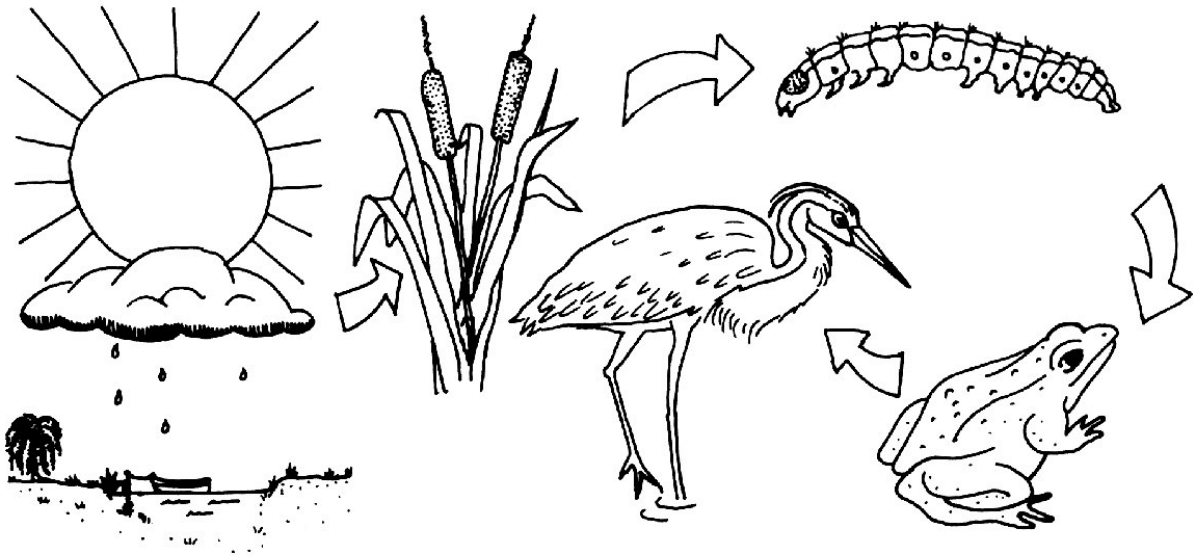
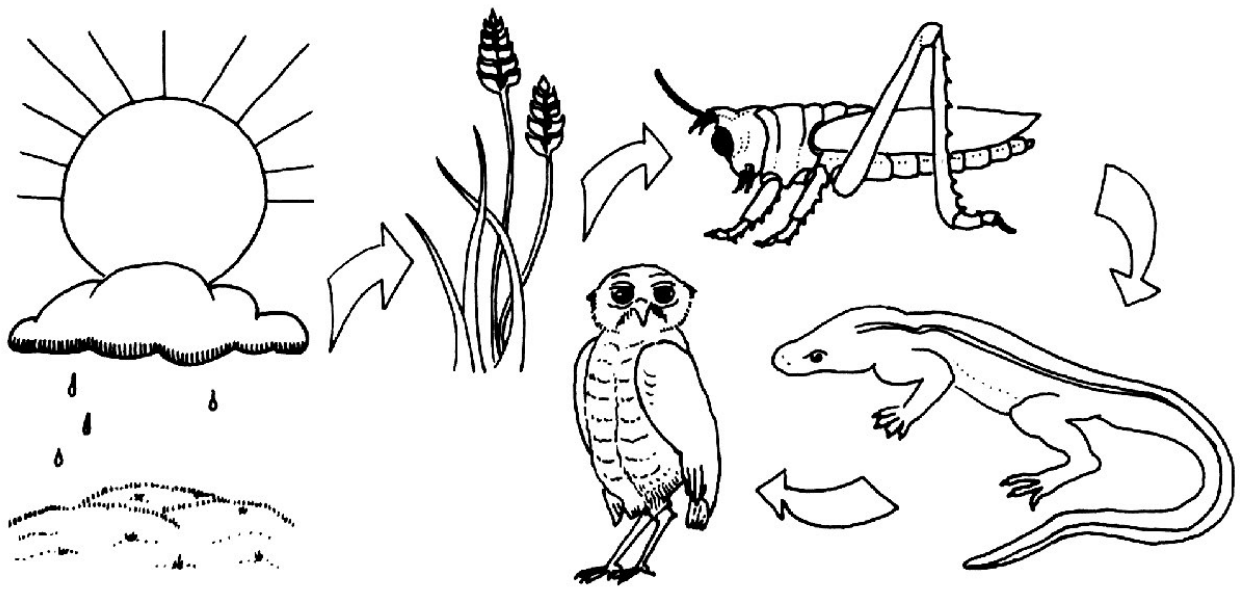
Food Chains

A TYPICAL FRESH-WATER FOOD CHAIN

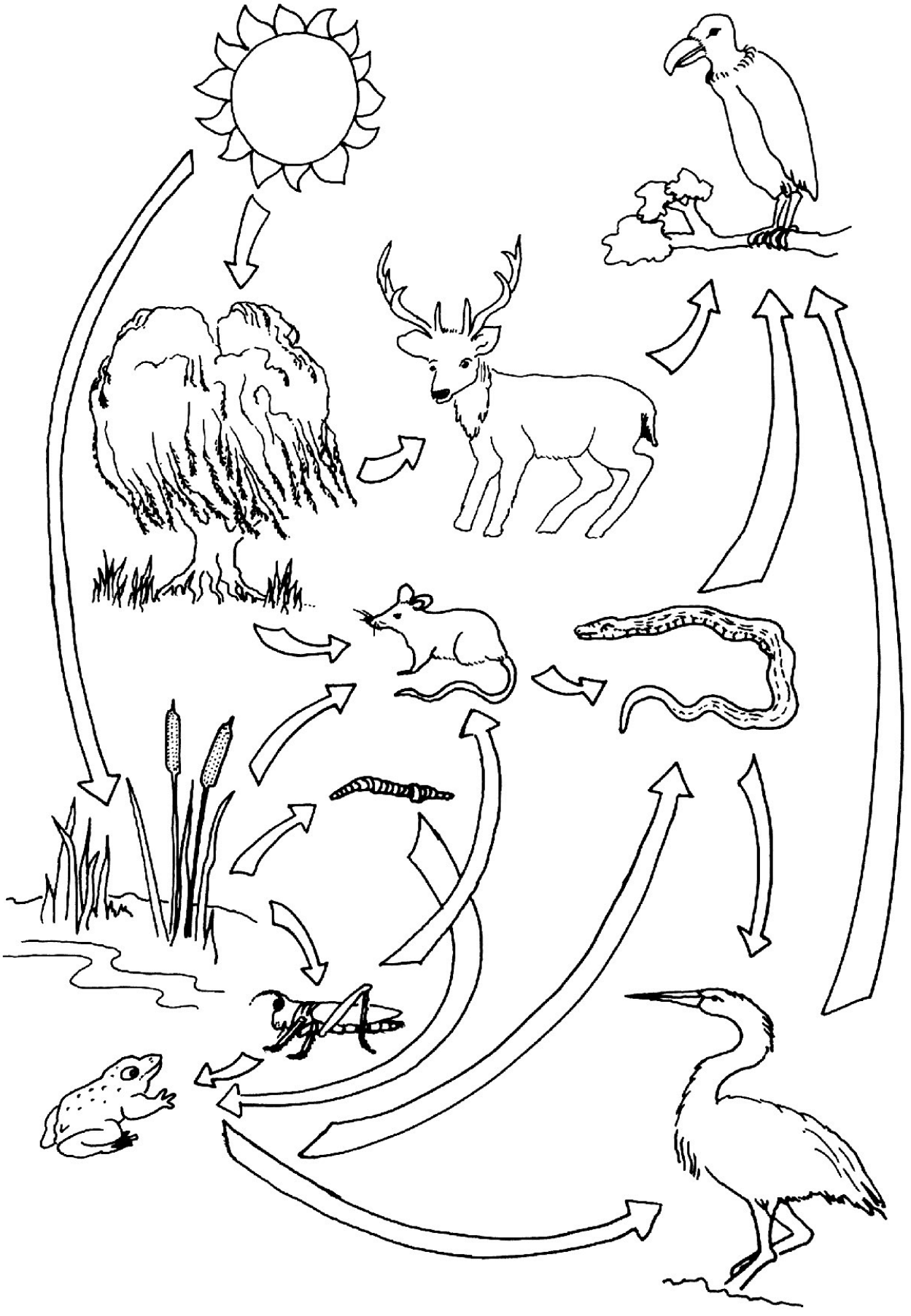


A TYPICAL GRASSLAND FOOD CHAIN

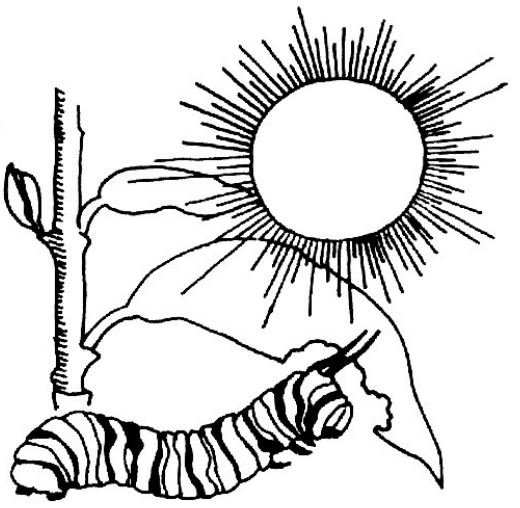


transparency master

A Food Web



16.1 Food Chains: Background Information



Energy is one of the basic requirements for all living things. Indeed, much of what we call "living" centers around obtaining food. We use food as an energy source as well as a source of materials with which to make and repair our bodies. Even plants need energy.

Green plants convert and store energy from the sun in the process of **photosynthesis.** Organisms that can make their own food are called autotrophs or **producers.**

Animals and other organisms that do not "make their own food" are called heterotrophs or **consumers.** All heterotrophs (consumers) depend upon the autotrophs (producers) for their energy and for the chemicals of which they are made.

An animal that eats plants is called a primary consumer or an **herbivore.** An animal that eats other animals is called a secondary consumer if it eats herbivores, or a tertiary consumer if it eats other consumers. Since **carnivores** eat other animals, they are consumers. An animal that eats both plants and animals is called an **omnivore.**

As one organism feeds on or eats another, a **"food chain"** is formed. An example of a simplified food chain is shown below:

grass . . . is eaten by . . . grasshoppers, . . . which are eaten by . . . a lizard, . . . which is eaten by . . . a fox, . . . which dies and is consumed by . . . insects and bacteria

Another way of showing this food chain is:

grass → grasshopper → lizard → fox → bacteria and insects

Two other food chain examples are:

marine plankton → sardine → pelican → bacteria

corn → cow → man → bacteria

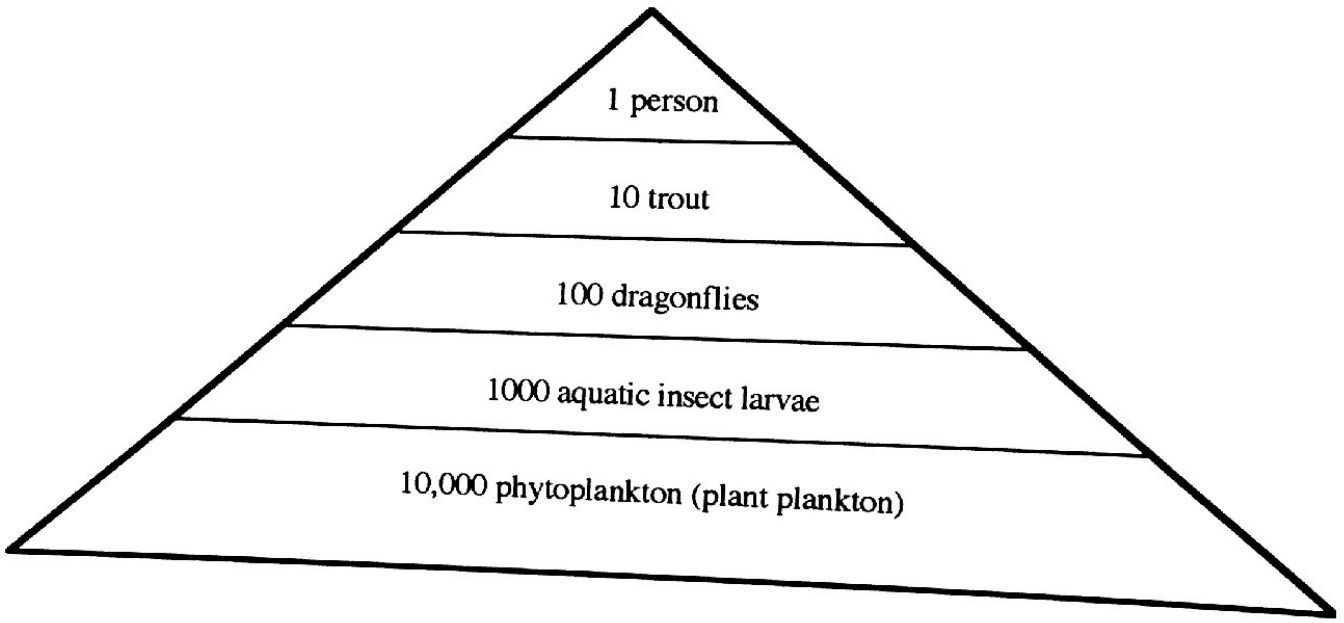
The ultimate source of energy for essentially all food chains is the sun. When the organism at the end of the food chain dies, the materials from which its body was built are returned to the environment by bacteria, fungi, worms, insects, and other organisms that are called **decomposers.**

It is very important to realize that food chains such as those described here are very simplified versions of what actually occurs. For example, the grass (or grass seeds) in the first example would be eaten by a great variety of insects, birds, and mammals. The grasshopper would be prey for birds, snakes, and other insects as well as lizards. In addition to the fox, birds of prey and other mammals would feed on lizards. The dead fox might be eaten by a coyote, crows, or vultures. We use food chains to make the relationships among parts of an **ecosystem** easier to understand.

A more realistic representation of what actually occurs in nature would include all of the aforementioned organisms and many more. Such a representation would be called a **food web.**

It is also important to realize that at each "step" in a food chain there is a transfer of both energy and materials. The consumer must spend some energy to acquire and use its food and to move about and stay alive. There is energy lost in the animal's waste. Thus, at each step or level in a food chain, energy is lost to the environment and less energy is available to the organism(s) at the next level. Only about 10 percent of the energy is transferred to the next trophic level.

This leads to what is called a food pyramid or a "pyramid of numbers" or, more accurately, a "pyramid of **biomass**." The term "pyramid of biomass" is more accurate because, for example, one oak tree might support many insects because of the large biomass of its leaves. A hypothetical example of a pyramid of numbers follows.



An important ramification of the pyramid of numbers is that the more steps in a food chain there are, the fewer top consumers (such as man) can be supported. A given amount of land will support more people eating lower on the food chain (eating plants) than it will support when people eat higher on the food chain (eating other animals such as pigs or cattle, which eat the plants). Simply put, the Earth can support more vegetarians than it can support carnivores!

It is very important to understand that the lives of all living things depend upon nonliving things, including both energy and materials. The term for the nonliving parts of an environment is "**abiotic** factors." Examples include air, water, and sunlight. These abiotic factors form the basis for all food chains.

Name _____ Class _____ Date _____

16.2 Food Chains: Questions

1. What is the difference between a food chain and a food web?

2. Define, give an example of, and explain the role of each of the following parts of a food chain:

   a. abiotic factors

   b. producers

   c. consumers

   d. decomposers

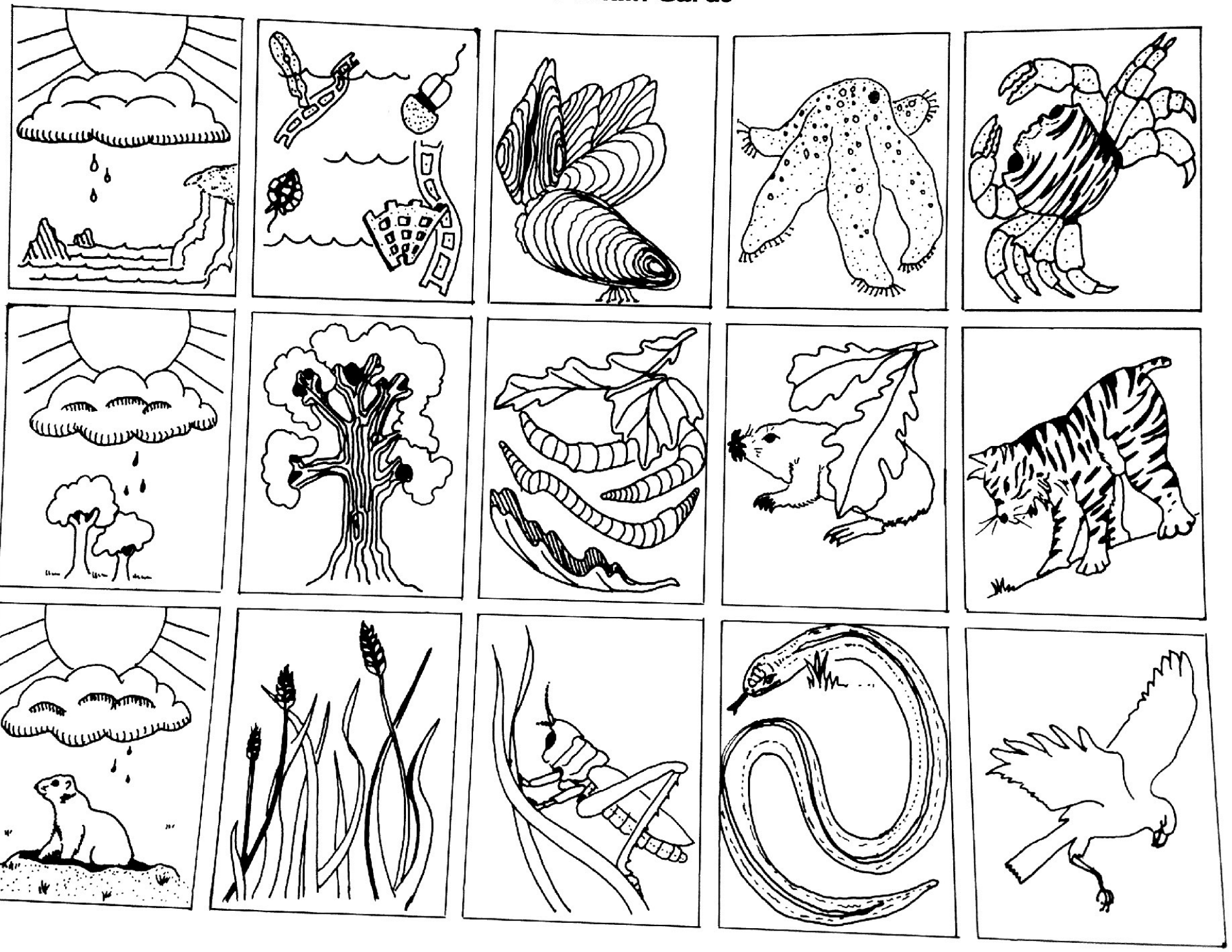
   e. scavengers

3. What would happen to a food chain if the producers were eliminated?

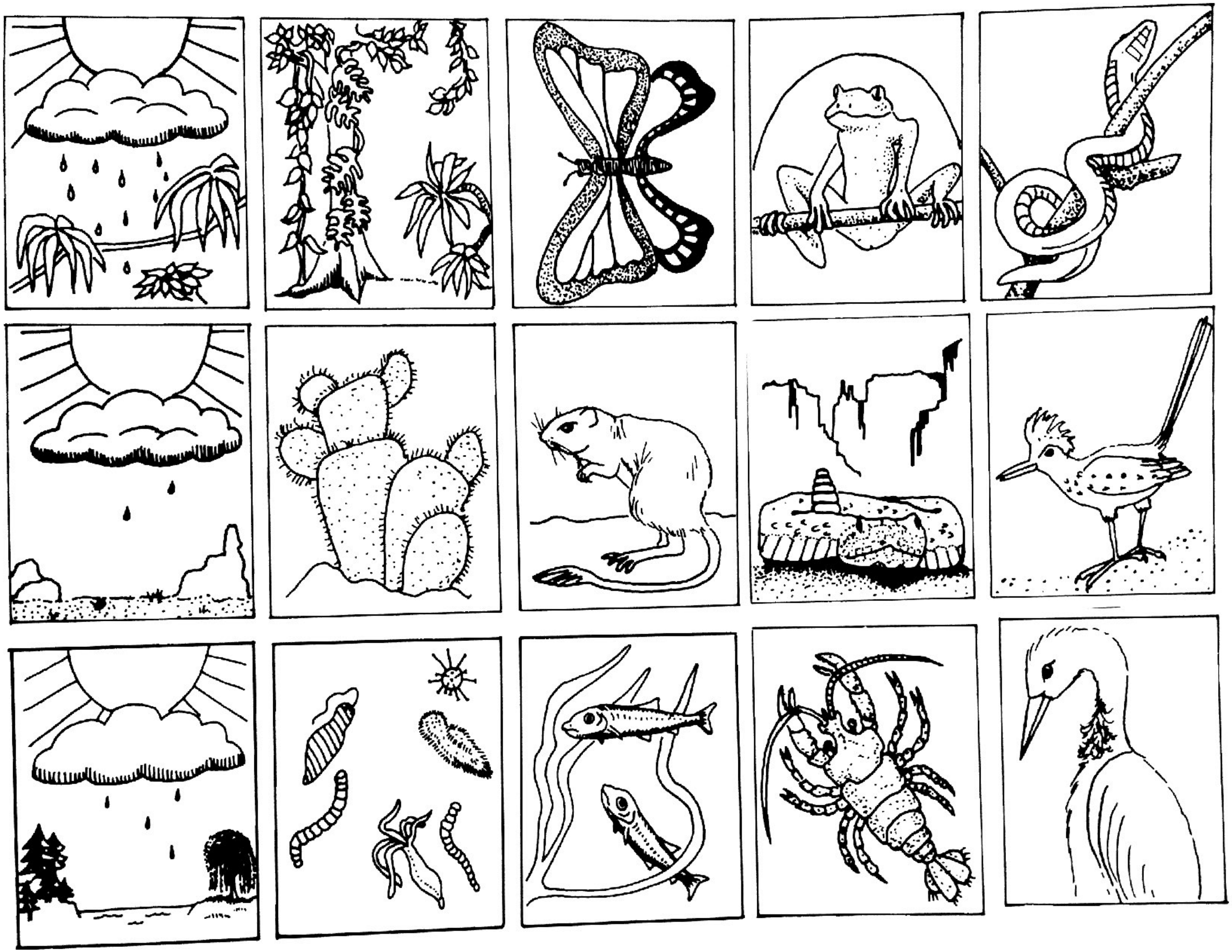
4. Where do humans fit in most food chains?

5. If all humans were vegetarians, what effect would that have on the number of people that the Earth could support?

Food Chain Cards



Food Chain Cards



Supplemental Food Chain Cards

(Use these to alter the food chains provided or to adjust them according to the number of students doing the activity.)