# Unit 1 BASIC CONCEPTS OF SCIENCE

## 1.1 The Nature of Science and its Branches

The word science comes from the Latin word 'Scientia', which means' Knowledge'. But science is not just about having knowledge: Science is a systematic method of gaining knowledge about the physical and natural world and the social aspect of human society. It provides an ordered way of learning about the nature of things, based on observation and evidence. Science can be indigenous or conventional.

**Indigenous science** is process by which indigenous people build their empirical knowledge of their natural environment. It is knowledge based on the social, physical and spiritual understandings.

**Conventional science** is the system of knowledge which relies on certain laws that have been established through the application of the scientific method to phenomena in the world around us.

Indigenous Science incorporating local people's knowledge and indigenous perspectives, while conventional scientific approaches are commonly recognized as Western science.

**Why Do You Learn Indigenous Knowledge In Science?**

There are two main reasons to include Indigenous Knowledge in the science: firstly, to increase awareness of original culture and identity and secondly, to integrate indigenous knowledge with western science. Ethiopia is one of the countries where a wide variety indigenous knowledge practiced for a long time to solve practical problem that exist in different areas like:

• extractions of medicinal chemicals from plants to treat disease and fight infections. The common medicinal plants used for treating and curing various disease are: Hagenia Abyssinica (Kosso tree) , Eucalyptus globulus (bahrzaf), and Ocimum lamiifolium Hochst (Damakese)etc

• preserving meat by adding a salt and smoke drying.

**1.1.2. Branches of Science**

Science has two major categories, which are natural science and social science. Natural science is the study of nature and natural laws. It includes fields such as Chemistry, Biology and Physics.

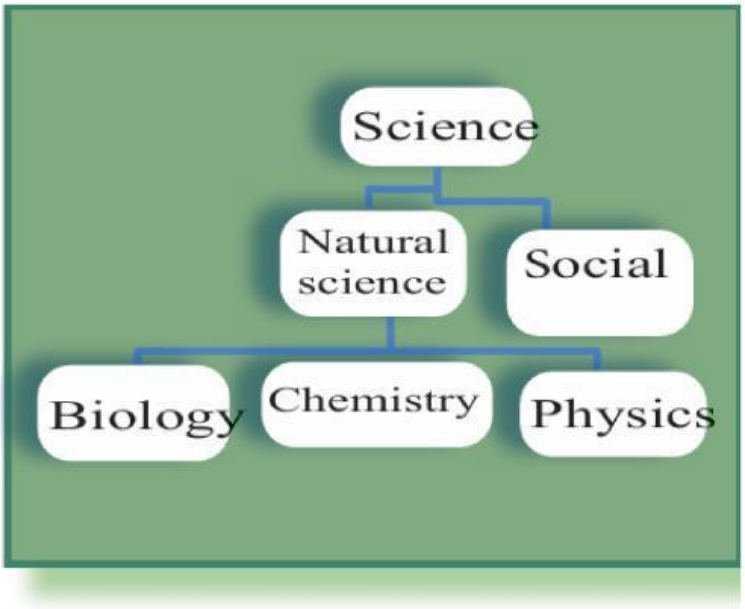


Figure 1.1. Branches of science

**Biology** is a branch of natural science which studies about living things.

**Chemistry** is a branch of natural science which deals with the properties, composition, structure and transformation of substances.

**Physics** is the branch of natural science. It is the study of the nature of matter, energy and their interactions

There is no clear boarder line between the different branches of natural sciences. Knowledge of natural sciences overlaps with each other. For example, Chemistry and Physics knowledge

are studied as a subject called physical science/physical chemistry. It is the study of properties of materials and their interaction.

**Biopysics:** a combination of Biology and Physics. It is the study of physical phenomena and physical processes in living things, on scales spanning molecules, cells, tissues and organisms.

**Biochemistry:** combination of biology and Chemistry. It is the branch of science that explores the chemical processes within and related to living organisms. It involves the study of chemical reaction in living things.

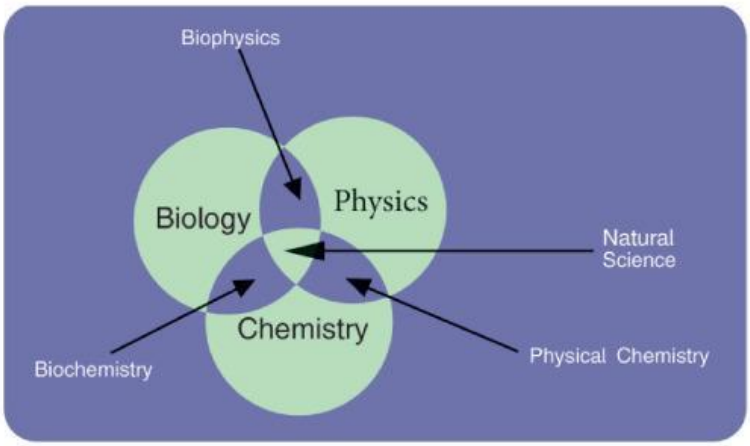


Figure1.2.The relationships between some fields of Natural Science

**Multiple Choice Questions**

1. **The word "science" originates from which Latin word?**

   a) Scientia b) Natura

   c) Cultura d) Physica

2. **What does the Latin word "Scientia" mean?**

   a) Nature b) Study

   c) Knowledge d) Law

3. **Science is best described as:**

   a) A collection of facts only b) A systematic method of gaining knowledge

   c) A belief system d) An unorganized way of thinking

4. **Science gains knowledge about:**

   a) Only physical things

   b) Only human culture

   c) The physical, natural world and social aspects of society

   d) Only the spiritual world

5. **Which of the following is the basis of science?**

   a) Assumptions b) Myths

   c) Observation and evidence d) Authority

6. **Indigenous science is based on:**

   a) Spiritual, social, and physical understanding

   b) Only experimental laboratories

   c) Western laws and principles

   d) Random guessing

7. **Conventional science mainly refers to:**

a) Myths and traditions

b) Western science

c) Only biology and chemistry

d) Indigenous practices

8. **Why is indigenous knowledge included in science?**

a) To replace conventional science

b) To increase cultural awareness and integrate with western science

c) To ignore modern research

d) To study only ancient rituals

9. **Which country is mentioned as practicing a wide variety of indigenous knowledge?**

a) Kenya

b) Ethiopia

c) Nigeria

d) Egypt

10. **Which of the following is an indigenous practice in Ethiopia?**

a) Use of electricity

b) Preserving meat with salt and smoke

c) Online medicine distribution

d) Printing books

11. **Which plant is known as the "Kosso tree"?**

a) Ocimum lamiifolium

b) Eucalyptus globulus

c) Hagenia abyssinica

d) Aloe vera

12. **Which plant is locally called "Bahrzaf"?**

a) Hagenia abyssinica
b) Eucalyptus globulus
c) Ocimum lamiifolium
d) Damakese

13. **Which plant is locally known as "Damakese"?**

a) Ocimum lamiifolium
b) Eucalyptus globulus
c) Hagenia abyssinica
d) Olive tree

14. **The two major categories of science are:**

a) Natural science and social science
b) Biology and Chemistry
c) Physics and Chemistry
d) Indigenous and Conventional

15. **Natural science is the study of:**

a) Human society only
b) Nature and natural laws
c) Spiritual world
d) History

16. **Which of the following is NOT a branch of natural science?**

a) Chemistry
b) Biology
c) Physics
d) Sociology

17. **Biology is the study of:**

a) Non-living things
b) Living things
c) Atoms and molecules
d) The universe as a whole

18. **Chemistry deals with:**

a) Planets and stars

b) Properties and transformation of substances

c) Human behavior

d) Laws of motion only

19. **Physics is the study of:**

a) Spiritual beliefs

b) Matter, energy, and their interactions

c) Social relationships

d) Human emotions

20. **The overlap of Chemistry and Physics is called:**

a) Biochemistry

b) Physical science / Physical chemistry

c) Biophysics

d) Natural science

21. **Biophysics is the combination of:**

a) Physics and Chemistry

b) Biology and Chemistry

c) Biology and Physics

d) Physics and Mathematics

22. **Biophysics studies:**

a) Stars and galaxies

b) Physical processes in living things

c) Human behaviour

d) Economic systems

23. **Biochemistry is the study of:**

a) Social life of humans

b) Physical reaction of materials

c) Chemical reactions in living organisms

d) Motion of planets

24. **Biochemistry combines:**

a) Biology and Physics

b) Chemistry and Physics

c) Biology and Chemistry

d) Physics and Mathematics

25. **The main difference between indigenous and conventional science is:**

a) Indigenous science ignores evidence

b) Conventional science is based on myths

c) Indigenous incorporates local culture, conventional relies on scientific laws

d) Conventional science is spiritual, indigenous is physical