



Weaving the Web

Overview

Students construct food webs to learn how food chains are interconnected.

Suggested Grade Level

2 – 5

Estimated Time

30 – 40 minutes

Objectives

Students will be able to:

1. construct a food chain and explain how energy flows through the chain.
2. explain how all living things depend directly or indirectly on green plants for food.
3. use pictures and arrows to create a food web that includes the sun, green plants, herbivores, omnivores, and carnivores.

Materials

1. Ball of yarn
2. Activity Sheets 1- 8 (pictures of prairie plants and animals)
3. Tape to attach pictures to clothing
4. Space for the class to form a large circle

Background

Living Things Need Energy From Food

Energy can be defined as the capacity for change. Living things need energy for everything they do. For example, a butterfly needs energy to change position when it flies, and a daffodil needs energy to change size as it grows and blooms.

All living things get energy from food. Green plants use energy from the sun to make their food. Plants use the food they make for energy to grow. Animals get energy by eating plants or other animals.

The Sun is the Source

The energy in living things originates from the sun. Green plants are the only living organisms that can use the energy from the sun make food.

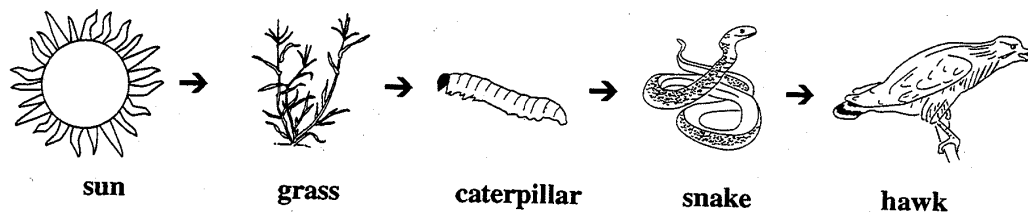
Although many children know that the sun keeps plants healthy, they may not know that plants rely on the sun's energy to make food, or that this food can be used by the plant itself or by animals that eat the plant. For example, a sugar maple tree uses the sun's energy to make sugar, a food, in its leaves. The tree uses the sugar for energy to grow and stay alive. If people eat maple syrup, they get energy from the sugar in the tree. But people cannot hold out their hands to the sun and make food in the same way that a maple tree can make food in its leaves.

Children may think that the sun is important because it keeps animals warm. The sun does provide warmth to the animals, but, more importantly, the sun provides the energy that green plants use to produce food. Animals get this energy when they eat the plants. To help students understand that animals depend on the sun for food energy, have them think about how long a deer could live if it only basked in the sun and did not eat green plants. The relationship between the sun's energy and the energy required by living things will become clearer as the children learn about food chains and webs.

Children may cling to the idea that plants draw in usable food from the soil through their roots. It is true that plants absorb water and essential minerals from the soil and that they need water to make food. Food contains energy, however, and the water and minerals in the soil do not contain energy. So plants use the energy from the sunlight plus water and minerals along with carbon dioxide from the air to produce food that contains energy.

Food Chains

A food chain's energy is transferred in sequence. For example, energy comes from the sun, to green plants, to animals that eat plants, and to animals that eat other animals. Green plants use the sun's energy directly to make food. When animals eat green plants and other animals eat those animals, the energy moves from one living thing to another along the food chain. Animals that eat plants are called herbivores, animals that eat both plants and animals are called omnivores, and animals that eat *only* other animals are called carnivores. Ultimately, all members of a food chain depend on the energy from the sun that green plants transform into food energy.



The above diagram illustrates a food chain that might be found in the prairie. Arrows indicate the transfer of energy from one organism to another. The sun provides energy for the grass, the grass for the caterpillars that eat the grass, and so on.

Students may want to use arrows to show animals moving toward their food. It may be necessary to help students recognize their thinking, as in the following example: “Does your arrow show that the frog hops toward the fly to get food? Now, can you draw the arrow to show which way the food energy is going? Does eating the fly give energy to the frog?” As they draw food chains in this unit, the students will better understand how the sun’s energy passes through food chains.

Food Webs

Food webs are more complex than food chains. They consist of many food chains that are interconnected. The following example is a series of food chains, which together make a food web.

sun → grass → grasshopper → blue jay → owl

sun → grass → rabbit → hawk

sun → clover → caterpillar → snake → hawk

Vocabulary/Glossary

carnivore – an animal that eats only animals

community – all the plants and animals that live in one place, and that interact and depend on one another.

energy – the capacity for change: all living things need energy from food to live and grow.

food chain – transfer of energy in sequence, for example, from green plants, to animals that eat plants, to animals that eat other animals.

food web – a network of food chains that are interconnected within a particular community.

herbivore – an animal that eats only plants.

interact – to influence one another

omnivore – an animal that eats both plants and animals

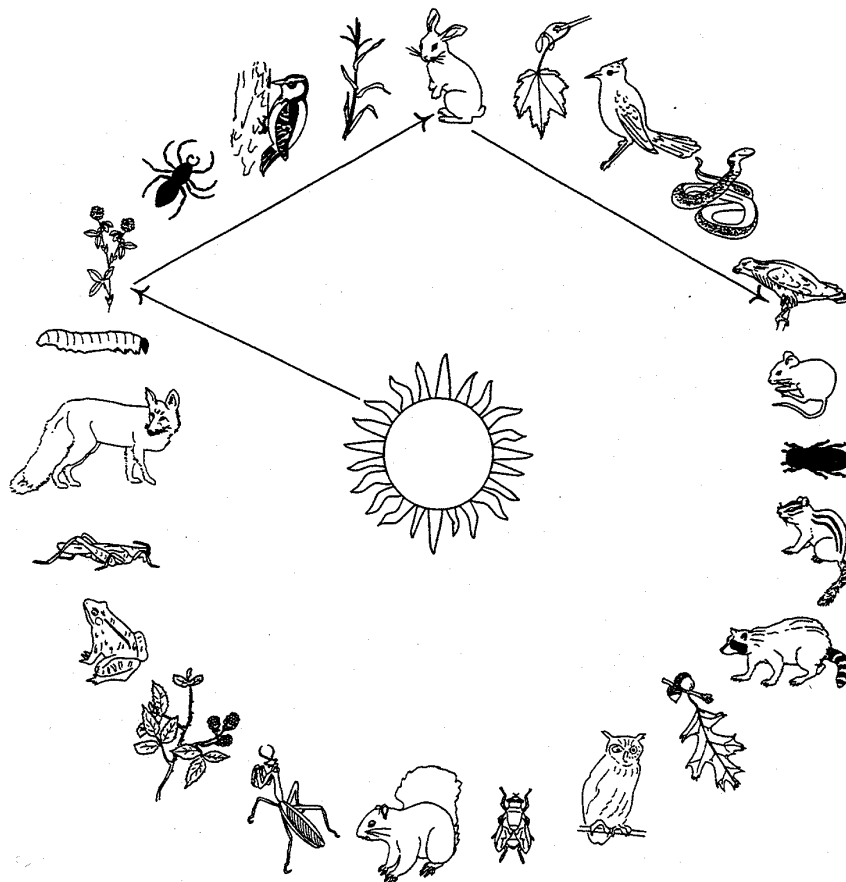
Activity

1. Copy Activity Sheets 1 – 8 and cut apart. Have students tape one picture each to their chests.
2. Tell the students that they will make a food web. Have them stand in a circle and introduce themselves as the plant or animal they represent. The student with the sun picture should stand in the center. They should look around and ask themselves:

Who in the circle could I give my energy to? (Who might eat me?)

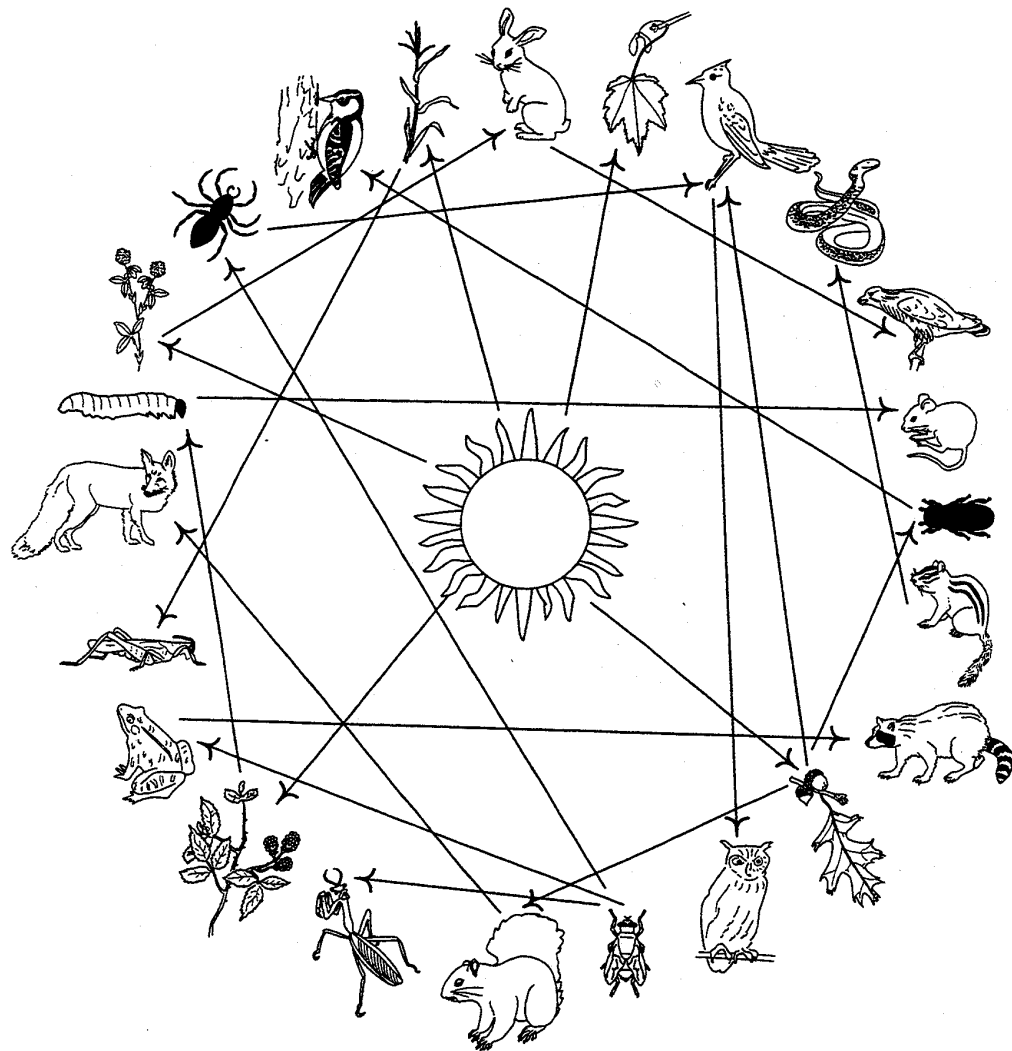
Who in the circle could give me energy? (Whom could I eat?)

- After the first food chain is completed, a view from above might look like this.



4. Return the yarn to the sun to start another chain. This time the sun might throw its energy to the grass, the grass to the field mouse, and the field mouse to a great horned owl. Again, break the yarn, throw it back to the sun, and have the sun start another chain. Continue making chains until every student holds at least one strand of yarn.

Now a view from above might look like this.



Ask:

Have we made food chains? (Yes, lots of them!)

What do all of our food chains together look like? (A food web.)

What is the difference between a food chain and food web? (A food web is made up of several food chains. A web is more complicated than a chain because it has connections among the chains.)

Who is holding the most pieces of yarn? (The sun.)

Why? (Because each food chain starts with the sun.)

Who else is part of many food chains? (Green plants)

What would happen if all the green plants died? (Nothing else in the food web could survive.)

Ask:

How could we show what could happen if one kind of plant, such as all the clover died? (The student representing clover could pull out his or her pieces of yarn and sit down.)

If all the clover is gone, who may have trouble getting enough food? (Identify all the animals that were in food chains that included clover. Whoever had yarn pulled out of their hands might have trouble getting enough food without the clover.)

What happened to our food web? (It is much thinner, less complex, and less strong.)

Why should we be concerned about each kind of plant or animal? (Because other plants and animals in the food web may depend on it.)

Emphasize that each group is important and applaud each in turn.

Will the carnivores please show their teeth?

Will the omnivores please shake a leg?

Will the herbivores please wink an eye?

Will the only living things that can make food using the sun's energy – green plants – please take a bow?

Collect the “Who Eats Who” sheets to save for another activity.

Extensions

1. Have students identify food chains from other ecosystems (forest, wetland, marine, etc.) and make pictures of the plants and animals from that ecosystem, using arrows to indicate the flow of energy.
2. Students can learn about the plant or animal they represented in the food web activity and write a report, tell a story, or make an illustration about the plant or animal to share with the class.

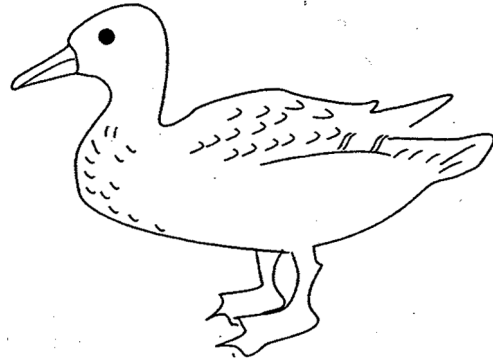
Adapted from Project LEAP: Learning about Ecology, Animals, and Plants, College of Agriculture and Life Sciences, Cornell University, Ithaca, NY 14853.

Weaving the Web

Activity Sheet 1



Human



Duck



Prairie Grass



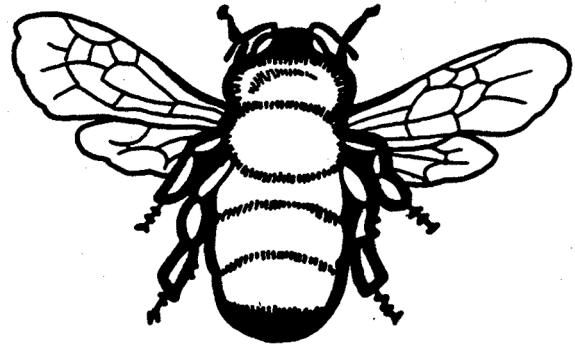
Deer

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Activity Sheet 2



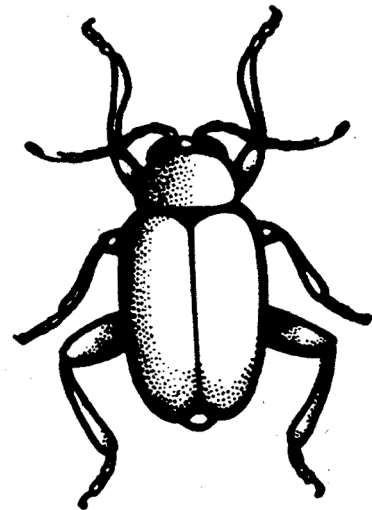
Owl



Bee



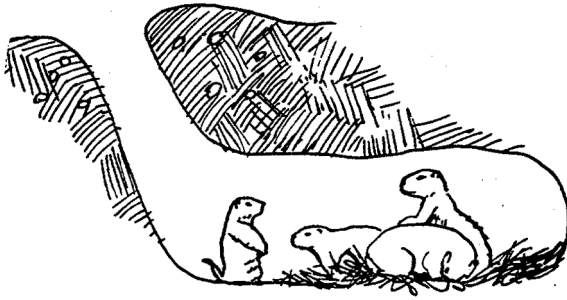
Mole



Beetle

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Activity Sheet 3



Prairie Dogs



Sunflower



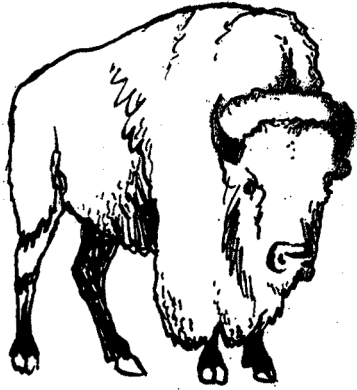
Meadow lark



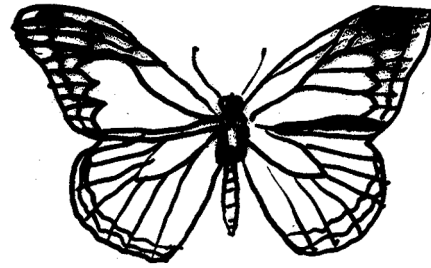
Quail

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Activity Sheet 4



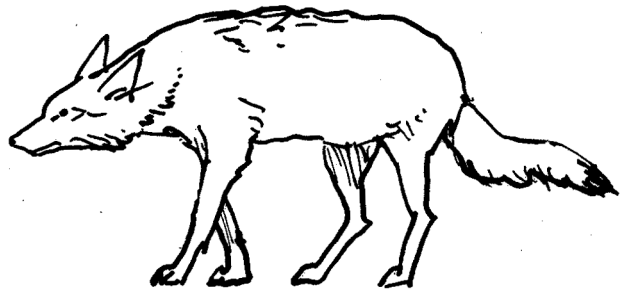
Bison



Butterfly



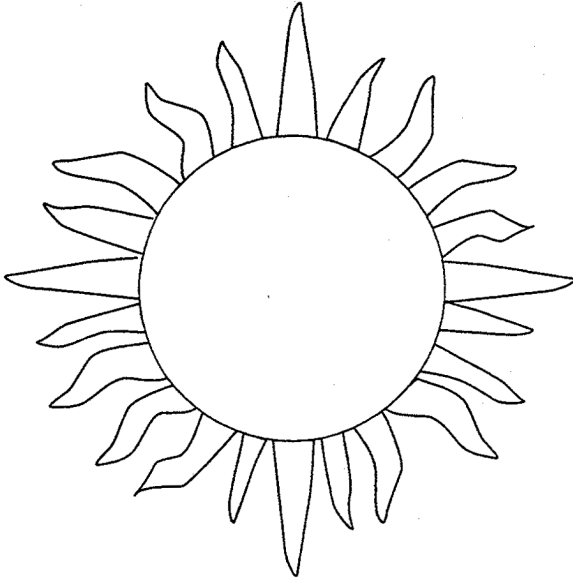
Aster



Coyote

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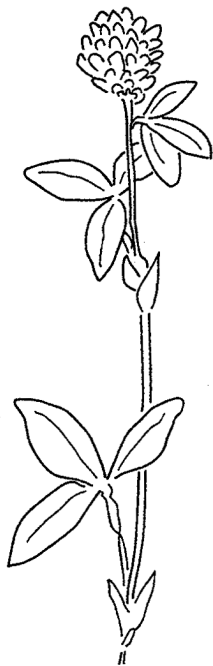
Activity Sheet 5



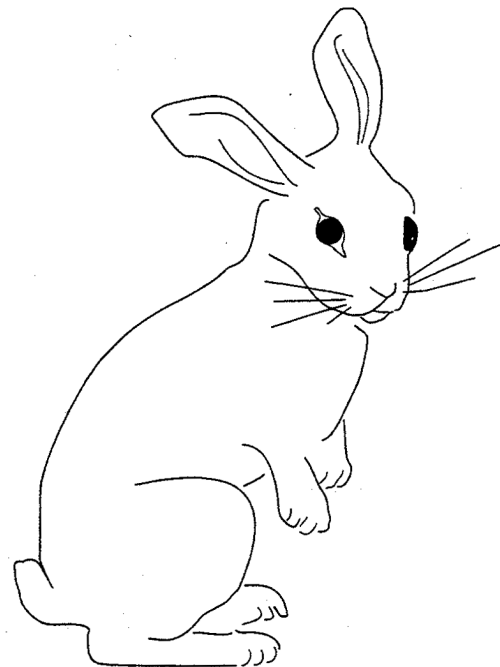
Sun



Orchard grass



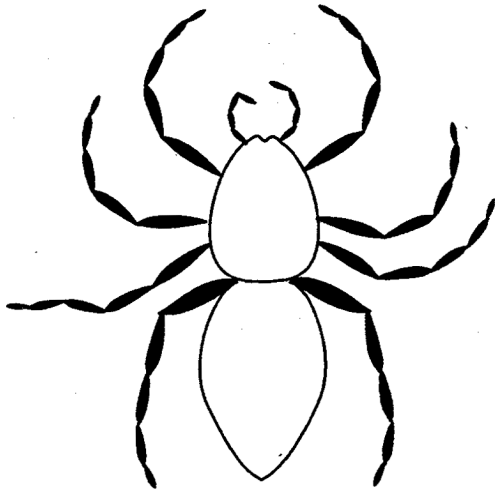
Clover



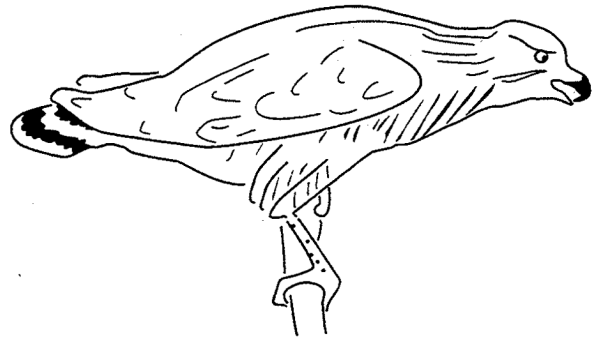
Rabbit

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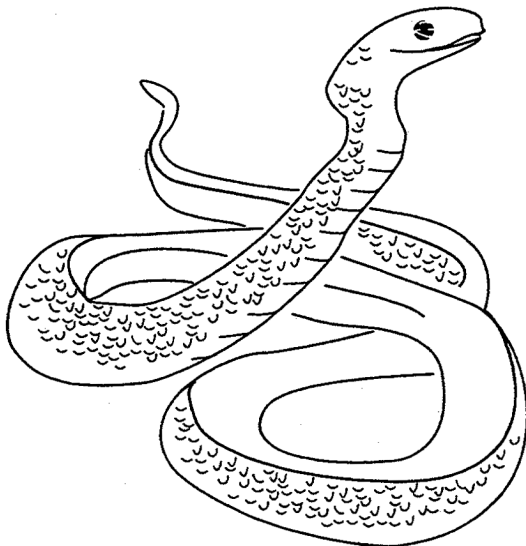
Activity Sheet 6



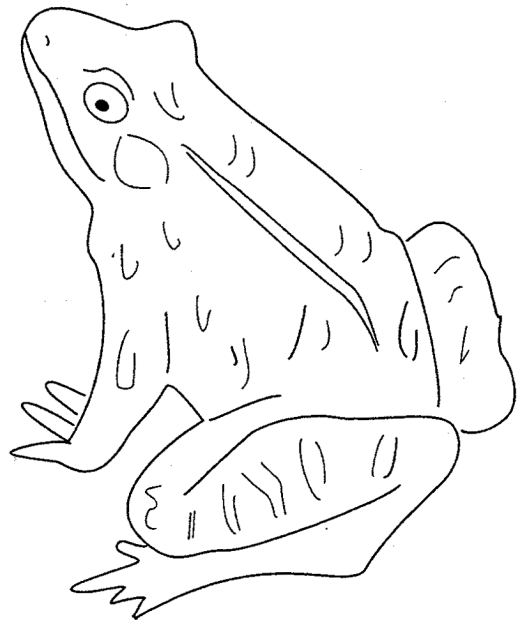
Spider



Hawk



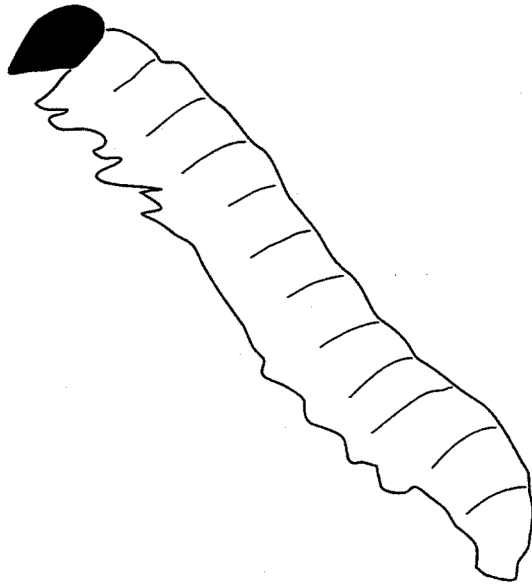
Snake



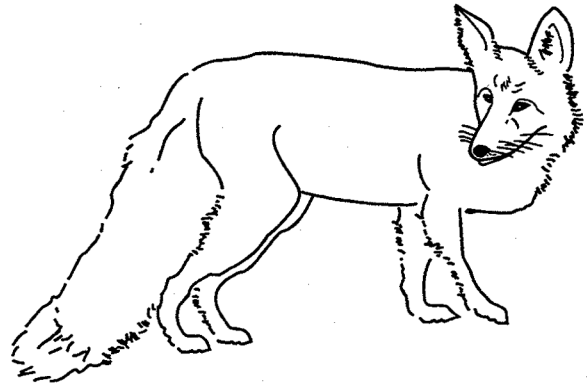
Frog

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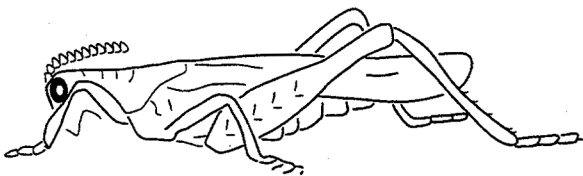
Activity Sheet 7



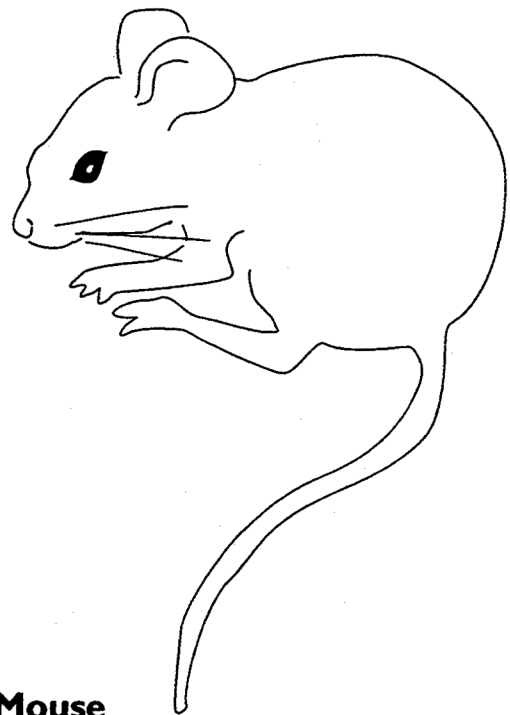
Caterpillar



Fox



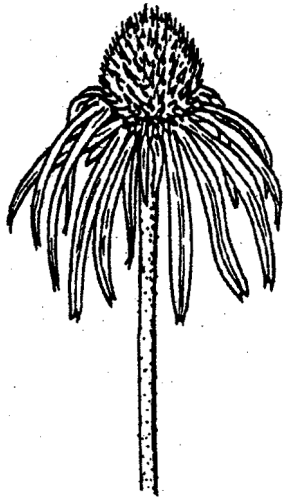
Grasshopper



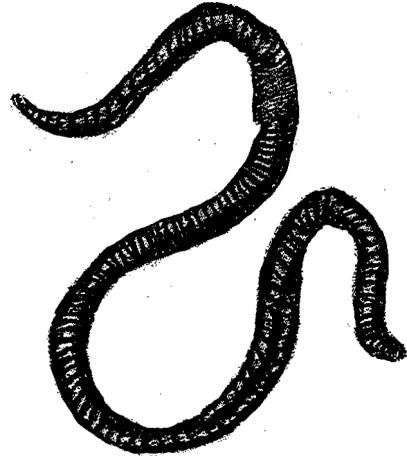
Mouse

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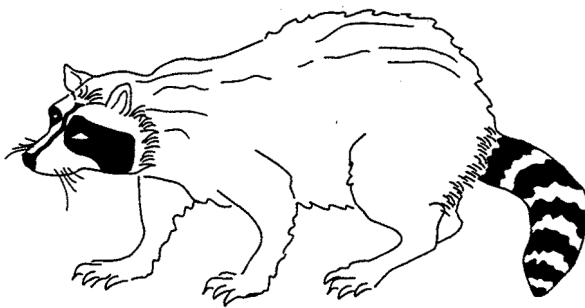
Activity Sheet 8



Coneflower



Worm



Raccoon



Black-eyed Susan