Dear students,

Now, we are going to learn about the lesson – Nature of physical world and measurement.

INTRODUCTION – SCIENCE

- The word **'science'** has its root in the Latin verb ***scientia***, meaning ***"to know"***.
- In Tamil language, it is **'□□□□□□□□'** (Ariviyal) meaning **'knowing the truth'.**
- Science is the systematic organization of knowledge gained through observation, experimentation and logical reasoning.
- The knowledge of science dealing with non-living things is physical science (Physics and Chemistry), and that dealing with living things is biological science (Botany, Zoology etc.)

SCIENTIFIC METHOD:

- The scientific method is a step-by-step approach in studying natural phenomena and establishing laws which govern these phenomena.
- Any scientific method involves the following general features.
  (i) Systematic observation
  (ii) Controlled experimentation
  (iii) Qualitative and quantitative reasoning
  (iv) Mathematical modelling
  (v) Prediction and verification or falsification of theories.

INTRODUCTION – PHYSICS

- The word 'physics' is derived from the Greek word ***"Fusis",*** meaning nature.
- The study of nature and natural phenomena is dealt with in physics.

Unification:

- It is act of unifying the different laws valid for different phenomena in to a single theory that explains all the different phenomena.
- For example- Newton's universal law of gravitation (in unit 6) explains the motion of freely falling bodies towards the Earth, motion of planets around the Sun, motion of the Moon around the Earth, thus unifying the fundamental forces of nature.

Reductionism:

- Reductionism is breaking down of a complex system in to simple constituent systems to so that laws of physics can be applied on these systems and we can understand the working of the complex system.
- An attempt to explain a macroscopic system in terms of its microscopic constituents is ***reductionism***.

BRANCHES OF PHYSICS:

- Physics as a fundamental science helps to uncover the laws of nature. The language of its expression is mathematics.

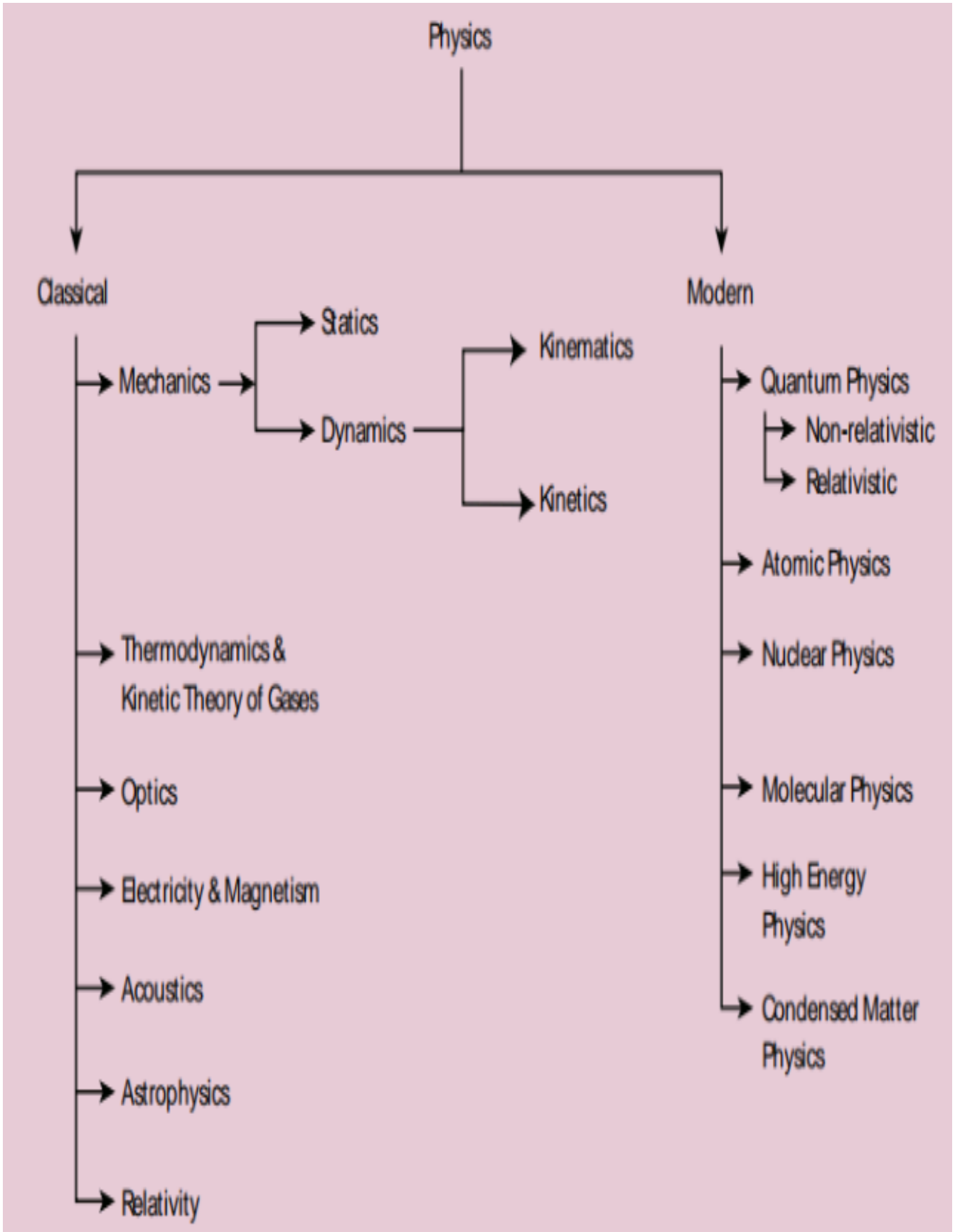
Physics
Classical
Modern
Statics
Mechanics
Kinematics
Dynamics
Kinetics
Quantum Physics
Non-relativistic
Relativistic
Atomic Physics
Nuclear Physics
Thermodynamics &
Kinetic Theory of Gases
Optics
Molecular Physics
Electricity & Magnetism
High Energy
Physics
Acoustics
Condensed Matter
Physics
Astrophysics
Relativity

Table 1.1 Branches of Physics

Classical Physics		**Refers to traditional physics that was recognized and developed before the beginning of the 20th century**
	Branch	**Major focus**
1.	Classical mechanics	The study of forces acting on bodies whether at rest or in motion
2.	Thermodynamics	The study of the relationship between heat and other forms of energy
3.	Optics	The study of light
4.	Electricity and magnetism	The study of electricity and magnetism and their mutual relationship
5.	Acoustics	The study of the production and propagation of sound waves
6.	Astrophysics	The branch of physics which deals with the study of the physics of astronomical bodies
7.	Relativity	One of the branches of theoretical physics which deals with the relationship between space, time and energy particularly with respect to objects moving in different ways .
Modern Physics		**Refers to the concepts in physics that have surfaced since the beginning of the 20th century.**
1.	*Quantum mechanics	The study of the discrete nature of phenomena at the atomic and subatomic levels
2.	Atomic physics	The branch of physics which deals with the structure and properties of the atom
3.	Nuclear physics	The branch of physics which deals with the structure, properties and reaction of the nuclei of atoms.
4.	Condensed matter physics	The study of the properties of condensed materials (solids, liquids and those intermediate between them and dense gas). It branches into various sub-divisions including developing fields such as nano science, photonics etc. It covers the basics of materials science, which aims at developing new material with better properties for promising applications.
5.	High energy physics	The study of the nature of the particles.

URL: https://www.youtube.com/watch?v=Cu9RJ9LwZy0&feature=youtu.be