

## Meaning, Branches and Importance of studying Natural Science

### Natural Science: – Meaning

What is Natural science? The natural sciences seek to understand how the world and universe around us works. Natural science is a branch of science concerned with the description, prediction, and understanding of natural phenomena, based on empirical evidence from observation and experimentation. Mechanisms such as peer review and repeatability of findings are used to try to ensure the validity of scientific advances.

### Branches of Natural Science:

Natural science can be divided into two main branches: life science (or biological science) and physical science. Life Science, include botany and zoology; and Physical science is subdivided into branches, including physics, chemistry, astronomy and Earth science. These branches of natural science may be further divided into more specialized branches (also known as fields). As empirical sciences, natural sciences use tools from the formal sciences, such as mathematics and logic, converting information about nature into measurements which can be explained as clear statements of the laws of nature.

### Life Science

Biology is a branch of Life science that involves the scientific study of living organisms from the molecular level to their interactions with one another and their environment. This field encompasses a set of disciplines that examines phenomena related to living organisms. The scale of study can range from sub-component biophysics up to complex ecologies. Biology is concerned with the characteristics, classification and behaviours of organisms, as well as how species were formed and their interactions with each other and the environment.

The biological fields of botany, zoology, and medicine date back to early periods of civilization, while microbiology was introduced in the 17th century with the invention of the microscope. However, it was not until the 19th century that biology became a unified science. Once scientists discovered commonalities between all living things, it was decided they were best studied as a whole.

Some key developments in biology were the discovery of genetics; evolution through natural selection; the germ theory of disease and the application of the techniques of chemistry and physics at the level of the cell or organic molecule. Modern biology is divided into sub disciplines by the type of organism and by the scale being studied. Molecular biology is the study of the fundamental chemistry of life, while cellular biology is the examination of the cell; the basic building block of all life. At a higher level, anatomy and physiology look at the internal structures, and their functions, of an organism, while ecology looks at how various organisms interrelate.

### Physical Science

Physics focuses on the physical properties of matter and energy and the interactions and relationships between these, and attempts to develop mathematical models to explain physical phenomena. Thus, Physics embodies the study of the fundamental constituents of the universe, the forces and interactions they exert on one another, and the results produced by these interactions. In general, physics is regarded as the fundamental science, because all other natural

science use and obey the principles and laws set down by the field. Physics relies heavily on mathematics as the logical framework for formulation and quantification of principles.

The study of the principles of the universe has a long history and largely derives from direct observation and experimentation. The formulation of theories about the governing laws of the universe has been central to the study of physics from very early on, with philosophy gradually yielding to systematic, quantitative experimental testing and observation as the source of verification. Key historical developments in physics include Isaac Newton's theory of universal gravitation and classical mechanics, an understanding of electricity and its relation to magnetism, Einstein's theories of special and general relativity, the development of thermodynamics, and the quantum mechanical model of atomic and subatomic physics.

The field of physics is extremely broad, and can include such diverse studies as quantum mechanics and theoretical physics, applied physics and optics. Modern physics is becoming increasingly specialized, where researchers tend to focus on a particular area rather than being "universalists" like Isaac Newton, Albert Einstein and Lev Landau, who worked in multiple areas.

### **Chemistry**

Chemistry constitutes the scientific study of matter at the atomic and molecular scale; it deals primarily with collections of atoms, such as gases, molecules, crystals, and metals. The composition, statistical properties, transformations and reactions of these materials are studied. Chemistry also involves understanding the properties and interactions of individual atoms and molecules for use in larger-scale applications.

Chemistry is one branch of Natural Sciences but it consists of many branches, such as inorganic chemistry, organic chemistry, physical chemistry and biochemistry. Chemistry can be viewed as the study of different types, components and properties of matter, and the chemical changes that different types of matter undergo.

### **Astronomy**

This discipline is the science of celestial objects and phenomena that originate outside the Earth's atmosphere. It is concerned with the evolution, physics, chemistry, meteorology, and motion of celestial objects, as well as the formation and development of the universe.

Astronomy includes the examination, study and modelling of stars, planets, comets, galaxies and the cosmos. Most of the information used by astronomers is gathered by remote observation, although some laboratory reproduction of celestial phenomena has been performed (such as the molecular chemistry of the interstellar medium). While the origins of the study of celestial features and phenomena can be traced back to antiquity, the scientific methodology of this field began to develop in the middle of the 17th century. A key factor was Galileo's introduction of the telescope to examine the night sky in more detail.

The mathematical treatment of astronomy began with Newton's development of celestial mechanics and the laws of gravitation, although it was triggered by earlier work of astronomers such as Kepler. By the 19th century, astronomy had developed into a formal science, with the introduction of instruments such as the spectroscope and photography, along with much-improved telescopes and the creation of professional observatories.

## **Earth Science or Geosciences**

Earth science is an all-embracing term for the sciences related to the planet Earth, including geology, geophysics, hydrology, meteorology, physical geography, oceanography, and soil science. Although mining and precious stones have been human interests throughout the history of civilization, the development of the related sciences of economic geology and mineralogy did not occur until the 18th century. The study of the earth, particularly palaeontology, blossomed in the 19th century. The growth of other disciplines, such as geophysics, in the 20th century, led to the development of the theory of plate tectonics in the 1960s, which has had a similar effect on the Earth sciences as the theory of evolution had on biology. Earth sciences today are closely linked to petroleum and mineral resources, climate research and to environmental assessment and remediation.

### **Importance of Studying Natural Science:**

The role of Science with reference to sustainable development and Health can be summarised as follows:

É By emphasizing and explaining the dependency of living things on each other and on the physical environment, science fosters the kind of intelligent respect for nature that can inform decisions on the uses of technology to improve the world for humans and all living things. The more science-literate individuals are, the stronger their society can be. Specifically, the lessons and skills science gives us can have effects that help make for more responsible citizens, a balanced economy, a healthier environment, and a brighter sustainable future for everyone.

É Science makes us aware of environmental problems.

É Helps to improve our understanding in areas such as climatic change, growth in rates of resource consumption, demographic trends, and environmental degradation.

É Use of technology for remote sensing and GIS helps in tracking environmental degradation

É Helps in meaningful resource utilization.

É Science helps suggest alternative practices to reduce pollution.

É Scientific knowledge should be applied to articulate and support the goals of sustainable development, through scientific assessments of current conditions and future prospects for the Earth system.

É Such assessments, based on existing and emerging innovations within the sciences, can be used in the decision-making process and in the interactive processes between the sciences and policy-making.

É To develop innovative, green solutions to address the climate, food and energy crises facing the world today, science, technology, research and development capacities for sustainable development must be strengthened.

The role of Science with reference to health issues can be summarised as follows:

É Advances in Science & Technology have led to longer, healthier, better lives.

É A generation that understands and honours or celebrates past achievements will welcome and pave the way for future discoveries and inventions that will improve physical and mental health.

É Science helps create an awareness of diseases (Physical and mental health),

Importance of having a balanced diet, measures to prevent diseases.