# Week 5

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| **Learning Planner** | | | | | | | |
| **Subject** | Physics | **Week** | 5 | **Duration** | 240 minutes | **Form** | 1 |
| **Strand** | Mechanics and Matter | **Sub-Strand** | Kinematics | | | | |
| **Content Standard** | Demonstrate knowledge and understanding of motion and its relevance to everyday activities. | | | | | | |
| **Learning Outcome(s)** | 1.Explain the terminologies and measurement of distance, displacement, speed, velocity, acceleration, average velocity, and instantaneous velocity, and distinguish between them. | | | | | | |
| **Learning**  **Indicator(s)** | 1. Describe the various types of motion, that is: linear, circular, oscillatory, spin and random. 2. Establish equations of uniformly accelerated motion and its application in daily life. 3. Represents the motion of objects graphically, i.e. distance-time, displacement-time and velocity-time and deductions that can be made from it. | | | | | | |
| **Essential Question(s)** | 1. What activities can be used to demonstrate the given types of motion?  2. How can the learners be led to appreciate why the Newton’s equation of motion only hold for uniformly accelerated motion?  3. How can the use of graph sheets help learners interpret graphs of motion?  4. What strategies can be employed to ensure that learners are actively participating and thinking during lesson on equations of motion? | | | | | | |
| **Pedagogical Strategies** | Whole – class discussions, small group discussion, presentations, scaffolding, problem -based learning. | | | | | | |
| **Teaching & Learning Resources** | Audio-visuals, Internet, Projectors, calculators, graph sheets, Virtual lab | | | | | | |
| **Key Notes on Differentiation** | | | | | | | |
| ***Learning task***  **Lesson 1:**  1. Define motion.  **2.** State the various types of motion.  **3.** Describe the various types of motion and give examples.  **Lesson 2:**  1. Define the terminologies associated with rectilinear motion (s, u, v, a and t).  2.Establish the equations of motion  **3.** Solve problems associated with the equations of motion  **Pedagogical Exemplars**  **Lesson 1:**  **1.** Instruct learners to research and prepare a presentation describing an assigned type of motion. They should explore the characteristics, examples and real-life applications of the motion they are studying. Encourage them to use diagrams, graphs, animations and real-life examples to illustrate their findings.  **2.** Set up some demonstrations around the room to demonstrate the types of motion and allow students to use these in their presentations.  **3.** Have learners present their findings to the class. During the presentations, encourage learners to describe the main features and unique characteristics of the motion type they researched. Prompt them to provide clear examples to help the class understand each type better. The audience could be provided with a table in which to summarise the key points from each presentation.  **Lesson 2:**  a). In mixed ability groupings, provide learners with graphs showing uniform and non-uniform velocity and acceleration. Task them to tabulate the plotted values from each graph and use them to explain why some of the graphs have straight slopes while others have curved slopes*.*  b). Using a virtual lab, demonstrate to the class the various scenarios in a displacement-time and velocity – time graphs such as; an object moving with uniform and non-uniform velocity, maintaining a position for a period and making a return journey. | | | | | | | |
| **Keywords** | Equations, Graphically, deductions, uniform, non – uniform | | | | | | |

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| **Lesson 1: TYPES OF MOTION** | |
| **Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual** | |
| ***Teacher Activity*** | ***Learner Activity*** |
| **Starter *Activity (10 minutes)***  Start lesson by showing the class a video about the movement of bodies in different ways, such as;  1.a runner running a 100 m race on a straight line  2. the planets in their orbits around the sun  3. a wind mill  4. liquid moving in a U – tube  5. smoke particles moving | |
| ***Introductory Activity (15minutes)***  I. After watching the video, task the learners to think – pair and share their observations with their sitting partners, while trying to answer the question; “what common description will you give to all five (5) cases?”  II. Guide a few learners to volunteer and share their observations in a whole – class discussion.  ***Activity 1 (40 minutes)***  I. In their mixed ability groups, guide the learners to give the appropriate name of each of the five (5) types of motion shown earlier in the video.  II. Appoint one group to present their answers with the class in a whole – class discussion while guiding their *answers*.  III. Still in their groupings task learners to discuss among themselves and write down at least three examples each of each of the five types of motion.  IV. Appoint another group to share their answers with the class so that they learn collaboratively from each other.  ***Activity 2 (40 minutes)***  I. Show the class the video on the 100 m race on the straight line (linear motion) and guide the learners to tease out the terms; displacement(s), initial velocity(u), acceleration(a), time (t) and final velocity(v)    II. Lead the learners in a whole – class discussion to establish the equations of uniformly accelerated motion.  III. In their mixed ability groupings task each group with problems on the equations of motion to solve, in a problem -based learning fashion. | ***Introductory Activity (15minutes)***  I.Think – pair and share your observations with your sitting partner, while trying to answer the question; “what common description will you give to all five (5) cases?”  II. Share your observations in a whole – class discussion.  ***Activity 1 (40 minutes)***  I. In your groups, give the appropriate name(s) of each of the five (5) types of motion shown earlier in the video.  II. Participate as your group present their answers with the class in a whole – class discussion.  III. Discuss among yourselves and write down at least three examples each of each of the five types of motion.  IV. Share your answers with the class so that you learn collaboratively from each other.  ***Activity 2 (40 minutes)***  I. From the video on the 100 m race on the str tease out the terms; displacement(s), initial velocity(u), acceleration(a), time (t) and final velocity(v)    II. Participate in the whole – class discussion to establish the equations of uniformly accelerated motion.  III. In your group. Collaborate with your peers and solve the given problems |
| **Assessment DoK aligned to the Curriculum and Subject Teacher Manual** | |
| ***Level 3***  *1.* How does the type of motion (linear, rotational, or periodic) influence the design and functionality of mechanical systems in everyday applications such as transportation or household appliances? Provide specific examples and analyze the importance of understanding these types of motion in engineering and design. | |
| **Lesson Closure** | |
| ***Activity (15 minutes)***   1. *End lesson by guiding the groups to present their answers from the problems and to compare their answers.* 2. *Students asks questions to clarify as misunderstanding and consolidate what is learnt* 3. *Give learners assignment* | |
| **Reflection & Remarks** | |
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| **Lesson 2: GRAPHS OF MOTION** | |
| **Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual** | |
| ***Teacher Activity*** | ***Learner Activity*** |
| **Starter *Activity (10 minutes)***  Start the lesson by reviewing with the class the meaning of the terms; displacement, velocity and acceleration through the question-and-answer technique. | |
| ***Introductory activity (25 minutes)***  In their mixed ability groupings, provide learners with four graphs showing uniform and non-uniform velocity and acceleration. Task them to tabulate the plotted values from each graph and use them to explain why some of the graphs have straight slopes while others have curved slopes*.*  ***Activity 1 (25 minutes)***  I. Using the virtual lab, demonstrate to the class the various scenarios in a displacement-time graph such as; an object moving with uniform and non-uniform velocity, maintaining a position for a period and making a return journey.  ***Activity 2 (25 minutes)***  I. Guide the learners to sketch the scenarios illustrated in the virtual lab while working collaboratively in their groups.  II. Lead them to share their graphs with the class for a whole – class discussion.  ***Activity 3 (25 minutes)***  I. Using the virtual lab, demonstrate to the class the various scenarios in velocity-time graph such as; an object moving with uniform and non-uniform acceleration, maintaining velocity for a period and retarding to rest.  II. Guide the learners to sketch the scenarios illustrated in the virtual lab while working collaboratively in their groups.  III. Lead them to share their graphs with the class for a whole – class discussion. | ***Introductory activity***  In your groups discuss in a collaborative manner and tabulate the plotted values from each graph and use them to explain why some of the graphs have straight slopes while others have curved slopes.  ***Activity 1(30 minutes)***  Observe carefully the demonstration of the various scenarios in a displacement-time graph from the virtual lab.  ***Activity 2 (25 minutes)***  I. Sketch the scenarios illustrated in the virtual lab while working collaboratively in your groups.  II. Share your graphs with the class for a whole – class discussion  ***Activity 3 (25 minutes)***  I. Observe carefully the demonstration of the various scenarios in a displacement-time graph from the virtual lab.  II. Sketch the scenarios illustrated in the virtual lab while working collaboratively in your groups.  III. Share your graphs with the class for a whole – class discussion |
| **Assessment DoK aligned to the Curriculum and Subject Teacher Manual** | |
| ***Level 3***  Imagine a scenario where a car is initially at rest, accelerates uniformly for a period of time, maintains a constant velocity, then decelerates uniformly until it comes to a stop. Design a storyboard utilising either distance-time or velocity-time graphs to depict this motion scenario. Explain how your chosen graph accurately represents the motion of the car throughout the entire journey. | |
| **Lesson Closure** | |
| ***Activity (15 minutes)***   1. *End lesson by summarizing main points of the lesson* 2. *Students asks questions to clarify as misunderstanding and consolidate what is learnt* 3. *Give learners assignment* | |
| **Reflection & Remarks** | |
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