

Populations and Communities

Communities

.....Read to Learn.....

Communities, Habitats, and Niches

You learned that a community is made up of all the species that live in the same ecosystem at the same time. *The place within an ecosystem where an organism lives is its **habitat**.* A habitat provides all the resources an organism needs, including food and shelter. A habitat also has the right temperature, water, and other conditions the organism needs to survive.

Many species can live in the same habitat at the same time. This is possible because each species uses the habitat in a different way. A **niche** (NICH) *is what a species does in its habitat to survive.* For example, butterflies and ants can live in the same forest. The butterflies feed on flower nectar. The ants eat insects or plants. These species have different niches in the same environment.

Energy in Communities

All organisms need energy to live. Consider a slow-moving sloth that sleeps 15 to 20 hours a day. Then consider a fast-moving squirrel monkey swinging through treetops. Sloths might seem not to use energy. However, sloths, squirrel monkeys, and all other organisms need energy to live. All living things use energy and carry out life processes such as growth and reproduction.

Energy Roles

How an organism gets energy is an important part of its niche. Almost all the energy available to living things comes from the Sun. There are exceptions, such as organisms that live near deep-sea vents. They obtain energy from chemicals such as hydrogen sulfide.

Producers are organisms that get energy from the environment, such as sunlight, and make their own food. For example, most plants are producers. They get their energy from sunlight. They use the process of photosynthesis (foh toh SIHN thuh sus) and make sugar molecules to use as food. Some producers live near deep-sea vents. They use hydrogen sulfide and carbon dioxide and make sugar molecules.

Consumers are organisms that get energy by eating other organisms. Consumers are classified by the type of organisms they eat. Types of consumers are shown in the table.

Type of Consumer	What They Eat	Examples
Herbivores	producers such as plants	sloths, cows, and sheep
Carnivores	other consumers	harpy eagles, ants, lions, and wolves
Omnivores	producers and consumers	humans
Detritivores	dead organisms	some bacteria and some fungi

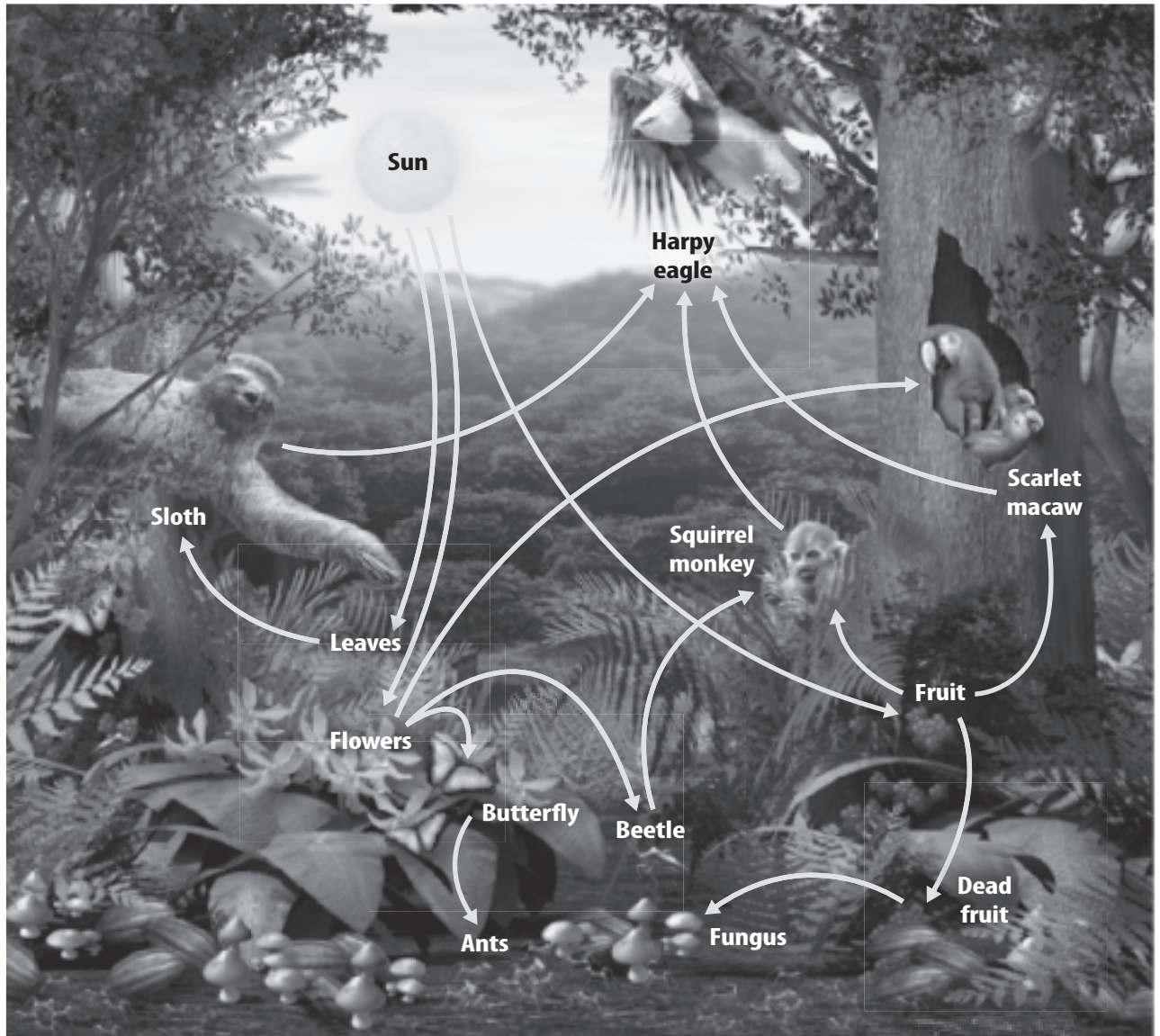
Energy Flow

A food chain is a way of showing how energy moves through a community. Think about a rain forest community. Energy flows from the Sun to a rain forest tree. The tree is a producer. It uses the light energy and grows, producing leaves and other plant parts. When a consumer eats leaves and other plant parts, energy moves to consumers. For example, a sloth eats the leaves of the tree and energy flows to the sloth. When the eagle eats the sloth, energy flows to the eagle. When the eagle dies, detritivores (dee TRI tuh vorz), such as bacteria, feed on its body. That food chain can be written like this:

Sun → leaves → sloth → eagle → bacteria

A food chain shows only part of the energy flow in a community. A food web, like the one on the next page, shows many food chains within a community. Notice that some of the food chains overlap.

Food Web



In the rain forest community above, the flowers provide food for a butterfly, a beetle, and a scarlet macaw. The flowers, then, are part of more than one food chain. Here are some food chains in which the flowers provide food:

Sun → flowers → butterfly → ants

Sun → flowers → beetle → squirrel monkey → harpy eagle

Sun → flowers → macaw → eagle

Relationships in Communities

The populations that make up a community interact with each other in many ways. Some species have feeding relationships. They either eat or are eaten by another species. Some species interact with another species to get the food or shelter they need.

Predator-Prey Relationships

Hungry squirrel monkeys fight over a piece of fruit. They do not notice the harpy eagle flying above them. Suddenly, the harpy eagle swoops down and grabs one of the monkeys. The eagles and the monkeys have a predator-prey relationship. The eagle, like other predators, hunts other animals for food. The hunted animals, such as the monkey, are called prey.

Predators help keep prey populations from growing too large. As you already learned, predators are one way that a prey population is kept from reaching the carrying capacity of the ecosystem. Predators often catch weak or injured members of a prey population. When the weak members are removed, more resources become available for the remaining members. This keeps the prey population healthy.

Cooperative Relationships

The members of some populations work together in cooperative relationships for their survival. For example, leaf-cutter ants cooperate with each other and grow food. They work together to cut apart leaves and carry them to their underground nest. The ants do not eat the leaves. Instead, they eat the fungus that grows on the leaves.

Meerkats cooperate with each other as they raise young and watch for danger. Squirrel monkeys live in groups. They cooperate with each other as they hunt for food and watch for danger.

Symbiotic Relationships

Some species have such close relationships that they are almost always found living together. *A close, long-term relationship between two species that usually involves an exchange of food or energy is called **symbiosis** (sihm bee OH sus).* There are three types of symbiosis. They are mutualism, commensalism, and parasitism.

Mutualism *A symbiotic relationship in which both partners benefit is called **mutualism**.* Boxer crabs and sea anemones have a mutualistic partnership. Boxer crabs and sea anemones live in tropical coral reef communities. The crabs carry sea anemones in their claws. The sea anemones have stinging cells that help the crabs fight off predators. The sea anemones eat leftovers from the crabs' meals. Both partners benefit from the relationship.

Commensalism *A symbiotic relationship that benefits one species but does not harm or benefit the other is commensalism.* Plants called epiphytes (EH puh fites) grow on the trunks of trees and other objects. The roots of an epiphyte anchor it to the object. The plant absorbs nutrients from the air. The epiphytes benefit by getting living space and sunlight. The plants do not help or harm the tree. The trees are neither helped nor harmed by the plants. The epiphytes and trees have a commensal relationship.

Parasitism *A symbiotic relationship that benefits one species and harms the other is parasitism.* The species that benefits is the parasite. The species that is harmed is the host. Types of parasites and hosts are shown in the table below.

Parasitism		
Parasite	Host	Result
heartworm	dog	causes a dog's heart to work harder and eventually fail
ringworm, toenail fungus	human	fungi feed on a protein in skin and nails
strangler fig	tree	sends roots through a tree and absorbs all of its nutrients, eventually killing the tree

Heartworms, tapeworms, fleas, and lice are parasites. They feed on a host organism, such as a human or a dog. The parasite benefits by getting food. The host is harmed by losing blood. The host is usually not killed, but it can be weakened. For example, heartworms in a dog can cause the dog's heart to work harder. The heart can fail after time, killing the host.

The fungi that cause ringworm and toenail fungus are other common parasites. The fungi feed on a protein in skin and nails.

Plants can be parasites too. The seeds of the strangler fig sprout on the branches of a host tree. The young fig sends roots into the tree and down into the ground below. The host tree provides nutrients to the fig and a trunk for support. The strangler fig grows quickly and can kill the host tree.