



## Ecology

Heather Brennan25.9K reads

### Basic Concepts

Ecology is the study of how organisms interact with their environment, including both abiotic (non-living) and biotic (living) aspects of the environment. It is a very broad definition and the science of ecology tends to overlap other biological sciences.

In his 1972 book *Ecology*, C.J. Krebs defined it more specifically:

“Ecology is the scientific study of interactions that determine the distribution and abundance of organisms.”

There are many sub-disciplines of ecology including:

- evolutionary ecology
- paleoecology
- behavioral ecology
- community ecology
- biodiversity
- physiological ecology
- population ecology
- ecosystem ecology

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## Ecological Levels

There are three main levels of study in ecology:

### 1. Organism

At the organism level, scientists examine how an individual interacts with the biotic and abiotic elements in his environment.

### 2. Population

This gets expanded to the population level which looks at interactions of a group of individuals of the same species. It includes both how individuals interact with one another within the population and how the population as a whole interacts with its environment.

### 3. Community

The community includes all of the species within the environment. Community studies tend to focus more on how energy, nutrients, and resources, pass through an environment.

## Defining Environment

Environments can be large like the sea or small like a drop of tap water. They can be natural such as forest or manmade, such as a planted field of crops. Elements of the environment that organisms interact with include:

- other members of their species
- other species (both flora and fauna)
- weather
- habitat factors
- man's interference in the habitat
- climate change
- habitat loss

- pollution
- etc

Types of interactions include:

- predator-prey relationships
- reproduction
- migration
- use of resources such as food, nesting sites, etc

By examining all the factors that affect an environment, some ecologists try to create mathematical models to help predict future behavior of populations and communities. This can be very useful when considering the introduction of another species or trying to decrease or increase the abundance of a species within an area.

While these models can be useful, they are also sometimes limiting and it is important to always remember that they are just another way to try to understand what happens in the natural world.

Ecological science has many practical applications and plays a key role in conservation efforts. Environmental impact studies that are conducted when new buildings and factories are built always have ecological component to study how the new structure and anything it generates that goes back into the environment, from increased traffic to chemical disposal, will affect the current environment and the species residing in it.

Ecologists are used in virtually every corner of the Earth and it is a high growth area of scientific employment, beyond the traditional academic setting.

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