

**Pre- and Post-Visit Activities:  
Biodiversity in a Stable Ecosystem**

**Overview:**

These activities, which support the Staten Island Museum's lesson "Biodiversity in a Stable Ecosystem", introduce students to the importance of biodiversity.

**Background Information for Educators:**

Biodiversity is a term used to describe the enormous variety and interconnected system of life on Earth. It can be used more specifically to refer to all of the species in one region or ecosystem. Biodiversity refers to every living thing, including plants, bacteria, animals, and humans. Scientists have estimated that there are around 8.7 million species of plants and animals in existence. However, only around 1.2 million species have been identified and described so far, most of which are insects. This means that millions of other organisms remain a complete mystery.

Scientists are interested in how much biodiversity there is on a global scale, given that there is still so much biodiversity to discover. All species are interconnected and depend on one another. Forests provide homes for animals. Animals eat plants. The plants need healthy soil to grow. Fungi help decompose organisms to fertilize the soil. Bees and other insects carry pollen from one plant to another, which enables the plants to reproduce. With less biodiversity, these connections weaken and sometimes break, harming all the species in the ecosystem. Ecosystems with a lot of biodiversity are generally stronger and more resistant to disaster than those with fewer species.

Biodiversity is important to people in many ways. Plants, for instance, help humans by giving off oxygen. They also provide food, shade, construction material, medicines, and fiber for clothing and paper. The root system of plants helps prevent flooding and soil erosion. Plants, fungi, and animals such as worms keep soil fertile and water clean. As biodiversity decreases, these systems break down.

Hundreds of industries rely on plant biodiversity. Agriculture, construction, medical and pharmaceutical, fashion, tourism, and hospitality all depend on plants for their success. When the biodiversity of an ecosystem is interrupted or destroyed, the economic impact on the local community could be enormous. Biodiversity is especially important to the medical and pharmaceutical industries. Scientists have discovered many chemicals in rain forest plants that are now used in helpful drugs. A most popular pain reliever, aspirin, was originally made from the bark of willow trees.

Biodiversity around the world has decreased. Many species have gone extinct. Although extinction is a natural process, human activity has contributed to some species dying out. Without intervention, vital species will become extinct through the loss of habitat, overuse, climate change and the introduction of invasive species.

- The UN summarized human activities into five main categories

- Changes in land and sea use (Deforestation, urbanization, development )
- Direct exploitation (using resources) of organisms (over using resources is not sustainable, fishing, demands on resources for livestock )
- Climate change (Causing earthquakes, melting ice caps, flooding, greenhouse gases)
- Pollution
- Invasive alien (not from native habitat) species

A significant reason for the loss of biodiversity is that natural habitats are being destroyed. The fields, forests, and wetlands where wild plants and animals live are disappearing. Land is cleared to plant crops or build houses and factories. Forests are cut for lumber and firewood. As habitats shrink, fewer individuals can live there. Pollution, overfishing, and overhunting have also caused a drop in biodiversity. Global climate change—the latest rise in the average temperature around the globe, linked to human activity—is also a factor. Warmer ocean temperatures damage fragile ecosystems such as coral reefs. Biodiversity can also be harmed by introduced species. When people introduce species from one part of the world to another, they often have no natural predators. These non-native species thrive in their new habitat, often destroying native species in the process. Because of the interconnectivity of biodiversity, there will be economic, medical, and climate consequences for humanity.

### **Vocabulary:**

Apex predator: An animal found at the top of a food web and is not eaten by any other animals. Examples include owls, eagles, sharks and lions.

Bacteria: tiny living things all around us, important in an ecosystem to break down dead and decaying matter.

Biodiversity: all the different species of plants and animals living in an environment

Carnivore: an animal that eats only animals

Community: all the plants and animals that live in one place and that interact and depend on one another

Consumer: an organism that feeds on other organisms in the food chain

Decomposer: organism that breaks down the remains of dead and decaying animals and plants, consumers and producers. Most common decomposers are bacteria and fungi.

Ecosystem: a community of organisms and their environment functioning as an ecological unit.

Energy: the capacity for change, all living things need energy from food to live and grow.

Food chain: transfer of energy in sequence, for example from green plants, to animals that eat plants, to animals that eat other animals. A sequence of living things in which each one feeds on the living thing below it.

Food web: a network of food chains that are interconnected within a particular community. A model of intersecting food chains.

Fungi: Fungus is a living thing that helps break down dead and decaying matter, such as mushrooms, mold and yeast.

Habitat: the place where a plant or animal lives and grows

Herbivore: an animal that eats only plants

Indigenous: produced, growing, living, or occurring naturally in a particular region or environment.

Interdependence: when two or more things depend on each other for survival

Introduced species: organisms that are not native or natural to a habitat which have been accidentally or purposefully brought to a new habitat (also known as an exotic species).

Invasive species: not native to a specific location and tend to steal nutrients and resources from native organisms.

Omnivore: an animal that eats both plants and animals.

Photosynthesis: A process by which plants use sunlight to make sugar from carbon dioxide and water.

Producer: A living thing (usually a plant) that takes energy from the sun and makes its own food.

Producers are found in the first level of the food web.

Species biodiversity: the existence of many different kinds of plants and animals in an environment.

Wetland: an area of land where water covers the soil.

### Before Your Visit:

1. Create a mind map or word web with your students to understand their background knowledge about biodiversity.
2. Have students begin to list animals that they see living around their home and think about how they share their habitat with these other animals.
  - a. Do you see many animals around your home?
  - b. Do you hear animals around your home?
  - c. How can you be a good neighbor to these animals?
3. What animals might have adapted to an urban habitat?
4. What plants do you see in your neighborhood? How do the animals interact with the plants?

### After Your Visit:

1. Create a food chain chart with an animal typically found in your neighborhood.
2. Encourage students to start thinking about what happens to a group of animals if certain aspects of their habitat begin to disappear. What happens to the forest wildlife when we chop down trees? What happens to the ocean wildlife when we dump chemicals into the water?

**Biodiversity in a Stable Ecosystem**

This animal lives in	This animal eats	
	The animal is	
It is eaten by	It is protected by	

Fill out this table with this animal being a consumer in a food chain

Producer
Consumer (the animal you chose)
Decomposer

Draw or paste in a picture of your animal in their habitat.

