Biology is the study of life. It covers various aspects of living organisms, such as structure, function, growth, origin, evolution, and distribution. All living organisms share several key characteristics: they are composed of cells, have levels of organization, use energy, maintain homeostasis, grow, reproduce, respond to stimuli, and adapt to their environment.

The cell is the fundamental unit of life. Cells are either prokaryotic or eukaryotic. Prokaryotic cells, like those of bacteria, lack a nucleus. Eukaryotic cells, found in plants, animals, fungi, and protists, contain a nucleus and other organelles.

Organisms are classified into three domains: Bacteria, Archaea, and Eukarya. The domain Eukarya includes four kingdoms: Protista, Fungi, Plantae, and Animalia.

Evolution is the process by which populations of organisms change over generations. Genetic variation and natural selection are the main drivers of evolution. Charles Darwin proposed the theory of natural selection as a mechanism of evolution.

In science, a hypothesis is a tentative explanation for an observation. It must be testable and falsifiable. Scientific methods include observation, forming a hypothesis, experimentation, and drawing conclusions.

DNA (deoxyribonucleic acid) is the molecule that carries genetic information. Genes are segments of DNA that determine the traits of an organism. DNA replication ensures that genetic information is passed from cell to cell and from generation to generation.

Homeostasis is the process by which an organism maintains stable internal conditions despite changes in the external environment. Feedback mechanisms are crucial in regulating homeostasis.

Energy is vital for life processes. Organisms obtain energy through various means: autotrophs produce their own food via photosynthesis, while heterotrophs consume other organisms.

Enzymes are proteins that act as biological catalysts, speeding up chemical reactions in cells without being consumed. Each enzyme works on a specific substrate.

Ecology is the study of interactions between organisms and their environment. It includes the study of ecosystems, food chains, and biogeochemical cycles.

Photosynthesis is the process by which green plants convert sunlight, carbon dioxide, and water into glucose and oxygen. Cellular respiration is the process by which cells break down glucose to produce ATP, the energy currency of the cell.