

SEMESTER-2

PEDAGOGY OF SCHOOL SUBJECT –PSS-2: BIOLOGY

By

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UNIT –I: NATURE AND SCOPE OF BIOLOGICAL SCIENCE 08 Hours

1.1 Meaning and Nature of Biology- History of Biology and new developments.

1.2 Interdisciplinary linkages, biological science and society

1.3 Contributions of Indian biologists-ancient Biologist and Modern Biologists.

(Ancient Biologist -Aacharya, Sushruta, Charaka, Parashara.) (Modern

Biologists, Sir J.C. Bose, Dr. Haragobinda Khorana, Dr. P. Maheshwari,

Dr.Swaminathan. Dr.BGL Swamy.)

Meaning and Definition of Biological Sciences:

Biological Sciences is the study of life and living organisms.

It is also called as “Biology”.

The Greek word ‘bio’ means life and ‘logos’ means study of. In the late 1700s Pierre-Antoine de Monet and Jean-Baptiste de Lamarck coined the term biology.

- Earlier study of living things was restricted to the pure Science like Botany and Zoology that together comprise the Biology.
- But as the time passed new branches evolved, new technologies developed in pure subjects as well as in applied fields, which gave rise to a very broad science called Biological Sciences.

- Biological Sciences is an extensive study covering the minute workings of chemical substances inside living cells, to the broad scale concepts of ecosystems and global environmental changes.
- It is also concerned with the physical characteristics and behaviors of organisms living today and long ago, how they came into existence, and what relation they possess with each other and their environments.
- Intimate study of details of the human brain, the composition of our genes, and even the functioning of our reproductive system are dealt in Biological science.
- Today it is also called by new name- Life sciences.

- The life sciences can be defined as “a systematic study of living beings or study of nature”.
- Teaching of life Science basically deals with providing information about the latest developments in the field of Biological sciences all over the world.

The knowledge of Biological Sciences helps the student:

1. To develop the individual's sensitiveness to nature and make him feels at home with it.
2. To understand all living beings on the earth emerged from one being to another which inculcates 'oneness' of all living beings.
3. Develops scientific outlook.
4. Develops respect towards nature to protect it.

5. Removes 'dogmatic approach'.

6. To explain the living world in terms of scientific principles and appreciating all organisms which behave in different ways.

7. Show capabilities, which differ from one another.

8. Satisfy the curiosity of the students.

9. Generate interest about his surroundings.

History of Biological Sciences:

- Human knowledge of biology began with prehistoric man and his experiences with plants and animals and also through the instincts and efforts to explore the nature.
- The information was verbally passed on from one generation to another.
- The history of science therefore can be said to have begun with the history of human existence.

- During early period, people knew about medicinal and poisonous plants and knew that a heartbeat meant that someone or some animal was alive.
- They also had the idea that the conception of babies is in some way connected with sexual reproduction.

Groundbreaking Biology Discoveries & Breakthroughs

1. RNA Interference Discovered

- In the early 1990s, biologists started getting some odd results when trying to manipulate gene expression. The most striking example of this was in a study about petunias.
- Plant biologists were trying to intensify the red color on the flower petals by introducing a gene that induced the formation of a red pigment, but were surprised to discover that their efforts turned the flower entirely white.

2. Dolly the Sheep Becomes the First Adult Mammal Cloned

- In 1996, scientists cloned a female domestic sheep using adult somatic cells from the mammary glands through the process of nuclear transfer. The resulting sheep, Dolly, matured and reproduced naturally.
- Dolly was a significant biological breakthrough, because she demonstrated not only that a full, separate embryo with properly expressed cells of all types could be cloned from a cell taken from a specific part of the body, but also that the cell could come from a fully developed adult.

- **3. Human Genome Mapped**

- In 2000, scientists from across the world finished a rough draft of the map of the human genome. The final version was realized in 2003.
- This biological breakthrough was a difficult accomplishment to reach. It took more than 10 years and contributions from hundreds of scientists.

- **4. Stem Cells Created from Mature Skin Cells**

- In 2007, two separate teams of scientists from Kyoto University and the University of Wisconsin-Madison reverted adult skin cells, so that they could act like pluripotent stem cells.
- Pluripotent stem cells can differentiate into nearly all cells and were previously only found in embryonic stem cells. This new process of creating induced pluripotent stem cells from mature cells changed the “programming” of the cells telling them to become skin in favor of acting like embryonic stem cells that could end up being virtually any kind of cell.

