

What is an Ecosystem?

Background Ecology Information



Major Concepts

- Healthy functioning ecosystems maintain life in balance on Garden Earth.
- Although the type of ecosystems varies around the world, all ecosystems are important for maintaining a healthy planet.
- There are seven eco-services or life-support functions provided by planet Earth.
- Human activities can create stresses that alter normal ecosystem functions, and impair life support functions.

Ecosystems

Every place on planet Earth is an ecosystem. There are desert ecosystems, lake ecosystems or even urban ecosystems. An ecosystem is composed of the living creatures as well as the non-living parts such as water, rocks, and air. Although we think of ecosystems as fairly large entities, an ecosystem can be as small as a backyard pond. It just needs to be a defined area where organisms live and interact with their environment.

A critical part of the ecosystem concept is that all parts of an ecosystem are connected and what occurs in one part of the ecosystem will influence other parts. Healthy functioning ecosystems are in balance.

In the Garden Earth Naturalist curriculum, there are seven eco-services or ‘Departments’ and each of these comprise a different GEN Module. Organisms, both animals and plants, in their daily activities are workers that maintain these life support functions.

The Air Purification Department is responsible for maintaining a normal climatic regime. The presence of trees and other components of the natural ecosystem moderate local temperatures and maintain appropriate levels of carbon dioxide in the atmosphere. The Air Department also helps to remove harmful pollutants from the atmosphere, as well as particulate material such as dust.

The Water Purification function of the ecosystem is to act as a filter. As rain falls, it picks up gases and particulate material and falls to the ground. Ecosystems are able to remove natural pollutants such as sulfur gases from volcanic eruptions as well as man-made pollutants such as nitrous oxides. Once these pollutants fall to the ground, the soil filters these substances out and purer water passes into streams and rivers.

Ecosystems provide the services of Food Production and Pollination, allowing us to produce healthful food for ourselves and other animals on the planet. Keeping a healthy balance between all the organisms in Earth's ecosystems is the responsibility of the Pest and Disease Control Department. Insects and diseases that attack plants and animals are controlled by predation by other insects, fungi, or bacteria. Without these controlling organisms, epidemic outbreaks would be much more common.

The Soil Department is responsible for maintaining a healthy balance in the soil portion of the ecosystem. Soil organisms break down waste materials from plants and animals, and maintaining the structure and nutritional quality of the soil.

The Biodiversity Department is responsible for maintaining Earth's "living library". The Biodiversity Department is composed of all the species on earth, from the smallest bacteria to the largest mammal, the blue whale. This Department also is responsible for maintaining the genetic diversity of all the species, though with the endangerment of many species this task is increasingly difficult.

The Value of Ecosystems

As you can see, Garden Earth's ecosystems are very important to people as well as all the animals and plants that depend upon them. Some scientists and economists have tried to put a dollar value on some of these eco-services. For example, what is the value of clean water to New York City? In 1997, when the source of the drinking water was increasingly polluted, city officials had to decide how to clean up the water. They could build new water treatment plants, which cost about \$6 billion or they could invest in cleaning up the source of their drinking water, the Catskill Mountains. By helping install new septic systems and paying landowners to plant trees and protect the streams on their property, they could get better water quality for less than one tenth of the cost of building new water treatment plants! A cleaner environment for less money?! That's a no-brainer!

Standards Checks

We know that human activities can have a negative impact on ecosystems. But people can also make a positive impact on ecosystems. When we recycle organic material into the soil or plant trees, we improve the eco-services of Earth.

In order to see and quantify the positive impacts of GEN members at their school or community site, children conduct experiments called ecological "standards checks" on a regular basis. With standards checks, children collect data about the current environmental status of their site. In the first year of their GEN Club, the data they collect is referred to as 'Baseline Data'. As the club implements environmental stewardship or service learning projects that help Garden Earth, the data that children collect should show an improvement in the health of their site over time. The collection, maintenance, and analysis of this data strengthens science process skills and provide positive reinforcement to learners for all their hard work!

Quiz Yourself

1. The living creatures as well as the physical processes that take place in an area define an _____.
2. All parts of an ecosystem are _____.
3. True or False. Ecosystem services are economically valuable.