SENIOR HIGH SCHOOL

DepED
DEPARTMENT OF EDUCATION

General Physics 1

Quarter 1 – Module 3:
Title: Kinematics: Motion Along a Straight Line

ALTERNATIVE DELIVERY MODE
ADM

Science – Grade 12
Alternative Delivery Mode
Quarter 1 – Module 3: Motion Along a Straight Line
First Edition, 2020

Published by the Department of Education
Secretary: Leonor Magtolis Briones
Undersecretary: Diosdado M. San Antonio

Development Team of the Module

Writer: Loida A. Arce

Editor: Jacqueline T. Ureta

Reviewer: Alma D. Acuña

Illustrator: Name

Layout Artist: Name

Management Team: Dr. Carlito D. Rocafort
Dr. Job S. Zape Jr.
Eugene Adrao
Elaine Balaogan
Dr. Elpidia B. Bergado
Noel S. Ortega
Dr. Josephine Monzaga

Printed in the Philippines by _____

Department of Education – Region IV-A

Office Address: Capitol Compound, Brgy. Luciano
Trece Martires City, Cavite
Telefax: (046) 419 139 / 419-0328
E-mail Address: depedcavite.lrmd@deped.gov.ph

12

General Physics1

Quarter 1 – Module 3: Kinematics: Motion Along a Straight Line

DepED
DEPARTMENT OF EDUCATION

Introductory Message

For the facilitator:

Welcome to the General Physics 1 12 Alternative Delivery Mode (ADM) Module on Kinematics: Motion Along a Straight Line!

This module was collaboratively designed, developed and reviewed by educators both from public and private institutions to assist you, the teacher or facilitator in helping the learners meet the standards set by the K to 12 Curriculum while overcoming their personal, social, and economic constraints in schooling.

This learning resource hopes to engage the learners into guided and independent learning activities at their own pace and time. Furthermore, this also aims to help learners acquire the needed 21st century skills while taking into consideration their needs and circumstances.

In addition to the material in the main text, you will also see this box in the body of the module:

Notes to the Teacher

This contains helpful tips or strategies that will help you in guiding the learners.

As a facilitator you are expected to orient the learners on how to use this module. You also need to keep track of the learners' progress while allowing them to manage their own learning. Furthermore, you are expected to encourage and assist the learners as they do the tasks included in the module.

For the learner:

Welcome to the General Physics 1 12 Alternative Delivery Mode (ADM) Module on Kinematics: Motion Along a Straight Line!

The hand is one of the most symbolized part of the human body. It is often used to depict skill, action and purpose. Through our hands we may learn, create and accomplish. Hence, the hand in this learning resource signifies that you as a learner is capable and empowered to successfully achieve the relevant competencies and skills at your own pace and time. Your academic success lies in your own hands!

This module was designed to provide you with fun and meaningful opportunities for guided and independent learning at your own pace and time. You will be enabled to process the contents of the learning resource while being an active learner.

This module has the following parts and corresponding icons:

 ***What I Need to Know***	This will give you an idea of the skills or competencies you are expected to learn in the module.
 ***What I Know***	This part includes an activity that aims to check what you already know about the lesson to take. If you get all the answers correct (100%), you may decide to skip this module.
 ***What's In***	This is a brief drill or review to help you link the current lesson with the previous one.
 ***What's New***	In this portion, the new lesson will be introduced to you in various ways such as a story, a song, a poem, a problem opener, an activity or a situation.
 ***What is It***	This section provides a brief discussion of the lesson. This aims to help you discover and understand new concepts and skills.
 ***What's More***	This comprises activities for independent practice to solidify your understanding and skills of the topic. You may check the answers to the exercises using the Answer Key at the end of the module.
 ***What I Have Learned***	This includes questions or blank sentence/paragraph to be filled in to process

what you learned from the lesson.

What I Can Do — This section provides an activity which will help you transfer your new knowledge or skill into real life situations or concerns.

Assessment — This is a task which aims to evaluate your level of mastery in achieving the learning competency.

Additional Activities — In this portion, another activity will be given to you to enrich your knowledge or skill of the lesson learned. This also tends retention of learned concepts.

Answer Key — This contains answers to all activities in the module.

At the end of this module you will also find:

References — This is a list of all sources used in developing this module.

The following are some reminders in using this module:

1. Use the module with care. Do not put unnecessary mark/s on any part of the module. Use a separate sheet of paper in answering the exercises.
2. Don't forget to answer *What I Know* before moving on to the other activities included in the module.
3. Read the instruction carefully before doing each task.
4. Observe honesty and integrity in doing the tasks and checking your answers.
5. Finish the task at hand before proceeding to the next.
6. Return this module to your teacher/facilitator once you are through with it.

If you encounter any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator. Always bear in mind that you are not alone.

We hope that through this material, you will experience meaningful learning and gain deep understanding of the relevant competencies. You can do it!

What I Need to Know

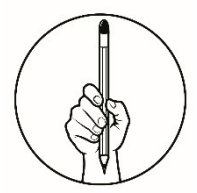
This module was designed and written with you in mind. It is here to help you master the Motion Along a Straight Line. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course. But the order in which you read them can be changed to correspond with the textbook you are now using.

The module has one lesson, namely:

- Lesson 1 – Uniformly Accelerated Motion

After going through this module, you are expected to:

1. recognize whether or not a physical situation involves constant velocity or constant acceleration



What I Know

Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

1. Which of these is an example of deceleration?
   a. a bird taking off for flight
   b. a car approaching a red light
   c. a roller coaster moving down a steep hill
   d. an airplane following a straight flight path

2. Which of these is an example of acceleration?
   a. a bird taking off for flight
   b. a car approaching a red light
   c. a roller coaster moving down a steep hill
   d. an airplane following a straight flight path

3. An object is accelerating_____.
   a. only when its speed changes
   b. only when the direction changes
   c. when its speed or direction changes
   d. if its velocity is large

4. What is the acceleration of an object moving with constant velocity?
   a. Negative
   b. Non-uniform
   c. uniform
   d. zero

5. An object is shot vertically upward. While it is rising

a. Its velocity and acceleration are both upward

b. Its velocity is upward and its acceleration is downward

c. Its velocity and acceleration are both downward

d. Its velocity is downward and its acceleration is upward

6. Which of the following event illustrate constant velocity?

a. the car moves from 5 m/s to 10 m/s

b. the car with speedometer gives a speed of 30 m/s

c. the car moves 20 m/s in 1 hour

d. the car accelerates 10 m/s^2

7. What will be the acceleration of the car if it has a constant acceleration

a. increased b. not determined c. reduced d. zero

8. A ball is thrown up into the air. What happens to the acceleration as the ball rises in the air?

a. the acceleration increases c. the acceleration decreases

b. the acceleration remains constant d. the acceleration is zero

9. A ball is thrown up into the air. What happens to the velocity as the ball rises in the air?

a. the velocity increases c. the velocity decreases

b. the velocity remains constant d. the velocity is zero

10. What happens to the velocity of a ball as it dropped off a cliff?

a. it decreases at a uniform rate c. it increases at uniform rate

b. it is constant d. it increases at non uniform rate

11. An object has an initial velocity that is negative. If the acceleration of the object is

positive, how will velocity be affected?

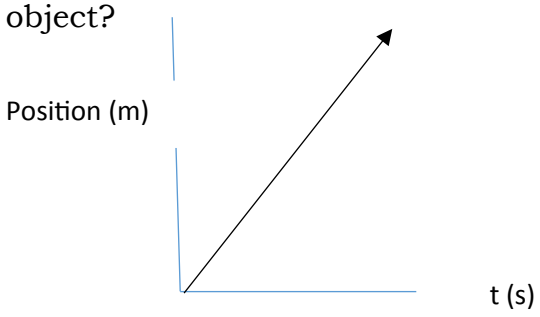
a. Velocity will decrease.

b. Velocity will increase.

c. Velocity will be constant.

d. Velocity will either increase or decrease

12. What does the following position-time graph tell us about the motion of the object?



a. The object is accelerating in the positive direction.

b. The object is moving in the positive direction at a constant velocity.

c. The object is in uniform motion and headed in the negative direction.

d. The object is not moving

13. Which of the following is the correct definition of constant velocity?

a. when an object travels the same distance every second

b. when an object travels the same distance every minute

c. when an object travels the same distance in an hour

d. none of the statements are true

14. Which of the following is not a unit of constant velocity?

a. m/s b. mi/h c. km/h d. m/s/s

15. The figure below shows a motion diagram. Each dot represents the location of the object during every one second interval (for a total of six seconds). This motion diagram is an example of constant velocity.

a. No

b. Yes

c. There is enough information to tell

d. Yes, but only for limited time.

a.

Lesson 1 Uniformly Accelerated Motion

Constant acceleration occurs when an object's velocity changes by an equal amount in every equal time period.

What's In

Show pictures of moving body or moving object. Describe the motion based on pictures.

- Playing basketball, volley ball, sepak takraw, javelin throw.
- Riding in a roller coaster and Ferris wheel
- Falling objects

Notes to the Teacher

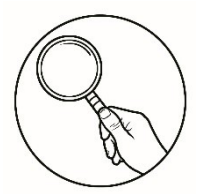
It is significant that learners had background on the distance, displacement, velocity and acceleration.

What's New

Traveling with a constant velocity means you're going at the same speed in the same direction continuously. If you have a constant velocity, this means you have zero acceleration. ... If you travel with a constant acceleration, your velocity is always changing, but it's changing by a consistent amount each second.

An object experiencing constant acceleration has a velocity that increases or decreases by an equal amount for any constant period of time.

Assuming acceleration to be constant does not seriously limit the situation, we can study and does not degrade the accuracy of our treatment, because in a great number of situations, acceleration *is* constant. When it is not, we can either consider it in separate parts of constant acceleration or use an average acceleration over a period of time.



What is It

Constant Velocity

Motion with constant velocity is one of the simplest forms of motion. This type of motion occurs when an object is moving (or sliding) in the presence of little or negligible friction, similar to that of a hockey puck sliding across the ice. To have a constant velocity, an object must have a constant speed in a constant direction. Constant direction constrains the object to motion to a straight path.

Constant acceleration

We are all familiar with the fact that a car speeds up when we put our foot down on the accelerator. The rate of change of the velocity of a particle with respect to time is called its acceleration. If the velocity of the particle changes at a constant rate, then this rate is called the constant acceleration.

Since we are using meters and seconds as our basic units, we will measure acceleration in meters per second per second. This will be abbreviated as m/s^2. It is also commonly abbreviated as m/s^2.

For example, if the velocity of a particle moving in a straight-line change uniformly (at a constant rate of change) from 2 m/s to 5 m/s over one second, then its constant acceleration is 3 m/s^2.

What's More

Classify the physical situation as constant velocity or constant acceleration:

1. Riding a Ferris Wheel
2. Freely falling object
3. Shooting a ball in a ring
4. Rowing a boat
5. Driving in a curve road
6. Falling parachute
7. Throwing a golf ball
8. Racing car as approaching the finish line
9. A car moving down from a hill
10. Dribbling a ball

What I Have Learned

1. An object moving with constant velocity must have a constant speed in a constant direction.

2. If the velocity of the particle changes at a constant rate, then this rate is called the constant acceleration.

What I Can Do

Do you encounter road speed and velocity limit? If yes, what are the importance of this along the roads.

What are the devices that act as accelerator and decelerator among cars?

Assessment

Multiple Choice. Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

1. Which of these is an example of deceleration?
   a. a bird taking off for flight
   b. a car approaching a red light
   c. a roller coaster moving down a steep hill
   d. an airplane following a straight flight path

2. Which of these is an example of acceleration?
   a. a bird taking off for flight
   b. a car approaching a red light
   c. a roller coaster moving down a steep hill
   d. an airplane following a straight flight path

3. An object is accelerating_____.
   a. only when its speed changes
   b. only when the direction changes
   c. when its speed or direction changes
   d. if its velocity is large

4. What is the acceleration of an object moving with constant velocity?
   a. Negative
   b. Non-uniform
   c. uniform
   d. zero

5. An object is shot vertically upward. While it is rising
   a. Its velocity and acceleration are both upward
   b. Its velocity is upward and its acceleration is downward
   c. Its velocity and acceleration are both downward
   d. Its velocity is downward and its acceleration is upward

6. Which of the following event illustrate constant velocity?

   a. the car moves from 5 m/s to 10 m/s

   b. the car with speedometer gives a speed of 30 m/s

   c. the car moves 20 m/s in 1 hour

   d. the car accelerates 10 m/s^2

7. What will be the acceleration of the car if it has a constant acceleration

   a. increased b. not determined c. reduced d. zero

8. A ball is thrown up into the air. What happens to the acceleration as the ball rises in the air?

   a. the acceleration increases c. the acceleration decreases

   b. the acceleration remains constant d. the acceleration is zero

9. A ball is thrown up into the air. What happens to the velocity as the ball rises in the air?

   a. the velocity increases c. the velocity decreases

   b. the velocity remains constant d. the velocity is zero

10. What happens to the velocity of a ball as it dropped off a cliff?

a. it decreases at a uniform rate

b. it is constant

c. it increases at uniform rate

d. it increases at non uniform rate

11. An object has an initial velocity that is negative. If the acceleration of the object is positive, how will velocity be affected?

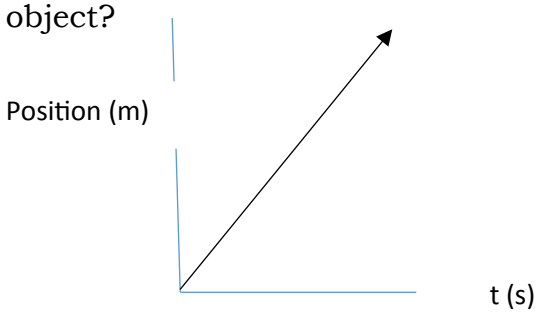
a. Velocity will decrease.

b. Velocity will increase.

c. Velocity will be constant.

d. Velocity will either increase or decrease

12. What does the following position-time graph tell us about the motion of the object?



a. The object is accelerating in the positive direction.

b. The object is moving in the positive direction at a constant velocity.

c. The object is in uniform motion and headed in the negative direction.

d. The object is not moving

13. Which of the following is the correct definition of constant velocity?

a. when an object travels the same distance every second

b. when an object travels the same distance every minute

c. when an object travels the same distance in an hour

d. none of the statements are true

14. Which of the following is not a unit of constant velocity?

a. m/s b. mi/h c. km/h d. m/s/s

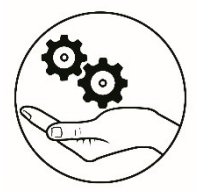
15. The figure below shows a motion diagram. Each dot represents the location of the object during every one second interval (for a total of six seconds). This motion diagram is an example of constant velocity?

a. No

b. Yes

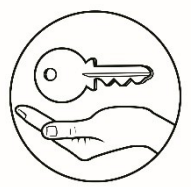
c. There is enough information to tell

d. Yes, but only for limited time.



Additional Activities

Cite 5 examples of constant velocity and constant acceleration in your environment or surroundings. Make a 4 picture one word for every example.



Answer Key

Assessment

1. B
2. C
3. C
4. D
5. B
6. C
7. C
8. C
9. A
10. C
11. D
12. B
13. D
14. D
15. A

What's More

1. Constant velocity
2. Constant acceleration
3. Constant acceleration
4. Constant velocity
5. Constant velocity
6. Constant acceleration
7. Constant acceleration
8. Constant acceleration
9. Constant acceleration
10. Constant velocity

What I Know

1. B
2. C
3. C
4. D
5. B
6. C
7. C
8. C
9. A
10. C
11. D
12. B
13. D
14. D
15. A

References

Tabujara Jr., Geronimo D. K-12 Compliant Worktext for Senior High School General Physics 1. Manila, Philippines: JFS Publishing Services

For inquiries or feedback, please write or call:

Department of Education - Bureau of Learning Resources (DepEd-BLR)

Ground Floor, Bonifacio Bldg., DepEd Complex
Meralco Avenue, Pasig City, Philippines 1600

Telefax: (632) 8634-1072; 8634-1054; 8631-4985

Email Address: blr.lrqad@deped.gov.ph * blr.lrpd@deped.gov.ph