# Week 3

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| **Learning Planner** | | | | | | | |
| **Subject** | Physics | **Week** | 3 | **Duration** | 240 minutes | **Form** | 1 |
| **Strand** | Mechanics and matter | **Sub-Strand** | Introduction to physics | | | | |
| **Content Standard** | Demonstrate knowledge and understanding of physical quantities | | | | | | |
| **Learning Outcome** | Classify quantities into fundamental, derived, scalars and vectors. | | | | | | |
| **Learning**  **Indicators** | 1. Explain scientific notations and their unit multipliers. 2. Distinguish scalars from vectors (qualitative treatment) | | | | | | |
| **Essential Question(s)** | 1.How does using scientific notation and unit multipliers help scientists and engineers in simplifying calculations and clearly communicating large and small quantities?  2. How do scalar and vector quantities differ in terms of their physical properties and how they are represented in physics?  3. How does the use of scientific notations and their multipliers simplify the conversion of one SI unit to the other?  4.What real-life examples or scenarios can be used to illustrate the concepts of scalars and vector quantities? | | | | | | |
| **Pedagogical Strategies** | Collaborative learning, Talk for learning (discussions, think – pair and share, presentations) | | | | | | |
| **Teaching & Learning Resources** | Worksheets, Internet, Calculators, | | | | | | |
| **Key Notes on Differentiation** | | | | | | | |
| ***Learning Tasks***  **Lesson 1:**  1*.* Identify some scientific notation and their unit multipliers  **2.** Express quantities in scientific notation to standard units  **3.** Convert other units into SI units  **Lesson 2:**  1.State the definition of a scalar and the definition of a vector.  **2.** Categorize a list of physical quantities into scalars and vectors and justify your answers.  **Pedagogical Exemplars**  **Lesson 1.**  a). Using their tablets, task each learner to search for the following in meters:  i. distance from Ghana to England  ii. distance from the earth to the sun  b). Using whole – class discussion, guide the learners to write their results in standard form as their ink – pair and share with their sitting partners  c). In their mixed ability groups, provide learners with a work sheet on which is a list of scientific notations, their symbols and multipliers and three- columned table where they will complete by providing the missing scientific notation, symbols and multipliers  **Lesson 2:**  a). In a collaborative manner task learners to research – pair and share their findings on the difference between scalar and vector quantities with their sitting partners.    b). Present real-life scenarios involving vector quantities. For each scenario, ask the learners to identify the vector involved and explain how both the magnitude and direction are essential in describing the physical situation.  c). In their mixed ability groups guide learners to discuss and categorizephysical quantities such speed, velocity, displacement, distance, mass, temperature etc into scalar and vector quantities. Allow learners to present their answers for whole – class discussion.  **Key Assessment**  1. **Level 2:** Define scientific notation and give an example of a number that is written in a scientific notation.  2. **Level 2:** Express 900 cm in m  3. **Level 2:** Convert the following:  a. 20 cm2 to m2  b. Convert 72 km hr-1 to ms-1  4. **Level 1**:What is the difference between scalars and vectors?  5. **Level 1**:Give three examples each of quantities that are vectors and quantities that are scalars | | | | | | | |
| **Keywords** | scientific notations, unit multipliers, scalars, vectors | | | | | | |

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| **Lesson 1: SCIENTIFIC NOTATIONS AND THEIR UNIT MULTIPLIERS** | |
| **Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual** | |
| ***Teacher Activity*** | ***Learner Activity*** |
| **Starter *Activity (10 minutes)***  Using their tablets, task each learner to search for the following in meters:  i. distance from Ghana to England  ii. distance from the earth to the sun  iii. width of the human hair  iv. diameter of a proton  Let learns pair and share their results with their sitting partners. | |
| ***Introductory Activity (15minutes)***  I. Based on their results, guide learners to appreciate the fact that the values of some quantities are extremely large or small such that they become difficult to write in their normal format and hence needs to be approximated into their standard forms.  II.Using whole – class discussion, guide the learners to write their results in standard form as their ink – pair and share with their sitting partners.  ***Activity 1 (40 minutes)***   1. In their mixed ability groups, provide learners with a work sheet on which is a list of scientific notations, their symbols and multipliers and three- columned table where they will complete by providing the missing scientific notation, symbols and multipliers. 2. Allow students to share their answers with the class for discussion and reconciliation of answers.   ***Activity 2 (40 minutes)***  I. In their groups, guide learners to convert given units of length, area and volume from one to the other.  II. Lead each group to present their answers and allow for questions and discussions from the other groups. | ***Introductory Activity (15minutes)***  I. Based on your results, appreciate the fact that the values of some quantities are extremely large or small such that they become difficult to write in their normal format and hence needs to be approximated into their standard forms.  II.Write your results in standard form as you ink – pair and share with sitting partner.  ***Activity 1 (40 minutes)***  I*.* In your groups, using the list given on the work sheet, complete the three- columned table by providing the missing scientific notation, symbols and multipliers.  II. Share your answers with the class for discussion and reconciliation of answers  ***Activity 2 (40 minutes)***  I. In your groups, discuss and convert given units of length, area and volume from one to the other.  II. Participate in presenting your group’s answers and allow for questions and discussions from the other groups. |
| **Assessment DoK aligned to the Curriculum and Subject Teacher Manual** | |
| ***Level 3***  1. A car travels at a speed of 120 km/h. Convert this speed into meters per second (m/s) and use this converted speed to calculate the distance the car travels in 30 minutes. | |
| **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: SCALARS AND VECTORS** | |
| **Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual** | |
| ***Teacher Activity*** | ***Learner Activity*** |
| **Starter *Activity (10 minutes)***  Call volunteers to come to the board and write down some physical quantities.  Ask students to tabulate the quantities as fundamental and derived. | |
| ***Introductory activity (25 minutes)***  I.Lead learners through a whole – class discussion to appreciate the fact that apart from fundamental and derived, physical quantities can also be classified as scalar or vector quantities.  ***Activity 1 (25 minutes)***  I. In a collaborative manner task learners to research – pair and share their findings on the difference between scalar and vector quantities with their sitting partners.  ***Activity 2 (25 minutes)***  Present real-life scenarios involving vector quantities. For each scenario, ask the learners to identify the vector involved and explain how both the magnitude and direction are essential in describing the physical situation.  (a) Scenario 1: A car moving along a curved road.  (b) Scenario 2: A person walking at a steady speed but changing direction.  ***Activity 3 (25 minutes)***  1.In their mixed ability groups guide learners to discuss and categorizephysical quantities such speed, velocity, displacement, distance, mass, temperature etc into scalar and vector quantities.  II. Allow volunteer groups to present their answers for whole – class discussion. | ***Introductory activity (25 minutes)***  I. From the discussion appreciate the fact that apart from fundamental and derived, physical quantities can also be classified as scalar or vector quantities.  ***Activity 1***  I. *R*esearch – pair and share your findings on  the difference between scalar and vector quantities with your sitting partners.    ***Activity 2 (25 minutes)***  For each scenario, identify the vector involved and explain how both the magnitude and direction are essential in describing the physical situation.  ***Activity 3 (25 minutes)***  1.In your groups, discuss and categorizephysical quantities such speed, velocity, displacement, distance, mass, temperature etc into scalar and vector quantities.  II. Present your answers for whole – class discussion. |
| **Assessment DoK aligned to the Curriculum and Subject Teacher Manual** | |
| ***Level 3***  1.A car travels 100 meters east in 20 seconds, then 150 meters north in 30 seconds.  a. Identify the scalar and vector quantities in this scenario.  b. Calculate the average speed and average velocity of the car  c. Explain why speed is considered a scalar quantity and velocity is considered a vector quantity. | |
| **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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