

SATISH GOYAL PHYSICS CLASSES

**PHYSICAL WORLD AND
MEASUREMENT**

PHYSICS –XI-(CHAPTER-1)

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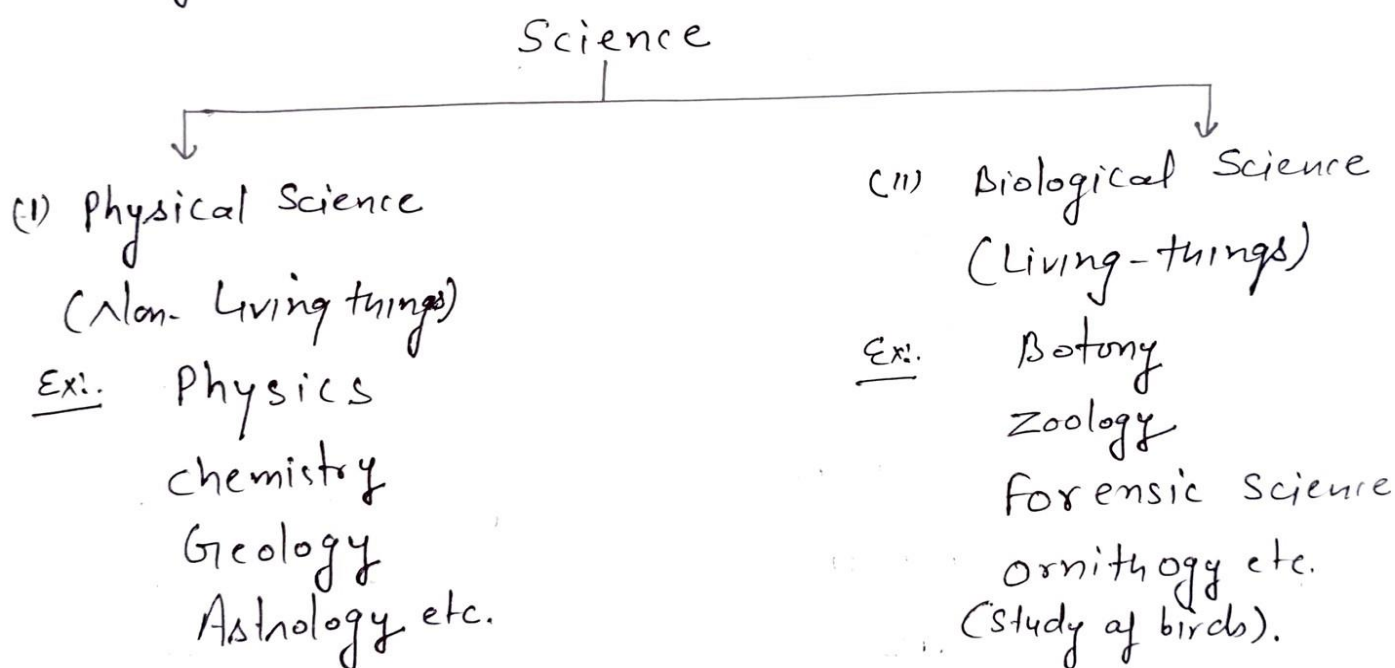
Introduction - Chapter-1.

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What is Science. = ?

How we Define Science, In simple word if we see around us everything is Science.

In fact, Knowledge which human have gained through observations and Experiments, when it organised systematically is called Science

What is Physics.

It is the branch of Science which is devoted to the study of Nature and its phenomena.

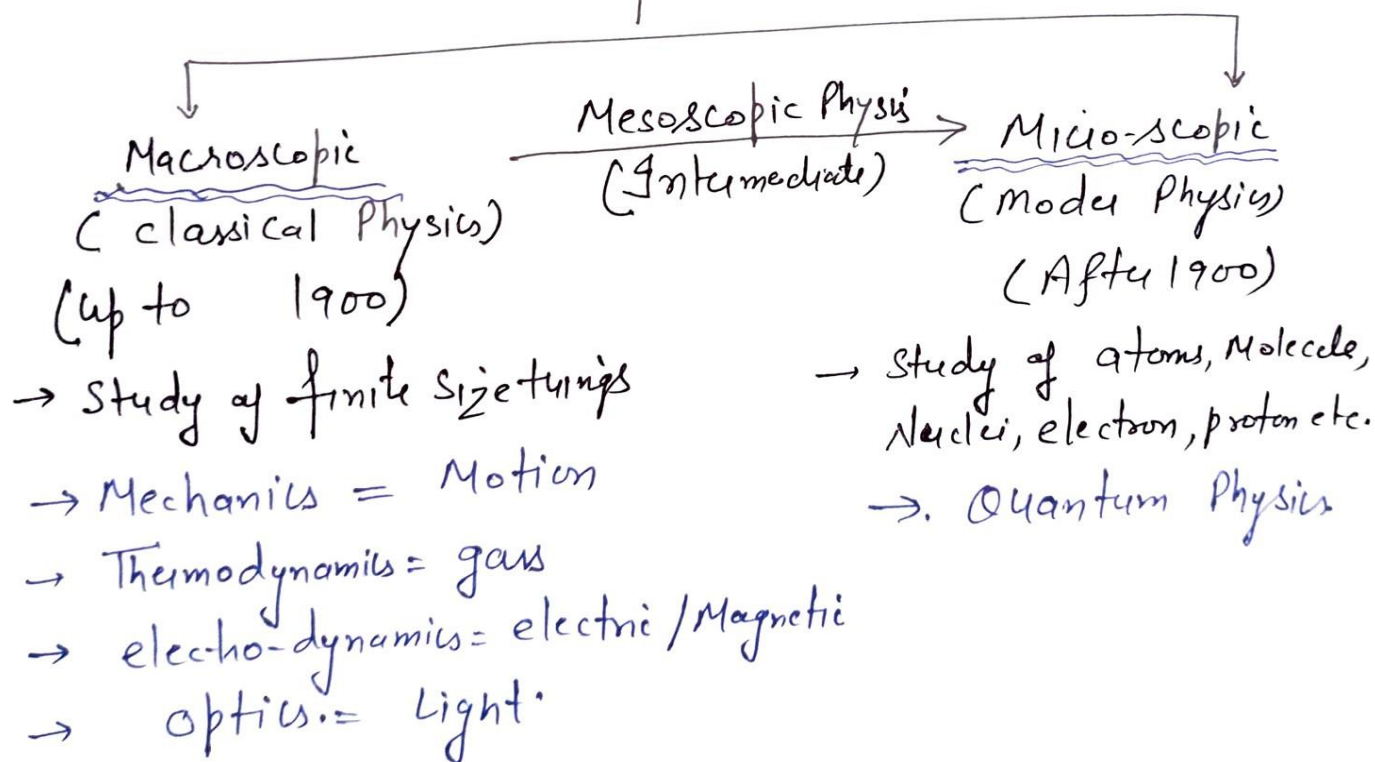
We apply Physics in any activity by keeping one thing in our mind that is unification

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and 2nd is Small part.

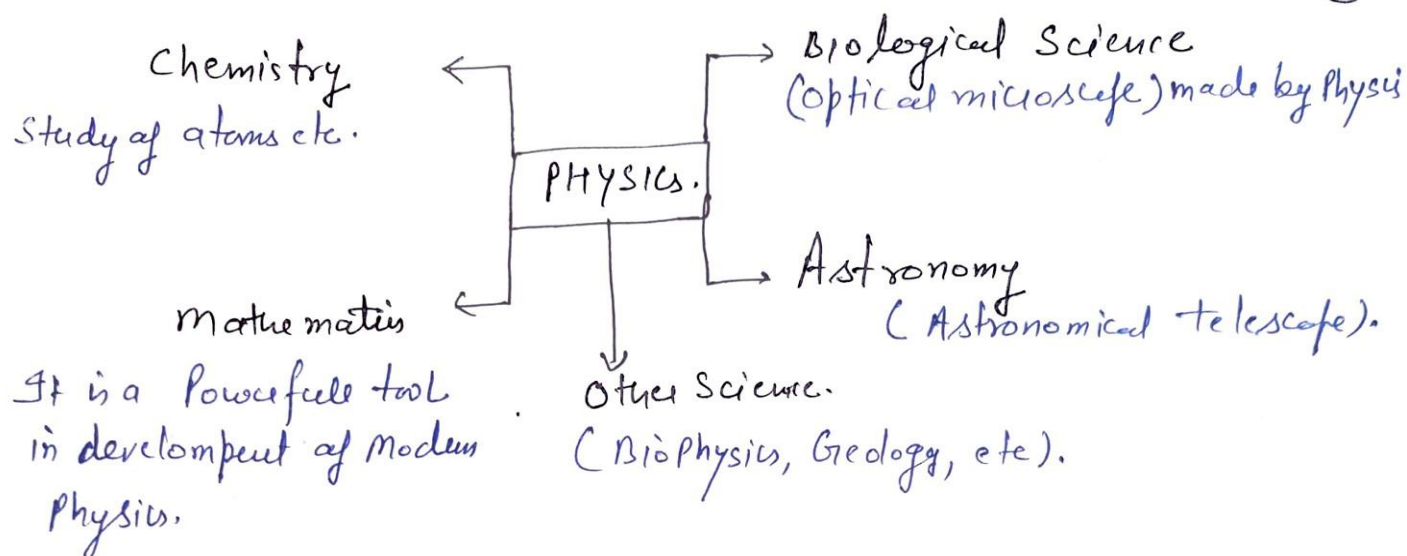
we apply Newton's Law in many activity (which we see later) this show the unification of Physics. also if there is large number of activity of different particles. then we apply Physics in small part and get the result. then we apply this in all particles.

Physics.



also, Physics has played a key role in the development of many other Branches of Science.

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Physics Related to Society

- 1) The development of Mobile, T.V, Satellites, Computer, Lasers, Rapid Transport, New source of Energy etc. all these things we used in Society. made by Physics only. Hence, Most of the Developments in Physics have a Direct Impact on Society.

Physics in Relation To Technology

Technology is the Application of Physics.

Confuse ???

Let take an Example. Steam engine is the technology Based on "Law of thermodynamics" a Physics Concept (we discuss it ch=12)

Some times technology rise to new physics and some other times, physics generate New technology. (4)

Some technology and Physics Link

- 1) Aero-plane = Bernoulli's principle
- 2) Radio/TV = electro-magnetism
- 3) Computer = Digital Logic
- 4) Rocket = Newton's Law of Motion.

Fundamental forces in nature

There are four fundamental forces.

- | | |
|-------------------------------|-----------------------------|
| (i) Gravitational forces | (ii) Weak Nuclear forces. |
| (iii) Electro-magnetic forces | (iv) Strong Nuclear forces. |

Gravitational forces :- it is attractive force between two objects having mass. it is very weak force.

Weak Nuclear forces :- forces of interaction between elementary particles of short life times. it is stronger than gravitational force. (around 10^{25} times).

{ elementary particles are Laptons, ~~lepto~~ mesons, etc. These particles are smaller than electron, proton, neutron. But at this level we don't about these particle. But in class 12th we discuss it but not in detail. }

(5)

(c) Electro-magnetic force.

- force between charged particles.
- operate, Not very Large Distance.
- stronger than gravitational force (10^{36} times).

Macroscopic force, like force between two surface, force of friction, tension in spring, force due to spring etc are also due to charged particles.

(d) Strong Nuclear force:-

- The force between Neutrons and protons (In nucleus).
- it is stronger than electro-magnetic force (about: 10^{38} times).
- that's why nucleus is stable, Because proton-proton has repulsive force due to their positive charge But strong nuclear forces bind them.
- it is very short range force.
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$$F_n : F_w : F_E : F_N$$

$$1 : 10^{25} : 10^{36} : 10^{38}$$

Nature of Physical Laws:- In Physics, some

Special Physical Quantities remain constant in time.

These are called the Conserved Quantities of Nature.

These Quantities are

(i) Law of Conservation of charge

(ii) " " " " " Energy

(iii) " " " " " linear momentum

(iv) Laws of Conservation of Angular momentum. (6)

Laws of Conservation of Energy :- The sum of All kinds of Energy in this universe is remain Constant. it Can change from one form to another. But total Energy is Conserved. (Same).

According to Einstein's Theory. mass is equivalent to Energy, Energy Can be obtained at the Cost of mass and vice-versa, Hence, mass conservation is equivalent to Energy Conservation.

Law of Conservation of linear momentum :-

In the absence of an external force, The linear momentum of a system remains unchanged.

Law of Conservation of Angular momentum

Angular momentum (L) = moment of Inertia $\times$ Angular speed (ω)

$$L = I \times \omega$$

if the total external Torque acting on a system is zero, Angular momentum of the system remain Constant.

Law of Conservation of charge :- Charge are neither created nor destroyed, but are simply Transferred from one body to another.