LESSON PLAN ON NATURAL SCIENCE

WEEK 8

Name of Teacher: Mr. Mac-Donald Arinze

Class: Year 7 & 8

Average age of learners: 13years

Gender: Mixed

Topic: Acceleration

Duration: 40mins

Date: Week ending 1st March, 2024.

CONTENT: Concept of Acceleration and velocity-time graph

RATIONALE: The knowledge acquired will enable the learners to understand the concept of acceleration and also solve calculation questions involving acceleration using appropriate formulas.

PERFORMANCE OBJECTIVES: By the end of the lesson, the learners should be able to:

**Cognitive Domain (Minds-on):**

1. Define acceleration correctly
2. State correctly the S.I unit for acceleration
3. Solve correctly calculation questions involving acceleration using appropriate formulas.
4. Draw a velocity time graph using information provided in a table.

**Affective Domain (Hearts-on):**

1. Show willingness in the lesson by attempting to solve calculation questions involving acceleration.
2. Appreciate the lesson by answering the teacher’s questions with keen interest.

**Psychomotor domain (Hands-on)**

1. Draw correctly the velocity-time graph of a journey.
2. Apply their understanding of acceleration to real-world scenarios.

**Interpersonal domain:** (Learners’ ability to interact with others and share knowledge):

1. Discuss elaborately in groups and share knowledge and experiences acquired.

**ENTRY/ENTERING BEHAVIOUR:** Learners are familiar with their athletes and cars changing speed at different times in a journey.

**INSTRUCTIONAL MATERIALS:** Laptop/desktop, projector, textbooks, toy cars, stopwatch or timer, meter rule, marker, whiteboard and coloured cardboard paper.

**INSTRUCTIONAL PROCEDURE:** Check table below.

**TABLE: INSTRUCTIONAL PROCEDURE**

| **Duration** | **Content Development** | **Teaching Strategies** | **Instructional Strategies** | **Specific Instructional Materials in Use** | **Teacher’s Performance Activities** | **Students’ Performance Activity** | **Learning Point** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 5 mins | Asking Provocative questions | Set Induction | Brainstorming | Marker, Whiteboard | The teacher divides the learners into groups of three members each to brainstorm on the meaning of acceleration and it's examples in everyday life | Learners carry out the task that the teacher has given them after brainstorming. | Learners have made an attempt to define the concept of acceleration and siting it's examples in real life scenarios. |
| 14mins | Definition of acceleration and the S.I unit of acceleration | Use of examples and illustrations, planned repetition, stimulus variation, questioning and reinforcement. | Illustration, demonstration | Pictures and flash cards of concepts and S.I units. | The teacher uses a flashcard to show an define the concept of Acceleration and also mention their S.I units.. students also illustrates acceleration using a toy car and stopwatch or timer and meter rule | The learners identify the key words in the definitions and also interpret the mathematical expression of acceleration. | The learners have learnt the definition of acceleration |
| 8mins | Mathematical formula for calculating acceleration | Use of examples and illustrations, planned repetition, stimulus variation | Think-pair-share | Use of flash cards | The teacher explains the meaning of each parameter captured in the formula of acceleration | The learners identify the how each parameter can be is given in the question.  A=v-u/t | The learners have learnt the the formula for calculating acceleration |
| 8mins | Calculation involving acceleration  Velocity-time graph | Use of examples and exercises from text and illustrations | brainstorming, think-pair-share | Textbooks. | The teacher guides the students on how to apply the formula for acceleration in solving calculation questions.. | The learners identify the application of the formula for acceleration in calculating the following parameters: acceleration, change in velocity, and time.  Also teacher tells the students how to draw a velocity-time graph | The learners have learnt how to calculate various parameters captured in the formula of acceleration and how to draw a velocity-time graph |

**EVALUATION:** The teacher evaluates the lesson using the following questions

1. Define the concept Acceleration
2. State the S.I unit for acceleration
3. Calculate the acceleration of a car, assuming it starts from rest and attains a velocity of 40m/s in 30 seconds
4. Calculate the average velocity of a car traveling at an acceleration of 2m/s² for 20secs
5. Draw a velocity-time graph for the information represented below

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Velocity (m/s) | 5 | 10 | 15 | 20 | 20 | 15 | 10 | 5 | 0 |
| Time (s) | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |

**CLOSURE:** The teacher summarizes the lesson by guiding the learners in going through the main points of the lesson, discussing the formula for calculating acceleration and emphasizin. The teacher gives the learners some time to reflect on what they have learnt, ask questions and as well take corrections.

**ASSIGNMENT (HOMEWORK):** the teacher tells the students to solve the following.

1. A car accelerates from rest at 3m/s² for 40secs, calculate the final velocity of the car.
2. Calculate the acceleration of a car with initial velocity of 20m/s assuming it attains a new velocity of 50m/s in 5 seconds.

**Actions to carry forward:** the students having learnt the concepts and mathematical formulas for acceleration can now solve other examples from their textbook and other materials.

**Acceleration**

Acceleration is the rate of chang of velocity with time. Mathematically is expressed as the ratio of change in velocity and time.

Acceleration= (V - U)/t

The S.I unit of acceleration is meter per seconds square (m/s²)

Procedures for calculating acceleration

* Write down the givens from the question
* Substitute the givens in the formula of acceleration to solve for the unknown.
* Ensure to write the S.I unit of the parameter solved for.

Procedures involved in plotting a velocity-time

* Draw the vertical line(y-axis) and horizontal line (x-axis) meeting at a point 0. Forming an L-shape.
* Label the y-axis as velocity (m/s) and x-axis as the time taken.
* Plot the graph based on the information provided in the table.
* Join the points on the graph.
* The slope of the graph can be calculated using S=(Y2-Y1)/(X2-X1). The slope of the graph is also equal to acceleration.

Guided practice:

1. Calculate the acceleration of a car, assuming it starts from rest and attains a velocity of 40m/s in 30 seconds
2. Calculate the average velocity of a car traveling at an acceleration of 2m/s² for 20secs
3. Draw a velocity-time graph for a car with the information represented in the table below

| Velocity (m/s) | 5 | 10 | 15 | 20 | 20 | 15 | 10 | 5 | 0 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Time (s) | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |

From the graph, determine the acceleration of the car.

1. Calculate the the time taken for a rocket accelerating at 10m/s² to attain a velocity of 300m/s

Application of acceleration in real life scenarios.