**EMERALD ROYAL INTERNATIONAL SCHOOL, MPAPE ABUJA**

**LESSON PLAN AND NOTE FOR WEEK 10 ENDING FRIDAY: 10th MARCH, 2023**

**TERM:** 2nd

**WEEK:** 9th

**DATE** : 6th – 10th March 2023

**SUBJECT:** Physics

**CLASS :** SS 2

**TOPIC:**  **PARTICULATE NATURE OF MATTER**

**SUB - TOPIC: 1. Structure of matter - Evidence of particle nature of mater**

1. **Simple atomic structure**
2. **Molecules -Their nature & Size.**

**PERIOD:** 3rd

**TIME:** 9: 30 - 10:10am

**DURATION:** 40 minutes

**AVERAGE AGE:** 17 years

**SEX:** Mixed

**SPECIFIC OBJECTIVES:** By the end of the lesson, students should:

1. Explain the structure of matter
2. Explain the atomic structure
3. Define molecules

**RATIONALE:** To enables students understand the concept matter

**PREVIOUS KNOWLEDGE:** Students have being taught matter

**INSTRUCTIONAL RESOURCES:** Charts showing fields, bar magnets and properties of fields

**REFERENCE:** Senior Secondary School Physics by P.N. Okeke et al, New School Physics for Senior Secondary Schools by Anyakoha, M.W, Comprehensive Certificate Physics by Olumuyiwa Awe and Okunola, O.O, Science Teachers Association of Nigeria Physics for Senior Secondary School, Book 1. New Edition and Melrose Physics for Senior Secondary School, Book 1 by Akano, O and Onanuga, O.O.

**LESSON DEVELOPMENT**

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| **STEPS** | **TEACHER’S ACTIVITIES** | **STUDENTS’ ACTIVITIES** | **LEARNING POINTS** |  |
| **INTRODUCTION** | The teacher introduces the lesson by asking the following questions::   1. What is matter? 2. State the components of an atom 3. What is molecules? | The students respond based on their previous knowledge | To arouse the students interest toward the lesion. |  |
| **STEP 1** | The teacher defines and explains matter and its structure | The students pay attention. | To keep them focus. |  |
| **STEP 2** | The teacher explains the simple atomic structure | The students explain the simple atomic structure | To encourage critical thinking |  |
| **STEP 3** | The teacher defines molecules, nature and sizes | The students participate in the class discussion | To encourage students retentiveness |  |
| **BOARD SUMMARY** | **Sub-Topic 1: STRUCTURE OF MATTER**  Matter can be defined as anything that has mass and occupies space. All substances are made up of matter and are all acted upon by gravitational force towards the centre of the earth.  When a matter such as a piece of yam is cut into smaller and smaller bits, one would eventually find the smallest particle which could not be divided further. Such particles are called molecules.  Matter can exist in the following states:   * Solid state * Liquid state and * Gaseous state.   **Evidence of Particle Nature of Matter**  The fact that matter is made up of particles is evident from the phenomena of diffusion and Brownian motion.  ***The random motion of particles such as smoke as a result of being bombarded by invisible air molecules is known as*** ***Brownian Motion.***  ***Diffusion is the process by which substances mix thoroughly, together and intimately with one another as a result of the random motion of their molecules.*** The direction of the molecules is in such a way that they flow from the region of higher concentration to the region of lower concentration. Diffusion is fastest in gaseous state and least in solid state.  The rate of diffusion is affected by the following factors:   * Mass of the molecules * Temperature * Density * Pressure * Concentration gradient   Other evidences of the particulate nature of matter are osmosis (the movement of molecules from a region of lower concentration to a region of higher concentration across a thin permeable membrane), and law of definite proportion.  **Sub-Topic 2: SIMPLE ATOMIC STRUCTURE**  Nucleus  Proton  Neutron    Electron  Outermost shell   * An atom is defined as the smallest unit of matter that can take part in a chemical reaction and is not capable of independent existence. * Every atom of a substance is believed to have a nucleus of about 10-15m in diameter. The nucleus of an atom contains neutron and proton, called the nucleons. * A nuclide is a particular species of atom, one whose nucleus contains a specified number of protons and neutrons. * The atomic number Z (when an element is considered), is the number of protons contained in the nucleus. This is equal to the number of electrons in a neutral atom of the element. * The mass number A is the number nucleons (protons plus neutrons) in the nucleus. * Isotopes are nuclides having the same atomic number but different mass number. E.g, * Isobars are nuclides having the same mass number but different atomic number. E.g     The below table summarizes the properties of the elementary particles in the atom of an element.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **S/N** | **Elementary Particles** | **Charge(Coulomb)** | **Mass(kg)** | **Location in the atom** | | 1. | Proton | Positively charged |  | Nucleus | | 2. | Neutron | Neutral |  | Nucleus | | 3. | Electron | Negatively charged |  | Outermost shell or orbit |  |  |  |  |  | | --- | --- | --- | --- | | **Particle** | **Charge** | **Mass (kg)** | **Relative Mass (amu)** | | Proton | +1 | 1.6727 x 10-27 | 1.007316 | | Neutron | 0 | 1.6750 x 10-27 | 1.008701 | | Electron | -1 | 9.110 x 10-31 | 0.000549 |   The important points to keep in mind are as follows:   * Protons and neutrons have almost the same mass, while the electron is approximately 2000 times lighter. * Protons and electrons carry charges of equal magnitude, but opposite charge. Neutrons carry no charge (they are neutral).   **Sub-Topic 3: MOLECULES -THEIR NATURE & SIZE**  All matter is made up of tiny particles called molecules. These molecules themselves are made up of tinier particles called atoms. Both molecules and atom are too tiny to be seen with the naked eyes.  One mole of every substance is believed to contain about molecules. One molecule of a substance could be found from the combination of two or more elements of that substance.  ***Hence, we define a molecule as ‘’ the smallest unit of matter that is capable of independent existence’’.*** This means that a molecule of a substance could exist alone.  ***An atom is defined as the smallest unit of matter that can take part in a chemical reaction and is not capable of independent existence.***  ***An element is any substance in which everything could be built up. It is a substance which consists of only one kind of matter and cannot be broken down into anything simpler by any chemical means.*** | The students copy notes into their exercise book | For future reference. |  |
| **Evaluation** | The teacher evaluates the students with the following questions:   1. Explain the structure of matter 2. Explain the atomic structure 3. Define molecules | The students attempt the questions. | To ascertain their level of understanding. |  |
| **Conclusion** | The teacher concludes the lesson by making corrections where necessary and go through their notes. | The students copy the note on the board. | For future use. |  |
| **Assignment** | The teacher evaluates the students as follows:  1. What are the elementary particles contained in the nucleus of an atom?  2. Write down their masses and charges.  3. Which particle is located in the outermost shell?  4. On what condition will a body be considered a matter?  5. In what state of matter is diffusion a) fastest b) slowest?  6. What is the direction of flow of molecules during diffusion?  7. Define the following terms.   1. Molecule 2. An atom 3. An element. 4. Which of the above is capable of dependent existence? 5. Which of them is capable of independent existence?   **GENERAL EVALUATION:**  1. Differentiate an atom from a molecule.  2. Highlight the states of matter.  3. Enumerate the factors capable of influencing diffusion rate.  4. What were the evidences to prove the particulate nature of matter?  **WEEKEND ASSIGNMENT:**  1. The following are elementary particle, except ---   1. Electron 2. Nucleus 3. Neutron 4. Proton   2. In a neutral atom of an element,   1. The quantity of electron at the orbit outnumber that of the proton in the nucleus. 2. The electron has no charge but has a relative mass of . 3. The number of proton in the nucleus equals that of the electron in the outermost shell. 4. The charge on the proton equals that of the neutron in the nucleus.   3. Which of the following is the correct mass value for an electron?   1. 9.110 x 10-31g 2. 9.110 x 10-30 kg 3. 6.110 x 10-31 kg 4. 9.110 x 10-31 kg   4. One of the below is capable of independent existence.   1. Atom 2. Element 3. Molecule 4. Compound   5. Considering the element, , ‘P’ represents ---   1. Atomic number. 2. Mass number. 3. Number of proton 4. Non of the above.   **Essay**  1. Briefly discuss the atomic structure.  2. Make a distinction between an isotope and an isobar. | The students copy assignment solve at home and submit for marking endorsement. | To encourage further studying at home. |  |



31/3/2023

Principal Head Instructor