

Students will discover how all parts of an ecosystem can interact and how these interactions are essential for the success of an ecosystem.

## OBJECTIVES

- Students will be able to define the terms ecosystem and community.
- Students will be able to differentiate between living (biotic) and non-living (abiotic) factors of an environment.
- Students will be able to explain how various parts of an ecosystem rely on one another for survival.

## SOUTH CAROLINA SCIENCE STANDARDS

K-LS1-1, K-ESS2-2, K-ESS3-1, K-ESS3-2, K-ESS3-3, 2-LS2-1, 2-LS4-1, 2-ESS3-1, 3-LS2-1, 3-LS3-1, 4-ESS2-1, 5-LS1-1, 5-LS2-1

## MATERIALS IN BIN

- Copy of "Teamwork of an Ecosystem" activity
- Aquarium map (with activity habitats marked)
- 10 copies of "Teamwork of an Ecosystem" worksheet
- Copy of "Teamwork of an Ecosystem" worksheet answer key (for teachers only)
- 10 dry-erase markers
- Eraser

## VOCABULARY TERMS

Review terms with students before coming to the Aquarium to ensure that they have a basic understanding of the terms that will be used in the activity! Choose which terms are relevant/need to be reviewed based on your students' ages.

- **Ecosystem** – A group of living organisms, their environment (non-living) and their relationships with one another
- **Food Chain** – A ranking of organisms that depend on the next as a food source
- **Consumer** – An organism that feeds on other animals in order to gain energy (also known as a *heterotroph*)
- **Producer** – An organism that can create their own food (also known as an *autotroph*)
- **Apex Consumer** – An organism at the top of its food chain (nothing feeds on it)
- **Biotic Factor** – A living part of an ecosystem (plant, animal, etc.)
- **Abiotic Factor** – A non-living part of an ecosystem (rock, sun, water, etc.)

## BACKGROUND

South Carolina does not have many areas of high elevation, with only about 2% of the state being covered by the Blue Ridge Mountains. This area is located in the northwest corner of the state near the border that separates North Carolina and South Carolina.

An ecosystem is a community of organisms that interact with one another and their surrounding environment. This means that an ecosystem contains both living, or biotic, factors as well as non-living, or abiotic, factors. This consists of everything from the apex consumer at the top of the food chain to the microscopic bacteria in the water. A community is exclusively the living, or biotic, factors of an ecosystem.

Living parts of an ecosystem (biotic factors) fit into a food chain — a series of organisms that show the transfer of energy from one to the next. Producers are organisms that produce their own energy, like many plants which undergo photosynthesis. Consumers are organisms that eat other organisms in their food chain in order to gain energy. Animals can use the nonliving (abiotic) factors of their environment as shelter or protection, such as birds building nests in a tree or a bear hibernating in a cave. Water is an abiotic factor that is needed for the survival for all of the components of the ecosystem.

In order for plants to reproduce, their seeds need to be moved around or dispersed. Animals can help with this dispersal, both by moving seeds stuck to their bodies or by ingesting seeds and then defecating them somewhere else. The nonliving factors of an ecosystem can help to disperse seeds too! Wind can blow seeds away from their original spot. Moving water, such as rivers or rain, can cause a flow that moves seeds. All of these methods are helpful in the process of plant reproduction.

## **MOUNTAIN FOREST BIOTIC FACTORS**

### **North American River Otter**

Our two river otters, Charlie and Beau, prefer colder waters and are often found in clear and clean water with an abundance of trout. They typically eat the slower-moving fish in the river, but will also feed on amphibians, mice, small rabbits, turtles and bird eggs. River otters eat 15–20% of their body weight per day and have a very rapid metabolism.

### **Brook Trout**

Brook trout are found in cool, well-oxygenated freshwater, such as lakes and fast-moving rivers. They typically feed on aquatic insects, small amphibians and crustaceans.

### **Brown Trout**

Brown trout live in cool streams and lakes, but they do not require the same clear, sediment-free water that other types of trout do. Their prey usually consists of insects, salamanders, frog, fish and crustaceans.

### **Birds**

A range of birds, including birds of prey, live in mountain forest habitats for the cooler weather as well as for the abundance of prey options. They feed on trout and have been known to feed on river otters as well. The large, sturdy trees found in these regions are perfect shelter for them.

### **Red Maple**

Red maples are large trees with heavy leaf coverage on the upper portion of their trunk, reaching heights of 90–120 feet. They are found throughout the eastern United States in mountain forest regions.

### **American Holly**

Holly trees are woody evergreen trees with a wide, lower leaf coverage in a forest habitat. They are found throughout the eastern U.S. in moist soils.

## **MOUNTAIN FOREST ABIOTIC FACTORS**

### **Rocks**

Rocks are a non-living part of an ecosystem that can be used as shelter or protection for animals, as well as a method of slowing down flowing water and more.

## Wind

Wind can make an environment cooler and can physically move some parts of an ecosystem around, such as seeds, plants or soil.

## Water

Bodies of water, like rivers, can serve many purposes in an ecosystem. Many plants and animals live in water. Additionally, it serves as a source of hydration and can physically change parts of an ecosystem by shaping the land over time.

## PROCEDURES

Pick up the Exhibit Activity from the Information Desk. Make your way to the Mountain Forest gallery.

- 1) Review the following with your students at your first stop.
  - a. What is an ecosystem?
  - b. What are living (biotic) and nonliving (abiotic) factors? Do you see examples of each around you?
  - c. What are some animals that can live in this ecosystem?
- 2) Give each pair of students a worksheet and a dry-erase marker and have them explore the exhibit to make connections between different factors of the mountain forest ecosystem. **Remind them that some of the needs of the ecosystem may have more than one possible solution.**
- 3) Once students have made some connections between the listed factors, regroup and have them explain how they came to their conclusions about their connections. Students should grasp that without one connection, the others wouldn't be able to happen. **If students have different answers to the same question, use the opportunity to explain how multiple factors can contribute to the same need.**
- 4) Ask students if they can think of ways in which this ecosystem could be disturbed by humans. Answers could include trash and pollution, over-fishing, habitat destruction and more.
- 5) Ask students if they have any other ideas of connections between factors in the ecosystem that were not listed on the worksheet.
- 6) When finished, wipe off all answers with the provided eraser, gather all items/supplies and return the Exhibit Activity to the Information Desk.