



“बेटी बचाओ, बेटी पढ़ाओ”

## JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

### (Format for Preparing E Notes)

### Faculty of FEM

**Faculty Name-** JV'n Dr. Priya Gothwal (Associate Professor)

**Program-** B.Sc. B.Ed-V sem / 2023-2024

**Course Name -** Pedagogy of Physical Science

**Session No. & Name –** 1.1/ Nature of Science (Unit-I)

#### Academic Day starts with –

- Greeting with saying ‘**Namaste**’ by joining Hands together following by 2-3 Minutes Happy session, Celebrating birthday of any student of respective class and **National Anthem**.

Lecture Starts with-

Review of previous Session- .....

- Topic to be discussed today- Today We will discuss about –

#### What is science? Explain the nature of science.

- Lesson deliverance (ICT, Diagrams & Live Example)-
  - PPT (10 Slides)
  - Diagrams

- University Library Reference- Journal
- Online Reference if Any
- Suggestions to secure good marks to answer in exam-
  - Explain answer with key point answers
- Questions to check understanding level of students-
- Small Discussion About Next Topic-
- Academic Day ends with-
  - National song' VandeMataram'

### **What is Science? Nature of Science:**

#### **Topic: What is science? Explain the nature of science**

**Definition:** Science is a systematic and organized study of the natural world, aiming to understand how it functions through empirical observation, experimentation, and the formulation of theories and laws. It seeks to uncover the underlying principles and mechanisms governing various phenomena, using a combination of logical reasoning and evidence-based investigation.

The nature of science is characterized by its reliance on:

- Empirical evidence,
- Testable hypotheses,
- Peer review, and
- The continuous refinement of knowledge through the application of the scientific method.
- It is inherently self-correcting and open to change based on new data and observations, fostering a dynamic and evolving understanding of the universe.
- The nature of science is also characterized by its objectivity, as it strives to minimize biases and subjectivity in the pursuit of knowledge.
- Scientists aim to formulate hypotheses that are falsifiable and can be tested through repeatable experiments and observations. Additionally, scientific inquiry involves

rigorous scrutiny through peer review, where findings are evaluated and critiqued by the scientific community to ensure accuracy and reliability.

- Furthermore, science is a collaborative endeavor, with researchers sharing their findings and building upon the work of others.
- It encourages skepticism and critical thinking, challenging established beliefs and theories to push the boundaries of our understanding.

Ultimately, the goal of science is to provide explanations and predictions about natural phenomena, leading to advancements in technology, medicine, and our overall comprehension of the world around us.

### **Topic: Nature of sciences -**

The nature of science involves several key aspects:

- **Empirical:** Science relies on empirical evidence obtained through observation and experimentation.
- **Tentative:** Scientific knowledge is always provisional, subject to modification in light of new evidence.
- **Objective:** It aims to be as objective as possible, minimizing the influence of personal bias and subjectivity in research.
- **Falsifiable:** Scientific ideas and hypotheses are formulated in a way that allows them to be tested and potentially proven false.
- **Replicable:** Experiments and studies must be replicable by other researchers to ensure the validity and reliability of the findings.
- **Self-correcting:** Science is a self-correcting process, with new information leading to the refinement and sometimes the rejection of previously accepted theories.
- **Creative:** While grounded in evidence, science also requires creativity in forming new hypotheses and designing experiments to test them.
- **Systematic:** Scientific investigations follow a systematic approach, employing logical and organized methodologies to gather and analyze data.

- **Communicative:** Scientists communicate their findings through publications, conferences, and discussions, allowing for the exchange of ideas and the collective advancement of knowledge.
- **Universal:** Scientific principles and laws are expected to hold true universally, regardless of cultural, geographic, or temporal differences.
- **Ethical:** Science is governed by ethical norms and guidelines that promote honesty, integrity, and the responsible use of data and resources.
- **Interdisciplinary:** Science often involves collaboration across various disciplines, encouraging the integration of knowledge from different fields to address complex and multifaceted challenges.
- **Predictive:** Science aims to make predictions about natural phenomena based on established principles, allowing for the anticipation of future outcomes and events.
- **Skeptical:** Scientists maintain a healthy skepticism, critically examining claims and evidence to ensure that conclusions are well-supported and reliable.
- **Paradigm shifts:** Over time, scientific breakthroughs can lead to paradigm shifts, fundamentally altering the way we perceive and understand the natural world.
- **Inclusive:** Science strives to be inclusive, welcoming diverse perspectives, backgrounds, and experiences, as it acknowledges that a variety of viewpoints can contribute to a richer and more comprehensive understanding of complex phenomena.

By encompassing these characteristics, the nature of science remains dynamic and adaptable, driving continuous exploration and advancement in various fields of study.

#### **Topic: Technology there in Science in School curriculum-**

Technological Science often leads to the development of new technologies that enhance our ability to explore, understand, and manipulate the natural world.

#### **Some facts are given below:**

- **Quantitative:** Science frequently involves the use of quantitative measurements, data analysis, and mathematical models to describe and explain phenomena accurately.

- **Empowering:** Through the acquisition of knowledge and understanding, science empowers individuals and societies to make informed decisions and enact positive changes for the betterment of humanity and the environment.
- **Evolving:** The body of scientific knowledge is continually evolving, with new discoveries and insights building upon existing theories and contributing to the ongoing development of various scientific fields.

These characteristics collectively contribute to the robust and dynamic nature of science, fostering an environment of curiosity, exploration, and innovation that drives progress and enriches our collective understanding of the world.

- **Iterative:** Science often involves an iterative process, where new data or observations lead to the refinement or modification of existing theories and hypotheses, further strengthening our understanding of natural phenomena.
- **Unbiased:** Scientists aim to minimize bias in their research, employing methodologies that ensure objectivity and impartiality in the interpretation of results.
- **Universal principles:** Science relies on the assumption that the laws of nature apply uniformly across different contexts and circumstances, allowing for the formulation of general principles that can be applied across various domains.
- **Historical context:** Scientific knowledge is shaped by historical context, as past discoveries and advancements form the foundation upon which current research and understanding are built.
- **Ethical responsibility:** Scientists have an ethical responsibility to consider the broader implications of their research, including the potential societal, environmental, and ethical impacts of their findings and technological advancements.

These aspects collectively contribute to the holistic and comprehensive nature of science, emphasizing its role as a powerful tool for elucidating the complexities of the universe and addressing the challenges and opportunities that confront humanity.