**EMERALD ROYAL INTERNATIONAL SCHOOL, MPAPE ABUJA**

**LESSON PLAN AND NOTE FOR WEEK 1 ENDING FRIDAY: 13th JANUARY, 2023**

**TERM:** 1st

**WEEK:** 1st

**DATE** : 9th - 13th January 2023

**SUBJECT:** Physics

**CLASS :** SS 1

**TOPIC:** Heat Energy

**SUB - TOPIC:** i. Concept of temperature

ii. Effects of heat

iii. Expansion of solids and its consequences and application

**PERIOD:** 3rd

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

**DURATION:** 40 minutes

**AVERAGE AGE:** 16 years

**SEX:** Mixed

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

1. Define temperature
2. State the effects of heat
3. State the consequences and application of expansion

**RATIONALE:** To enables students understand the concept of heat and temperature

**PREVIOUS KNOWLEDGE:** Students have being taught heat and temperature

**INSTRUCTIONAL RESOURCES:** Charts showing effects of heat and temperature

**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 questions as follows:   1. What is heat? 2. Define temperature 3. State the effects of heat. | The students respond based on their previous knowledge | To arouse the students interest toward the lesion. |
| **STEP 1** | The teacher defines temperature and heat | The students pay attention. | To keep them focus. |
| **STEP 2** | The teacher lists and explains the effects of heat. | The students state the effects of heat | To encourage critical thinking |
| **STEP 3** | The teacher explains the consequences and application of heat. | The students participate. | To encourage retention ability. |
| **BOARD SUMMARY** | **Sub topic 1: Concept of heat and temperature**  Heat is a form of energy that moves from one point to the other due to temperature difference. When you dip one end of an iron rod into fire and hold the other end with your hand, this other end soon becomes hot because energy has flowed from the point dipped into the fire to this other end. This energy flow is what is known as heat. Temperature is a measure of how cold or hot a body is.  **Differences between heat and temperature**   |  |  | | --- | --- | | **Heat** | **Temperature** | | It is a form of energy | It is not a form of energy | | It is measured in joules | It is measured in Kelvin | | it is a form of energy transferred from a body at a higher temperature to one at a lower temperature | it is a measure of the average kinetic energy of the constituent particle of the a substance | | it is a derived quantity | It is a fundamental quantity | | Other unit for measuring heat :calorie (Cal), kcal, ... | Other units include: 0F, 0C | | It can be determined using a calorimeter | It can be measued using a thermometer |   **The kinetic theory of matter**  The kinetic theory of matter states that:   1. Matter is made up of atoms and molecules. 2. The molecules are in a state of constant random motion. 3. They possess kinetic energy because of their motion. 4. The kinetic energy of the molecules is directly proportional to the temperature of the body.   **Sub topic 2: Effects of heat on substances (expansion, vaporization)**  When heat is applied to a substance, it can lead to the following changes   1. Chemical changes. 2. Temperature changes. 3. Expansion/contraction. 4. Change of state (melting, vaporization, sublimation). 5. Change in pressure in gases at constant volume. 6. Thermionic emission.   **Thermal expansion**  Most solid substances expand when heated. The rate of expansion varies from one solid to another. Expansion is more pronounced in gases followed by liquids and least in solids. A substance whether solid, liquid or gaseous consists of molecules. When the substance is heated, the molecules gain kinetic energy and move faster and hence the molecules take up more space in the substance. This leads to expansion.  **Ball and ring experiment**  Experiment to demonstrate expansion of a solid.  Apparatus: Bunsen burner, ball and ring apparatus  ring metal ball  Before heating After heating    **Solid expansion**  **Procedure:** Allow the metal ball to pass through the ring. Heat the metal ball for some time in the Bunsen burner and make it pass through the same ring. The metal ball will no longer pass through the same ring it passed through earlier as a result of expansion. When allowed to cool down for some time and allowed to pass through the ring once more, it will pass through because it has contracted and regained its original size.  **Using kinetic theory to explain temperature of a body**  According to the kinetic theory of matter, the average kinetic energy of the molecules is directly proportional to the temperature. This means that as the kinetic energy of the molecules increases, the temperature also increases. When a body is subjected to heat, the velocities of the molecules increases and hence they gain more kinetic energy this of course will lead to increase in the temperature of the body. On the other hand, if we reduce or lower the heat, the velocities of the molecules will decrease leading to a decrease in the kinetic energy of the molecules. Hence the temperature falls or reduces. | The students copy notes into their exercise book | For future reference. |
| **Evaluation** | The teacher evaluates the students with the following questions:   1. Define temperature and state its unit. 2. State three assumptions of the kinetic theory of matter | The students attempt the questions. | To ascertain their level of understanding. |
| **Conclusion** | The teacher concludes by making corrections where necessary. | The students copy the note on the board. | For future use. |
| **Assignment** | 1. Give three differences between heat and temperature 2. Explain the phenomenon of expansion using the kinetic theory of matter 3. Give four effects of heat on a substance | The students solve assignment submit for marking and correction. | To encourage the students to study at home. |



7/3/2023

Principal Head Insrtuctor

NOTE: Take note of the highlighted items; red shows omission while yellow shows a preferred sentence construction.

Effect all the corrections on other or subsequent lesson note before uploading or submitting for endorsement.