

## Sample Lesson #3

### Ecosystems: Resources and Competition

All living things need energy, nutrients, and space. An ecosystem provides these resources. But each ecosystem has only enough resources to support a certain number of individuals. This number is the ecosystem's **carrying capacity**.

When a population exceeds the ecosystem's carrying capacity, several changes occur. For example, the population size declines. Scarce resources may cause illness and death. Individuals may migrate out of the ecosystem to find food and water somewhere else. Fewer individuals move into the ecosystem. Organisms have fewer offspring. Animals may reproduce less often, or their litters may become smaller. Plants may produce fewer seeds. All these factors decrease the size of populations.

When there are not enough resources, an organism will not grow to its full potential. A tree planted in nutrient-poor soil will not grow as big as a tree that is well nourished. An animal that lacks food will be smaller and weaker than an animal that is well fed.

In ecosystems, organisms compete for the resources they need. Animals in an area **compete** for space. Animals that eat the same food compete for vegetation or prey. Plants that grow together compete for sunlight. There is always competition because resources are always limited.

Competition can occur between individuals of the same species. When two maple trees are growing in the same area, for example, their roots compete for the same water and nutrients in the soil. They compete for space and sunlight.

This is true of other plants as well. Two squirrels may compete for a nesting site. Elks compete for grasses, tree leaves, twigs, and shrubs.

Competition also occurs between individuals of different species. Predators, such as dolphins, sharks, and seabirds, hunt the same prey. In a forest ecosystem, woodpeckers and squirrels compete for tree holes and other spaces to build their nests. Trees, shrubs, and grasses all compete for sunlight, water, and space.

When resources are abundant, there is less competition. When there are not enough resources, competition increases.



In a forest ecosystem, plants must compete for sunlight.

1. All ecosystems have a carrying capacity. What is true about carrying capacity?
  - A) Carrying capacity is the number of organisms that an ecosystem can support.
  - B) Carrying capacity is determined by the resources available.
  - C) Carrying capacity is only a factor in terrestrial ecosystems.
  - D) both A and B

2. What is competition?

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3. Why does competition occur?

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4. True or False?

\_\_\_\_\_ Competition only occurs when resources are scarce.

\_\_\_\_\_ Competition only happens between members of the same species.

5. Changes may occur when an ecosystem does not have enough resources for the organisms that live there. Complete each statement.

A population's size will (increase / decrease).

Individual organisms will grow (larger / smaller) than their full potential.

Competition will (increase / decrease).

6. What are some of the ways that population size may decrease?

Organisms may \_\_\_\_\_ out of an ecosystem.

Organisms may have \_\_\_\_\_ offspring.

A population may experience more illness and \_\_\_\_\_.

7. True or False?

\_\_\_\_\_ All organisms have certain needs.

\_\_\_\_\_ All organisms get their needs met in the same way.

8. Every ecosystem provides what is needed by the organisms living in that system. All living things need space, for example. What other factors do living things need?

water	air	warm temperatures	direct sunlight
soil	minerals	a source of energy	mobility

9. An ancient fish fossil is found at the top of a mountain. Which statement is more likely?

A) The land atop the mountain was once underwater.

B) Fish once lived on land.