FIRST TERM E-LEARNING NOTE

SUBJECT: PHYSICS **CLASS: SS 1**

SCHEME OF WORK

WEEK TOPICS

1 Introduction to Physics; Familiarization of Physics Laboratory
2 Measurement of Mass, Weight, Length and Time;
3. Motion in Nature, Force, Circular Motion, Centripetal and Centrifugal Forces
4. Frictions
5. Vector and Scalar Quantity, Distance/Displacement, Speed/Velocity, Acceleration, Distance/Displacement-Time Graph, Speed/Velocity-Time Graph, equations of uniformly acceleration
6. Calculations on velocity-time graph.
7. Density and Relative Density
8. Upthrust, Archimedes Principle, Law of floatation, Pressure
9. Work, Energy and power. Work Done in a Force Field, Types of Energy and Energy Conversion.
10. Viscosity
11. Revision

REFERENCE BOOKS

- New School Physics. By Prof. M.W Anyakoha
- New System Physics. By Dr. Charles Chow et.al

WEEK ONE
TOPIC: INTRODUCTION TO PHYSICS
CONTENT

- **MEANING OF PHYSICS**
- **FUNDAMENTAL QUANTITIES AND UNITS**
- **DIMENSIONS OF PHYSICAL QUANTITIES**

MEANING OF PHYSICS

Physics is the scientific study of matter and energy and how they interact with each other. This energy can take the form of motion, light, electricity, radiation, gravity etc. Physics deals with matter on scales ranging from sub-atomic particles (i.e. the particles that make up the atom and the particles that make up those particles) to stars and even the entire galaxies. It can also be defined as a natural science that involves the study of matter and its motion through space-time, as well as all applicable concepts, such as energy and force. More broadly, it is the general analysis of nature, conducted in order to understand how the universe behaves.

Physics is one of the oldest academic disciplines, perhaps the oldest through its inclusion of astronomy. Over the last two millennia, Physics had been considered synonymous with Philosophy, Chemistry, and certain branches of Mathematics and Biology, but during the scientific revolution in the 16th century, it emerged to become a unique modern science in its own right. However, in some subject areas such as in mathematical physics and quantum chemistry, the boundaries of physics remain difficult to distinguish.

Physics is both significant and influential, in part because advances in its understanding have often translated into new technologies, but also because new ideas in Physics often resonate with other sciences, Mathematics, and Philosophy. For example, advances in the understanding of electromagnetism or Nuclear physics led directly to the development of new products which have dramatically transformed modern-day society, such as television, computers, domestic

appliances, and nuclear weapons; advances in thermodynamics led to the development of motorized transport; and advances in mechanics inspired the development of calculus.

In order to understand clearly the fundamental concepts, Physics is divided into two main branches:

(i) Classical Physics – This consists of the following: mechanics, heat, optics, wave and sound, electricity and magnetism.

(ii) Modern Physics – This covers the aspects of matter energy and their relations at atomic and sub-atomic levels.

Other fields of Physics are: Geophysics, Astrophysics, Bio-physics, Nuclear physics, Engineering physics etc.

EVALUATION

1. What do you understand by the term "Physics"?
2. State the step involved in scientific method?

FUNDAMENTAL QUANTITIES AND UNIT

Measurements play an important role in Physics. A unit has to be defined before any kind of measurement can be made. Different systems of units have been used in the past. These include the foot – pound – second (FPS) system, the centimetre – gramme – second (CGS) system, and the metre – kilogramme – second (MKS) system. The new system which has now gained universal acceptance is the systeme international d'units, usually called S.I. units.

Physical quantities are often divided into fundamental quantities and derived quantities.

FUNDAMENTAL QUANTITIES:

These are the basic quantities that are independent of others and cannot be defined in terms of other quantities.

They are the basic quantities upon which most (though not all) quantities depend.

FUNDAMENTAL UNITS: are the basic unit upon which other units depend. They are the units of the fundamental quantities.

The three most important basic quantities in Physics are length, mass and time.

Length may be defined as the extent of space or distance extended.

Mass is commonly defined as the quantity of matter or material in the body.

Time is defined as that in which events are distinguishable with reference to before or after. Examples of fundamental quantities and their units are shown below:

Table 2.0 Fundamental Quantities and Units

Quantity	Unit	Unit – abbreviation
Length	Metre	M
Time	Second	S
Mass	Kilogram	Kg
Electric current	Ampere	A
Temperature	Kelvin	K
Amount of substance	Mole	mol
Luminous intensity	Candela	Cd

DERIVED QUANTITIES AND UNITS

Derived quantities and units are those obtained by some simple combination of the fundamental quantities and units. They are dependent on the fundamental quantities and units. Some examples of derived quantities and units are…