

Lesson: What's My Ecosystem Address?

Grade Level

5th - 8th grade

Subject Areas: Geography, Weather and climate, Biology

Activity time:

1 hour with computer access for initial activity.

Setting: Indoors

Skills: Research, Public speaking, Organize and analyze information

Vocabulary:

- **Abiotic:** not consisting of living organisms; examples include: sunlight, temperature, precipitation.
- **Biodiversity:** a measure of the distinct characteristics, qualities, or elements of plant and animal life in a defined area; a measure of biological differences
- **Climate:** the long term weather pattern of an area
- **Ecology:** the study of the relationships of living things to one another and the environment
- **Ecosystem:** a community of living organisms and their physical and chemical environment
- **Environment:** all of the external factors, conditions, and influences that affect an organism or a biological community

- **Elevation:** a measurement of height above sea level
- **Habitat:** the environment where a plant or animal grows or lives
- **Humidity:** the amount or degree of moisture in the air
- **Prevailing wind:** winds that blow from a single general direction over a particular point

Objectives:

- Students will
- 1) Compare and contrast their home state with Great Smoky Mountains National Park.
 - 2) Learn about local biodiversity
 - 3) Improve understanding of abiotic components and their role in supporting species diversity.

Materials:

- "What's My Ecosystem Address" worksheet (attached)
- Computers for research
- Map of the United States

Background:

Great Smoky Mountains National Park encompasses over 800 square miles in the Southern Appalachian Mountains. No other area of equal size in a temperate climate can match the park's amazing diversity of plants, animals, and invertebrates.

Over 17,000 species have been documented in the park, but scientists believe tens of thousands additional species may live here. Why such a wondrous diversity?

Mountains, glaciers, and weather are the big reasons. The park is dominated by plant-covered, gently contoured mountains, that rise more than 5,000 feet for over 36 miles. Elevations in the park range from 875 to 6,643 feet. This range in altitude mimics the latitudinal changes you would experience driving from Georgia to Maine. Plants and animals common in the southern United States thrive in the lowlands of the Smokies while species common in the northern states find suitable habitat at the higher elevations.

The Great Smoky Mountains are among the oldest mountains in the world, formed perhaps 200-300 million years ago. They are unique in their northeast to southwest orientation, which allowed species to migrate along their slopes during climatic changes such as the last ice age, 10,000 years ago. During that time, glaciers did not quite reach as far south as the Smokies. Consequently, these mountains became a refuge for many species of plants and animals that were disrupted from their northern homes. The Smokies have been relatively undisturbed by glaciers or ocean flooding for over a million years, allowing species a long time to diversify.

In terms of weather, the park's abundant rainfall and high summertime humidity provide excellent growing conditions. In the Smokies, the average annual rainfall varies from approximately 55 inches in the valleys to over 85 inches on some peaks—more than anywhere else in the country except the Pacific Northwest.



in Great Smoky Mountains National Park



The relative humidity in the park during the growing season is about twice that of the Rocky Mountain region.

Over 130 species of native trees find homes in the Smokies, more than in any other North American national park. Over 1,500 additional flowering plant species have been identified in the park. The park is the center of diversity for salamanders and is home to more than 240 bird species, 66 mammal species, 77 native fish species, 40 reptile species, and 43 amphibian species.

Introduction:

Great Smoky Mountains National Park is world renowned for its biodiversity. Many people study the park and try to understand why the Smokies are so diverse. The lessons learned at the park can be applied to your home state, region, or backyard. It isn't necessary to travel to distant locations to learn about ecology or the amazing diversity of living creatures—they are all around you. All you need to do is start looking.

Procedure:

- 1: Individual students or student teams are assigned all or several components of their state's ecosystem to research.
- 2: The students will research their own state's biodiversity components as well as the abiotic elements.
- 3: The students will enter their results in their "home" column of the "What's My Ecosystem Address" worksheet and compare them to those at Great Smoky Mountains National Park.
4. The students will place the direction of prevailing winds of the park and their own state on the United States map.
5. The students will place their state's highest and lowest points on the United States map.
- 6: The students will summarize and present their findings to the rest of the class.

Wrap Up:

Teachers can complete the comparison table on a Smartboard, whiteboard, or blackboard while the students present their findings. Discuss with the students how their home state compares to the Great Smoky Mountains National Park. Discuss if there is more or less diversity in their state than the Park and why this might be.

Assessment:

Ask the students to explain how the abiotic factors contribute to biodiversity. Ask the students to list some of their state's native animals and plants.

Extensions:

Students can pick a plant or animal species native to their state and create a flyer or poster explaining why it should be considered as the state representative (example: Northern Cardinal as the State Bird).

Resources:

Bird Checklists by State:

<http://www.thayerbirding.com/WildBirds/Bird-Checklists>

Great Smoky Mountains National Park:

<https://www.nps.gov/grsm/learn/nature/amphibian-checklist.htm>

Ecosystems of the US

<https://www.usgs.gov/science/science-explorer/Biology+and+Ecosystems>

Finding Latitude and Longitude of Specific Areas

<http://www.lat-long.com/>

Finding Elevations in Each State

<http://www.lat-long.com/>

<https://www.infoplease.com/almanacs>

Natural Features and Ecosystems

<https://www.nps.gov/grsm/learn/nature/naturalfeature-andecosystems.htm>

Weather Patterns (Prevailing Winds)

<http://www.wunderground.com>

Weather Records and Averages by State

<http://www.weatherbase.com>

United States Fish and Wildlife Endangered and Threatened Species Report for Each State

http://ecos.fws.gov/tess_public/StateListing.do?state=all

Your state's Department of Fish and Wildlife Website or Department of Environment Website



What's My Ecosystem Address?

	Great Smoky Mountains National Park	Your Home/State
Latitude and Longitude	Latitude: 35-35'00" N Longitude: 083-30'30" W	
Prevailing Winds	SouthWest, NorthWest, South-East	
Acres	521,086 acres	
Elevation (highest and lowest)	875 feet-6,643 feet	
Annual Precipitation	55 inches (low elevation) 85 inches (high elevation)	
Average Winter Temperature	56 °F (low elevation) 38 °F (high elevation)	
Average Summer Temperature	87 °F (low elevation) 65 °F (high elevation)	
Miles of Rivers and Streams	Over 2,900 miles	
Tree Species	130 +	
Shrub Species	150+	
Wildflower Species	1,663	
Bird Species	251	
Amphibian Species	44	
Reptile Species	40	
Fish Species	77	
Mammal Species	70	
Invertebrate Species	11,600+	
What natural events or processes influence the land around your community? (example: glaciers, volcanoes, earthquakes...)	Fires, high winds, glaciers were not here but they influenced our ecosystem	
Threatened or Endangered Species in your area	14 Threatened and Endangered (Federal) and 20 species of concern	