LEVEL: Grades 3-6

SUBJECTS: Environmental Education, Language Arts, Science, Social Studies.

PROCESS: Through a small-group activity, students evaluate how wild animals and plants can be used to manage some environmental problems.

OBJECTIVES: The student will:
1. Give five examples of how wild animals and plants can be used to manage some environmental problems.
2. Be able to describe and give examples of an organism's niche.

TIMEFRAME: 30 to 45 minutes.

SKILLS: Analyzing, deciding, discussing, evaluating, explaining, justifying, reading, sharing.

MATERIALS: For each small group: Ecosystem Map, "Critter Cards," "Ecosystem Cards," "Critter Tokens" (attached); have at least three of each different "Critter Token."

VOCABULARY: Acorn, construction, ecosystem, erosion, insecticide, irrigation ditch, manager, niche, rodent, stream-bank.

CAREER CRITTERS

OVERVIEW: This activity introduces the concept that wild animals and plants can "manage" some environmental problems. Sometimes organisms can help solve or mitigate human-induced environmental problems by simply doing their "jobs." An organism's ecological job is called its niche.

PROCEDURE:

PRE-ACTIVITY:

Introduce and define the vocabulary words.

ACTIVITY:

1. Divide students into small groups of four to eight.

2. Give each group a copy of the Ecosystem Map, and a set of "Critter Cards," "Ecosystem Cards," and "Critter Tokens." Have them locate key areas on the map. Ask:

-Where are the 12 ecosystems on the map?

-Where does the stream begin and end? Trace the course of the stream.

-Where is the golf course in relationship to the stream?

-Where are the parking lots in relationship to the stream?

-Where is the town park in relationship to other areas of town. Who do you think visits?

-Where is the prairie ecosystem in relationship to houses?

-Are there areas or neighborhoods on the map that are similar to where we live?

3. Have each group pass out their "Critter Cards." Each student reads the back of the card either silently or aloud to the group and looks at the illustration on the card. Each student must keep his or her card - no trading!

4. Arrange the "Critter Tokens" neatly around the edge of the Ecosystem Map. There should be at least three of each different "Critter Token." They don't need to be in any particular sequence.

5. Shuffle and stack the 12 "Ecosystem Cards" face down beside the Ecosystem Map. One student draws a card and reads it aloud to the group. Each student examines his or her own "Critter Cards" to determine if those animals or plants could help solve the ecosystem problem described. If so, students explain how to the group. If the group agrees, a "Critter Token" of that plant or animal is placed on the map ecosystem. Remember more than one plant or animal **may** be used to solve the problem. There may be several unused "Critter Tokens" at the end of the activity.

6. When all the "Ecosystem Cards" have been drawn and all the ecosystem problems solved, have the groups compare their results with the other groups' results.

7. Discuss and ask:

-Could any of these solutions backfire? In other words could the plants or animals used to help solve certain problems end up being a problem themselves?

-Are there other wild plants or animals (not identified in this activity) that could have been used to help solve the ecosystem problems?

-The gambusia fish is not native to many states. Is it okay to introduce "foreign species" to help with an ecosystem problem? What are the benefits? What are the risks?

-How could the location of the 12 ecosystems on the map be redesigned to reduce some of the environmental problems?

-Are there ways that animals, plants, and humans could work together to solve environmental problems?

-In what ways is this activity realistic? Unrealistic?

ASSESSMENT:

Have students:

1. Summarize five or more of the ecosystem problems described in this activity and explain how a wild animal or plant was helpful in solving those problems.

2. Define "niche." Give examples of the niches held by the animals and plants described in this activity.

3. Think of one ecosystem problem (not used in this activity) and describe how wild plants and animals might be used to help solve the problem.

EXTENSIONS:

1. Students may research more information about the animals or plants on the "Critter Cards."

2. Survey the neighborhood or study the newspapers and news articles for local environmental problems. Could they be solved by using wild animal or plant managers? Have students make their own maps of the community highlighting environmental issues.

PASTE ECOSYSTEM CARDS ON THE BACK OF 3"x5" INDEX CARDS

#1 Prairie Ecosystem

A prairie ecosystem is near a new housing development on the edge of town. The grassy field has prairie dogs in it. With all the new houses, lots of the prairie dog's natural enemies -- coyotes and eagles -- have disappeared. Now the prairie dog population is growing. The prairie dogs are digging burrows and mounds in the lawns of the new homes. They are also eating vegetable gardens and underground telephone wires. Some people are worried the prairie dogs might carry diseases and want to begin poisoning the prairie dogs. As a manager, how could you help solve this problem? What critter(s) or plant(s) could you "employ" to help you? How would they help?

#2 Mountain Ecosystem

Outside of town is a big national park in the mountains. Lots of people come to the park to see wild animals, especially elk. In fact, there are so many elk in the park that they are running out of grass to eat. Now the elk are starting to eat the shrubs, and the bark of trees. Trees are starting to die because so much bark has been eaten. Your job as manager is to reduce the number of elk in the park before they really damage the ecosystem. Remember that hunting is not allowed in a national park. What critter(s) or plant(s) could you "employ" to help you? How would they help?

#3 Golf Course Ecosystem

You are the manager of a golf course. The golf course is your ecosystem. You are very proud of your golf course -- especially the nearby stream, ponds, and water holes on the course. Golfers enjoy trying to get their balls in the holes without hitting them into the water. It's fun! One problem. Mosquitoes lay their eggs in ponds. When the eggs hatch the mosquitoes go after the golfers!

You could spray insecticide around the course to kill the mosquitoes but it's expensive and would probably harm other animals. What critter(s) or plant(s) could you "employ" to help you? How would they help?

#4 Stream Ecosystem

A stream ecosystem runs near a farm. Along the edge of the stream is a nice green area with lots of willows and tall trees. In the spring and summer the farmer takes water out of the stream. The water goes from the stream down an irrigation ditch to water a field of crops. When that happens there is not much water left for the animals in the stream. The stream becomes very shallow. Little fish can live in shallow water, but big fish need deep, cool pools of water. What critter(s) or plant(s) could you "employ" to help you? How would they help?

#5 Farm Ecosystem

You are a farmer. The farm is your ecosystem. Your crops are turning into a field of dreams for insect pests like grasshoppers. They are eating up your crops! You could spray with insecticides to kill the grasshoppers but that would cost a lot of money. Your field is also close to homes. The spray might drift over into the homes and people could become ill. What critter(s) or plant(s) could you "employ" to help out? How would they help?

#6 Pine Forest Ecosystem

In your pine forest ecosystem, all the trees are the same age and the same kind. Thousands of acres of your forest all look the same.

As a manager, your job is to change the forest so that a variety of new plants and animals live there. To do this you must cut/kill some trees. When that happens other grasses, shrubs, and flowers will grow where the trees once were. What critters or plant(s) could you "employ" to help you? How would they help?

#7 Stream Ecosystem

A stream ecosystem runs through town. Most of the time there is only a little water in your stream. But when a thunderstorm hits, lots of rain falls on paved streets and parking lots. The rain can't soak into the asphalt, so it runs downhill into the stream. The stream suddenly fills with fast-moving water. This water is often polluted with the oil and gasoline that has dripped on the asphalt from cars. The stream banks erode so trees and shrubs along the edge of the stream sometimes fall. Soil washes away. When the storm is over, the stream gets low again. It is full of dirt, sand, and pollution. As a manager your job is to stop the erosion of the stream bank and to keep the stream from having big changes in the level of water. What critter(s) or plant(s) could you "employ" to help you? How would they help?

#8 Garden Ecosystem

Your town has a community garden. Townspeople come here to plant vegetables. But this year small insect pests called aphids are eating the vegetables! Lots of people depend on those vegetables for meals. You could spray insecticides to kill the aphids, but some people don't want to use insecticides. They say that insecticides might make people ill. The community garden has another problem: The soil is too hard and packed so roots have a hard time growing. What critter(s) or plant(s) could you "employ" to help you? How would they help?

#9 Town Park Ecosystem

In the town park some of the old oak trees are dying. They need to be replaced by new oak trees. Of course, that costs a lot of money. What critter(s) or plant(s) could you "employ" to help you? How would they help?

#10 Foothills Ecosystem

On the hills at the edge of town many houses were going to be built. The bulldozers scraped the ground and plowed the dirt roads to get ready for the new construction. But the construction project was suddenly called off! The soil is now being blown away by the wind and washed downhill into the stream by rainstorms. As the manager, what critter(s) or plant(s) could you "employ" to help keep the soil on the ground? How would they help?

#11 Downtown Ecosystem

Downtown becomes very hot in the summer. The sun beats down on the sidewalks and black asphalt streets. The sun shines directly into the windows of buildings. Everyone turns on air conditioning, creating more air pollution, which makes being outside even more miserable. What critter(s) or plant(s) could you "employ" to solve this problem? How would they help?

#12 Downtown Ecosystem

There are many pigeons downtown. They like to nest on the ledges of buildings. Some people like the pigeons but others say there are just too many. Their droppings make certain areas really dirty and the birds may carry diseases. What critter(s) or plant(s) could you "employ" to reduce the number of pigeons downtown. How would they

CRITTER CARD CUT OUTS:

Squirrels

In the autumn we collect acorns from oak trees and store them to eat later in the winter. Sometimes we hide our acorns in little holes underground. The only problem is that we collect so many acorns sometimes we forget where we bury them! Some of these acorns sprout and grow into tall trees.

Weeds

Weeds are plants that people think are no good. But some weeds are good. We grow fast, even on bare ground. We are usually the first plants to grow where the soil has been disturbed. Our roots grow quickly and help keep soil from blowing away in the wind and washing away in the rain.

Trees

Living trees do many good things for the environment. Our roots help to hold soil down. We provide shade and keep areas cool. Our leaves are colorful and help clear the air of some kinds of pollution.

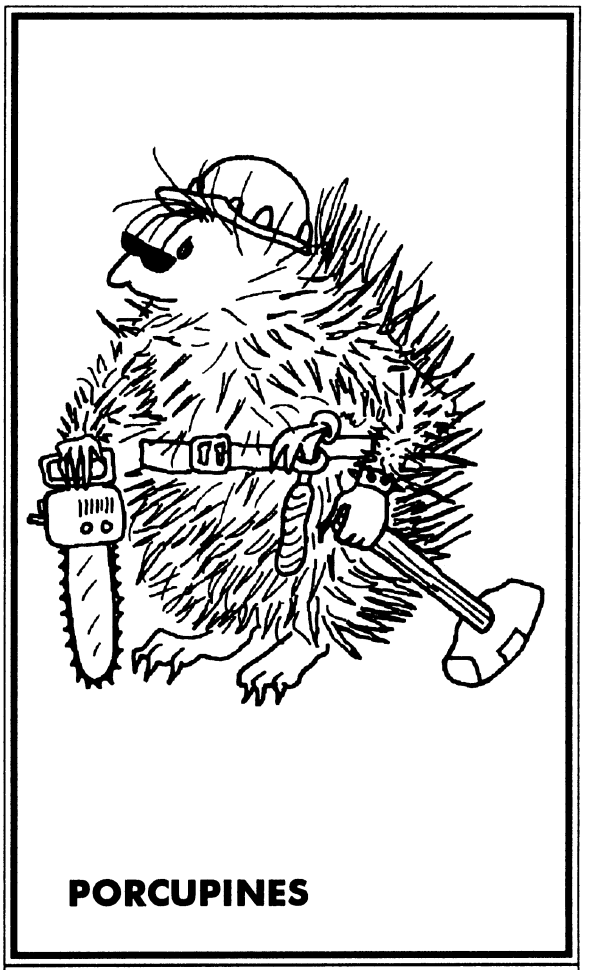
Falcons

We are hawk-like birds that are built for speed. We like to live and nest near high cliffs, canyon walls, and even sky scrapers. We are not afraid of heights. We swoop around to catch smaller birds to eat. Ecosystems with steep walls and plenty of birds to eat can be good places for us.

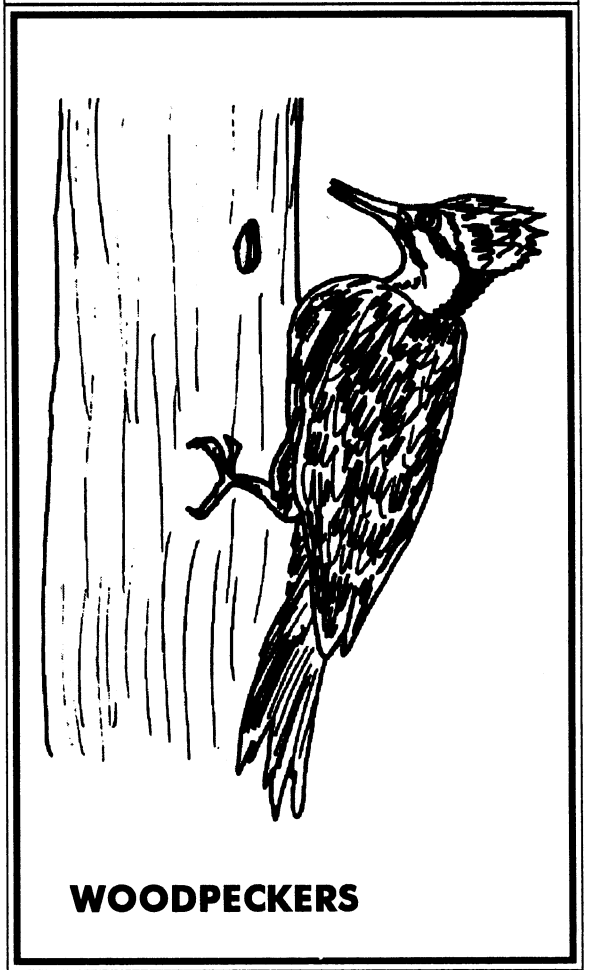
Earthworms

We love dirt and dirt loves us! We crawl around underground loosening the soil as we make our tunnels. Air can now get deep into the ground. Our waste also helps to fertilize the soil.

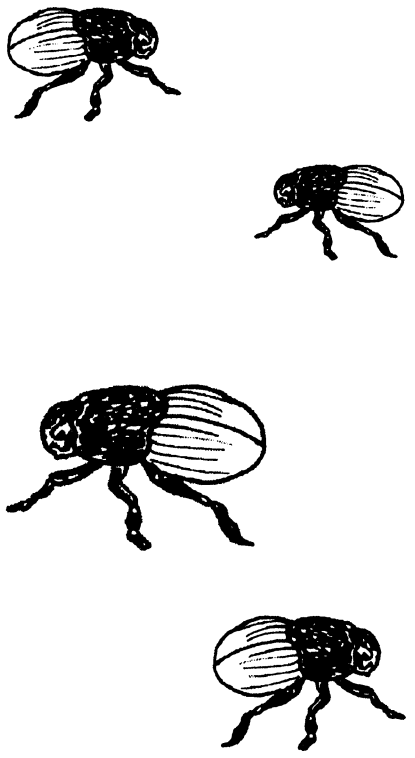
PLACE CRITTER CARD CUTOUTS ON THE BACKS OF CRITTER CARD PICTURES



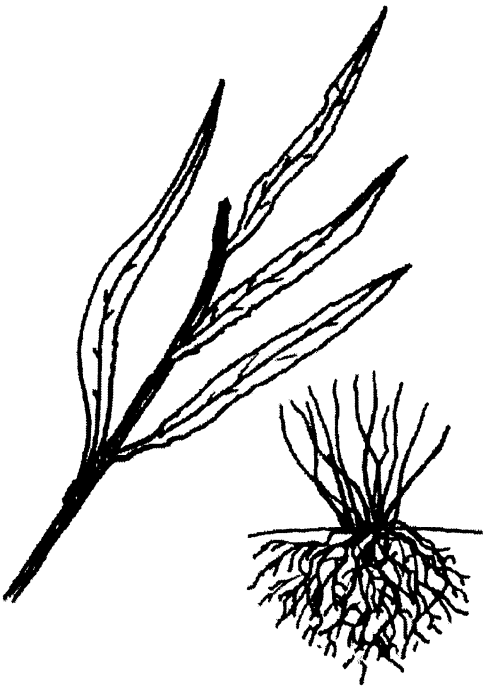
PORCUPINES



WOODPECKERS

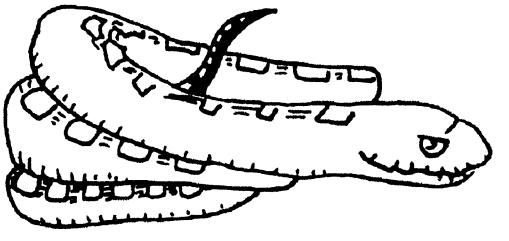


BARK BEETLES



WILLOWS

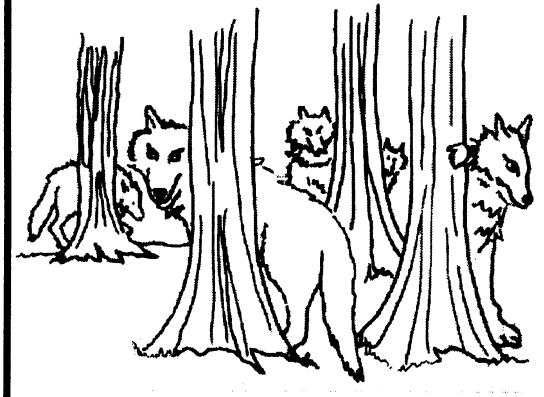
BEAVERS



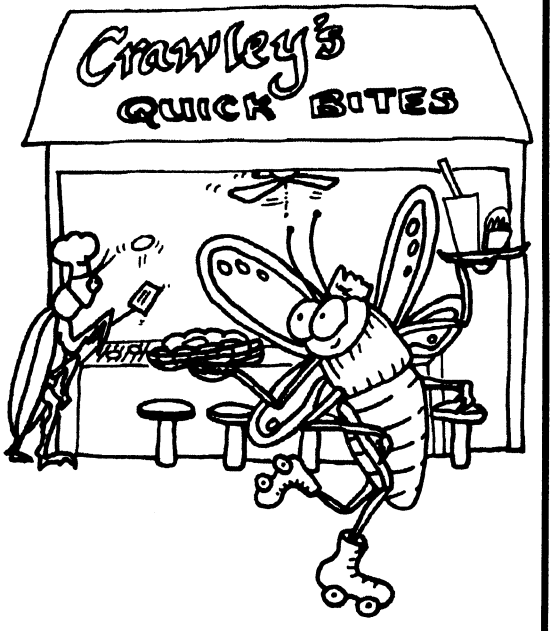
BULLSNAKES

BADGERS

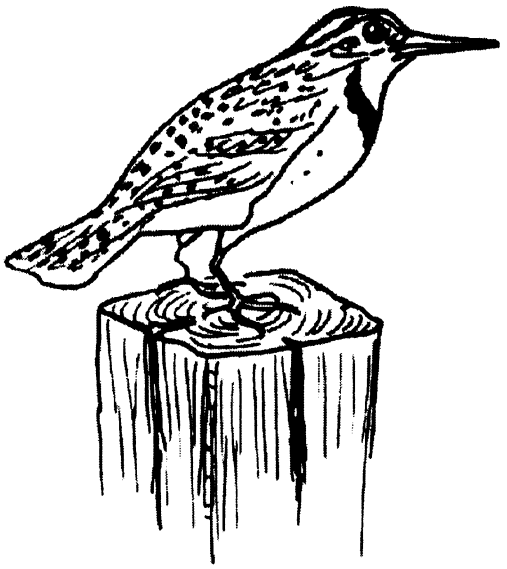
BATS



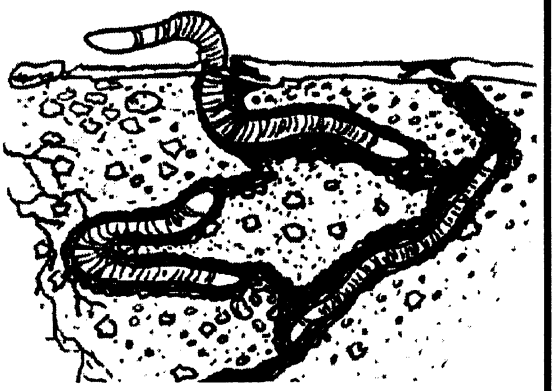
WOLVES



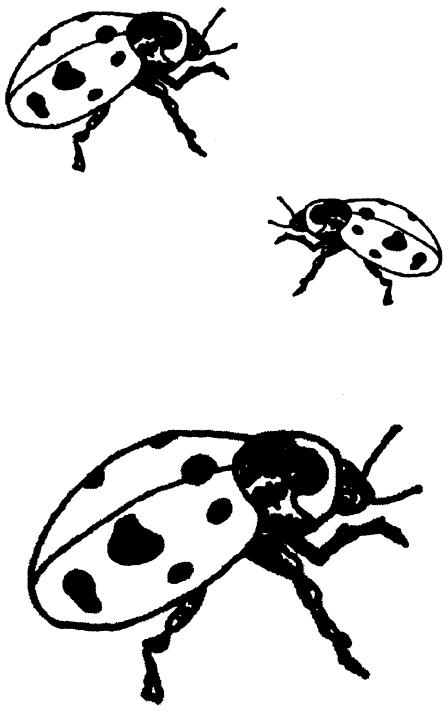
GAMBUSIA FISH



MEADOWLARKS

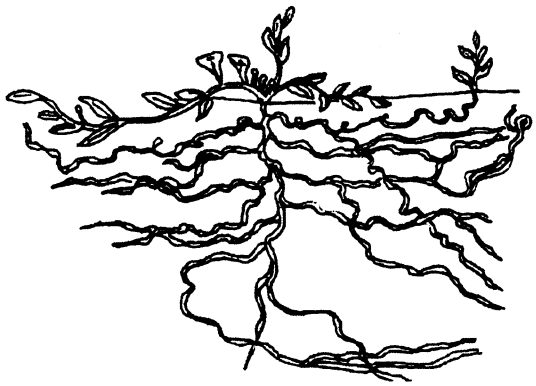


EARTHWORMS

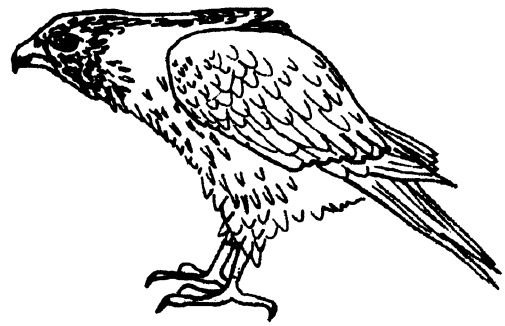


LADYBUGS

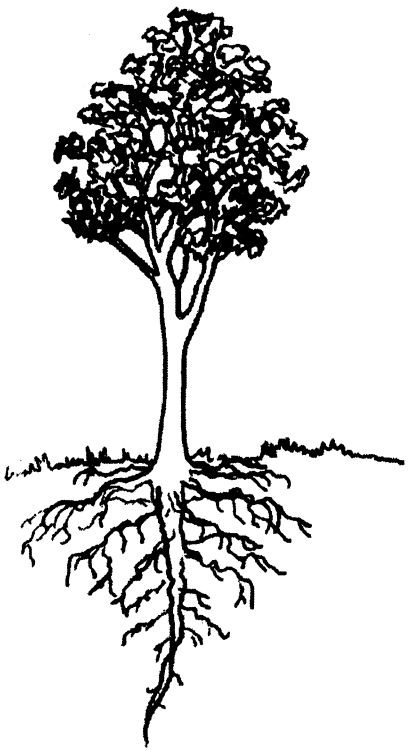
SQUIRRELS



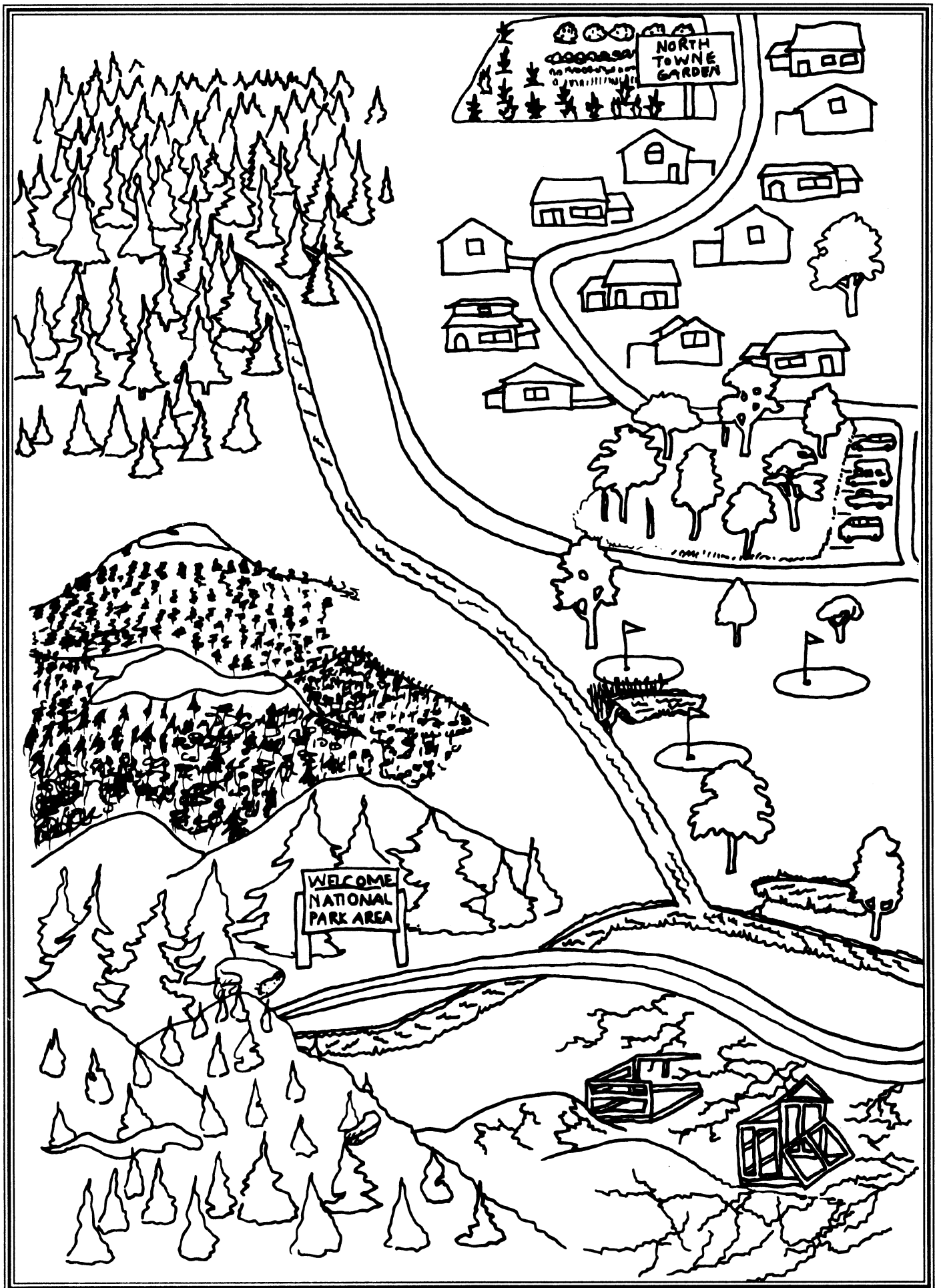
WEEDS

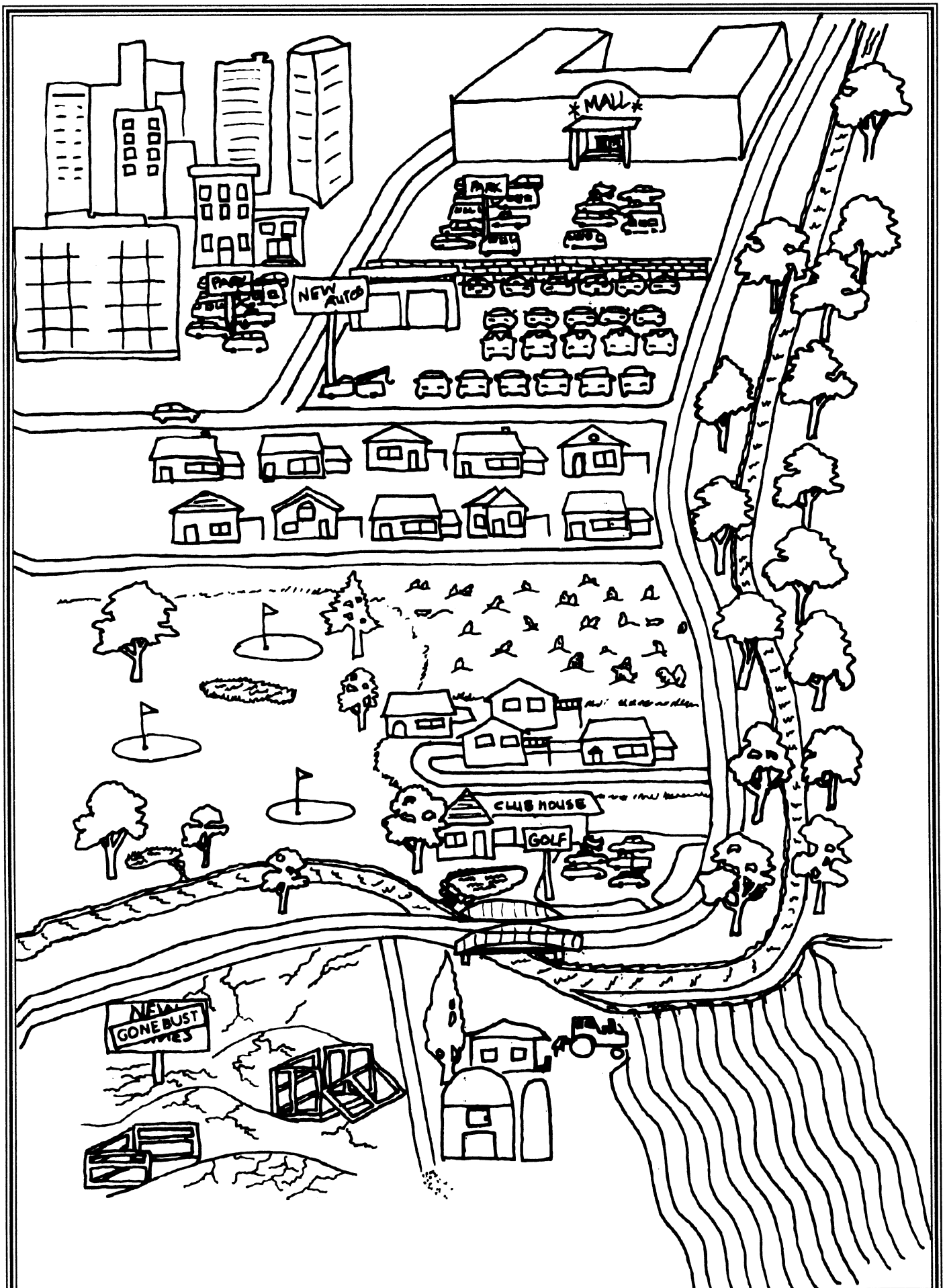


FALCONS

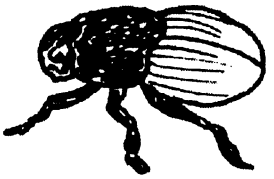


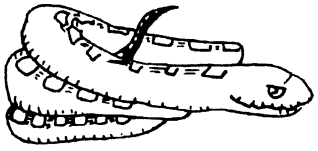
TREES

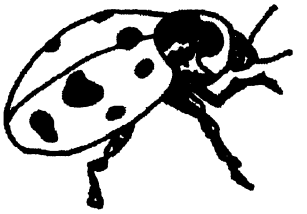

NORTH
TOWNE
GARDEN
WELCOME
NATIONAL
PARK AREA

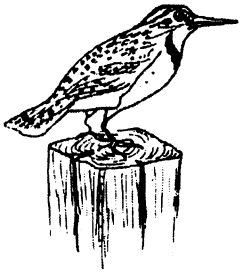

MALL
NEW AUTOS
CLUB HOUSE
GOLF
NEW
GONE BUST

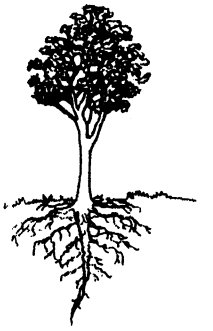
CRITTER TOKENS

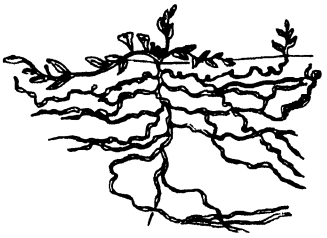


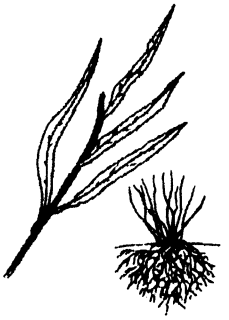


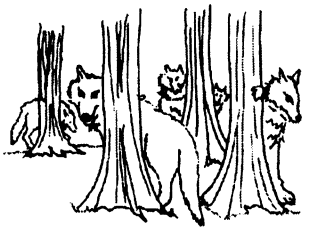


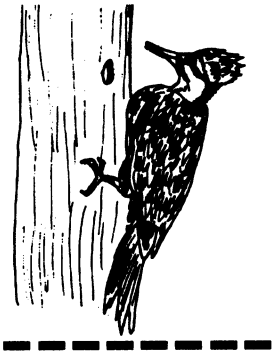


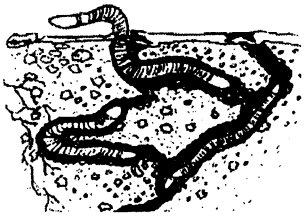












Use open spaces to come up with your own critters.