# Week 4

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| **Learning Planner** | | | | | | | |
| **Subject** | Physics | **Week** | 4 | **Duration** | 240  minutes | **Form** | 1 |
| **Strand** | Mechanics and Matter | **Sub-Strand** | Matter  Kinematics | | | | |
| **Content Standard** | Demonstrate knowledge and understanding of matter. | | | | | | |
| **Learning Outcome(s)** | Explain the various states of matter and the differences in their structure. | | | | | | |
| **Learning**  **Indicator(s)** | 1. Identify the various states of matter. 2. Distinguish between the molecular arrangements of the various states of matter. | | | | | | |
| **Essential Question(s)** | 1. What prior knowledge do the students have about the states of matter?  2. What materials are needed to best demonstrate the four state of mater which is the plasma?  3.How can the real -world significance of understanding matter be conveyed to the learners to motivate them? | | | | | | |
| **Pedagogical Strategies** | Collaborative learning, Talk for learning | | | | | | |
| **Teaching & Learning Resources** | PhET interactive simulations, Audio-visuals, Internet, Projectors,  Virtual lab. | | | | | | |
| **Key Notes on Differentiation** | | | | | | | |
| ***Learning tasks***  **Lesson 1:**  1.State the four states of matter.  **2.** Give examples of substances in the various states of matter.  **3.** Explain plasma as a state of matter.  **4.** Use the formula ρ=m/V to calculate the density of regular and irregular solid objects  **Lesson 2:**  1.Describe the molecular arrangement of the various states of matter.  **2.** Draw the diagrams of the molecular arrangement of the various states of matter.  **3.** Explain how heating or cooling a substance affect the particles that make it up, and how this  can result in a state change.  ***Pedagogical Exemplars***  **Lesson 1:**  a). In their mixed ability groups, present learners with a worksheet with a list of objects; ice cube, water, pencil, helium, wood etc. Task them to discuss and tabulate them into liquids, solids and gases.    b). Guide learners through a whole class discussion on the characteristics of solids, liquids and gases. Using a projector, show the class a video illustrating the characteristics of the plasma state. Learners discuss the characteristics of the plasma state.  **Lesson 2:**  a). With the aid of a projector, show learners PPT slides on the molecular arrangement of the various states of mater and in their small groups, task learners to describe the molecular arrangement of the states of matter.  b). On manila cards, each small group draw diagrams of the molecular arrangement of the various states of mater.  c). In their small groups, learners can discuss the effect of heating or cooling a substance on its particulate nature and state after watching a video on heating and cooling.  ***Key Assessment***  **Level 1:**  **1.** List the three primary states of matter, commonly found in our surroundings.  **Level 2:**  2. Provide examples of naturally occurring plasmas and their significance in the universe.  **Level 3**   1. Plasma as a distinct state of matter is often overlooked. Discuss the unique molecular arrangement and behaviour of plasma. | | | | | | | |
| **Keywords** | molecular arrangements, matter, motion, i.e circular, oscillatory, rectilinear, spin, random. | | | | | | |

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| **Lesson 1: STATES OF MATTER** | |
| **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 leading the learners to recall the meaning of matter and stating the three main states of mater. Let them pair and share their answers with their sitting partners. | |
| ***Introductory Activity (15minutes)***  In their mixed ability groups, present learners with a worksheet with a list of objects; ice cube, water, pencil, helium, wood etc. Task them to discuss and tabulate them into liquids, solids and gases.  ***Activity 1 (40 minutes)***  I. Guide learners through a whole class discussion on the characteristics of solids, liquids and gases.  II. Using a projector, show the class a video of the behavior of the particles of solids, liquids and gases.  III. Allow learners to discuss what they watched in their groups and add to the list of the characteristics they listed above  ***Activity 2 (40 minutes)***  I. Guide learners through a whole class discussion on the characteristics of plasma state.  II. Using a projector, show the class a video illustrating the characteristics of the plasma state.  III. Allow learners to discuss what they watched in their groups and add to the list of the characteristics they listed above. | ***Introductory Activity (15minutes)***  In your groups, discuss and tabulate the list on your worksheet into liquids, solids and gases.  ***Activity 1 (40 minutes)***  I. Write down the characteristics of solids, liquids and gases as presented from the video.  II. Watch the video of the behavior of the particles of solids, liquids and gases.  III. In your groups, discuss what you watched and add to the list of the characteristics you listed above.  ***Activity 2 (40 minutes)***  I. Write down the characteristics of the plasma state as presented from the video.  II. Watch the video of the plasma state and write down what you heard.  III. In your groups, discuss what you watched and add to the list of the characteristics you listed above. |
| **Assessment DoK aligned to the Curriculum and Subject Teacher Manual** | |
| ***Level 3***  Evaluate the potential benefits and challenges of using plasma technology for environmental applications such as waste treatment and pollution control. Consider the efficiency, cost, and environmental impact in your assessment. | |
| **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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| **Lesson 2: MOLECULAR ARRANGEMENT OF THE VARIOUS STATES OF MATTER** | |
| **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 a group presentation from a pre-named group on the potential benefits and challenges of using plasma technology for environmental applications such as waste treatment and pollution control. | |
| ***Introductory activity (25 minutes)***  I. Using a projector, show learners PPT slides on the molecular arrangement of the various states of mater. II.In small groups, task learners to describe the molecular arrangement of the states of matter. III. Let volunteer groups share their responses with the class for whole -class discussions.  ***Activity 1 (25 minutes)***  On manila cards, task each small group to draw diagrams of the molecular arrangement of the various states of mater.  ***Activity 2 (25 minutes)***  Guide learners to paste their diagrams on the board for presentation and whole – class discussion.  ***Activity 3 (25 minutes)***  I. Show the class a video of how heating and cooling a substance affect its particular nature and state.  II. In their small groups, task learners to discuss the effect of heating or cooling a substance on its particulate nature and state.  III. Let volunteer groups share their responses with the class for whole -class discussions. | ***Introductory activity (25 minutes)***  I. Watch PPT slides on the molecular arrangement of the various states of mater.  II.In your small groups, describe the molecular arrangement of the states of matter.  III. Share their responses with the class for whole -class discussions.    ***Activity 1***  On manila cards, draw diagrams of the molecular arrangement of the various states of mater.  ***Activity 2***  Paste your diagrams on the board for presentation and whole – class discussion.  ***Activity 3 (25 minutes)***  I. Watch the video on how heating and cooling a substance affect its particular nature and state and write down your taught.  II. In your small groups, discuss among yourselves the effect of heating or cooling a substance on its particulate nature and state.  III. Share your responses with the class for whole -class discussions. |
| **Assessment DoK aligned to the Curriculum and Subject Teacher Manual** | |
| ***Level 3***  1. Imagine you are designing a container for transporting liquid nitrogen, which must remain in its liquid state for an extended period. Explain how the molecular arrangement of liquid nitrogen affects its properties and behavior in this scenario. Discuss the implications for the container design, considering the need to prevent the nitrogen from changing to its gaseous state.  2. You are tasked with explaining why ice cubes (solid water) float in a glass of liquid water during a science demonstration. Describe the molecular arrangement of water in its solid and liquid states, and analyze how this arrangement affects the density of each state, leading to the observed phenomenon. | |
| **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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