


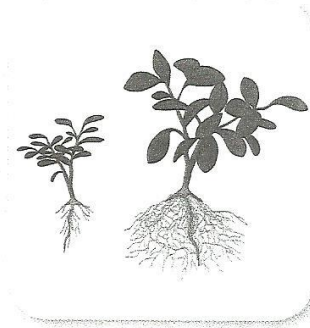
How do organisms help plants grow?

Different organisms often rely on other organisms to survive. One such relationship exists between types of fungi and plants. The fungi live on the roots of plants and help them obtain water and minerals. In return, the plants supply the fungi with nutrients.

- 1 Examine the photograph of plant roots. The roots on the right have had a beneficial fungus added to them. The roots on the left were grown in sterilized soil. Record your observations in your Science Journal.

Think About This

- 1. What difference do you note in the plant roots grown with a fungus added to the soil compared to the plant roots grown in sterile soil?
- 2. Which plants do you think might grow larger or faster?
- 3.  **Key Concept** How do you think the relationship between these organisms helps them use the resources in their environment?



Niches

Recall that a habitat is the area within an ecosystem that provides an organism with the resources it needs for life. Most organisms don't have a habitat all to themselves. A habitat usually is shared by many species.

Hundreds of species share the coral reef habitat shown in **Figure 8**. Spiny lobsters hide under the coral. They come out at night and feed on worms, shrimp, clams, and dead fish. Angelfish have rough teeth for scraping sponges and sea squirts from the surface of the coral. Filefish scrape algae from the coral to eat.

Each species that shares a habitat has a separate niche. A **niche** (NICH) is the way a species interacts with abiotic and biotic factors to obtain food, find shelter, and fulfill other needs. Species share habitats, but no two species share the same niche. For example, two species of crabs on a reef might share a habitat, but one might eat algae and the other might eat snails.

-  **Key Concept Check** How does a niche differ from a habitat?

Figure 8 Many organisms, such as the ones that live in this coral reef, share the same habitat.

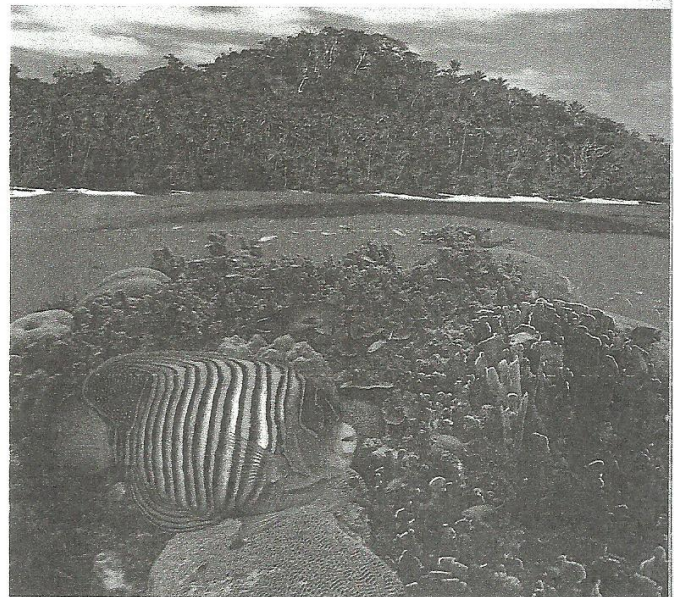





Figure 9 Organisms in the same area sometimes compete for the same resources.

Competition

In springtime, robins find mates, build nests, and raise their young. A male robin chooses a safe nesting site with plenty of food and water nearby. It sings to attract a female and to keep other males away. If another male comes too close to its territory, it chases its competitor away.

Competition describes the demand for resources, such as food, water, and shelter, in short supply in a community. Competition can take place among the members of a population or between populations of different species. The plants shown in **Figure 9** are competing for nutrients and living space.

Competition helps limit population size. If a community has too many robins and too few nesting sites, competition for these sites increases, and some robins will leave the area. The availability of nesting sites limits the size of the robin population.

 **Reading Check** What is competition?

Inquiry

MiniLab

10 minutes

How does competition affect the growth of radish plants?




All living things must obtain resources in order to survive. In any environment, there is a limited amount of resources available. How does the number of organisms in an environment affect the ability of a specific organism, such as a plant, to obtain the resources it needs?

- 1 Read and complete a lab safety form.
- 2 Fill one **small planting pot** with **potting soil**. Place five **radish seeds** on the surface, and cover the seeds with a thin layer of potting soil. Water the soil so that it is damp.
- 3 Fill a second small planting pot with potting soil. Add a small patch of **sod** to the surface of the soil. Place five radish seeds along the surface of the sod and cover the seeds with a thin layer of potting soil. Water the soil so that it is damp.
- 4 Continue to water and observe the two pots for several days. Note any observations in your Science Journal.



Analyze and Conclude

1. **Compare and contrast** the number and size of radish seedlings in both pots after several days.
2.  **Key Concept** Infer how competition between plant species affects the growth of all plants in an environment.



ild
bin
of
at a
If
dry,

for
, in
can
ila-
pe-
are

ize.
too
ites
the
mits

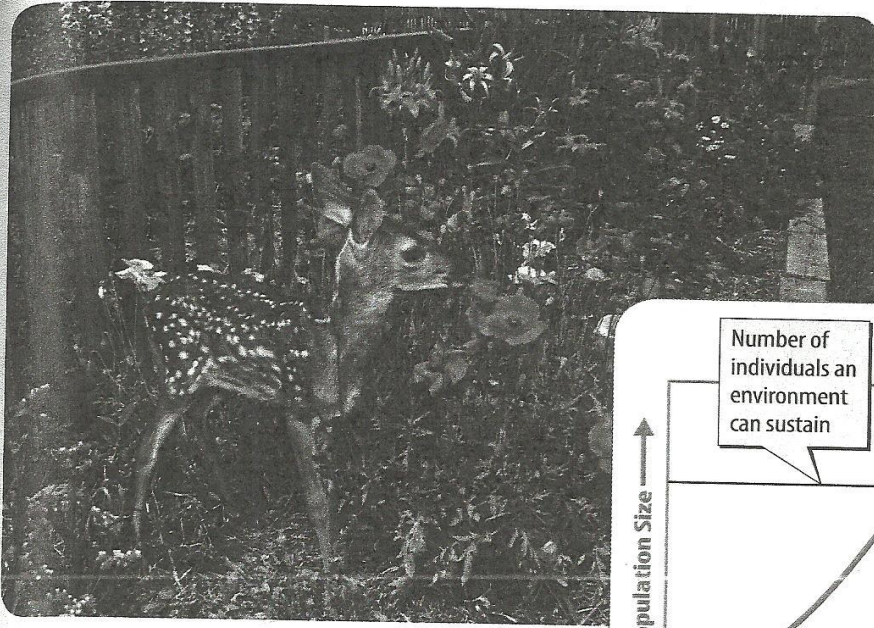
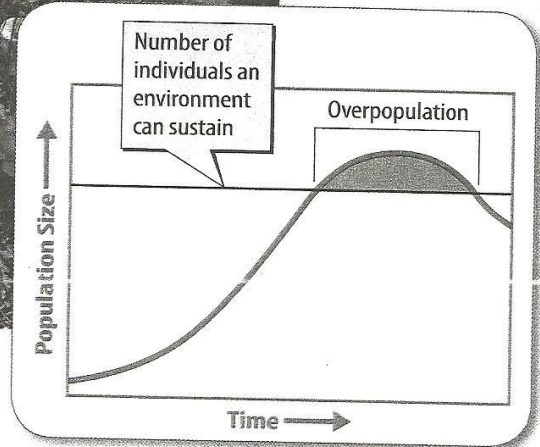


Figure 10 When too many deer live in an ecosystem, the area becomes overpopulated. Competition for resources increases and diseases spread easily.



Visual Check How might this deer affect this garden?

Overpopulation

White-tailed deer live near the edges of forests and meadows. They eat leaves, twigs, acorns, and fruit. Deer populations in some areas have become so large that they harm forest habitats, destroy crops, and even invade home gardens.

Overpopulation occurs when a population becomes so large that it causes damage to the environment.

When too many deer live in an ecosystem, they eat plants at a faster rate than the plants can grow back. This reduces the available habitat for the deer and other species. The deer, as well as other organisms in the area, must compete for a limited amount of resources. Sometimes the deer move into areas where they are not normally found, such as the deer pictured in a home garden in **Figure 10**. If there is nowhere for deer to move, they are forced to live too close together. Disease can spread easily within populations when this happens.

Overpopulation is temporary. When food and other resources eventually run out, some animals will move elsewhere, starve, or die from disease. Then the population quickly shrinks, as shown in the graph in **Figure 10**. This allows the resources in the environment to slowly return to normal.

Reading Check Why is overpopulation temporary?





▲ **Figure 11** When humans build roads through an ecosystem, animals face new dangers.

Competing with Humans

Humans need some of the same biotic and abiotic factors as other organisms, including food, living space, and water. To meet these needs, people take certain actions. They plow grasslands to plant food crops. People clear forests and fill in wetlands to make room for roads and buildings. They divert water from lakes and streams to supply irrigation for crops and drinking water for cities and towns. Actions such as these put humans in competition with other species for the same resources.

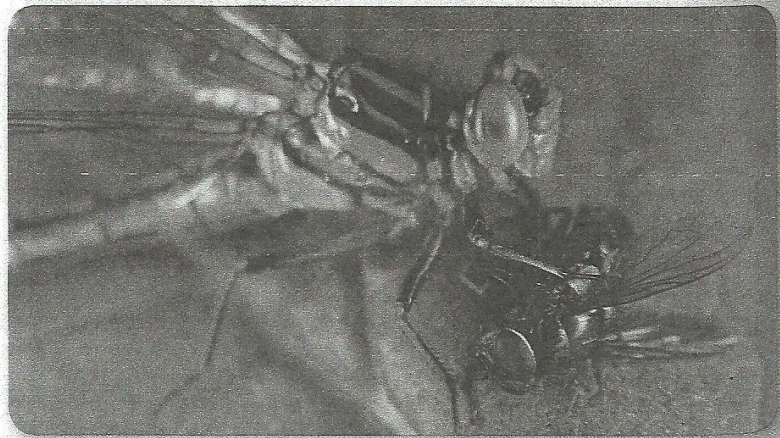
You might have heard news reports about raccoons raiding garbage cans, snakes living under houses, or squirrels moving into attics. Natural habitats for these and other organisms are disrupted when humans replace natural environments with homes and other structures. As shown in **Figure 11**, roads can make it dangerous for animals to move safely from one part of their habitat to another.

Sometimes humans compete with other organisms in less-obvious ways. The North American population of monarch butterflies spends the winter in small forested areas in Mexico. Logging by humans endangers the monarch population. Without enough trees to live in, many monarchs do not survive for the return trip north in spring.

Predation

A predator is an organism that hunts and kills other organisms for food. Prey are the organisms hunted or eaten by a predator. **Predation** is the act of one organism, a predator, feeding on another organism, its prey, as shown in **Figure 12**. Predator and prey populations influence each other, as you learned in the Skill Practice lab. Predators help control the size of prey populations. When prey populations decrease, the number of predators usually decreases because less food is available.

Figure 12 In the relationship pictured here, the dragonfly is the predator and the fly is the prey. ►



Symbiosis

Competition and predation are two types of interactions that take place between organisms in an ecosystem. Another type of interaction that occurs is called symbiosis (sim bee OH sus). **Symbiosis** is a close, long-term relationship between two species that usually involves an exchange of food or energy. Examples of the three types of symbiosis are shown in **Figure 13**.

A symbiotic relationship in which both organisms benefit is **mutualism**. For example, fish benefit by having tiny organisms removed from their bodies by cleaner shrimp, and cleaner shrimp benefit by getting food. A symbiotic relationship in which one organism benefits but the other neither benefits nor is harmed is **commensalism**. Clumps of moss growing on the bark of a tree is an example of a commensal relationship. The moss benefits by having somewhere to grow, and the tree is neither benefited nor harmed. A symbiotic relationship in which one organism benefits while the other is harmed is **parasitism**. The organism that benefits is a parasite. For example, a parasitic wasp lays its eggs in a caterpillar's body. When the eggs hatch, the larvae develop and eventually chew their way out of the caterpillar and kill it. The organism that is harmed is the host, in this case the caterpillar that was attacked by the wasp.



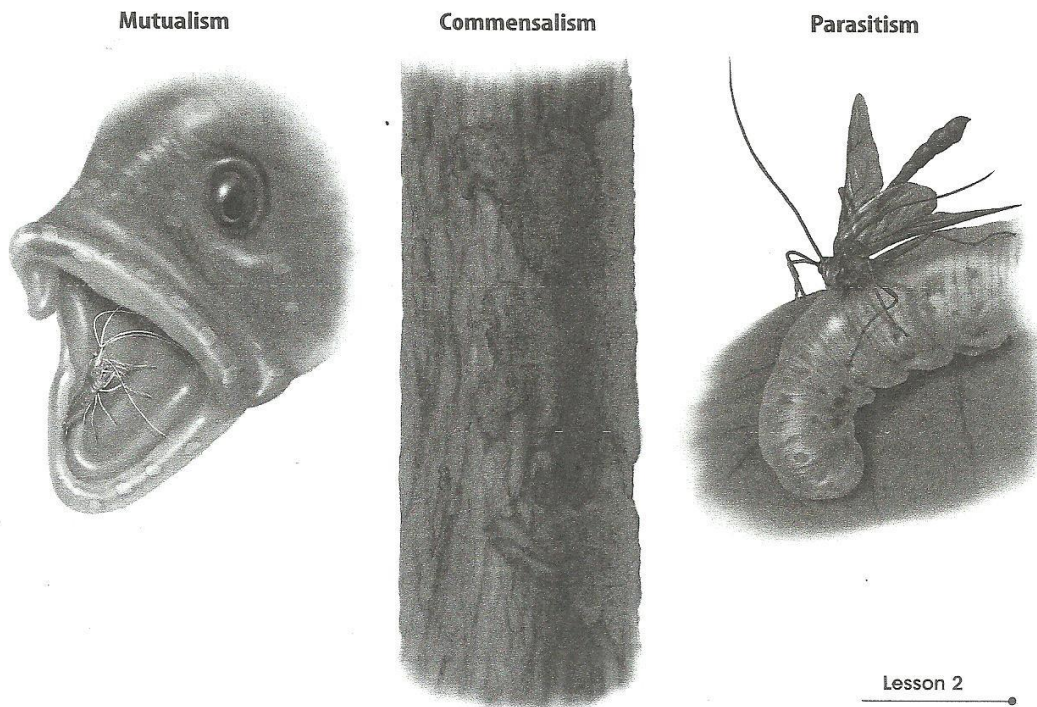
 **Key Concept Check** In what ways can organisms interact in an ecosystem?

Figure 13  The three types of symbiosis are mutualism, commensalism, and parasitism.



WORD ORIGIN

symbiosis
from Greek *symbios*, means
"living together"

FOLDABLES®

Make a horizontal three-tab concept map book. Label it as shown. Use it to organize your notes on symbiotic relationships.

