# WEEK 2

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Learning Planner** | | | | | | | |
| **Subject** | Physics | **Week** | 2 | **Duration** | 240 minutes | **Form** | 1 |
| **Strand** | Mechanics and Matter | **Sub-Strand** | Introduction to Physics | | | | |
| **Content Standard** | Demonstrate knowledge and understanding of physical quantities. | | | | | | |
| **Learning Outcomes** | Classify quantities into fundamental, derived, scalars and vectors. | | | | | | |
| **Learning**  **Indicators** | 1. Determine the dimensions. (velocity, acceleration, mass, length, time, weight, energy and force) 2. Identify the errors in the use of metre rule, protractor, electronic balance, vernier calliper, micrometre screw gauge 3. Explain the types of errors-systematic, random and parallax | | | | | | |
| **Essential Question(s)** | 1. How can the dimensions of physical quantities be determined? 2. Why do measuring instruments such as meter rule, protractor, vernier calliper etc. have errors on them? 3. What are the effects of errors on the values of measurements? 4. How can the errors on measuring instruments be corrected as they are being used? | | | | | | |
| **Pedagogical Strategies** | Collaborative learning, think pair share, Talk for Learning | | | | | | |
| **Teaching & Learning Resources** | Meter rule, protractor, vernier calliper, ammeter, voltmeter | | | | | | |
| **Key Notes on Differentiation** | | | | | | | |
| **Learning Tasks;**  **Lesson 1**  1.Determine the dimensions of physical quantities.  2. Evaluate the usefulness of dimensional analysis.  **Lesson 2**  3. Identify various measuring instruments.  4. Identify specific instruments for specific purposes.  5. Identify potential errors in the use of specific instruments  **Pedagogical Exemplars**  **Lesson 1:**  *a).* Guide learners to **think -pair – and share** on the general meaning of the term *dimension* and specifically *dimension of a physical quantity*.  b). In their mixed ability groupings, task each group with some specific physical quantities (area, volume, density, force etc.) to find their dimensions. Guide a presentation from each group and a whole class discussion on the answers of each group.  c). Group learners into mixed ability groupings and task each group with some specific equations to determine whether or not they are dimensionally valid.  **Lesson 2:**  a). Play a pre-downloaded video explaining the uses of the measuring instruments. Ask learners to watch, listen and write down what they hear and see.  b) Provide learners with measuring instruments such as meter rule, protractor*,* measuring cylinder and venier callipers to identify any type of error on them.  c). In their groups, provide learners with the same materials (such as water, wire etc) to measure their quantities. Guide each guide to write a written report from each measurement made  **Key Assessment**  **Level 1:**  1.State three uses of dimensional analysis.  **Level 2:**  2.Use dimensions to determine the fundamental units of the following quantities:  a. Acceleration  b. Force  c. Energy  d. Power  **Level 3:**  3. Analyze the reasons why some measuring instruments have errors on them and their effects on measurement. | | | | | | | |
| **Keywords** | Dimension, systematic, random and parallax | | | | | | |

|  |
| --- |
|  |

|  |  |
| --- | --- |
| **Lesson 1: DIMENSIONS** | |
| **Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual** | |
| ***Teacher Activity*** | ***Learner Activity*** |
| **Starter *Activity (10 minutes)***  In their mixed grouping, provide learners with cuboids and ask them to identify the three main dimensions of it; they write their answers down.  Ask one group to volunteer and present their answers. | |
| ***Introductory Activity (15minutes)***  I.In their mixed ability groupings, ask learners to draw a cylinder and identify at least four dimensions. Guide learners to **discuss** among themselves their answers.  II. Based on their answers, guide learners **think -pair – and share** on the general meaning of the term *dimension* and specifically *dimension of a physical quantity*.  ***Activity 1 (40 minutes)***  I. In their mixed ability groupings, task each group with some specific physical quantities (area, volume, density, force etc.) to find their dimensions.  II. Guide a presentation from each group and a whole class discussion on the answers of each group.  III. Still in their groupings, task learners to use their answers to find the base units of the physical quantities given.  ***Activity 2 (40 minutes)***  I. Using a whole class discussion, guide learners to share among themselves in their groups, the principle of dimensional homogeneity.  II. In their mixed ability groupings, task each group with some specific equations to determine whether or not they are dimensionally valid.  III. Guide a presentation from each group and a whole class discussion on the answers of each group. | ***Introductory Activity***  I.Draw a cylinder and identify at least four dimensions. Discuss among yourselves your answers  II. Think -pair – and share on the meaning of the term dimension and dimension of a physical quantity.  ***Activity 1***  I. In your mixed ability groupings, find the dimensions of the given physical quantities.  II. Engage in a presentation and whole class discussion on the answers of each group.  III. In your groupings use your answers obtained from the dimensions to find the base units of the physical quantities given.  ***Activity 2 (40 minutes)***  I. Using your tablets search for the meaning of systematic, random and parallax errors in measuring instruments.  II. In your groups, work together to determine whether or not the equations given are dimensionally valid.  III. Present your answers to the entire class for a whole class discussion |
| **Assessment DoK aligned to the Curriculum and Subject Teacher Manual** | |
| ***Level 3***  1.Suppose we suspect that the frequency(f) of oscillation of a pendulum bob depends on it mass (m), length of the thread (l), and acceleration due to gravity(g), use dimensional analysis to obtain the relationship between f, m, l and g. What conclusion can you draw from your answer? | |
| **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** | |
|  | |
| **Lesson 2: ERRORS IN THE USE OF MEASURING INSTRUMENTS** | |
| **Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual** | |
| ***Teacher Activity*** | ***Learner Activity*** |
| **Starter *Activity (10 minutes)***    In their mixed ability groupings, present learners with measuring instruments such as meter rule, protractor, venier calliper, measuring cylinder, ammeter and voltmeter. Ask them to identify each instrument given. | |
| ***Teacher Activity***  ***Introductory activity (25 minutes)***  I. Play a pre-downloaded video explaining the uses of the measuring instruments. Ask learners to watch, listen and write down what they hear and see.  II. In their groups, task learners to discuss among themselves the uses of the instruments.  III. Allow a group that wishes to volunteer to share with the class their answers.  ***Activity 1 (25 minutes)***  I. Using their tablets, guide learners to search for the meaning of *systematic*, *random* and *parallax* errors in measuring instruments.  II. Provide learners with measuring instruments such as meter rule, protractor*,* measuring cylinder and venier callipers to identify any type of error on them.  ***Activity 2 (20 minutes)***  I.In their groups, provide learners with the same materials (such as water, wire etc) to measure their quantities.  II. Guide each guide to write a written report from each measurement made.  ***Activity 3 (25 minutes)***  I. Guide a presentation from each group and a whole class discussion on the answers of each group.  II. Guide learners to compare their results, discuss differences how to reconcile them. | ***Learner Activity***  ***Introductory activity***  I. Watch the video explaining the uses of the measuring instruments and write down what you hear and see.  II. In your groups, discuss among yourselves the uses of the instruments.  III. Share with the class your answers.    ***Activity 1***  I. Using your tablets, search for the meaning of systematic, random and parallax errors in measuring instruments*.*  II. Identify the errors on given measuring instruments such as meter rule, protractor, measuring cylinder and venier callipers.  ***Activity 2***  I. Measure the quantities of the given material in your groups.  II. Write a written report from each measurement made.  ***Activity 3***  I. Participate in a presentation from your group and in a whole class discussion on the answers of each group.  II. Compare your results with other groups discuss differences how to reconcile them. |
| **Assessment DoK aligned to the Curriculum and Subject Teacher Manual** | |
| **Level 3**  A reading can be precise but inaccurate. Discuss | |
| **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** | |
|  | |