

Chapter 9 — Nature of Science

Exercise Short Questions (with Answers)

Class 9 Physics (New Syllabus) — Board Level

Q 9.1. State in your own words, what is science? Write its two main groups.

Ans: Science is the collective knowledge about the natural phenomena, processes and events occurring around us. It begins by asking how and why things behave as they do, and looks for orderliness among diverse phenomena. Its two main groups are the biological sciences, which deal with living things, and the physical sciences, which deal with non-living things.

Q 9.2. What is Physics all about? Name some of its branches.

Ans: Physics is the fundamental science that deals with the constituents of the universe: matter, energy, space, time and their mutual relationships and interactions. It strives to understand how the universe works, from the smallest subatomic particles to the largest galaxies. Its branches include mechanics, heat and thermodynamics, acoustics, optics, electromagnetism, quantum mechanics, nuclear physics and astronomy.

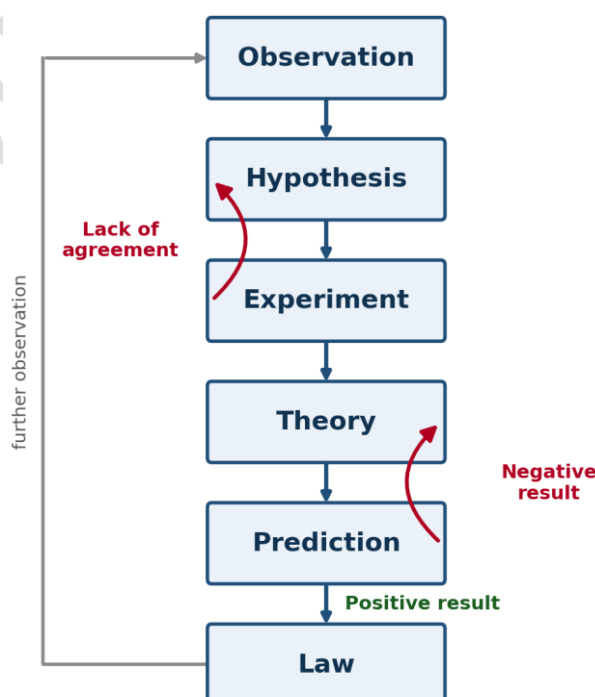
Q 9.3. What is meant by interdisciplinary fields? Give a few examples.

Ans: Interdisciplinary fields refer to the integration and interaction of Physics with various other fields of study. Physics, being a fundamental science, provides essential principles, techniques and methods that are applicable across a wide range of disciplines. Examples are biophysics, medical physics, astrophysics, geophysics, climate physics and computational physics.

Q 9.4. List the main steps of scientific method.

Ans: Scientific method is a systematic approach used to search for the truth of an issue. Its main steps are: identify the problem, gather information through observation, propose a hypothesis, perform experiments to test the hypothesis, record and analyse the data to reach a theory, and after repeated successful tests, formulate a law.

Q 9.4 The steps of the scientific method

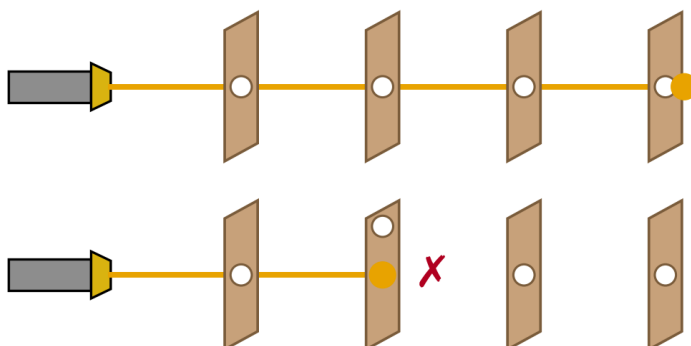


Q 9.5. What is a hypothesis? Give an example.

Ans: A hypothesis is an explanation or guess work proposed on the basis of the data collected through observation or experimentation. It assumes that nature will act in a particular way under certain circumstances. For example, from the observation that shadows of opaque objects are formed, we assume that light travels in a straight line.

Q 9.5 Testing a hypothesis by experiment

(a) all four holes in line — the light of the torch is seen



(b) one card displaced — no light passes through

The experiment proves the hypothesis that light travels in a straight line

Q 9.6. Distinguish between a theory and a law of Physics.

Ans: A theory is a logical explanation of the causes and effects of an event occurring in nature, and it is formed after an assumption has been successfully verified by careful experimentation. A law is a statement about the behaviour of nature that is formed when a theory has been tested many times and is generally accepted as true.

Q 9.7. What is the basis of laser technology?

Ans: Laser technology is based on the principles of atomic physics. Technology refers to the methods and techniques developed by using scientific knowledge, so the laser is an application of physical laws. It is widely used in medical diagnosis and treatment, metallurgy, industry, telecommunication and space exploration.

Q 9.8. What is falsifiability concept? How is it important?

Ans: Falsifiability is the concept that a theory is scientific only if it also makes predictions that can be tested and potentially proven false. Its importance is that it ensures theories are not based on vague, non-specific or untestable claims, and it distinguishes scientific theories from false or pretended beliefs that cannot be experimentally tested.