, such as safety goggles, is available.

•Continually monitor the area where the investigation is being conducted.

References

1.Dean R., M. Dean, and L. Motz. (2003). *Safety in the Elementary Science Classroom*. National Science Teachers Association.

2.Moreno N., and B. Tharp. (2011). *The Science of Food Teacher's Guide.* Fourth edition. Baylor College of Medicine. ISBN: 978-1-888997-76-7. Development of this student activity was supported, in part, by grant numbers R25 ES06932 and R2510698 from the National Institute of Environmental Health Sciences of the National Institutes of Health to Baylor College of Medicine.

Key Words

science, classroom, safety, lab, laboratory, rules, safety signs,

What Is a Food Web?

Begin the activity by asking students, *Do you know what a food web is?* Lead a class a discussion about the different organisms found in different environments (such as oceans, forests, lakes and deserts). Remind students that living things are classified as either producers (organisms that use solar energy to make the molecules they need from substances present in the air, water and soil) or consumers (which live directly or indirectly on food provided by producers). Explain to students that the general hierarchy within an ecosystem of which organism eats which is known as a food chain, and that the relationship among all interactions that occur in an ecosystem usually are described as a food web.

Follow by asking, *Do humans eat only one kind of food?* Then ask, *Can you name an organism that is a herbivore, a carnivore, an omnivore, or a decomposer/scavenger?* Remind students that herbivores (primary consumers) feed on plants and other producers.

•Cows, camels, caterpillars and aphids are herbivores.

•Carnivores (secondary consumers) feed on other animals.

•Lions, owls and lobsters are carnivores.

•Omnivores eat plants and animals. Pigs, dogs, humans and cockroaches all are omnivores.

•Decomposers and scavengers feed off the dead remains and waste of other organisms at any step along a food chain. Scavengers, such as vultures and flies, feed on remains of animals that have been killed or that die naturally. Decomposers live off

waste products and parts of dead organisms. Many kinds of bacteria and fungi (molds and mushrooms) are decomposers.

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Image Reference

Moreno N, Tharp B, & Dresden J. (2006). *Food: Teacher's Guide.* Teacher Resources from Baylor College of Medicine. Houston, TX: BioEd.

Key Words

food web, food chain, humans, herbivore, carnivore, omnivore, decomposer, scavenger, environment, plant, animal, ecosystem,

Let's Get Started

- Identify the producers and the consumers in your ecosystem.
- Discuss "who might eat whom."
- Use the colors below to write the names of each organism in your ecosystem around the edges of drawing paper.
  - Green: Producers
  - Yellow: Herbivores
  - Blue: Carnivores
  - Red: Decomposers/Scavengers
- Draw lines to connect each consumer to all of its food sources.

Each organism has a unique place in the food web.

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Let's Get Started

In this activity, students will construct possible food webs for different ecosystems as they learn about the roles of different kinds of living organisms. Overall, students will discover that food webs can become complex, as they depict all of the different foods eaten by each animal within an ecosystem.

Give each group of students a different set of Ecosystem Cards. Each set consists of six cards depicting producers and consumers typically found within a given environment. Have students read the information on their cards and identify which organisms are the producers in their groups' ecosystems. Next, have each group identify which cards represent the consumers (herbivores, carnivores and scavenger/decomposers) in their respective ecosystems.

Once students have identified the producers and consumers, have the groups discuss "who might eat whom" among the organisms depicted on their cards. For example, in the Freshwater Pond, the bluegill fish (carnivore) might eat dragonfly nymphs and snails. The snail (decomposer/scavenger) might eat the green algae and the waste or dead body parts from all other organisms in the system. Have students consider possible food sources for each organism in their ecosystems.

Give each group a sheet of drawing paper. Instruct students to write the names of the organisms in their ecosystems around the edges of the sheet, using the following colors: producers in green; herbivores in yellow; carnivores in blue; and decomposer/scavengers in red. Then have students draw lines to connect each consumer to all of its food sources. They will find that there are many ways to

connect even as few as six organisms within an ecosystem.

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Image References

1. Photo of a white female tree frog courtesy of Evan (LiquidGhoul), released into the public domain. http://commons.wikimedia.org/wiki/File:Caerulea3_crop.jpg
2. Photo of a yellow snail © Brian0918 CC-BY-SA 3.0. http://commons.wikimedia.org/wiki/File:Snail-WA_edit02.jpg
3. Photo of a tawny owl © K. M Hansche CC-BY-SA 2.5. http://commons.wikimedia.org/wiki/File:Tawny_wiki_edit1.jpg
4. Photo of a European garden spider © André Karwath CC-BY-SA 2.5. http://commons.wikimedia.org/wiki/File:Araneus_diadematus_%28aka%29.jpg

Key Words

animal, environment, experiment, food chain, food web, plant, lesson,

Let's Talk About It

The Food Webs activity teaches students that different environments are home to different communities of organisms, and that different kinds of organisms have different needs. This activity helps students to understand the concept of a food chain within an ecosystem. As students construct possible food webs for different ecosystems, they will learn that energy is passed from one organism to the next at each step in the chain.

Have each group share the information about its ecosystem and food web with the rest of the class. Begin a discussion about students' observations by asking, *How many lines did you draw in your food web? Which organism in your ecosystem is a carnivore? Which organism is a herbivore*

Encourage students to think about the complex relationships within ecosystems by asking, *What would happen if there were no producers in your ecosystem? What if there were no decomposers? Where would humans fit in your food web? Do humans also depend on many different plants and animals?*

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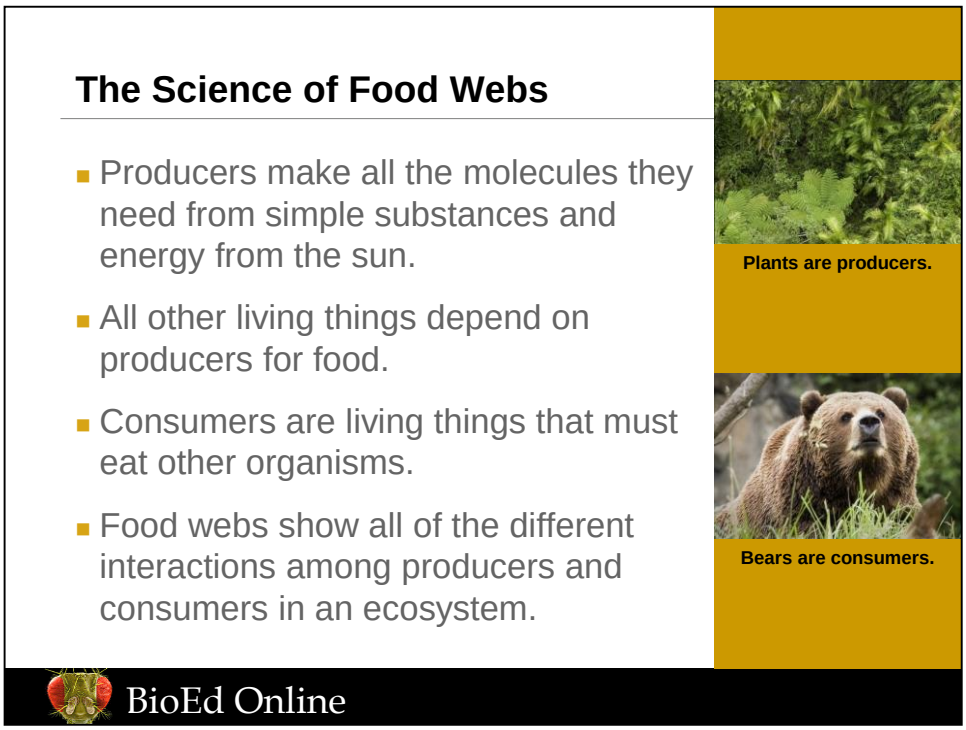
Image References

1.Photo of aphid feeding on sap © Sanjay Acharya CC-BY-SA 3.0. http://commons.wikimedia.org/wiki/File:Aphid-sap.jpg

2.Photo of Emperor penguins courtesy of the U.S. Antarctic Program Photo Library\Josh Landis. Public domain. http://commons.wikimedia.org/wiki/File:Emperor_penguins.jpg

Key Words

lesson, experiment, food web, food chain, environment, plant, animal, organism, ecosystem, herbivore, producers, consumers, humans,



The Science of Food Webs

This activity introduced students to the following properties of food.

- **Producers make all the molecules they need from simple substances and energy from the sun.** Producers use solar energy to make the molecules they need from substances in the air, water and soil. During photosynthesis, producers absorb energy from the sun and use it to combine carbon from carbon dioxide with water to make sugars and other carbohydrates. Thanks to this amazing process, light energy from the sun is converted into chemical energy stored in the bonds between atoms that hold molecules together. Plants use the energy stored in these molecules to build other compounds necessary for life.

- **All other living things depend on producers for food.** Consumers cannot trap energy directly from sun and must rely on molecules manufactured by plants for food.

- **Living things that must eat other organisms as food are known as consumers.** All animals depend on plants and other producers. Some animals eat plants for food. Other animals eat animals that eat the plants, and so on. Some organisms even feed on waste and dead material.

- **Food webs show all of the interactions among the producers and consumers within an ecosystem.** The general sequence of "who eats whom" in

an ecosystem is known as a food chain. Energy is passed from one organism to the next at each step in the chain. Along the way, much energy is given off as heat. Most organisms have more than one source of food. The relationship among all energy flow interactions that occur within an ecosystem usually are described as a food web.

Reference

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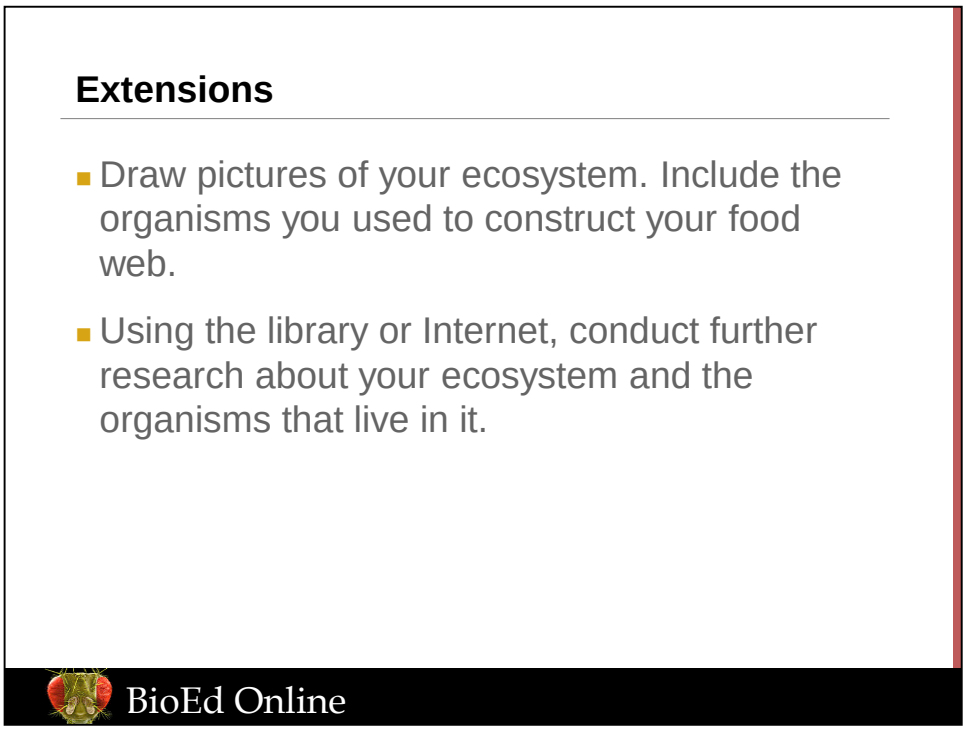
Image Reference

Microsoft Office Clip Art.

Key Words

food web, food chain, science, producers, consumers, organisms, ecosystem,



Extensions

•Have each student or group draw his/her ecosystem, including the organisms that live there and the food webs that connect them.

•Have students conduct additional research about their ecosystems and/or native organisms by consulting resources available at the library, on the Internet, or from CD ROM software.

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Key Words

lesson, experiment, extensions, food web, food chain, ecosystem, organisms,