ESSON PLAN FOR WEEK TWO ENDING 22ND SEPTEMBER, 2023

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| THEME: | Heat |
| DATE: | 21 – 09 – 2023 |
| CLASS: | SS2 |
| TIME: | 10:30am - 11:50am |
| DURATION | 80 MINUTES |
| PERIOD | 2 |
| SUBJECT: | Physics |
| UNIT TOPIC: | Measurement of Heat Energy |
| LESSON TOPIC: | Determination of Specific Heat Capacity |

SPECIFIC OBJECTIVE: By the end of the lesson, learners should be able to

1. Determine the Specific Heat Capacity of a solid by mixture method
2. Determine the Specific Heat Capacity of a solid by electrical method
3. Use these two above methods to solve problems

INSTRUCTIONAL RESOURCES: Charts showing different substances and their respective specific heat capacities.

LESSON PRESENTATION

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| STEP 1 | PREVIOUS KNOWLEDGE: The students are conversant with thermometers. | | Students recall. |
| STEP 2 | EXPLORATION: The teacher arouses the interests of the learners by telling them why a piece of steel bar and copper bar of the same mass do not become hot at the same rate when supplied with same quantity of heat, using his chart. | |  |
| STEP 3 | DISCUSSION:  **DETERMINATION OF SPECIFIC HEAT CAPACITY BY MIXTURE METHOD**  The solid lead block is weighed on a balance to be . A lagged calorimeter is dried and weighed to be . It is then reweighed to be when half filled with water. The initial temperature of the water is taken to be .  The lead block is suspended in boiling water with a temperature after which it is transferred to the calorimeter and the mixture stirred to maintain a uniform temperature  The specific heat capacity of the lead can be calculated using the fact that heat loss by the lead = heat gained by calorimeter and water.  Given the specific heat capacity of calorimeter and water to be , and respectively  Heat loss by the lead = heat gained by calorimeter and water        **DETERMINATION OF SPECIFIC HEAT CAPACITY BY ELECTRICAL METHOD**  **For a solid***:*  To calculate the specific heat capacity of a solid brass block, we make two holes in a weighed brass block into which a thermometer and a heating element connected to a source of power supply are inserted. Oil is poured in the holes to ensure thermal conductivity. Assuming no heat is lost to the surrounding, the total amount of electrical heat energy supplied by the coil is equal to heat gained by the brass  Heat energy supplied by the coil = Heat gained by the brass      From ohms law,    So, equation above becomes,    *For a liquid* | | Students listen attentively and take down notes. |
| STEP 4 | APPLICATION:  250g of lead at 1700C is dropped into 100g of water at 00C. If the final steady temperature is 120C, calculate the specific heat capacity of lead. | | Students ask questions on the topic which the teacher answers. |
| STEP 5 | EVALUATION: The teacher evaluates the students using the following:   1. State the conclusion made from determination of specific heat capacity by mixture method? 2. State the principle of conservation of energy? 3. From which principle is obtained? | | The students answer the questions. |
| **Assignment**   1. A piece of copper of mass 120g is heated in an enclosure to a temperature of 1250C. It is then taken and held in the air for 30 seconds and dropped carefully into a copper calorimeter of mass 105g containing 200g of water at 200C. The temperature of the water rises to 250C. Calculate the rate at which heat is being lost from the copper when it is held in the air. [Specific heat capacity of copper = 400 JKg-1K-1, Specific capacity of water = 4200 JKg-1K-1] 2. An immersion heater supplies heat at the rate of 500Js-1 (i) what is quantity of heat produced in 24 minutes (ii) if there is no heat loss, calculate the rise in temperature if a brass of 3kg initially at 300C absorbed all the heat produced by the heater   References  **Extensive physics for Senior Secondary Schools and Colleges, by OSINUBI SAHEED et al. New School Physics for SS2 by M.W ANYAKOHA {Ph D}. Senior Secondary Physics for SS2 by P. N OKEKE et al.** | |  |