

# Life in the Web

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<b>Strand</b>	Living Systems
<b>Topic</b>	Investigating ecosystems
<b>Primary SOL</b>	4.5 The student will investigate and understand how plants and animals, including humans, in an ecosystem interact with one another and with the nonliving components in the ecosystem. Key concepts include b) organization of populations, communities, and ecosystems and how they interrelate; c) flow of energy through food webs; d) habitats and niches; e) changes in an organism’s niche at various stages in its life cycle.
<b>Related SOL</b>	4.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which b) objects or events are classified and arranged according to characteristics or properties; e) predictions and inferences are made, and conclusions are drawn based on data from a variety of sources; l) models are constructed to clarify explanations, demonstrate relationships, and solve needs; m) current applications are used to reinforce science concepts.

## Background Information

A food chain is a representation of the energy flow among organisms in an ecosystem. The sun provides the energy to the producer of the food chain, which is usually a plant. The energy moves to an herbivore as it eats the plants. Omnivores (plant and animal eaters) or carnivores (animal eaters) then eat the herbivores or other carnivores to continue the food chain. A simple way to illustrate a food chain is to use arrows to designate the direction of energy flow.

An example of a simple food chain would be: sun → wheat → mouse → owl. The arrow points to the organism that receives the energy. Of course, this food chain is far too simple, as in reality there will be many organisms eating the mouse and the wheat, and the owl will be eating other organisms other than just the mouse. This is called a food web. A food web shows the interrelationship of all of the food chains in an ecosystem.

An organism’s niche is the organism’s role in an ecosystem.

## Materials

- Paper chain made of interconnected paper links
- Organism pictures from magazines, the Internet, old calendars, coloring books, etc.
- Bulletin board or chart paper labeled for each ecosystem (ocean, forest, grassland, etc.)
- Stapler
- Yarn

- Push pins
- Reference materials including trade books, encyclopedias, and Internet sources
- Copies of the What's My Niche? Data Sheet

### **Vocabulary**

*food chain, food web, niche, role, community, habitat, consumer, producer, decomposer, herbivore, omnivore, predator, prey*

### **Student/Teacher Actions (what students and teachers should be doing to facilitate learning)**

#### *Introduction*

1. Hold the paper chain up with one finger so that it hangs straight down. Ask students what would happen to the chain if you cut off any of the loops.
2. Ask students how this is the same in nature with animals and plants.
3. Explain to the students that they can create their own model of a food chain and a food web in the classroom.

#### *Procedure*

1. Draw a familiar food chain on the board. Examples include:  
sun → wheat → mouse → owl,  
sun → plankton (small floating plants and animals) → clam → sea star → octopus,  
sun → grass → cow → human.
2. Inform students that the arrows point to the organisms receiving energy. Point out that all food chains begin with plants (producers) capturing the sun's energy. The plant uses some of the energy to live and grow and then passes the rest on to the herbivore that eats the plant. The energy moves from organism to organism through the chain.
3. Have students choose an ecosystem with which to create a food chain (ocean, forest, grassland, etc.).
4. Have students use pictures from magazines, the Internet, old calendars, coloring books, and other sources.
5. Allow students to staple their pictures or drawings onto bulletin board or chart paper to form a mural.
6. Ask students to use push pins and yarn to connect one organism to another to show the different food chains and food webs for each ecosystem. If students need to, allow them to research the different organisms to determine what predator and prey relationships exist by using the reference materials.

#### *Observations and Conclusion*

1. Ask the students the following questions to stimulate class discussion:
  - Does any animal eat only one thing?
  - How does eating a variety of things make it easier for an organism to survive?
  - What happens if one link in the food chain is lost? How about two organisms lost? Three?

2. Pass out the attached What’s My Niche? Data Sheet to each student. Ask students to use the bulletin board or chart paper pictures to complete a row for an organism in each ecosystem.

### **Assessment**

- **Questions**
  - What is a niche?
  - What happens if the phytoplankton in the ocean ecosystem is all eaten?
- **Journal/writing prompts**
  - Imagine you have a brand new animal that eats grass. What ecosystem(s) would this animal fit?
- **Other**
  - Have students compare and contrast the roles of different organisms in a food web.

### **Extensions and Connections (for all students)**

- Have students make individual food web mobiles instead of the mural.
- Have students write the names of the organisms on index cards, punch two holes in each card, and string yarn through the holes so they can wear the cards around their necks. Starting with a plant, create a food chain by having the plant hold onto the end of the skein of yarn and passing the skein to the next organism in the food chain. Passing the skein of yarn from organism to organism, the students will create a complex food web.

### **Strategies for Differentiation**

- Use vocabulary bands to identify animals at the top of the food chain. Have the students wear the bands with an animal name. Other students provide clues to help that student guess the animal on his/her band.
- Distribute a flow chart and pictures that students can glue into the flow chart to create a food chain.
- Using an interactive white board, create a sort. Students can be directed to move pictures into the correct order to create a food chain or food web.
- Conduct an Internet search to find group vocabulary game activities (e.g., use search term “snowball vocabulary activity,” or “I have, who has.”)

# What's My Niche? Data Sheet

Name: \_\_\_\_\_ Date: \_\_\_\_\_

A niche (rhymes with ditch) is the way of life that an organism adopts to survive in a particular habitat.

<b>Organism</b>	<b>Habitat</b>	<b>How it uses living and nonliving things</b>	<b>How other things use it</b>
Mouse	Vacant lots, fields, homes, wooded areas	Uses brush or dried plants to make a nest. Uses burrows for protection. Eats grains and other plants for food.	Eaten by birds of prey, snakes, foxes, and other animals. Plants are fertilized by its waste.