

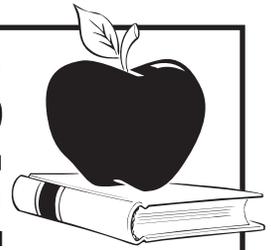
GRADE LEVEL: 5

CORRELATION TO NEXT GENERATION SCIENCE STANDARDS: 5-LS2-1

SKILLS/PROCESSES: observation, comparison & generalization, grouping, fact-finding, identification, group planning, relationships, inference

OBJECTIVE: Students will become familiar with the concept of predation and the relationship between prey and predator.

TEACHER'S GUIDE



UNIT TWO ■ LESSON FOUR

The Predator-Prey Relationship

BACKGROUND

Among the mammal species in Illinois are some known as **predators**. From bobcats and foxes to raccoons and weasels, they share a common behavioral trait: they catch, kill and eat other animals (called **prey**).

There are different degrees of predation. Some strict predators, such as bobcats, eat only meat. But other mammals, such as raccoons and opossums, eat berries, nuts and plants in addition to catching and eating prey.

Most predators are prey to other, larger predators. A weasel that eats a field mouse may then be dinner for a bobcat. Those few predators that are not prey to others are called **top predators**.

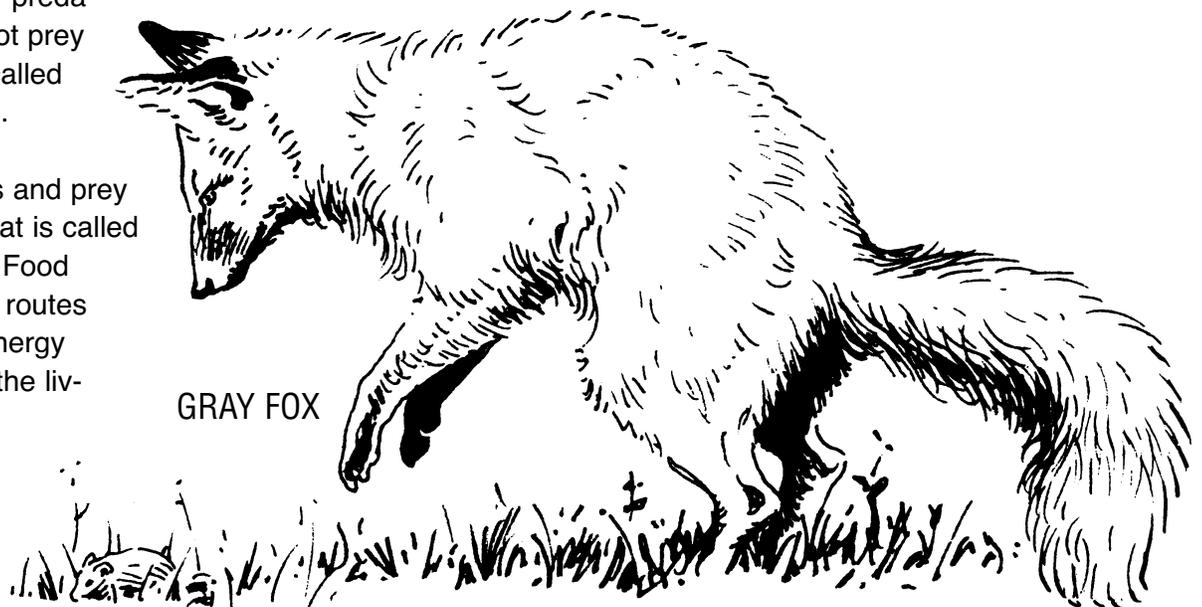
Both predators and prey are links in what is called a **food chain**. Food chains are the routes along which energy flows through the living world.

This energy always starts with the sun.

Through the process of **photosynthesis**, plants use the sun's energy to produce food. Animals such as rabbits and deer eat the plants and transfer the energy from the plants' stored food into their own bodies . . . only to become prey to the predators, who again transfer the energy to themselves.

But the flow of energy doesn't end there. Even top predators eventually die, and their bodies become food for **scavengers**, those animals that eat dead animals and plants. Bacteria and fungi break down bones, scales, fur and feathers into the simplest chemical compounds. These compounds become the nutrients in the soil that are the raw materials for plant growth. Thus the food chain becomes a closed cycle with no real beginning and no real end.

Most food chains overlap (individual species of plants and animals may be links in the food chains of several species of predator) and the entire system becomes a food web.



GRAY FOX

PROCEDURE AND DISCUSSION

Review the student information with your class. Emphasize the relationship between predators and prey, and their mutual dependence on one another. Lead the students to an understanding of the entire food chain.

1. What is a predator?

A predator is any animal that catches, kills and eats other animals.

2. What is photosynthesis?

Photosynthesis is the process whereby plants use sunlight to convert carbon dioxide, water and nutrients into food.

3. What is a top predator?

A top predator is a predator that is not prey to any other animal.

4. What is a scavenger?

A scavenger is an animal that feeds on the dead bodies of other animals but does not catch and kill them itself.

5. What is a food chain?

A food chain is the route along which energy flows through any community of plants and animals.

VOCABULARY

food chain—the route along which energy flows through a community of plants and animals

photosynthesis—the process by which plants use sunlight to convert carbon dioxide, water and nutrients into food

predator—any animal that catches, kills and eats any other animal

prey—any animal that is caught, killed and eaten by any other animal

scavenger—any animal that eats the dead bodies of other animals but does not catch and kill them itself

top predator—any predator in a food chain on whom no others prey

CHALLENGE YOURSELF EVALUATION

1. The two predators are the white-footed mouse and the least weasel.
2. The sun provides energy to the plants.
3. Two prey items in the diagram are the white-footed mouse and the grasshopper.
4. The weasel dies and is decomposed by the bacteria and fungi.
5. Yes, a mammal can be classified as both a predator and a prey item. For example, the white-footed mouse eats the grasshopper. The mouse is a predator in this situation. If the least weasel then eats the mouse, the mouse is a prey item. Many other examples could be given.

ACTIVITY PAGE EVALUATION

The top predator was the least weasel. The other predator was the white-footed mouse. The prey items were the grasshopper and the white-footed mouse. The game represented a food chain by having the sun providing energy to the plants, the plants converting the energy to stored energy in food, the grasshoppers eating the plants to get the energy, the white-footed mice eating the grasshoppers to get energy and the least weasels eating the white-footed mice to get energy. Usually a few grasshoppers survive but not always. Usually a few mice survive but not always. Weasels have many food squares because they were eating mice which had previously eaten grasshoppers. All of the food squares are passed along, although realistically some of the energy would be lost in each transfer. That's why they need so many food squares and why there are fewer top predators. The transfer of energy is shown by passing along the food squares in the "stomachs." The game is fairly realistic. There would not be such chaos and things would not happen as quickly as they do in the game, but the result is basically the same. Other factors such as population fluctuations, disease and pollution are not considered in the game. Predators do not normally kill all of the prey species because in nature there are many other species to prey upon, too.

EXTENSIONS

Have each student pick a favorite meal, list the foods that make up that meal, and develop a food chain from the various foods listed.

Using the "Species Sheets," have the students develop a possible food chain.

The Predator-Prey Relationship

STUDENT'S GUIDE

Among the mammal species in Illinois are some we call **predators**. Predators are animals that catch, kill and eat other animals. The animals that are eaten are called **prey**.

Some predators, like bobcats, are called strict predators because they eat only other animals. Others, like raccoons and opossums, will, in addition to catching and eating prey, also eat a lot of berries, nuts and plants.

Most predators are themselves prey to other, larger predators. A weasel that eats a field mouse for lunch may itself be dinner for a bobcat. Those predators that are not prey to others are called **top predators**.

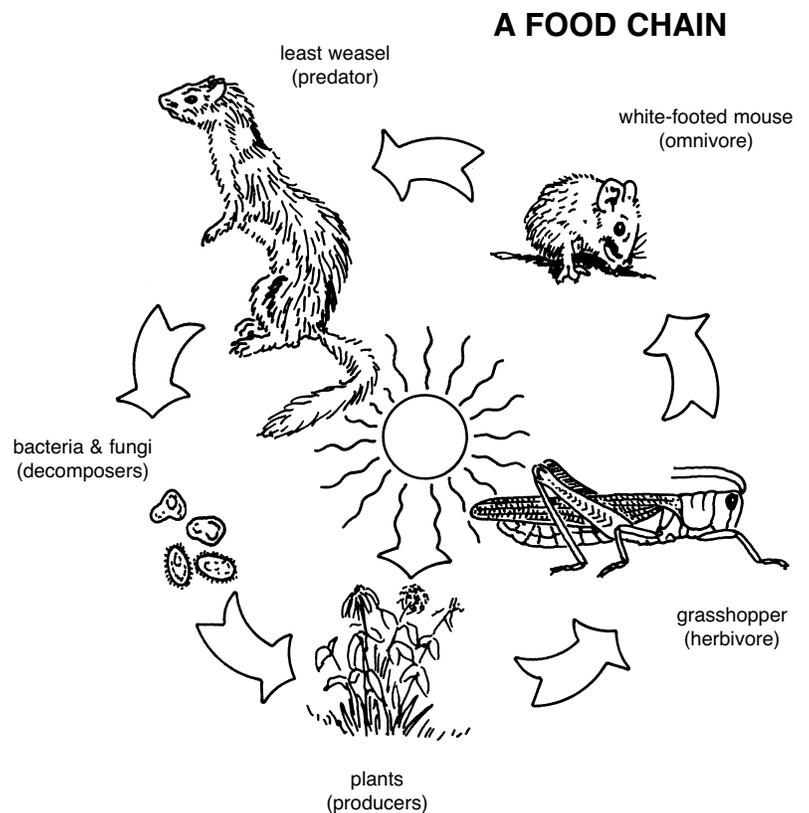
Both predators and prey are links in what is called a **food chain**. Food chains are the routes along which energy flows through the living world.

This energy always starts with the sun. Through a process called **photosynthesis**, plants are able to use the sun's energy to convert carbon dioxide, water and nutrients from the soil into food. Animals like rabbits and deer eat the plants and use the food energy for their own needs. When they become prey, the energy is transferred to the predator.

But the flow of energy doesn't end there. Even top predators eventually die, and then their bodies become food for **scavengers**, those animals that eat the bodies. The remains of all animals are broken down into their simplest compounds by microscopic bacteria and fungi. These compounds are the nutrients that plants then use for their own growth. The food chain becomes a closed cycle which begins all over again.

CHALLENGE YOURSELF

1. What are the two predators in the "A Food Chain" diagram?
2. What is the sun providing to the plants in the diagram?
3. What are two prey items in the diagram?
4. What is represented by the arrow between the least weasel and the bacteria and fungi?
5. Can a mammal be both a predator and a prey item? Explain and give an example.



VOCABULARY

food chain
photosynthesis
predator

prey
scavenger
top predator

ACTIVITY PAGE:

The Predator-Prey Pyramid

What you will need

- per class of 26 students (can be modified for other class sizes)
- two pieces of brown cloth
- six pieces of white cloth
- 18 pieces of green cloth
- 18 small paper bags or envelopes
- small (1" x 1" or so) construction paper squares, about 500
- watch or timer

WHAT YOU DO

Go outside to a large, open playing field. Designate two students to be least weasels, six students to be white-footed mice and 18 students to be grasshoppers (or use these proportions for other class sizes). Loosely tie a green cloth around the arm of each "grasshopper" (you may want to use clothes pins to pin the cloth to clothing instead or use construction paper squares instead of cloth). Following the same procedure use white cloth for the white-footed mice and brown cloth for the least weasels.

Give each "grasshopper" a small paper bag or envelope. This container represents the "stomach" of the animal. Have the students turn their back to the playing area. Scatter the small construction paper squares over the playing area.

Tell the students to turn around. The "grasshoppers" may now go to feed by picking up the paper squares and putting them in their "stomach" bag. The "mice" and "weasels" watch from the sidelines. After about 15 seconds, tell the "mice" that they may hunt the grasshoppers. (NOTE: Times can be adjusted. If 15 seconds is too short for your class, try 30 seconds or one minute.) If a mouse tags a grasshopper, the grasshopper dies and must give its "stomach" to the mouse. The "dead" grasshopper then goes to the sideline to wait. After about 15 more seconds, allow the "weasels" to hunt the mice. If a mouse is tagged by a weasel, it must give the "stomach(s)" it has collected to the weasel. After another 15 seconds or so, stop the game.

Ask the students what the top predator was in the game. What was the other predator? What were the prey items? How did the game represent a food chain? Did any grasshoppers survive? If so, how many

food squares does each have? Did any mice survive? How many food squares does each have? How many food squares does each weasel have? Why do the weasels have so many food squares? Does it take more energy for them to survive? How is the transfer of energy shown in this game? Is this game realistic?

Have the students line up in this order: first line, all grasshoppers (students who were grasshoppers at the start of the game); second line, white-footed mice (centered in front of the grasshopper line); third line, least weasels (centered in front of the mice line). Your formation should be like a pyramid to illustrate the decrease in numbers as you go up from herbivores to top predators.

Adapted with permission from "Hazardous Links, Possible Solutions," Project WILD K-12 Curriculum and Activity Guide, 2000, Council for Environmental Education.

