

Ecology

by Sophia



WHAT'S COVERED

In this lesson, we will cover the topic of ecology. We will discuss the various levels of organization of organisms within ecology and explore several real-world examples. Specifically, this lesson will cover the following:

1. What is Ecology?
2. Levels of Organism Organization
 - 2a. Organism
 - 2b. Population
 - 2c. Community
 - 2d. Ecosystem
 - 2e. Biosphere
3. Examples of Organism Organization
 - 3a. Ant
 - 3b. Mushroom

1. What is Ecology?

Ecology, our key term for today, is a core subject of study within environmental science and is therefore important for us to discuss. It is the study of the distribution and abundance of organisms as well as their interactions with the living and nonliving parts of the environment.



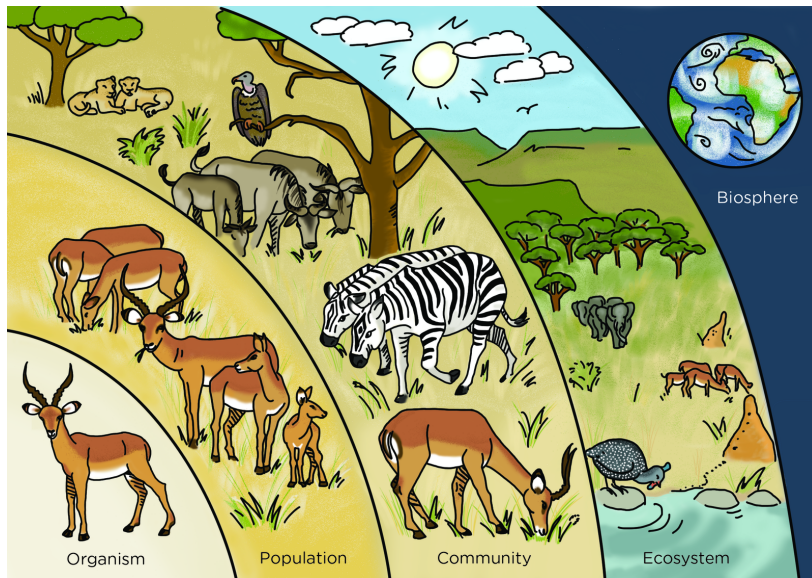
TERM TO KNOW

Ecology

The study of the distribution and abundance of organisms and their interactions with the living and nonliving parts of the environment.

2. Levels of Organism Organization

There are multiple levels of organization within ecology. The smallest is an individual organism, and the levels go up to population, community, ecosystem, and finally, the biosphere.



At each new stage, there are emergent properties that can be observed that were unseen at the level before it.

2a. Organism

An organism is an individual living thing. When people talk about organisms, most people tend to think of animals. But organisms include fungi, animals, plants, as well as algae and bacteria.

2b. Population

The next level of organization above organisms is population, which is all the members of a single species in a given area.

The following are emergent properties of populations along with their descriptions:

- Abundance: The number of organisms
- Density: The number of individuals in the population per its specified area
- Patterns of dispersion: The spatial spread of species geographically
- Age structure: The relative number of different ages within a population
- Sex ratio: The number of females versus males within a population
- Variability: The differences between organisms within a species

2c. Community

The next level is that of the community. A community is all the populations of species within a given area and time.

The following are emergent properties of communities along with their descriptions:

- Species abundance: The number of species and the relative abundance of species in that community
- Species composition: The exact species that exist in the community
- Species distribution: The way species are distributed geographically in relation to each other
- Species interactions: Observations about how species interact with each other

2d. Ecosystem

The level after the community is the ecosystem. Ecosystems comprise all the communities and their relationships with the abiotic factors in a specific area. You may recall that abiotic factors are nonliving parts of an ecosystem, such as weather, climate, and rocks, while biotic factors are the living, organic parts, such as flora and fauna. Ecosystems are quite complex and consist of hundreds and even thousands of species interacting.

The following are emergent properties of ecosystems:

- Number of communities in an ecosystem
- Interactions between those communities
- Interactions between living organisms and the area's abiotic factors



KEY CONCEPT

Note that the concept of a habitat is important. A habitat is the area within an ecosystem that a particular species inhabits. Habitats comprise both biotic and abiotic factors.

Niche is another important concept, which is all the abiotic and biotic factors that affect and influence a particular species. It extends beyond the habitat of a species because it deals with everything that impacts the species.

2e. Biosphere

The biosphere is the highest level of organization and includes all ecosystems on the planet or all parts of the planet that contain life.

Emergent properties of the biosphere include the following:

- Number and types of ecosystems
- Interactions between ecosystems
- Global phenomena, such as climate and weather patterns

3. Examples of Organism Organization

Let's look at a couple of examples and see what organism organization looks like in the bigger picture.

3a. Ant

An ant is an example of the lowest level of organization—the organism level. Different ant species prefer different habitats. Let us consider a particular ant that makes its home in a forest and lives in a tree. Its habitat includes trees, the rain, the humidity in this area, and the sources of the food it consumes.

Its niche includes these things as well as the actions of other nearby species, specifically, actions that might impact this ant. For example, another ant species nearby may be competing for similar resources.

The ant's ecosystem includes a large region around it that is filled with various species and other abiotic factors.



3b. Mushroom

Another example is a mushroom, like the one shown below. Its habitat is also often in a forest, perhaps at the base of a tree that can provide protection. It grows near the roots of the tree where it can access the resources it needs, and its habitat also includes the local weather.

Its niche includes breaking down waste in the forest, such as leaf litter. Its niche also includes how it is affected and distributed as a result of available nutrients and weather patterns, such as rainfall and sunlight.

Its ecosystem includes the forest and species around it, the local weather, and any potential species that consumes it.





SUMMARY

In this lesson, we learned about **ecology** and the various **levels of organism organization**: **organism**, **population**, **community**, **ecosystem**, and **biosphere**. Important to note are the concepts of habitat, which is the area within an ecosystem that a particular species inhabits, and niche, which includes all the abiotic and biotic factors that affect and influence a particular species. We looked at **examples of organism organizations**, including those of **ant** and **mushroom**. Our key term was ecology, which is the study of the distribution and abundance of organisms and their interactions with the living and nonliving parts of the environment.

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