GREGORY GRAMBO

THE ECOSYSTEM

February/March 1997
Teacher's Helper Magazine

pages 41, 42, 43, 44, 45
46, 47, 48, 48 and 50

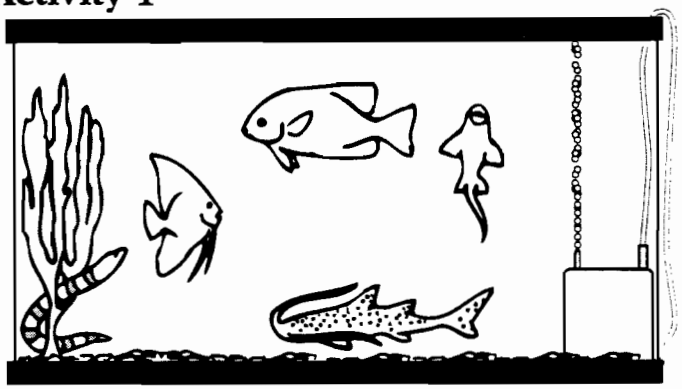
Name _____

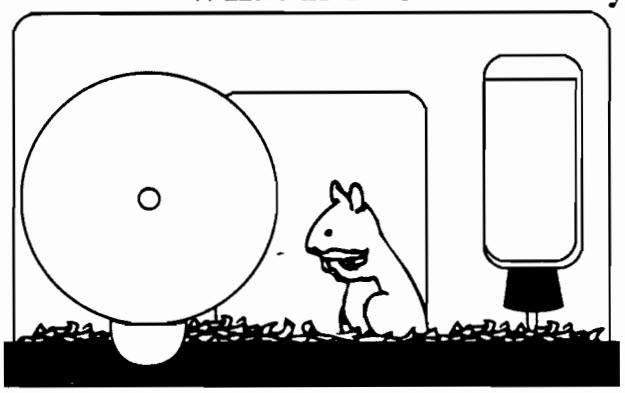
Date _____

The Ecosystem

Activity 1

What Is A Community





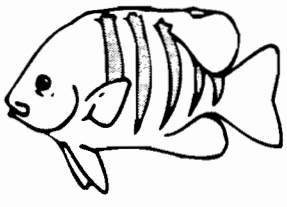
1. Look at the animal cage and the aquarium. They are both ecosystems.

2. Define *ecosystem:* _____

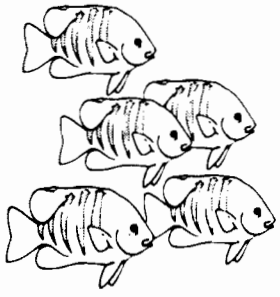
3. What are three things that make these ecosystems similar? _____

4. How are they different from each other? _____

5. What do you think is the most important thing to each ecosystem? _____

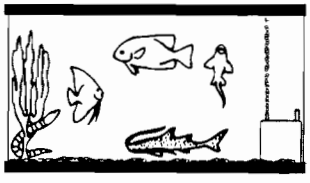


organism



population

community



ecosystem

6. Study the pictures above. How is an organism different from a population? _____

7. How can a population turn into a community? _____

8. What is the biggest difference between a community and an ecosystem? _____

9. Define *community:* _____

10. Define *population:* _____

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How To Use This Unit (Pages 41–50)

The Ecosystem

The ten student activities on pages 41–50 are designed to give students an introduction to the concept of an ecosystem and its components. Use the activities for independent student research, or with pairs or small groups.

Background For The Teacher

The Ecosystem

An ecosystem is made up of a *community* and its *abiotic environment.* The abiotic environment (nonliving or physical environment) includes the climate, soil, water, air, nutrients, and energy. Ecologists categorize the six main parts of an ecosystem as (1) the sun, (2) abiotic substances, (3) primary producers, (4) primary consumers, (5) secondary consumers, and (6) decomposers.

The series of stages that energy goes through in the form of food is called a *food chain.* Most ecosystems have various producers, consumers, and decomposers, which form an overlapping network of food chains called a *food web.*

The Ecosystem

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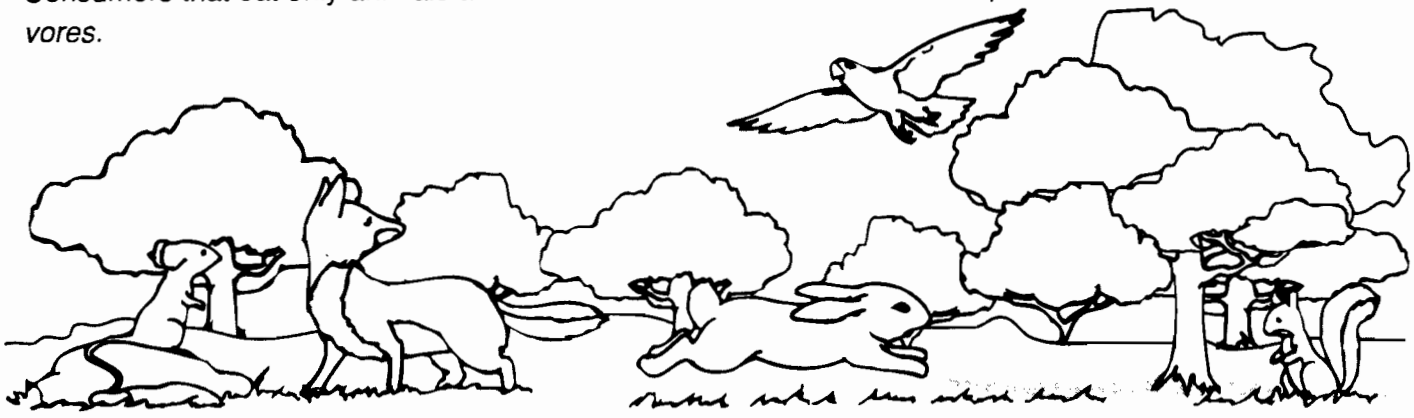
Activity 2

How Do Communities Change?

A community has *producers,* which are green plants. Green plants produce food from sunlight. Animals that eat plants or other animals are called *consumers.* Consumers that eat only plants are *herbivores.* Consumers that eat only animals are *carnivores.* Consumers that eat both plants and animals are *omnivores.*



1. Why are most humans omnivores? _____
2. How can producers get into a carnivore if a carnivore only eats animals? _____
3. How would the population of herbivores or other animals in a community be affected if all the carnivores disappeared? _____
4. How would populations in a community be affected if all green plants died? _____
5. How would the population of plants be affected if all animals died? _____
6. Why are there more producers than consumers in an ecosystem? _____
7. Why are carnivores, producers, and herbivores (all three) needed in order to maintain an ecosystem? _____
8. What happens if the population of one group grows too large? _____

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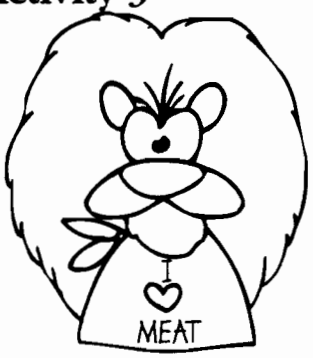
The Ecosystem

Activity 3

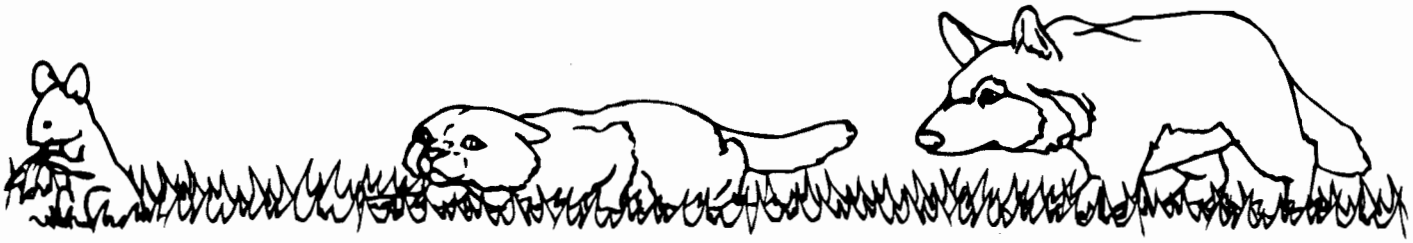
How Do Living Things Get Food?



1. What is a carnivore? _____

2. Describe how plants might get into the stomach of a carnivore.

Look at the picture below that shows a food chain. The mouse (an herbivore) eats the producer (grass). The cat eats the mouse. The wolf eats the cat. The wolf may be eaten by another carnivore—or it may die, decompose, and become fertilizer for plants.



3. How will the strength of a chain be affected if one link breaks? _____

4. The mouse and cat are links in the food chain shown above. How would a food chain be affected if a link were missing? _____

5. Why are green plants called producers? _____

6. Food chains always end with a green plant. Why do you think they always end this way?

7. Research *food web.* Define food web: _____

On the back of this sheet (or on another sheet of paper), draw a food web.

a. How is a food web different from a food chain? _____

b. How is it similar to a food chain? _____

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The Ecosystem

Activity 4

What Happens To Energy In A Food Chain?

Plants take energy from the sun and make food from it through a process called *photosynthesis*. The sun's energy is now inside this food.

1. How does this energy move through a food chain? _____

2. What do animals do with energy? _____

3. Why do you get tired? _____

4. How does food help you when you are tired? _____

5. What does your body do with the energy it gets from food? _____

6. Why does more energy go into something than comes out? _____

Look at the energy pyramid. Producers are on the bottom and consumers are on the top. Each level is smaller than the one under it. Why do producers have such a large level and humans have such a small one?

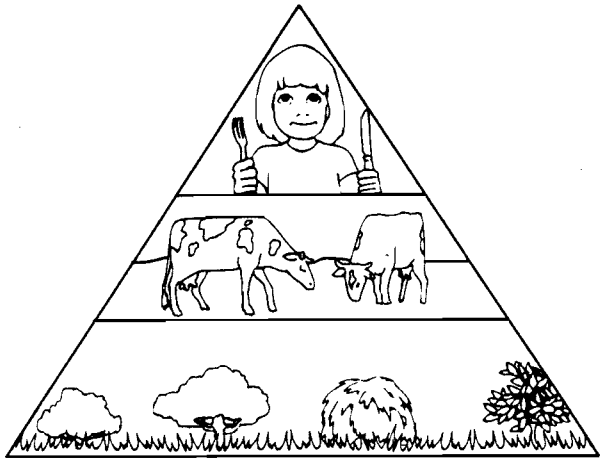
_____

_____

_____

_____

_____



On another sheet of paper, draw an energy pyramid. Include at least *five* levels. Color-code each level and make a key.

A law in physics states "Energy cannot be created or destroyed. It can only be changed from one form to another." Examples: Sound can be changed to heat or motion; stored energy can be used; and light can be changed into motion or electricity.

7. What happens if we take in more food than we can use? _____

   What must the body do with the extra energy? _____

8. How is food, or chemical energy, used by the body? _____

9. What kind of energy can it be changed into? _____

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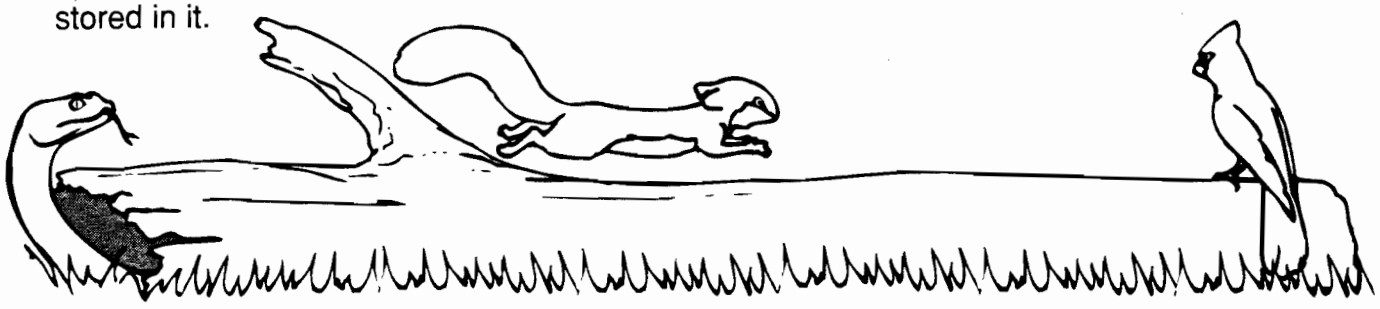
Activity 5 — What Else Can We Learn About A Food Chain?

Do you remember this law in physics: "Energy cannot be created or destroyed. It can only be changed from one form to another"? Stored energy is called *potential energy*. Energy you use is called *kinetic energy*. Fat is a form, or way, of storing the body's energy.

1. What might happen to all the energy in an animal when it dies? _____

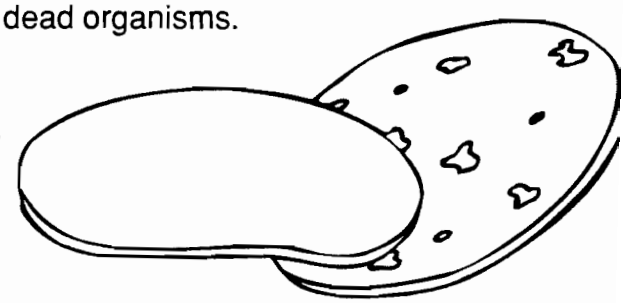
Remember: energy can be stored. Millions of years ago, plants died and fell to the earth's surface. Over time, these plants became coal. We burn coal to release the plants' energy stored in it.



2. A tree falls in a forest. What will happen to it over several years? _____

3. Will the tree eventually disappear? _____ Why? _____

Decomposers are organisms that cause decay in dead organisms.

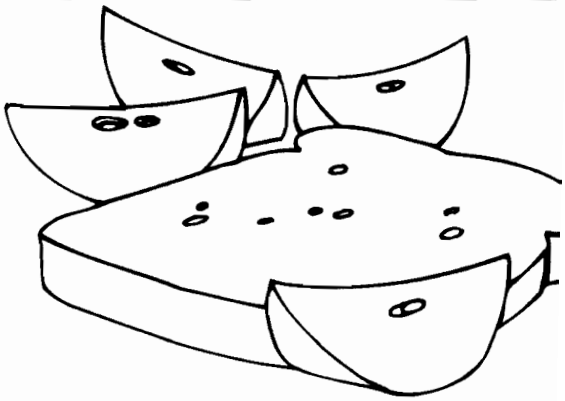


4. Home Activity:
   Find a place outside your home that will not be disturbed. Put a small piece of sandwich meat (bologna, luncheon meat, etc.) on the ground. Watch it for a few days.

   a. What happened to the piece of meat? How was it affected? _____

   b. What were the first signs of decay? _____

   Try this experiment again with a slice of bread and pieces of apple.



   c. What kind of consumers did each attract? _____

   Decomposers help put energy and nutrients—things plants need in order to grow—back into the ground.

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The Ecosystem

Activity 6

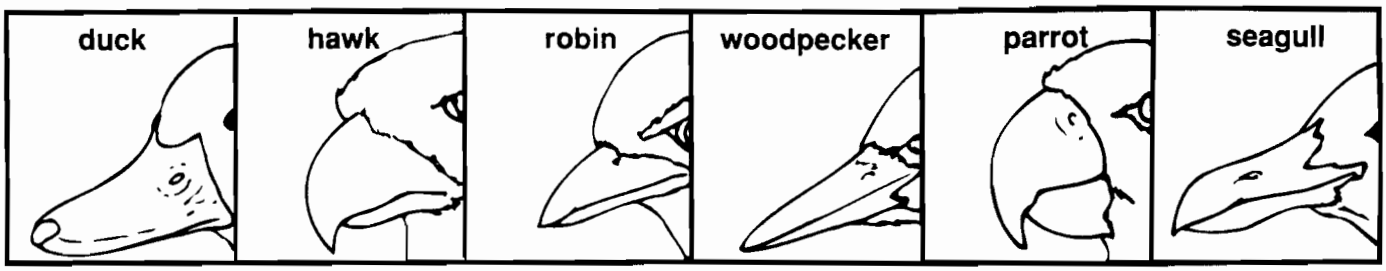
How Are Animals Adapted To Obtain Food?

1. How do your hands help you to eat? _____

2. Why doesn't a dog or cat eat the same way you do? _____

3. Why are your hands more useful than a cat's or dog's paws? _____

Look at the following bird beaks:



4. Why do the beaks (in the diagram) have different shapes? _____

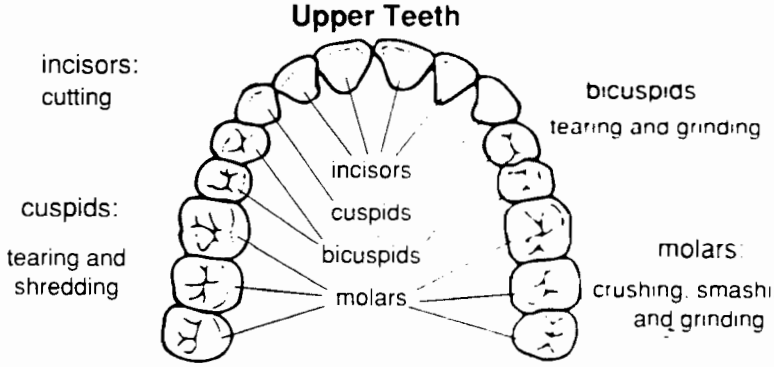
5. How does the shape of a bird's beak tell us what it eats? _____

6. Which bird in the diagram has a beak built for:
   a. tearing flesh? _____
   b. catching insects? _____
   c. boring holes into trees to find insects? _____
   d. catching fish? _____
   e. crushing seeds? _____
   f. scooping and straining water plants and seeds? _____

Birds also have special feet:

7. Which feet would be good for swimming? _____ For clutching a small animal? _____

8. Look in your mouth, using a mirror. How many different-shaped teeth do you have? _____
   Look at the diagram:



9. Why do cows and horses have a lot of molars? _____

10. What kinds of teeth does a lion have? _____
    Why? _____

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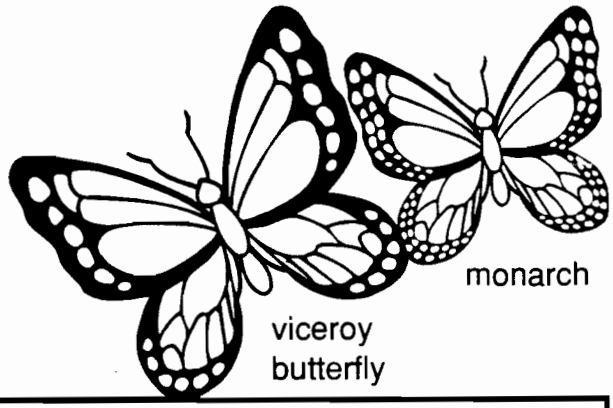
Activity 7 — How Are Animals Adapted To Protect Themselves?

1. Look at the two butterflies. The viceroy butterfly has a very nice taste that birds like. The monarch tastes awful! Why do you think that birds avoid the viceroy butterfly as well as the monarch butterfly? _____

_____

_____

One animal looking like another to avoid being eaten is called *mimicry.*



2. Look at the snake. How do you think its colors help it stay alive? _____

_____

Blending into the background for protection is called *protective coloration.*

3. Look at the turtle. Why does it pull its head and legs into its shell when a dog is nearby? _____

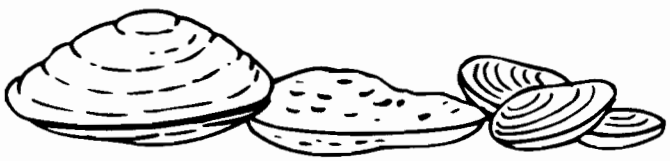
_____

4. How would building tunnels help an animal protect itself? _____

_____

5. Why do some animals, such as clams, have hard shells? _____

_____



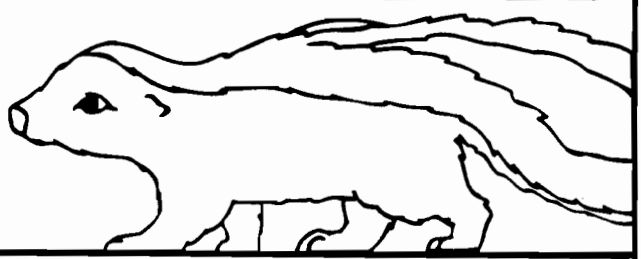
6. A squid gives off a blue ink when in danger. How would this help protect a squid?

_____

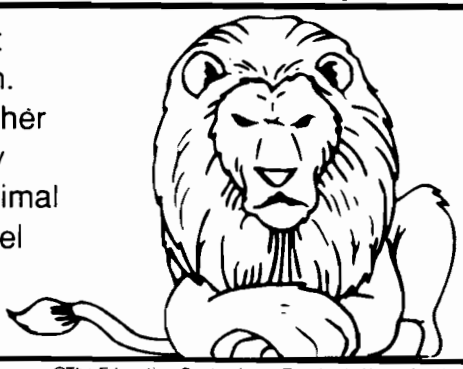
_____

7. How does a skunk protect itself? _____

_____



8. Some animals don't have tricks for protection. They are so powerful, other animals simply run away from them! One such animal is the lion. Draw and label two other such animals.



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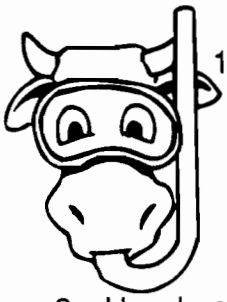
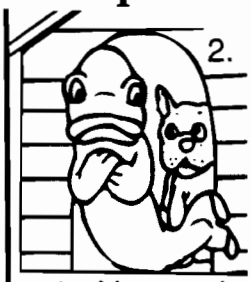
Activity 8

How Else Are Living Things Adapted To Their Environments?



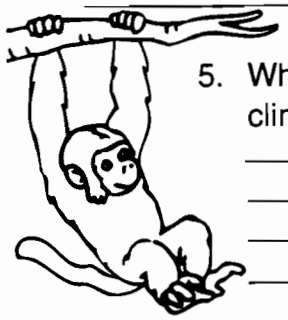
1. Why can't a cow live in the ocean? _____



2. Why can't a fish live on land? _____

3. How has a fish been adapted to a life in the ocean? _____

4. You are in a jungle and being followed by a lion. How can you keep from being eaten? _____

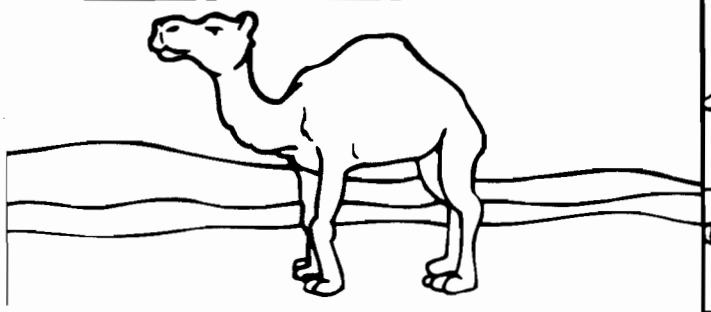


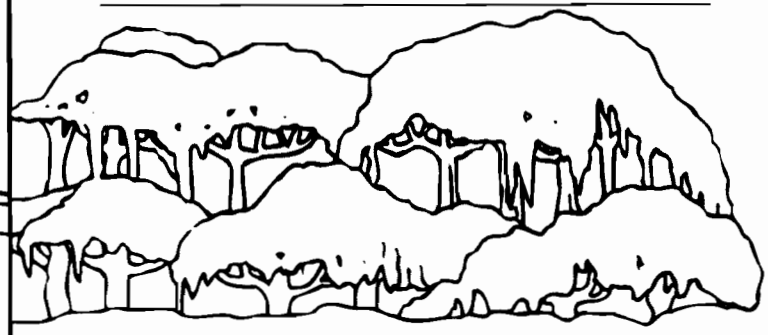
5. Why do you think monkeys climb trees in the jungle? _____

6. You are in a desert. What would you need in order to stay alive? _____

7. How does a camel or cactus survive the desert heat? _____

8. It is very wet in a tropical rain forest. Why couldn't a cactus live well there? _____





9. In a bog, the soil is so bad, plants can't get the food they need from it. How can plants get the food they need to stay alive? _____

10. In winter, some animals hibernate, trees lose their leaves, and many animals' fur gets thicker. How do these things help keep plants and animals alive? _____

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The Ecosystem

Activity 9 — What Are Some Special Relationships Among Living Things?

Have you ever had a friend who would do favors for you when you did favors for him or her? Have you ever had a friend who borrowed something from you or asked for your help, but never helped you in return? These things also happen with plants and animals in nature.

1. Why are green plants called producers? _____

2. Why do green plants need the sun? _____

3. In a forest, vines climb trees. How do the trees help the vines? _____

   Do the vines help the trees? _____ Explain. _____

This type of relationship is called *commensalism*. This is when one organism is helped and the other is not harmed.

Let's compare two insects: ants and aphids. Most aphids produce a sweet juice called honeydew. Ants eat the extra juice aphids produce. Ants protect the aphids in return. They move the aphids from one plant to another.

4. In this relationship, how are the ants helped? _____

5. How are the aphids helped? _____

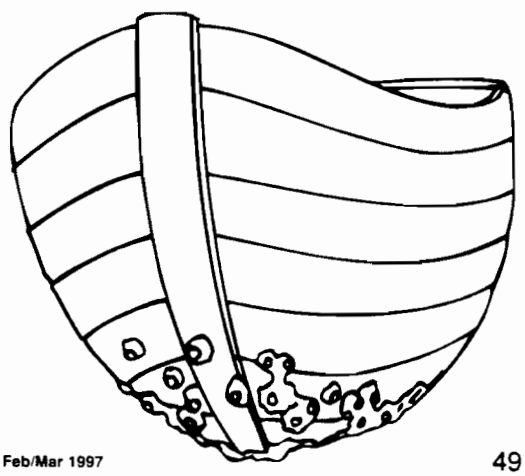
Mutualism is a relationship between organisms in which both organisms are helped.

Think about barnacles. Barnacles need moving water to pass over them so they can eat. They attach themselves to boats.

6. How does the boat help the barnacles? _____

7. Do the barnacles help the boat? _____

8. Is this an example of commensalism or mutualism? _____



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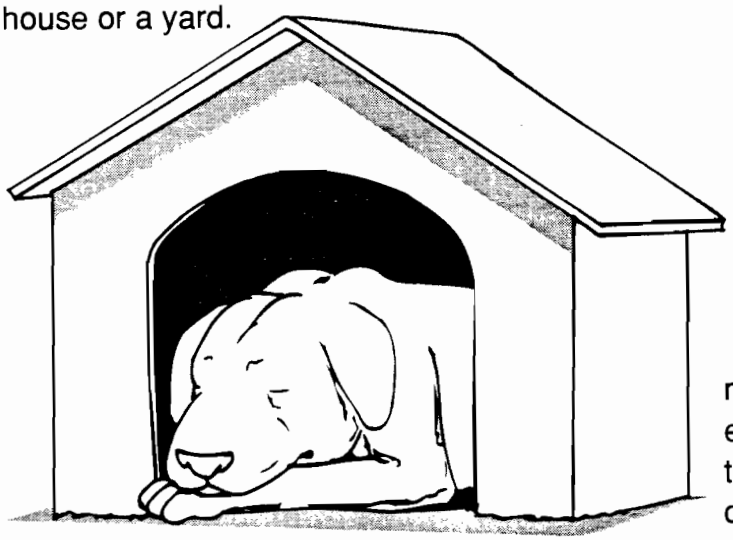
The Ecosystem

What Are Hosts And Parasites?

Activity 10

A dog lives in an environment such as a house or a yard.



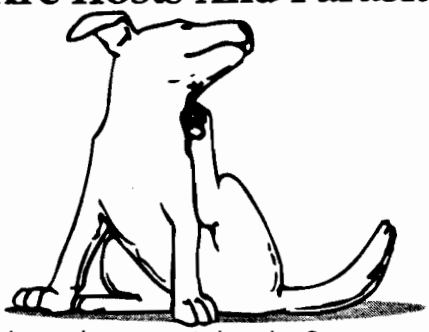
1. How can a dog act as an environment?

_____

_____

_____

_____



2. Why might a dog scratch a lot? _____

_____

_____

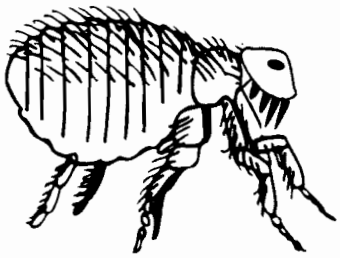
An organism like a flea or a tick sinks its mouth parts into a dog and sucks blood. Disease and infection can spread to the dog from the blood of other animals that the insect carries.

3. How does the dog help the flea? _____

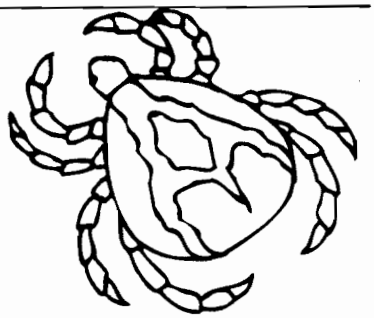
_____

4. How does the flea affect the dog? _____

_____



An organism that feeds on another living organism is a *parasite.* The organism on which it feeds is called a *host.*



5. Which is the parasite: the dog or the flea? _____

How do you know? _____

_____

6. How is this relationship similar to commensalism? _____

_____

7. How is it different from commensalism? _____

_____

8. Tapeworms, which feed from the intestines of animals, are another form of *parasitism.* Why are parasites dangerous? _____

_____

_____

9. How can we get rid of parasites such as fleas? _____

_____

_____