

SNC1P

1.2 Ecology

Have you ever been stung by a wasp? The unpleasant experience is not soon to be forgotten! Organisms that cause problems for humans, like wasps, are often categorized as **pests**. Why don't scientists work to eliminate pests rather than just control their numbers?

Imagine a world without biting flies, mosquitoes, termites, caterpillars, or weeds. At first thought that world might seem very appealing, but consider how other organisms might be affected. For example, some fish and amphibians rely on mosquito larvae for food. The elimination of mosquitoes would have a devastating effect on lakes. In addition, adult mosquitoes are an important food source for swallows, robins, and other small birds.

Some other insect "pests" are needed by plants. Most plants rely on insects for pollination. Plants also benefit from insects like the wasp that help decompose tissues of dead plants and animals, returning nutrients to the soil. Many of the insects we call pests also dig around plants, loosening the soil and allowing more oxygen to get to plant roots.

Even garden weeds like crab grass serve an important purpose. Outside the garden these rapidly growing plants are an important source of food for many animals. Eliminate wild grasses and cattle, sheep, and other grazing mammals would soon become extinct. The long and fibrous roots of these hardy, fast-growing plants also pump nutrients back to the soil's surface, where they can be used by more delicate domestic plants. The greatest benefit of these plants might be their ability to grow along cliffs and in other precarious locations. Here they anchor the soil, preventing erosion.

Interactions with The Environment

To understand how living things affect one another, we have to observe them in their natural environment. **Ecology** is the study of how organisms interact with one another and with their environment. A variety of factors can affect how an organism interacts with its environment. Factors, such as competition, that are determined by the presence of other living things are called **biotic** factors. Influences such as light, heat, wind, and soil are called **abiotic** factors.

Organisms do not live in isolation. Organisms usually group with others of the same species. All of the members of the same species, living in the same ecosystem or habitat, are referred to as a **population**. For example, all the pike in a lake form a population.

Since there is usually more than one species in an ecosystem, there is also more than one population. The collection of all the populations of all the species in an ecosystem or habitat is called the **community** of organisms. The community in the lake might include populations of pike, perch, tadpoles, mosquito larvae, and algae, among others.

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When studying a community, an ecologist would study how biotic factors affect each population. For example, an ecologist studying a forest community might examine the interactions between different types of plants and animals in the area.

Ecologists can extend their study beyond the community of organisms to the physical environment. When they do so they begin investigating ecosystems. An ecosystem includes the community of living things and its physical environment. For example, in studying a forest ecosystem, an ecologist could examine how much sunlight reaches the forest floor, and what affect it has on the plants and animals that live in the ecosystem.

Biogeography

The kinds of living things that are found in an area are determined mainly by the abiotic factors in the physical environment—the heat, water, wind, and light. These are the major components of the climate. The climate of an area is determined by latitude (distance from the equator) and altitude (elevation above sea level). If you were to travel from the equator toward either pole, the air would get progressively cooler. You would also notice that the types of plants were changing. You would observe similar changes if you climbed a mountain. The air would become cooler as you climbed and the types of plants would also change. Of course, as the types of plants change, the types of animals also change because animals depend directly or indirectly on plants.

Biogeography is the study of the distribution of plants and animals. Scientists who study biogeography have found that similar organisms exist in different parts of the world because the ecosystems in which they live have very similar abiotic factors.

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Worksheet 1.2: Ecology and Energy

1. a) Write your definition of a pest.
b) Give an example of an organism you consider a pest and explain why you consider it a pest.
2. Explain what might happen if your pest were eliminated from the ecosystem.
3. Give two examples of biotic factors and two examples of abiotic factors in:
 - a. A lake ecosystem
 - b. A forest ecosystem
4. Using examples, describe how a population is different from a community.
5. What two main factors determine climate? Describe in your own words how these factors determine the kinds of organisms that can live in a particular area.