

What is Ecology?

Ecology is a branch of **biology** which is focused on the examination of living organisms in the natural environment. Ecologists look at how organisms interact with the environment and each other, and they study the complex and interconnected systems which influence life on Earth. Ecology is also sometimes known as environmental biology, and there are a number of subdisciplines within this branch of the sciences which deal with specific topics of interest, such as the relationship between humans and the natural environment.

Researchers in ecology can study individuals, populations, communities, and **ecosystems**. At each level, there are more things to learn about. The natural environment is usually heavily interconnected; researchers can focus on a single population of plants or animals, for example, and find much fodder for study, ranging from how that population shapes the physical environment to how other organisms interact with it. For example, **ruminant** populations can create paths and watering holes, shaping the land, and they can also influence plant populations by eating some plant species, leaving others alone, and excreting seeds which plants can use to spread themselves.

In the 20th century, ecologists became especially interested in human activities which had a deleterious effect on the environment, recognizing that humans could have a tremendous and not always beneficial influence on nature. For example, dumping pollutants into a river can cause a variety of changes in nature, just as paving over a wetland can eliminate a habitat and put stress on the animals and plants which are used to living there.

Ecologists are often interested in looking at entire ecosystems, and studying all of the organisms which live in them and influence them. Each **ecosystem** hosts unique plant and animal species which have adapted to the environment and each other, and studying this can provide scientists with information about the history of that ecosystem, and the evolutionary roots of the animals which live there. Ecology can also be studied in urban environments.

The study of ecology is not limited to the terrestrial environment; marine environments, lakes, and streams can also provide a great deal of food for thought and inspiration for study. The marine environment in particular is not very well understood, with researchers constantly finding that there is more to learn about the ocean, the creatures which live there, and its underlying **geography** and **geology**. For example, for centuries people assumed that the bottom of the ocean was inactive and bleak, but in the 20th century, researchers discovered areas of biological activity around hydrothermal vents, with organisms which had adapted to the dark, high pressure, low **oxygen** environment of the deep sea.

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It has long been known that **ecosystems** are complex systems which balance the activities of the weather and the organisms which inhabit them, and ecologists have long viewed the environment holistically. Functional ecologists get intimate with specific organisms to learn more about what they do, how they do it, why they might have evolved to exhibit that behavior, and how they are impacted by surrounding organisms. This can include work in the field, observing organisms in nature, as well as in the lab, studying things like behavior in controlled conditions and changes which occur on a genetic level.

In a simple example of functional ecology, researchers might study the role of trees in an environment like the **rainforest**. Trees play an active functional role in the forest, providing habitat, creating microclimates, enriching the soil, and sometimes even cultivating beneficial organisms. While people don't usually think of trees as farmers, trees can actually farm in a sense by influencing what grows, or does not grow, underneath their canopies, and they will actively promote plants and other organisms which are beneficial.

One important aspect of functional ecology is in sustainability studies. People cannot know whether a given activity is sustainable until they fully understand how that activity influences the natural environment. Thus, it's important to look at how human activities impact organisms in nature, and whether or not that creates a **ripple effect**. Removing a predator, for example, might create an imbalance which destabilizes an **ecosystem**, in which case removal of predators might be considered unsustainable. Conversely, adding something to the ecosystem could be equally damaging.