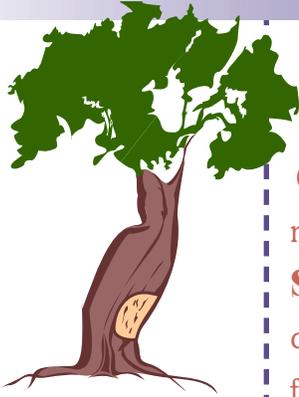


BEAVERS: Ecosystem Engineers

AGE LEVEL
9-12



Life Skill: Critical thinking

Project Skill: Studying beaver biology and behavior

Objective: Study the life history of beavers and how this mammal modifies its environment

Success Indicator: Participants form ideas and present data on both the benefits and the problems that might result from a family of beavers' moving into a neighborhood

Provisions Needed

- Waterproof boots
- Insect repellent
- Camera
- Binoculars
- Pencil and notebook
- Plastic bags



Trailhead

Have you ever noticed flooded areas off the highway or near your home where water was absent previously? Did you observe more dead trees than usual? If so, you may have witnessed the work of one of nature's most successful engineers—the beaver. Although many animals are surprisingly adaptable, the beaver is one of the few species of wildlife that can change its surrounding environment to meet its needs. By constructing a dam, beavers create ponds in which they can live and raise families. A beaver's instinctive behavior to stop any flowing water and its appetite for about any species of shrub or tree within 300 feet of the water often put the creature at odds with humans living nearby.



visit a
beaver colony

A beaver's instinctive behavior is to stop any flowing water.



Trailblazing

Contact a local forester, trapper, wildlife biologist, or your county Extension office to find out the locations of nearby beaver activity. Get permission to visit a site with an active beaver colony. You can confirm that beavers are living in the area by finding the cone-shaped trunks of felled trees, branches that have been stripped of bark, and dams made of sticks and mud. Before visiting a beaver pond, prepare to encounter wet areas and lots of insects. Visit the beaver pond several times if possible. Record what you observe.



BEAVERS: Ecosystem Engineers

Suggested Reading

- Rue, Leonard Lee, III. *The World of the Beaver*. Philadelphia: J.B. Lippincott Co. 1964.
- Hill, E. P. "Beaver," in: J. A. Chapman and G. A. Feldhamer, eds. *Wild Mammals of North America: Biology, Management, and Economics*. 256-281. Baltimore: Johns Hopkins University Press. 1982.
- Other activities in the Southeastern Wildlife Series, which this lesson is a part of, may be helpful in explaining the relationships between plants, animals, soils, and water quality. See "Urban Wildlife: Our Animal Neighbors," "Sharing Space with Wildlife," and "Houses for Wood Ducks."

Things to consider

- What types, sizes, and ages of plants are available to the beavers?
- What types, sizes, and ages of plants have been used by the beaver colony?
- How did the beavers use trees or other plants?
- Did the beavers eat different plants during different times of the year?
- Notice the degree of flooding, water marks on trees, and other signs of the changes in water flow. How has this affected the surrounding environment either negatively or positively?
- Make notes about other wildlife species and their activities.

Internet Resources

- <http://www.ces.ncsu.edu/nreos/forest/steward/www23.html>
- <http://www.ces.ncsu.edu/nreos/wild/wildlife/beavers.html>



From around the bases of the trees that have been felled, try to find chips of wood that have been cut from the tree and bring some home in a plastic bag. Observe and measure the incisor tooth marks beavers have left on tree trunks. Take pictures of the different pieces of evidence of beaver feeding activity. Consider the advantages and disadvantages of having beavers in your community. Present all your data in a graph, table, or drawing.

BEAVERS: Ecosystem Engineers



Field Guide

A beaver's house, called a **lodge**, is built on the side of a steep bank or on an island in the middle of a pond.

The family unit, a **colony**, consists of the parents, newborn beavers called kits, and young from the previous two years. Each year the two-year-old beavers leave the home pond and establish a colony of their own. Beavers can live up to 20 years in the wild.

The number of beavers in the United States likely exceeded **60 million** at one time. However, beavers were nearly trapped to extinction for their fur in the 1800s. More recently, programs designed to increase beaver numbers have been so successful that beavers are considered a nuisance in some areas.

The beaver is the **largest rodent** in North America and the second largest in the world (only the capybara of South America is larger). Adult beavers reach an average length of 4 feet, including a 6-inch-wide by 15-inch-long paddle-shaped tail. Adults usually weigh between 35 and 50 pounds, although the current record is 120 pounds.

Beavers use their tails as **rudders** when swimming, as tools to warn others of danger, as props when sitting or standing, and as places to store fat during the winter.

A beaver's **front feet**, although small, help gather and manipulate food and building materials. The 7-inch-long, webbed hind feet are used primarily for swimming. One of the five toes on each hind foot has a split nail that is used to comb the fur and apply a waterproofing oil that comes from a special oil gland located in the anal area.

In addition to the **waterproofing** gland, another gland, the castor gland, secretes a sweet-smelling liquid used to mark the home territory of the beaver family.

Beavers can spend as long as **10 minutes** underwater and swim submerged up to a quarter mile. They can cut woody material underwater using their four large, orange incisors. The incisors are self-sharpening and continue to grow throughout the life of the animal.

Beavers do not eat the **heartwood** of trees, which is actually dead and simply helps to hold the tree upright, but rather the living parts of trees, including the bark and an underlying layer called the cambium. While beavers in the southeastern United States will eat just about any woody shrub or tree, the most commonly consumed plants are sweetgum, yellow poplar, dogwood, oak, willow, cottonwood, and pine.

Beaver ponds are **complex ecosystems** that even human engineers cannot duplicate. Typically, a beaver pond supports more plant and animal diversity than was present before the stream or creek was dammed by the animal.

BEAVERS: Ecosystem Engineers



The Extra Mile

Bring a sketch pad and draw a blueprint of the beaver pond. Note the location of groups of felled trees, food piles, dens, dams, etc. Make a scale model of the beaver pond using your sketches. You might paint the pond on a piece of cardboard or plywood and use small sticks and papier-mâché to make the beaver lodge and dam.



Field Notes

SHARE

- Describe the activity you witnessed at the beaver pond.
- When were you more likely to see the animals?
- How did the beavers react to the presence of you or other humans?
- Can you think of other animals that can change their surroundings to meet their needs?

PROCESS

- Some beaver colonies store food for the winter, while others just a few miles away do not? Why do you think this happens?
- Why do you think beavers leave the colony after the age of two.
- What would be the pros and cons of having beavers move into your neighborhood?
- How can a balance be maintained between too many individuals of a species and too few?

GENERALIZE

- Why do people and animals often have trouble living close to each other?

APPLY

- How do you think conflicts between people and animals should be handled? Make sure you consider local trapping and hunting laws that apply to beavers and other wildlife.
- What can resolving conflicts between people and animals teach us about our everyday interactions with other humans?