Create a Food Web

Habitat Lab Field Journal Activity Lesson Plans & Resources

Online Lesson Plans & Resources available on the Alabama Wildlife Federation website

Students will find evidence of a food web that exists within the school's habitat lab and create a model to show the transfer of matter and energy within the environment between producers, consumers, and decomposers.

Materials: Copies of the Field Journal Activity Pages, Clipboards, Pencils, Colored pencils, Magnifying glasses, Specimen Jars or Ziploc bags, and Field identification guides such as *National Audubon Society's Field Guide to the Southeastern States*

Duration: Intro Discussion – 30 min. | Outdoor Exploration – 30 min. | Review Observations – 20 min.

STEP 1: Engage through Discussion

The background information and questions below can be used to help introduce the topic, engage the students, and build a foundation to discuss the topic:

Background Information (online as a PDF)

An ecological **food web** is a natural interconnection of **food chains**—a hierarchical series of organisms each dependent on the next as a source of food (matter) and energy. A food web provides a graphical representation of what eats what in an ecological community and traces the flow of energy and nutrients through an ecosystem. Food provides animals with the materials (matter) that they need for body repair and growth, along with the energy that they need to move around and to maintain body warmth. Every living thing, from a one-celled alga to an African elephant, needs food to survive and therefore is part of a food chain and a larger food web.

The energy released from food was once energy from the sun that was captured by plants in the chemical process called photosynthesis. The word **photosynthesis** includes the word "photo" which means light and "synthesis" which means putting together. Most plants are able to "synthesize" or "make/put together" their own food by using carbon dioxide (from the air), water (absorbed by its roots in the soil), and sunlight. The plants' leaves absorb energy from the sun in the form of sunlight, and then use this energy to convert the carbon dioxide and water into sugars (or food). Because plants produce their own food, they are referred to as the "**producers**" in a food chain or food web.

Plants pass on some of the matter and energy that they produce when animals eat (or "consume") the plants. These animals are referred to as "**primary consumers**" and are typically **herbivores** that only eat plants. Then **secondary consumers**, which can be meat-eating **carnivores** or **omnivores** that eat both plants and animals, eat the herbivore primary consumers. Secondary consumers are then eaten by **tertiary consumers**, which are eaten by the top predator called the **apex predator**.

Decomposers are the final part of a food chain or food web as they eat the remains of dead plants and animals. Decomposers can include fungi, bacteria, scavengers such as vultures, and a multitude of "bugs" including millipedes, centipedes, pill bugs, snails, spiders, beetles, ants, flies, and earthworms. These decomposers help break down the organic waste and return it to the soil as inorganic nutrients. This completes the life cycle and makes nutrients available to plants through the soil, allowing the whole process to take place again through another food chain or food web.

Example Discussion Questions & Answers (online as a PowerPoint or PDF)

Q: To review…What is a food chain?
A: *A food chain is the path of energy (in the form of food) from one organism to the next, linking the organisms in a chain with each dependent on the next as a source of food and energy. Example food chain includes the following: sun > plant > grasshopper > toad > snake > hawk.*

Q: Are you part of a food chain? What would an example food chain look like for humans?
A: *Yes, we part of the food chain. We eat hamburgers (meat from cows), cows eat grass, and grass gets energy from the sun. This is an example Food Chain that shows how energy flows from the sun to humans: Sun > Grass > Cow (hamburger) > Human*

Q: How does grass (and other plants) get their energy from the sun?
A: *The sun emits energy in the form of light. The plants absorb the energy from the sun in their leaves, and then use the energy to convert water (from the soil) and carbon dioxide (from the air) into sugars or food. Plants are the original "producers" of energy in food chains using this process called photosynthesis.*

Q: In our previous example, is this food chain complete?
A: *No, the final link in the food chain is the "decomposers." When organisms (plants & animals) die then scavengers like vultures and decomposers like pill bugs eat the detritus including carrion (decaying animal carcasses) and plant matter. The decomposers help break down the dead matter into smaller pieces and process the nutrients so that the nutrients are returned to the ecosystem where they can be used by other plants to grow and survive.*

Q: Which parts of the food chain will be eaten by the scavengers and decomposers?
A: *ALL dead plants and animals will be eaten and broken down into nutrients by scavengers and decomposers. Examples include vultures, earthworms, slugs, pill bugs, fungi, and bacteria.*

Q: What is a food web?
A: *A food web is made of many food chains with overlapping members and is a representation of an entire ecosystem*.

Q: How is the food web different from a "food chain"?
A: *Food chains include one producer (plant), primary consumer (herbivore or omnivore), secondary consumer (omnivore or carnivore), apex predator, and decomposer. Food webs contain multiple producers, consumers, and decomposers that can be found in an ecosystem to demonstrate the interdependence of these organisms.*

Q: What organisms are dependent on one another for food and energy in our habitat lab? **A:** *Producers such as grass, bushes and wildflowers; Consumers such as grasshoppers, rabbits and hawks; and Decomposers such as bacteria, earthworms, and fungi (mushrooms).*

STEP 2: Explore with Literature

These books can be used to further explore the topic with your students:

- *What are Food Chains and Webs?* (The Science of Living Things) by Bobbie Kalman (ISBN-0865058881)
- *Secrets of the Garden: Food Chains and the Food Web in Our Backyard* by Kathleen Weidner Zoehfeld (ISBN: 978-0385753647)

STEP 3: Explain using Technology

These videos can be used to further explain the topic to your students:

- Crash Course Kids #21.1: Home Sweet Habitat (4:41 min.) https://www.youtube.com/watch?v=p15IrEuhYmo & #21.2: The Importance of Food Webs (3:51 min.) @ https://www.youtube.com/watch?v=Vtb3I8VzIfg
- Odyssey Earth: The Food Chain (4:49 min.) https://www.youtube.com/watch?v=0ZOvqYypOuo & The Food Web (3:07 min.) - https://www.youtube.com/watch?v=MGODmyXkkPU or https://www.bing.com/videos/search?q=food+web+video&view=detail&mid=2150E54C13D49EB3764E2150E54C13D49EB3764E&FORM=VIRE

STEP 4: Elaborate with a Field Investigation in the Habitat lab 

The Habitat lab Field Journal Activity Observation Page(s) allow students to apply what they have learned as they investigate and record their real-world observations in their field journals. Before you go outside, don't forget to review the activity instructions and your Habitat lab Rules:

- **Habitat lab Activity Tip:** As the students explore the habitat lab, they can look for a variety of living organisms (plants and animals), and then research and discuss how each of them fit into different food chains and overlap into a larger food web. *Optional: Use an iPad, smart phone or camera to take photos of organisms that the students find in the habitat lab.*
- **Activity Instructions:** Create a Food Web that includes the plant and animal on the page **and** a plant and/or animal that the student finds in your habitat lab. Draw a picture of each plant and animal in your Food Web in each circle, identify the plant or animal species inside each circle, and then draw arrows from the plant or animal that is eaten to the animal(s) that might eat it to show the flow of energy from the sun to the apex predator. Then use the diagram of your food web to answer the questions on the second page of the activity.
- **Example Habitat lab Rules**: The habitat lab is not a playground, so do not run and do not climb on anything. Remember that the habitat lab provides habitat (a home) for local wildlife, and you should not damage the local wildlife habitat. Therefore, do not pick up wildlife, plants, flowers or rocks. Also, do not feed wildlife.

STEP 5: Review and Assess

Review and assess the students' observations and answers on their observation pages. Use the "Create a Food Web Assessment" pages on this activity's webpage to help you assess the level of understanding of your students about this topic.

Alabama Course of Study Standards for Fifth Grade

Language Arts (2016):

5.12) Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.

5.13) Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a Grade 5 topic or subject area.

5.16) Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.

5.19) By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the Grades 4-5 text complexity band independently and proficiently.

5.23) Write informative or explanatory texts to examine a topic and convey ideas and information clearly.

Science (2015):

5.10) Construct and interpret models (e.g., diagrams, flow charts) to explain that energy in animals' food is used for body repair, growth, motion, and maintenance of body warmth and was once energy from the sun.

5.11) Create a model to illustrate the transfer of matter among producers; consumers, including scavengers and decomposers; and the environment.