

## Big Picture

Biology is the study of living things. Six characteristics differentiate living things (organisms) from nonliving things: response to the environment, growth, reproduction, homeostasis, complex chemistry, and cells. In order to survive, organisms interact with each other and with the environments they're in. Biologists base their knowledge of organisms on important concepts such as the cell theory, the gene theory, homeostasis, and evolution.

## Key Terms

**Biology:** The study of living things.

**Evolution:** Change in characteristics of living things over time.

**Natural Selection:** Organisms with more favorable traits are able to produce more offspring and pass on their favorable traits.

**Adaptation:** Characteristic that helps organisms survive and reproduce in a given environment.

**Population:** Group of organisms of the same species living in a given area.

**Community:** All organisms living in a given area.

**Ecosystem:** All living things and nonliving factors in a given area.

**Biome:** A group of similar ecosystems.

**Biosphere:** Part of earth where all life exists.

**Symbiosis:** Relationship between different organisms where at least one organism benefits from the relationship.

**Competition:** Relationship between organisms needing the same resources in the same place at the same time.

## Characteristics of Life

Characteristics of a living thing (organism):

- Responds to the environment: detects changes in the environment and responds accordingly
- Grows and develops
- Reproduces: produces offspring
- Maintains homeostasis: keeps internal conditions (such as your internal body temperature) stable
- Has complex chemistry: consists of complex molecules that goes through chemical changes to stay alive
- Is made up of cells (the basic unit of structure and function)

## Unifying Principles of Biology

These four unifying principles form the basis of **biology**.

- Cell theory: Cells are the basic unit of life. All living things are made up of cells, and all cells come from other cells.
- Gene theory: Genes determine the characteristics of living things. They are located on chromosomes that are found in every cell, and genes are passed on from parents to offspring.
- Homeostasis: Keeping internal conditions constant even though the external environment changes.
- **Evolution:** Occurs by the process of **natural selection**. Organisms become more suited to their environments through evolution because they develop **adaptations**.

## Interdependence of Living Things

The world of living things can be organized into levels (from specific to general):

- **population** → **community** → **ecosystem** → **biome** → **biosphere**
  - Example: a herd of giraffes → all the plants, animals, bacteria in the area → all the living things and the water, soil, etc. in the area → all the savannas in the world → all the regions on earth occupied by living things

Organisms depend on their environment and other organisms for survival. They interact through relationships such as **symbiosis** and **competition**.

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