

Web of Life

Method

In this simulation game, students will represent plants and animals living in a forest habitat. Sitting in a circle, they will connect themselves to each other using string to represent the ways they depend on each other. As they make connections, the string forms a visual web of life. Finally, they will experience what happens when an invasive species enters their world.

Getting Ready

1. Choose the cards you will use in the activity based on your location and the students' familiarity with the plants and animals on the cards.
2. Arrange for an adult leader for each group of 8 to 15 students.
3. Copy one set of cards per group. Make additional cards for plants or animals that are unique to your location.

Introducing the Activity

Have you ever seen a perfect spider web? The rays reach out and connect to tree trunks, rocks, and fences. They hold the web in place. The spirals are evenly spaced. They tie the rays together. If you follow the strands of silk, you can eventually get to any place on the web!

Now picture a forest. The forest ecosystem is made up of living and non-living things that are connected to each other. Some of the connections are obvious; some are amazing. Oaks need the light of the sun to live and grow. Mice eat the tree's acorns. Snakes eat mice. If we could take a pencil and magically draw the connections in the forest, the picture might start to look something like a crazy spider web. Imagine a line drawn from the sun to the oak trees to the mice that live in their trunks and eat their acorns to the snakes that slither through their dead leaves and eat the mice. Let's play a game to see how this might work.

Doing the Activity

1. **Divide the students into groups.** Maximum group size is 15. The ideal size would be 8 to 12. Each group should sit in a circle with an adult leader.
2. **Assign each student an identity.** Give each student a plant or animal card. Be sure they know a little about the plant or animal on their cards. To play the game, students will need to know how the plants and animals are connected in food chains.
3. **Start the game.** Show the ball of string and explain that the string will let us see the connections between plants and



Objectives

- Describe a forest food web.
- Identify the connections between plants and animals in a forest ecosystem.
- Explain how the introduction of an invasive species impacts a forest food web.

Grades

2 – 8

Group Size

Small groups of 8 – 15

Activity Time

10 – 20 minutes

Setting

Anywhere

Materials

- Copies of forest plant and animal cards (pages 49 – 52)
- Yarn or string

Connections

See next page.

Academic Standards

Grades 2 – 4

- Environmental Education: B.4.1
- Science: F.4.4

Grades 5 – 8

- Environmental Education: B.8.8, B.8.21
- Science: F.8.9

Scout Connections

- Webelos Scouts: Naturalist
- Boy Scouts: Nature
- Brownie Girl Scouts: Eco-Explorer
- Junior Girl Scouts: Earth Connections

animals. Explain that you will represent the sun. You will start, because all energy comes from the sun. Model the game by saying, “I am the sun. I am passing the ball of string to the sugar maple tree, because I give the tree energy to grow.” You hold onto the string and pass the ball to the tree.

4. **Continue the play.** The “tree” now chooses a plant or animal in the circle that is connected to it in some way. The “tree” holds onto the string and passes the ball to that plant or animal. For example, the tree might pass the ball to the deer that eats tree leaves, the woodpecker that eats the bugs in its bark, or the owl that roosts in its branches. Keep the string tight, but not too tight! Play continues until everyone is holding onto the string. Some plants or animals might have more connections, but everyone should be a part of the crazy web!
5. **Show the power of the sun.** Explain that you, representing the sun, are very important. Ask what might happen if the sun suddenly stopped shining. Briefly discuss some of the consequences. (Obviously, it would be dark! Without the sun to provide warmth, the earth would cool off. The wind would stop blowing. Plants would eventually die. Animals that eat the plants would die. When we used up our food reserves, we would die too.) Ask everyone to sit still. Begin to tug gently on your part of the string. Tell the students that when they feel the tug, they should begin to tug gently. Ask them to watch as the tug moves through the web. Finally, the whole web will be shaking! Everything is connected to everything else.
6. **Explore other connections.** It is easy to understand how the sun influences the connections between plants and animals, because the sun is the source of all energy. What would happen if the mushroom (or some other plant or animal) disappeared? Mushrooms aren’t that important, are they? Try the game again with the mushroom gently tugging on the web. As each plant or animal in the circle feels the tug, he/she should call out the plant or animal he/she represents.
7. **Discuss impacts to the web.** Talk about things that might happen that would change the way the plants and animals are connected. What would happen if:
 - No rain fell for months?
 - A storm blew down all the mature trees?
 - Too much rain fell?
 - Part of the area was cleared for construction?
8. **Consider invasive species.** Ask what might happen if a new plant or animal came into the forest environment. Choose an invasive species that is common in your area. Ask the students how this new species might affect the plants and animals of your little circle. See the list below for some ideas.

Identify one plant or animal that the new invasive species will displace. Change the plant or animal tag of that student. Follow the connections from that student to other plants and animals in the circle. Ask the student to let go of the string. What happens to the web? Ask the other students to pull gently on the string. Watch as the web unravels. This activity helps students understand how the introduction of an invasive plant can impact native animals and vice versa.

- Buckthorn – Outcompetes other woodland plants by leafing out early in the spring and forming a dense canopy. Replaces plants like nannyberries, Virginia creepers, trilliums, mayapples, sugar maples, and basswoods.
- Garlic mustard – Outcompetes woodland wildflowers, such as trilliums and mayapples, by beginning growth very early in the spring and producing an abundance of seeds!
- Eurasian earthworm – Eats away the leaf litter that woodland wildflowers (mayapples and trilliums) and tree seedlings (sugar maples and basswood) need to sprout and grow.
- Gypsy moth larva – Feeds on the leaves of deciduous trees such as basswoods and sugar maples.
- Asian longhorned beetle – Feeds on a tree's growing layer (cambium) that lies just under the bark. Sugar maple is one of the trees that this insect attacks.
- Hemlock woolly adelgid – Feeds on hemlock needles. The feeding causes the needles to fall from the tree prematurely, eventually killing the tree.
- Wild boar – Digs up plants as it feeds. The disturbed ground encourages the growth of invasive forest plants.
- House cat – Preys on small birds and mammals such as chickadees, yellowthroats, robins, and white-footed mice.
- Starling – Takes the best nesting sites and leaves native cavity-nesting birds such as screech owls and chickadees with less desirable nesting locations.

Assessing the Learning

Students each choose one plant or animal from the game. Using a large sheet of paper, each student should draw a plant or animal in the center of the paper. Instruct students to draw or write the names of the other plants and animals from the game around their central drawings. Tell them to draw lines from their chosen plants or animals to other parts of the forest ecosystem that are connected to them in any way. Older students should describe the connections along the lines (e.g., “toads eat mosquitoes”). Encourage students to add nonliving things (e.g., rain, rocks, or soil) or other plants and animals that live in the forest habitat and connect to them.

Extending the Learning

Try a Habitat Lap Sit. After they try this activity, students will definitely understand why everything in a forest depends on everything else! Tell students that they are going to represent the plants and animals that live together in a forest habitat. Find some soft grass or carpet. Have students stand in a circle with shoulders almost touching. Instruct everyone to turn to the right and put their hands on the hips of the person in front of them. On the count of three, students should gently guide the person in front of them onto their lap. If it works correctly, everyone will be sitting on the lap of another person in a huge continuous lap sit! It may take a few attempts to get it right. Adjust the distance between people to match the sizes of your students. Caution: People with back or knee problems should sit this one out!

Encourage students to play with the cards individually.

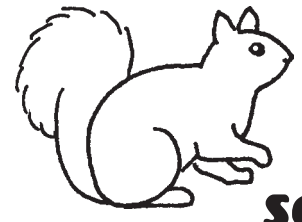
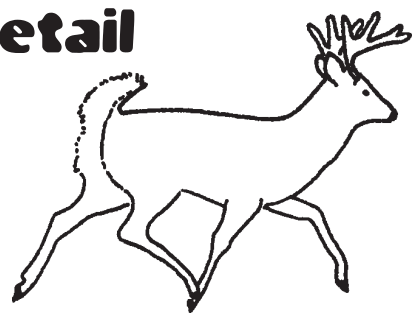
- Put the cards on a bulletin board and use string to connect them to each other in a web of life.
- Use the cards at a learning station and encourage students to play Dominoes. Starting with one card, students should place cards end to end. Each time they place a card, they must describe the connections between the new card and the card on the table.

Play *Web of Life* outdoors. Take the game outside! Create a *Web of Life* in the schoolyard or a nearby park. Start by tying a string to a tree or other plant. Connect the green plant to living and nonliving things. Use animal signs instead of real animals! Don't forget to clean up your string!

Finding Out More!

Who Eats What? Food Chains and Food Webs. Patricia Lauber. 1995. *Let's-Read-And-Find-Out Science* series – Stage 2 Book. Explains the concept of a food chain and how plants, animals, and humans are ecologically linked. Grades 1 - 4.

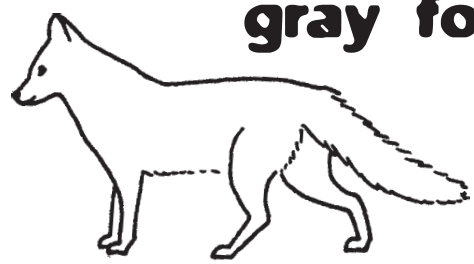
**whitetail
deer**



**gray
squirrel**



star-nosed mole



gray fox

**white-footed
mouse**

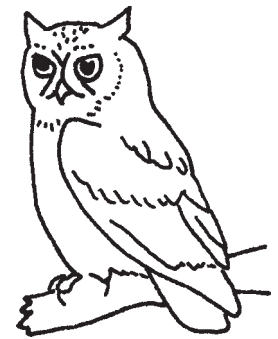


**flying
squirrel**

**Cooper's
hawk**



**screech
owl**

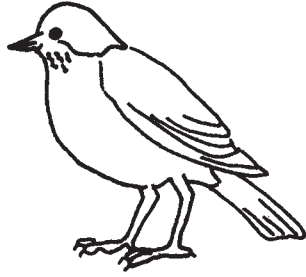


chickadee

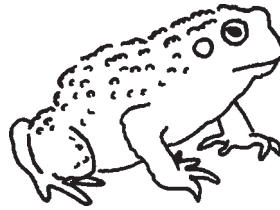


yellowthroat

robin



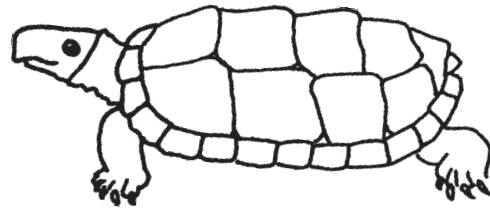
toad



spotted salamander



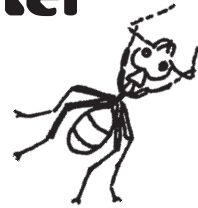
wood turtle



red-bellied snake



carpenter ant



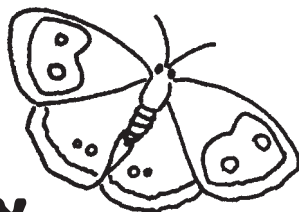
green June beetle



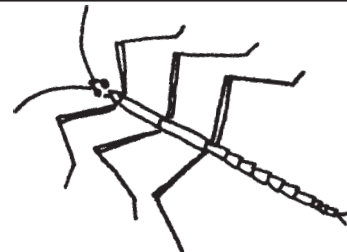
eastern tent caterpillar









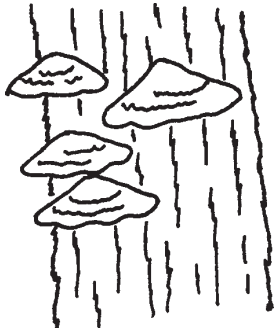
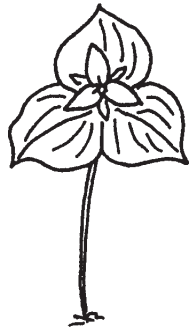


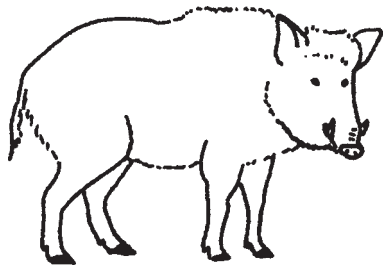
wood nymph butterfly



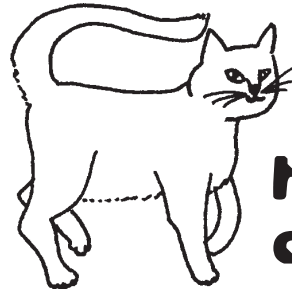
walkingstick



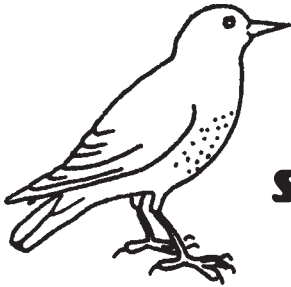
<p>mosquito</p> 	<p>basswood</p> 
<p>sugar maple</p> 	<p>eastern hemlock</p> 
<p>nannyberry</p> 	<p>Virginia creeper</p> 
<p>poison ivy</p> 	<p>mayapple</p> 
<p>shelf fungus</p> 	<p>trillium</p> 



**wild
boar**



**house
cat**

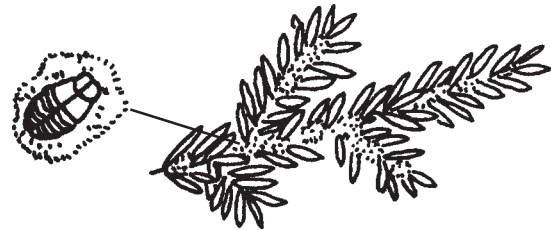


starling

**gypsy
moth**



**Asian
longhorned
beetle**



woolly adelgid



**Eurasian
earthworm**



buckthorn

**garlic
mustard**



human

