

**Ecosystems and Biomes** ▪ *Section Summary*

## Energy Flow in Ecosystems

### Guide for Reading

- What energy roles do organisms play in an ecosystem?
- How does energy move through an ecosystem?
- How much energy is available at each level of an energy pyramid?

An organism's energy role is determined by how it obtains energy and how it interacts with the other living things in its ecosystem. **Each of the organisms in an ecosystem fills the energy role of producer, consumer, or decomposer.**

Plants, algae, and some bacteria can carry out photosynthesis. In this process, the organism uses the sun's energy to turn water and carbon dioxide into sugar molecules. An organism that can make its own food is a **producer**. Producers are the source of all the food in an ecosystem.

Other organisms cannot make their own food. They depend on producers for food and energy. An organism that obtains energy by feeding on other organisms is a **consumer**. Consumers are classified by what they eat. Consumers that eat only plants are called **herbivores**. Consumers that eat only animals are called **carnivores**. A consumer that eats both plants and animals is called an **omnivore**. A **scavenger** is a carnivore that feeds on the bodies of dead organisms. An organism may play more than one role in an ecosystem.

Organisms that break down wastes and dead organisms and return the raw materials to the environment are called **decomposers**. As decomposers obtain energy for their own needs, they return simple molecules to the environment to be used again by other organisms.

**The movement of energy through an ecosystem can be shown in diagrams called food chains and food webs.** A **food chain** is a series of events in which one organism eats another and obtains energy. The first organism in a food chain is always a producer. The second organism, called a first-level consumer, eats the producer. The next consumer, called a second-level consumer, eats the first-level consumer. A food chain shows just one possible path of energy through an ecosystem.

Most producers and consumers are part of many food chains. A more realistic way to show the flow of energy through an ecosystem is a food web. A **food web** consists of the many overlapping food chains in an ecosystem.

When an organism makes its own food or eats other organisms, it obtains energy. The organism uses most of this energy for its own life processes. Only some of the energy will be available to the next organism in the food web. A diagram called an **energy pyramid** shows the amount of energy that moves from one feeding level to another in a food web. **The most energy is available at the producer level of the pyramid. As you move up the pyramid, each level has less available energy than at the level below.** In general, only about 10 percent of the energy at one level of a food web is transferred to the next higher level. For this reason, most food webs have only three or four feeding levels, with few organisms at the highest level in a food web.