



The Science of Biology

- The term **biology** is derived from the Greek word βίος, *bios*, "life" and ALatin-language form of the term first appeared in 1736 when Swedish scientist **Carl Linnaeus** used biology in his book (*Bibliotheca botanica*).
- Scholars of the medieval Islamic world who wrote on biology included **Al-Dīnawarī** , who wrote on botany and **Rhazes** who wrote on anatomy and physiology. Biology began to quickly develop and grow with **Anton van Leeuwenhoek's** dramatic improvement of the **microscope**. It was then that scholars discovered **spermatozoa**, **bacteria** and the diversity of microscopic life.
- Advances in **microscopy** also had a profound impact on biological thinking. In the early 19th century, a number of biologists pointed to the central importance of the **cell**. Meanwhile, taxonomy and classification became the focus of natural historians. **Carl Linnaeus** published a basic taxonomy for the natural world in 1735 , and in the 1750s introduced **scientific names** for all his species.
- Serious evolutionary thinking originated with the works of **Lamarck**, who was the first to present a coherent **theory of evolution**.
- In the 1940s and early 1950s, experiments pointed to **DNA** as the component of **chromosomes** that held the trait-carrying units that had become known as **genes**. A focus on new kinds of model organisms such as viruses and bacteria, along with the discovery of the double helical structure of DNA in 1953, marked the transition to the era of **molecular genetics**.
- Finally, the **Human Genome Project** was launched in 1990 with the goal of mapping the general human **genome**. This project was essentially completed in 2003, with further analysis still being published.

Definition of Biology

- ❖ **Biology** is the natural science that involves the study of life and living organisms, including their physical and chemical structure, function, development and evolution.
- ❖ Modern biology is a vast field, composed of many branches. In general, biology recognizes the cell as the basic unit of life, genes as the basic unit of heredity, and evolution as the engine that propels the creation of new species. It is also understood that all organisms survive by consuming and transforming energy and by regulating their internal environment.

Why study Biology is importance ?

- Because of its great variety, biology is one of the most interesting subject and important for everyone, many biologists are working on problems that critically affect our lives, such as the world's rapidly expanding population and diseases like CANCER and AIDS.
- The knowledge that biologists are gaining will be fundamental to our ability to manage the world's resources in a suitable manner, to prevent or cure diseases, an understanding of how organisms function is essential for us to coexist successfully with our environment and with each other and to improve the quality of our lives.

Subdivision or Branches of biology

These are the main branches of biology:

- **Anatomy** – the study of form and function, in plants, animals, and other organisms, or specifically in humans.
- **Histology** – the study of cells and tissues, a microscopic branch of anatomy.
- **Astrobiology** (also known as exobiology, and bio astronomy) – the study of evolution, distribution, and future of life in the universe.
- **Biochemistry** – the study of the [chemical reactions](#) required for life to exist and function, usually a focus on the cellular level.
- **Biogeography** – the study of the distribution of species spatially and temporally.

- **Bioinformatics** – the use of information technology for the study, collection, and storage of genomic and other biological data.
- **Biomathematics** – the quantitative or mathematical study of biological processes, with an emphasis on modeling.
- **Biomedical research** – the study of health and disease.
- **Pharmacology** – the study and practical application of preparation, use, and effects of drugs and synthetic medicines.
- **Biophysics** – the study of biological processes through physics, by applying the theories and methods traditionally used in the physical sciences.
- **Biotechnology** – the study of the manipulation of living matter, including **genetic modification** and **synthetic biology** .
- **Botany** – the study of plants.
- **Cell biology** – the study of the cell as a complete unit, and the molecular and chemical interactions that occur within a living cell.
- **Ecology** – the study of the interactions of living organisms with one another and with the non-living elements of their environment.
- **Epidemiology** – a major component of public health research, studying factors affecting the health of populations.
- **Genetics** – the study of genes and heredity.
- **Hematology** – the study of blood and blood-forming organs.
- **Microbiology** – the study of microscopic organisms (microorganisms) and their interactions with other living things.
- **Bacteriology** – the study of bacteria.
- **Mycology** – the study of fungi.
- **Parasitology** – the study of parasites and parasitism.
- **Virology** – the study of viruses and some other virus-like agents.

- **Molecular biology** – the study of biology and biological functions at the molecular level, some cross over with biochemistry.
- **pathology** – the study of diseases, and the causes, processes, nature, and development of disease.
- **Physiology** – the study of the functioning of living organisms and the organs and parts of living organisms.
- **Zoology** – the study of animals, including classification, physiology, development, and behavior, including:
 - **Ethology** – the study of animal behavior.
 - **Entomology** – the study of insects.
 - **Herpetology** – the study of reptiles and amphibians.
 - **Ichthyology** – the study of fish.
 - **Mammalogy** – the study of mammals.
 - **Ornithology** – the study of birds.