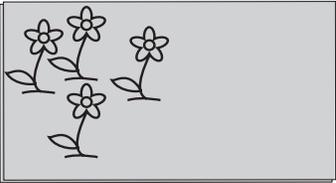


Activity:

1. Copy the Furbish's Lousewort Fact Sheet for students.
2. Give students some time to read the Fact Sheets. Explain the background information on the Furbish's Lousewort. The activity will be based primarily on this material.
3. Based on the information, ask students to list some of the threats to the Furbish's Lousewort.
4. Spread the tarpaulin on the floor and explain that it will represent the river bank for a population of Furbish's Lousewort plants. Each student is a plant and must remain standing in one place on the tarpaulin without moving. Depending on the size of the tarpaulin, only half of the class may be able to do this activity at a time. Decide which long side of the tarpaulin is closest to the water and explain that the opposite side is closest to the forest behind the river bank.
5. When all students have a good place to set down roots, the teacher will act as a narrator to explain the scenario:

Forest



You are a Furbish's Lousewort plant living on the bank of the Upper St. John River. All your basic needs are met and there is plenty of suitable habitat. Some of your population are above the huge falls at Grand Falls and some are along the shores that are downstream from the falls. Every spring, floods and ice do their work, scraping away bushes along the riverbank. In some of these places, Furbish's Lousewort plants are lost; in other places, habitat is created for new Lousewort plants. The mature plants in your population, those that are in their third summer or more, are able to produce flowers. Bumble bees spread the pollen amongst your flowers and seeds are produced. The seeds germinate and the young plants grow, thanks to their underground link with nitrogen-fixing host plants – plants from a different species that help provide nutrients to the young Louseworts. Although your species is rare in New Brunswick there are no significant threats to your population at this time. This is the way things were many years ago.

Generations pass, and your population sees many changes. One of these changes has a dramatic effect on your community at the water's edge. A dam is built at a falls on the St. John River. As water flows through the dam, it generates electricity used to power lights and provide heat in buildings. This hydroelectric dam affects when and how much water flows, causing your habitat to change. Higher water levels flood a portion of your original habitat and its plant population.

6. Depending on the class/tarp size, the teacher will fold over one third of the tarp, closest to the river. All plants that were growing on this soil are lost. These plants now become the student PLANT PATROL and watch to make sure that none of the remaining plants move. The teacher continues:

Your population has suffered a loss. Still, you cling to life as well as you can. The St. John River continues to flow past, as do the years. With time, your community sees other changes. Loud disturbing noises seem to be coming

from the nearby forest and the sounds appear to be drawing closer. One day, you see chainsaws, a skidder and dump trucks full of gravel for the first time. They proceed to cut down the trees directly above you on the riverbank and build a road through your population to the water. They use the road to bring boats and other vehicles down to the water. The road causes a direct loss of plants and the loss of trees means many of you are no longer protected from the sunshine. You lose one quarter of the habitat that you had before the road.

7. With help from the Plant Patrol, fold over 1/4 of the remaining tarp. The plants on this area join the Plant Patrol.

Your population has suffered another loss, and there are additional threats. You hear the now-familiar sound of trucks, but this time the trucks do not come down the road. Instead, they stop at the top of a portion of undisturbed bank, upstream from you. This time, old mattresses and other garbage are being dumped down the bank, destroying some plants and covering pieces of shore that were habitat for your species. You lose a small percentage of population and habitat, but you don't know how often this might happen again in the future...

8. Using help from the PLANT PATROL, fold over 1/4 of the remaining tarp and have the plants living on this soil step away from their habitat.

Your population has experienced change and loss. A new summer season comes and your flowers are once again pollinated by bumblebees. Life carries on. Although your population has diminished, with good luck you will recover. You gain optimism when the children of a nearby landowner come by one day. They seem to recognize the Furbish's Lousewort plants and know not to tread on the plants in your community. They take their litter home with them, instead of dumping it along the riverbank. When they grow older, they plant a forest buffer along the river edge to replace the trees that were originally cut down.

9. Depending on the teacher's choice, the activity can end at this point or other threats and recovery efforts can be simulated, using information from the fact sheet and the background information. Have the PLANT PATROL fold up the tarp and then gather as a group to discuss the activity.

10. Discussion:

- a. We have no way of knowing how many Furbish's Lousewort used to grow in New Brunswick or the exact area of their original habitat. Biologists have paid little attention to this species until the last few decades. However, looking back at the folds in the tarp, can you calculate what fraction of the habitat was lost through the events you acted out? Can you calculate the number of plants/ students who were lost with each disturbance? What percentage of the original Furbish's Lousewort survived?
- b. What contributed to the Furbish's Lousewort becoming an endangered species?

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- c. What has been done, and can be done, to protect this plant?
 - d. Why does habitat loss contribute to the endangerment of the Lousewort?
 - e. Over how many years did this story take place?
 - f. Do you agree that the Furbish's Lousewort is endangered because of the history of this species?

Variation:

This activity can be used with other wildlife, as it concentrates on all habitat and endangered species. Any animals used in this game would be able to move around, whereas plants must choose one place to call home.

Summary:

Students create a food chain for the Peregrine Falcon that includes the effects of a pesticide (DDT) on the food chain.

Learning Objective:

Students will:

1. place the Peregrine Falcon in a food chain.
2. turn the Peregrine Falcon food chain into a food pyramid.
3. learn how pesticides, such as DDT, build up (bioaccumulate) in the Peregrine Falcon food pyramid.
4. consider how to prevent making mistakes similar to the one that almost caused the extinction of the Peregrine Falcon.

Peregrine Falcon Food Chain



Photo: Richard Kuzn

Activity 8

Materials: Student copies of Peregrine Falcon Fact Sheet, student copies of Peregrine Falcon Food Pyramid Worksheet, and a red marker or pencil crayon for each student

Location: Indoors

Time required: 2 classes



Background Information:

The Peregrine Falcon has always been a rare species in New Brunswick. Before 1950, scientists believed that there were only a handful of pairs, nesting mainly along the Fundy coast in summer and migrating to the southern US and Central and South America in winter. During the mid 1950's, this majestic bird of prey all but disappeared from the Maritime Provinces and other areas of North America. The cause was DDT, a pesticide used widely throughout North America in both the nesting and wintering grounds of this species.

Pesticides, including herbicides, fungicides, and insecticides, are made to control certain organisms. Herbicides control unwanted weeds, fungicides kill unwanted fungi, and insecticides control pest insects. When these substances contain chemicals that do not break down easily, they eventually build up or accumulate in nature. Pesticides can build up in a water or food source used by wild animals and humans. The full effects of a pesticide such as DDT are only realized after many years of use.

In New Brunswick, and in many other places where Peregrines were found, DDT was used throughout the 1950's and 60's to kill the spruce budworm and other pests. Chemicals such as DDT travelled up the food chain through insects to their predators, eventually reaching top predators like the Peregrine Falcon. The higher up in the food chain an animal is, the greater the amount of pesticides that will build up in its tissues. As a result, concentrated toxins were ingested by the Peregrine Falcon with each pesticide-contaminated meal.



Curriculum Links:

Classify organisms according to their role in a food chain or web, and draw a diagram to illustrate the food chain.

Classify organisms according to their role in a food chain or web, and draw a diagram to illustrate the food chain.