**EMERALD ROYAL INT’L SCHOOL**

**LESSON PLAN/NOTE FOR WEEK 4 ENDING: 26TH MAY, 2023**

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| **Term** | 3rd |
| **Week** | 4 |
| **Date** | 26/05/2023 |
| **Class** | SSS 1 |
| **Subject** | Physics |
| **Topic** | Fluids at rest and in motion |
| **Sub-topic** | Surface tension |
| **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. Give several applications of surface tension and viscosity 2. State the similarities between surface tension and viscosity 3. Differentiate between surface tension and viscosity. |
| **Rationale** | To enable the students understand surface tension in liquids |
| **Previous knowledge** | Students should have been taught the kinetic theory of liquids |
| **Instructional aid** | One guide sheet for each student, oil, water, capillary tubes, science notebook and a science textbook. |
| **Reference** | * M.W. Anyakoha. New school physics for secondary schools. Africana first publishers PLC. page 104-109 * P.N. Okeke. Macmillan Senior Secondary Physics. Pearson. Page 68-71 |

**LESSON DEVELOPMENT**

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| **STEPS** | **TEACHER’S ACTIVITIES** | **STUDENTS’ ACTIVITIES** | **LEARNING POINTS** |
| **Introduction** | The teacher introduces the lesson by stating that surface tension T, is defined as the ratio of the tangential force, F in the surface to the length, d along which the force acts. I.e.  **T =**  Some insects can work on the surface of water; their feet make some marks in the surface but do not penetrate it. Such phenomena are examples of **surface tension**; the surface of the liquid behaves like a layer under tension. | The students listen attentively. | To give the students a proper understanding of surface tension. |
| **Step I** | *Applications of surface tension and viscosity*  Some applications of surface tension include;  1. Waterproof materials used for umbrellas, raincoats or tents, are usually treated with oil-based substances which prevent water from wetting the materials. A thin water-film is usually formed across the spaces between the threads of the fabric due to the surface tension skin on the raindrops. This skin prevents water from seeping through. If someone however touches the inside material of the umbrella, or tent, the surface film is broken and rainwater can now soak through the spaces between the threads.  2. Cleaning action of soaps and detergents: we find it difficult to wash effectively an oily plate of dirty cloth with water only. This is because the oil or dirt repels the water, thus it cannot wet the plate or cloth for effective washing. The use of soap or other detergents weakens the surface tension of water and enables it to float away the particles of oil or dirt from the articles being washed.  *Application of viscosity*  One way of reducing friction in machine is to lubricate surfaces which are sliding over each other with a liquid, usually oil. This places a layer of liquid between the metal surfaces and as metals slide through liquids with less friction than they slide over each other, friction is reduced. | The students are involved in the practical application of surface tension and viscosity. | To ensure proper understanding of the lesson. |
| **Step II** | *Similarities between surface friction and viscosity*  1. Both forces oppose relative motion between surfaces.  2. Both depend on the nature of the materials in contact. | The students listen attentively to the teacher’s explanation. | To ensure that all the students are carried along. |
| **Step III** | *Differences between surface tension and viscosity*  1. Friction does not depend on areas of surfaces in contact, while viscosity depends on areas of surfaces in contact.  2. Friction is dependent on normal reaction, while viscosity is not.  3. Friction occurs in solids, while viscosity takes place in liquids and gases (fluids).  4. Friction does not depend on the relative velocities between two layers, while velocity depends on the relative velocity between layers. | The students listen attentively to the teacher’s explanation. | To ensure that all the students are carried along. |
| **Summary** | The surface of a liquid behaves as if it were covered by an elastic skin. It thus appears to be under some forces or tension. This surface tension can be explained by the molecular attraction between the liquid molecules.  The coefficient of surface tension is the force per unit length acting on a line drawn on the surface. | 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.   1. Describe two applications of surface tension. 2. Why is it that a needle may float on clean water but sinks when detergent is added to the water. | 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.   1. Why does water wet a clean glass surface whereas mercury does not? 2. State two methods by which the surface tension of a liquid may be reduced. | The students copy the questions into their exercise books and take home for solving. | To facilitate critical thinking of the students at home. |



20/7/2023

Principal Head Instuctor