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## Topic

Food chains

## Key Question

Where do plants and animals get the energy they need to survive?

## Learning Goals

Students will:

- learn about food chains by researching animals and where they get their energy,
- create a food chain using the selected animals, and
- identify the variety of ways transfers of food energy can occur from a source in plants through a series of animals.

## Guiding Documents

*Project 2061 Benchmarks*

- *Some source of “energy” is needed for all organisms to stay alive and grow.*
- *Animals eat plants or other animals for food and may also use plants (or even other animals) for shelter or nesting.*
- *Insects and various other organisms depend on dead plant and animal material for food.*
- *Almost all kinds of animals’ food can be traced back to plants.*
- *Two types of organisms may interact with one another in several ways: They may be in a producer/consumer; predator/prey, or parasite/host relationship. Or one organism may scavenge or decompose another. Relationships may be competitive or mutually beneficial. Some species have become so adapted to each other that neither could survive without the other.*
- *All organisms, including the human species, are part of and depend on two main interconnected global food webs. One includes microscopic ocean plants, the animals that feed on them, and finally the animals that feed on those animals. The other web includes land plants, the animals that feed on them, and so forth. The cycles continue indefinitely because organisms decompose after death to return food materials to the environment.*
- *Thinking about things as systems means looking for how every part relates to others. The output from one part of a system (which can include*

*material, energy, or information) can become the input to other parts. Such feedback can serve to control what goes on in the system as a whole.*

- *Locate information in reference books, back issues of newspapers and magazines, compact disks, and computer databases.*

## NRC Standards

- *All animals depend on plants. Some animals eat plants for food. Other animals eat animals that eat the plants.*
- *Organisms have basic needs. For example, animals need air, water, and food; plants require air, water, nutrients, and light. Organisms can survive only in environments, and distinct environments support the life of different types of organisms.*

## Science

Life science

interdependence

food chains

## Integrated Processes

Observing

Comparing and contrasting

Collecting and recording data

Organizing

Drawing conclusions

## Materials

Paper plates

Paper clips

Scissors

Glue

Brown paper lunch sacks

Set of animal picture cards (included)

Colored pencils



## Background Information

A food chain represents the transfer of energy (originating with the sun) from the producer source to a consumer or a series of consumers. For example, a green plant, a leaf-eating insect, and an insect-eating bird would form a simple food chain.

The food web is divided into two broad categories: the grazing web and the detrital web. The grazing web begins with green plants while the detrital web

begins with organic debris. Both webs are made up of individual food chains and represent a series of nutritional levels. Green plants, primary producers of food, belong to the first nutritional level, and plant-eating animals belong to the second level. Predators that feed on the plant-eating animals form the third level, and predators that feed on predators belong to the fourth. As the levels rise, the predators become fewer, larger, and fiercer. Seldom are there more than four or five links or levels in a food chain.

### Management

1. Students should work together in small groups on this activity.
2. This activity involves research and will need to take place over a period of a week or more. Students will need access to a variety of research sources such as the Internet, reference books, magazines like *National Geographic* or *Ranger Rick*, or computer databases. References should always be cited when used.

### Procedure

1. Introduce the idea of the energy needed to live and grow by discussing the importance of food for our own survival. Extend the discussion to include all animals.
2. Distribute the first two student pages, scissors, colored pencils, paper plates, paper clips, and glue. Tell the students to follow the directions to create a model of two simple food chains.
3. Discuss the energy flow from the sun and through each link.
4. Initiate a “grab-bag research” activity. Use small pictures of animals (included). Place six to eight picture cards in a paper lunch sack and have each group draw out one or two animals for research.
5. Provide groups with the time and materials to find out what kinds of food each animal eats and whether it is eaten by other animals. Make certain students cite their sources of information.
6. Direct the groups to use the information gathered to construct food chains using paper plates as the sun and illustrated and titled paper strips to make links showing the path from the original energy source (the sun), to a food source, to a consumer. An example would be: sun → grain → field mouse → owl. One link in each food chain must include an animal drawn from the grab bag.
7. Have groups present their models to the rest of the class.

### Connecting Learning

1. What patterns emerged from your research about food chains?
2. Were you able to discover a food chain that did not originate with a plant source?
3. What kinds of animals eat only plants? [herbivores] ...only animals? [carnivores] ...both plants and animals? [omnivores]
4. Are there any plants that serve as consumers (eat something else, such as animals), or are plants always producers (eaten by something else)? [Some plants are consumers. The pitcher plant is an example. Some of its energy comes from its consumption of insects.]
5. How many different food chains can be constructed using the same consumer?
6. How long can a food chain be? [Food chains are rarely longer than five links.] Give an example of a three-link, four-link, and five-link chain.
7. What are the characteristics of the consumers at the higher levels of the food chain? [fewer, larger, fiercer] How do these compare to consumers at the lower levels?
8. What are you wondering now?

### Extension

Construct a giant food web that covers a bulletin board or small wall in your classroom. Write a story that explains how all the parts are interdependent.

### Curriculum Correlation

Kalman, Bobbie, and Jacqueline Languille. *What Are Food Chains and Webs?* Crabtree Publishing Company. New York. 1998.

Lauber, Patricia. *Who Eats What?* HarperCollins. New York. 1995.

McKinney, Barbara Shaw. *Pass the Energy, Please!* Dawn Publications. Nevada City, CA. 2000.

Reif, Patricia. *The Magic School Bus Gets Eaten: A Book About Food Chains.* Scholastic, Inc. New York. 1996.

Riley, Peter. *Food Chains.* Franklin Watts. New York. 1999.



## Key Question

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## Learning Goals

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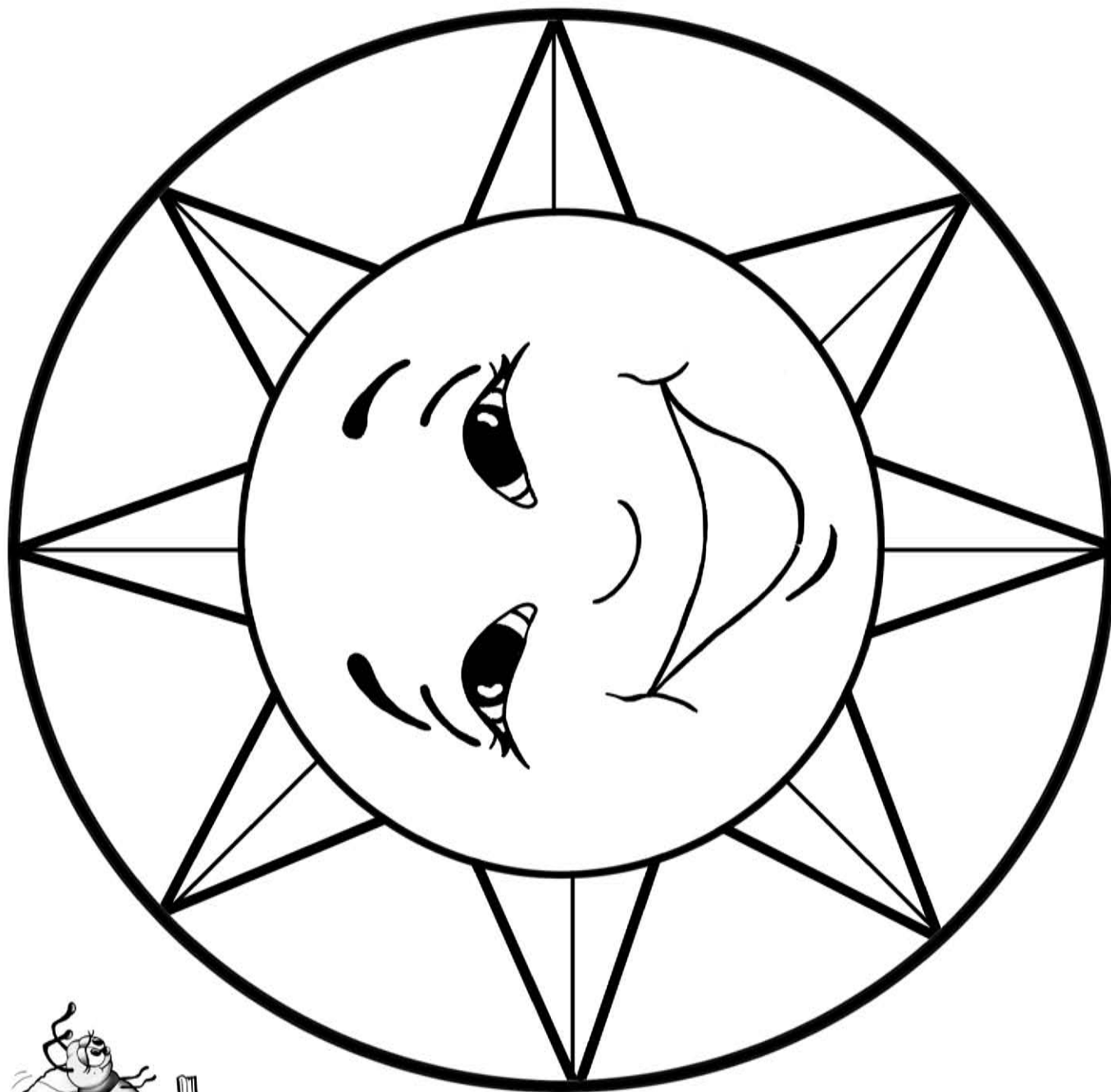
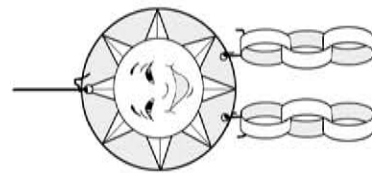
1. Color and cut out the sun.  
Mount it on a paper plate.

2. Color and cut out the  
food chains.

3. Glue the links together.



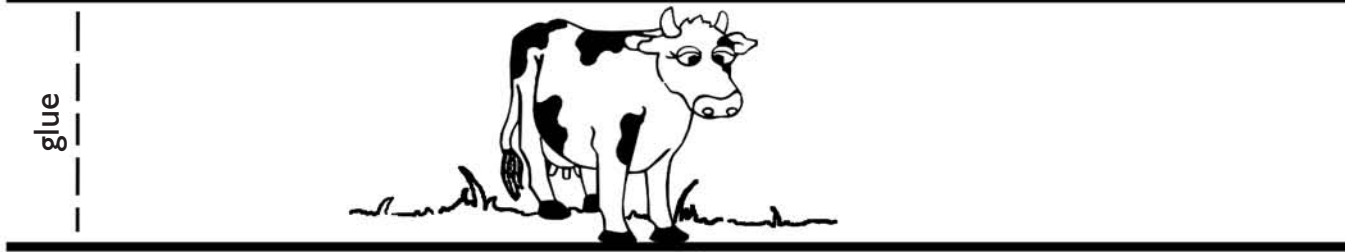
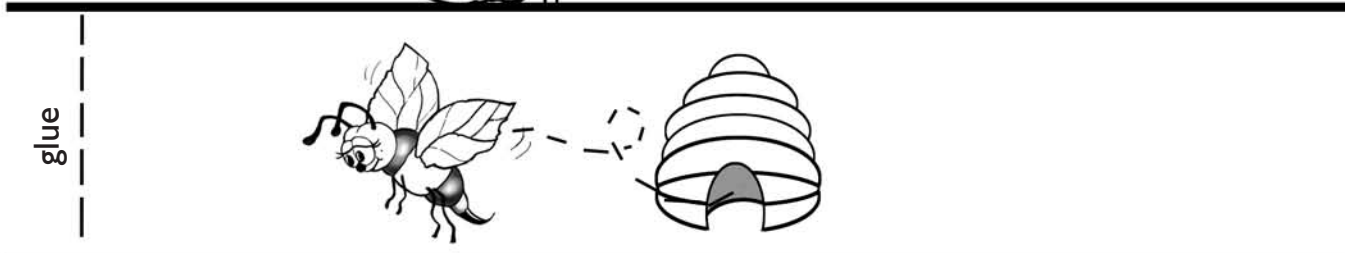
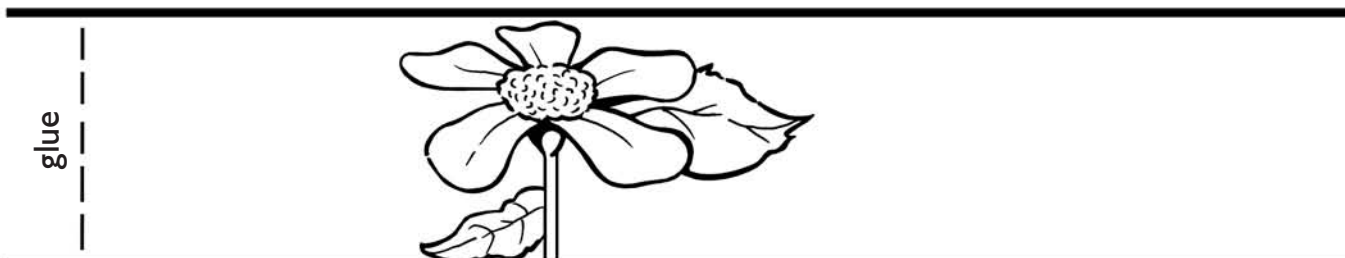
4. Hook the links to the  
sun with paper clips.





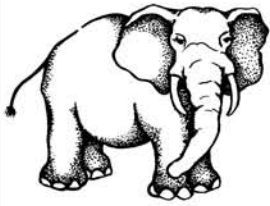
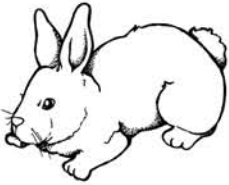




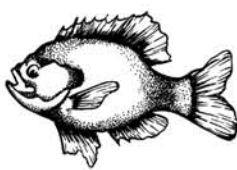





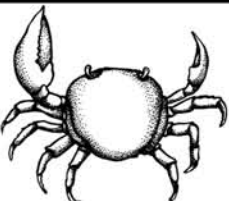



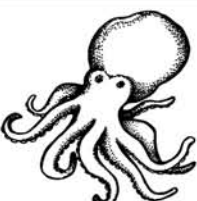
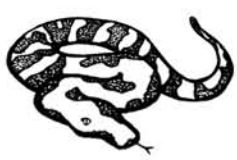
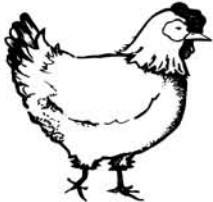




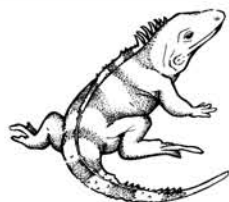


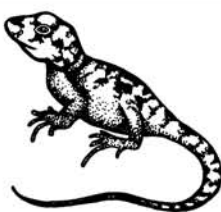

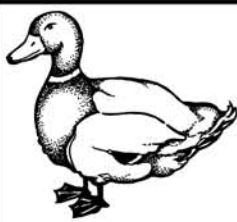
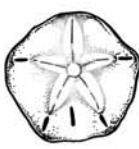



# FOOD Chain



Color the links in the food chains. Cut each strip on the solid lines and glue to make a circle. Make two food chains.



 butterfly	 lobster	 spider	 turtle	 elephant
 rabbit	 ladybug	 whale	 earthworm	 bee
 fish	 toad	 snail	 grasshopper	 dog
 lion	 crab	 frog	 sea star	 bird
 octopus	 snake	 chicken	 salamander	 alligator
 cat	 clam	 iguana	 monkey	 sheep
 lizard	 leech	 duck	 sand dollar	 squid



Illustrate the links in your food chain. Cut each strip on the solid lines and glue to make a food chain.

glue

glue

glue

glue

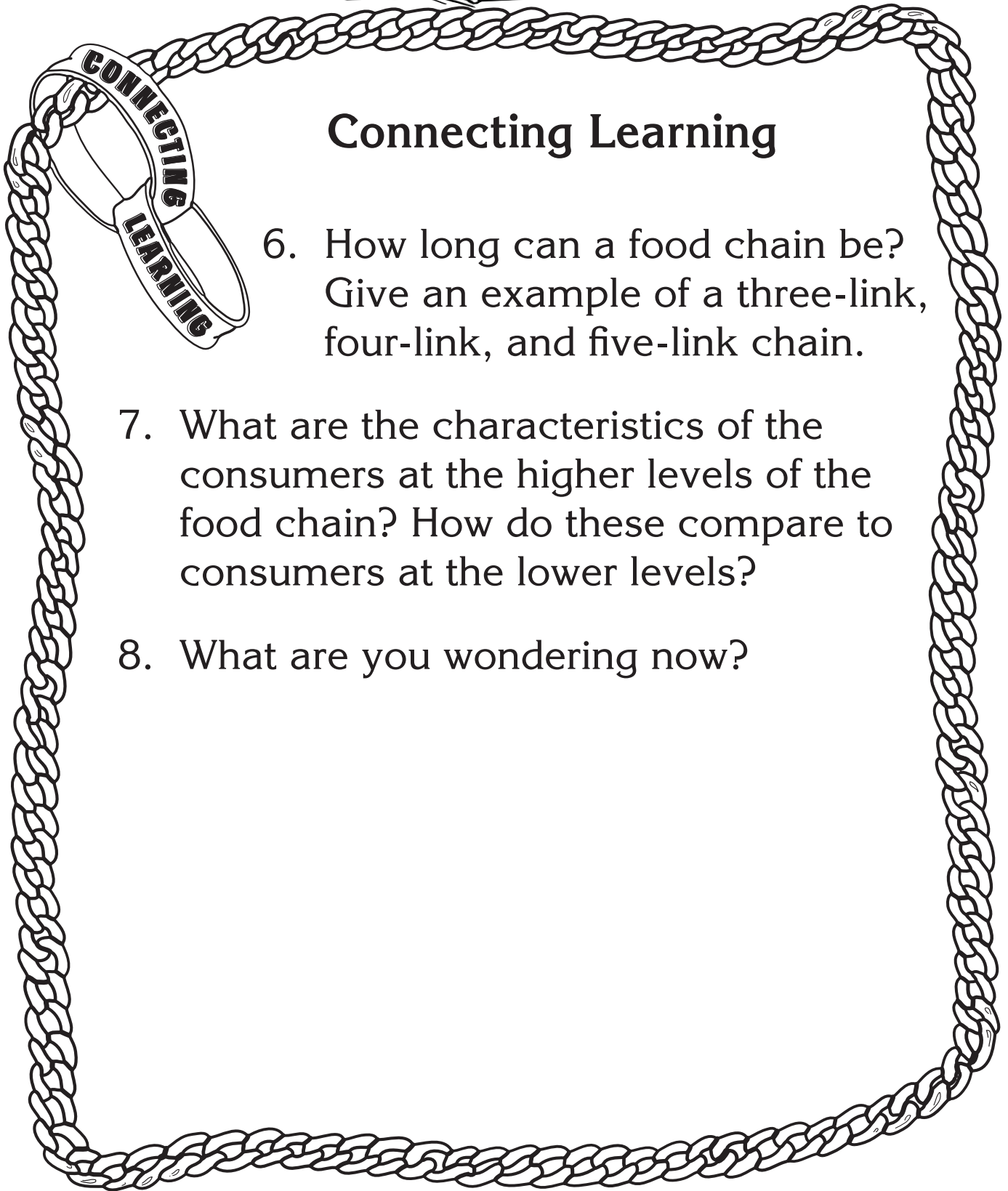
glue





## Connecting Learning

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## Connecting Learning

6. How long can a food chain be? Give an example of a three-link, four-link, and five-link chain.
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