**EMERALD ROYAL INT’L SCHOOL**

**LESSON PLAN/NOTE FOR WEEK 3 ENDING: 19TH MAY, 2023**

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| **Term** | 3rd |
| **Week** | 3 |
| **Date** | 19/05/2023 |
| **Class** | SSS 1 |
| **Subject** | Physics |
| **Topic** | Elastic properties of solids. |
| **Sub-topic** | Hooke’s law |
| **Period** | 3 |
| **Time** | 10:15-10:50 |
| **Duration** | 35minutes |
| **Number in class** | 8 |
| **Average age** | 13years |
| **Sex** | Mixed |
| **Specific objectives** | By the end of the lesson, the students should be able to:   1. State Hooke’s law. 2. Show an understanding of the terms stress, strain and young’s modulus. 3. Solve simple problems on work done in stretching or compressing a spring and elastic strings. |
| **Rationale** | To enable the students understand the elastic properties of solids |
| **Previous knowledge** | Students should have been taught the properties of solids |
| **Instructional aid** | One guide sheet for each student, rubber band, springs, strings, science notebook and a science textbook. |
| **Reference** | * M.W. Anyakoha. New school physics for secondary schools. Africana first publishers PLC. page 95-100 * P.N. Okeke. Macmillan Senior Secondary Physics. Pearson. Page 62-65 |

**LESSON DEVELOPMENT**

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| **STEPS** | **TEACHER’S ACTIVITIES** | **STUDENTS’ ACTIVITIES** | **LEARNING POINTS** |
| **Introduction** | the teacher introduces the lesson by stating that for a wire or spring, it is found that if a gradual stretching force, **F**, is applied, the extension, **e**, produced at any time is proportional to the force applied. If the force is removed, the wire should return to its original size and shape. | The students listen attentively. | To give the students a proper understanding of the elastic properties of solids. |
| **Step I** | *Hooke’s law*  Hooke’s law states that provided the elastic limit of an elastic material is not exceeded, the extension, **e**, produced by the material is directly proportional to the load or applied force, **F**.  Mathematically, Hooke’s law can be stated as;  **F α e** (1)  Introducing a constant, we have that  **F = Ke** (2)  Where **K** is the constant of the spring or wire, known as the stiffness or elastic constant.  If **F** is in newtons (**N**) and **e** is in meters (**m**), then **K** will be given as;  **K = Nm-1** (3)  It is the force required to produce a unit extension. | The students begin to develop an understanding of the elastic properties of matter. | To ensure proper understanding of the lesson. |
| **Step II** | *Stress, strain and young’s modulus*  The ratio of the force to the area is called the stress or tensile stress of the material. The unit is **Nm-2**.  The tensile strain is defined as the ratio of the extension to original length). It has no unit since **e** and **l** are the same unit.  We can also state Hooke’s law as stress is proportional to strain provided the elastic limit is not exceeded.  The constant of proportionality in this statement of Hooke’s law is known as Young’s modulus of elasticity (**Y**).  **Young’s Modulus =** | The students listen attentively to the teacher’s explanation. | To ensure that all the students are carried along. |
| **Step III** | *Example*  A spiral spring is compressed by 0.02m. Calculate the energy stored in the spring, if the force constant is 400Nm-1.  *solution*  Energy stored in the spring is given by;  W = Fe =Ke2  Therefore,  W = 2  W = 0.08 joules | The students listen attentively to the teacher’s explanation. | To ensure that all the students are carried along. |
| **Summary** | **Hooke’s law** states that provided the elastic limit of an elastic material is not exceeded, the extension of the material is directly proportional to the load or applied force causing the extension.  Work done in stretching or compressing a material is the same as the energy stored in the material or its elastic potential energy, and is given by  **W =**  It is also equal to  Young’s modulus **Y =** | The students listen attentively to the teacher’s explanation. | For reference purpose. |
| **Evaluation** | The teacher evaluates the students by giving the students the following class work.  A force of 0.8N stretches an elastic material by 2cm. find the elastic constant of the spring. | 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 force of 2N stretches an elastic spring by 30mm. what additional force will stretch thee material 35mm? Assume that the elastic limit is not exceeded. | The students copy the questions into their exercise books and take home for solving. | To encourage critical thinking of the students at home. |



12/7/2023

Principal Head Instuctor