**EMERALD ROYAL INT’L SCHOOL**

**LESSON PLAN/NOTE FOR WEEK 5 ENDING: 2ND JUNE, 2023**

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| **Term** | 3rd |
| **Week** | 5 |
| **Date** | 02/06/2023 |
| **Class** | SSS 2 |
| **Subject** | Physics |
| **Topic** | Electric field 2 |
| **Sub-topic** | Capacitors |
| **Period** | 3 |
| **Time** | 09:20-09:55 |
| **Duration** | 35minutes |
| **Number in class** | 2 |
| **Average age** | 14years |
| **Sex** | Mixed |
| **Specific objectives** | By the end of the lesson, the students should be able to:   1. Explain the energy stored by a capacitor 2. Solve simple problems involving the energy stored by a capacitor. |
| **Rationale** | To enable the students understand the concepts of energy stored by a capacitor. |
| **Previous knowledge** | Students should have been taught on the meaning of capacitors, and on the capacitance of a capacitor. |
| **Instructional aid** | One guide sheet for each student, a capacitor, an ammeter, a voltmeter, a science notebook and a science textbook. |
| **Reference** | * M.W. Anyakoha. New school physics for secondary schools. Africana First Publishers PLC. page 383-392 * P.N. Okeke. Macmillan Senior Secondary Physics. Pearson. Page 233-241 |

**LESSON DEVELOPMENT**

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| **STEPS** | **TEACHER’S ACTIVITIES** | **STUDENTS’ ACTIVITIES** | **LEARNING POINTS** |
| **Introduction** | The teacher introduces the lesson by explaining that a capacitor is charged so that it can store electrical energy. While the capacitor is being charged, its charge builds up from an initial value of zero to a final value, q, and the potential difference between its plates builds up from zero to a final value V. | The students will carry out a the experiment of charging a capacitor. | To give the students a rudimentary understanding of the energy stored in a capacitor. |
| **Step I** | *Energy stored in a capacitor*  During the charging of the capacitor, the average value of the potential difference is given by;  **= V**. The work done in charging the capacitor through an average potential difference of **V** is given by;  **W = Vq ----------(1)**  Bur recall that from definition, C =  **-----(a)**  Making V the subject of the formula form equation (a) and substituting into equation (1), we have that  **W = -------(2)**  Also, from equation (a), making q subject of formula and substituting into equation (1), we have that  **W = Cv2 -------(3)**  Where V is potential difference in volts  q is charge in coulombs  C is capacitance in farad | Begin to develop an idea on the capacitance of a capacitor. | To ensure proper understanding of the lesson. |
| **Step II** | *Examples*  A capacitor of capacitance 5μF is subjected to a potential difference of 1000 volts across its terminals. Calculate th energy stored in the capacitor.  *Solution*  Using **W = Cv2** we have that;  **W =**  **W = 2.5** joules | The students listen attentively the teacher’s explanation. | To ensure that all the students are carried along. |
| **Summary** | The potential difference (p.d) between two points A and B is the wok done in bringing unit positive charge from B to A where is at a higher potential than B.  Energy stored in a capacitor is given by;  **W** = **Vq = = Cv2** | The students listen attentively to the teacher’s explanation. | For reference purpose. |
| **Evaluation** | The teacher evaluates the students by giving the students the following classwork.  A capacitor of capacitance 3.0μF is subjected to a 2000 V potential difference across its terminals. Calculate the energy stored in the capacitor. | The students answer the question in their science notebook. | To ascertain the students level of understanding of the lesson. |
| **Conclusion** | The teacher makes correction of the classwork. | The students copy the correction in their exercise books. | For reference purpose |
| **Assignment (Homework)** | The teacher gives the students the following assignment.  A series arrangement of three capacitors of value 8μF, 12μF and 24μF is connected in series with a 90-V battery.   1. Draw an open circuit diagram for this arrangement. 2. Calculate the effective capacitance in the circuit. | The students copy the questions into their exercise books. | To encourage critical thinking of students at home. |



20/7/2023

Principal Head Instuctor