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DepED
DEPARTMENT OF EDUCATION

Science Activity Sheet
Quarter 3 – MELC 1
Weeks1-2
Describing Motion

REGION VI – WESTERN VISAYAS

Science 7
Activity Sheet No.1- Describing Motion
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Introductory Message

Welcome to Science 7!

The **Learning Activity Sheet** is a product of the collaborative efforts of the Schools Division of Guimaras and DepEd Regional Office VI - Western Visayas through the Curriculum and Learning Management Division (CLMD). This is developed to guide the learning facilitators (teachers, parents and responsible adults) in helping the learners meet the standards set by the K to 12 Basic Education Curriculum.

The **Learning Activity Sheet** is self-directed instructional materials aimed to guide the learners in accomplishing activities at their own pace and time using the contextualized resources in the community. This will also assist the learners in acquiring the lifelong learning skills, knowledge and attitudes for productivity and employment.

For learning facilitator:

The **Science 7 Activity Sheet** will help you facilitate the teaching-learning activities specified in each Most Essential Learning Competency (MELC) with minimal or no face-to-face encounter between you and learner. This will be made available to the learners with the references/links to ease the independent learning.

For the learner:

The **Science7 Activity Sheet** is developed to help you continue learning even if you are not in school. This learning material provides you with meaningful and engaging activities for independent learning. Being an active learner, carefully read and understand the instructions then perform the activities and answer the assessments. This will be returned to your facilitator on the agreed schedule.

Name of Learner:_____

Grade and Section: _____ Date: _____

SCIENCE 7 ACTIVITY SHEET No.1
Describing Motion

I. Learning Competency with Code

Describe the motion of an object in terms of distance or displacement, speed or velocity, and acceleration **(S7FE-IIIa-1).**

II. Background Information for Learners

Currently, you often hear the term physical distancing as one of the health protocols that should be observed during this time of pandemic. How would you know that you observe proper physical distancing? What distance should you maintain from another person?

You are also surrounded by many moving objects around. Some move so slowly like the ant and the turtle while others move so fast like airplanes. Motion might be very common but in science describing it entails careful use of some definitions.

In this learning activity, you will learn to describe motion of an object in terms of position, distance or displacement, speed or velocity, and acceleration.

III. Accompanying DepEd Textbook and Educational Sites

Department of Education. *K-12 Basic Education Curriculum, Science 7 Learners Material (p. 166-190)*. Pasig City, Philippines, 2015.

Department of Education.*Secondary Education Development and Improvement Project (SEDIP), Physics Textbook. (p. 257-258).* Quezon City, Philippines, 2010.

IV. Activity Proper

Familiarize yourself with the terms associated with motion by reading the texts below.

Motion is referred to as a change in position with respect to a reference object. The original position serves as a **reference** to the motion of the object and it is very important in describing its motion. An object is said to be moving when it has travelled a certain distance from the reference point, or it is displaced from the reference. The direction of an object's motion can be described with reference direction such as north, south, east, west, up, down, left and right.

To understand more about the importance of frame of reference or point of reference in describing motion, refer figure 1 on the succeeding page. Consider that you are standing along the railtracks looking at the boy on the train. You will see that it is moving to the right along with the motion of the train. However, if you change your frame of reference and stand with the boy on the same train, you will observe that the boy is not in motion. Another person outside of the train will see both you and the boy moving in the same direction with the train.

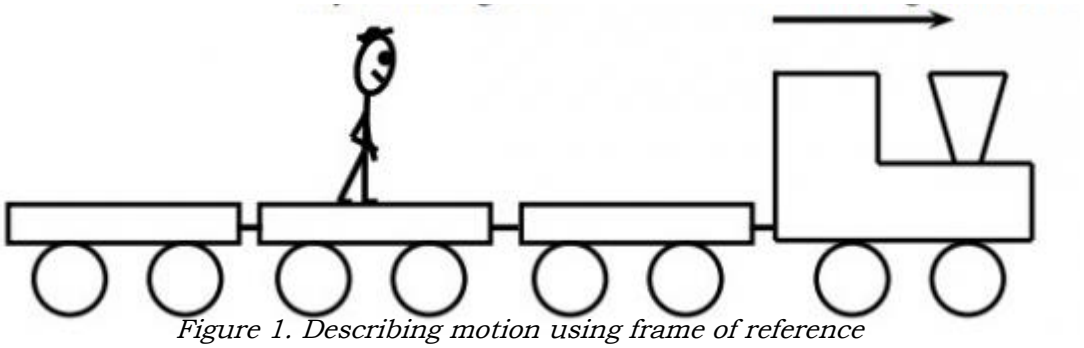


Figure 1. Describing motion using frame of reference

Activity 1

Describing Motion Through Visuals

Describing position of the objects can be done in many ways. For this activity, you will learn how to provide accurate descriptions of positions of the object through the use of visuals like diagrams.

Directions. The diagram below shows that the positions of the objects are described by their coordinates along the number line. Study the diagram and answer the questions that follow. Write the answer on your answer sheet.

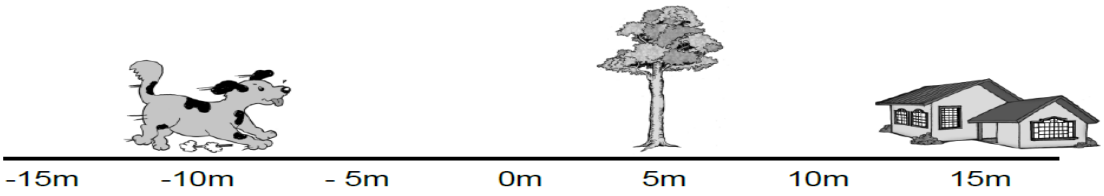


Figure 2. Coordinates of the different objects along the number

Questions.

1. What is the position of the dog?

_____

2. What is the position of the tree?

_____

3. What is the position of the dog with respect to the house?

_____

4. What is the position of the tree with respect to the dog?

_____

B. Study another example below. In the diagram, the positions of the rolling ball are shown at equal intervals of time. You can use the diagram to describe the position of the ball at any given time.

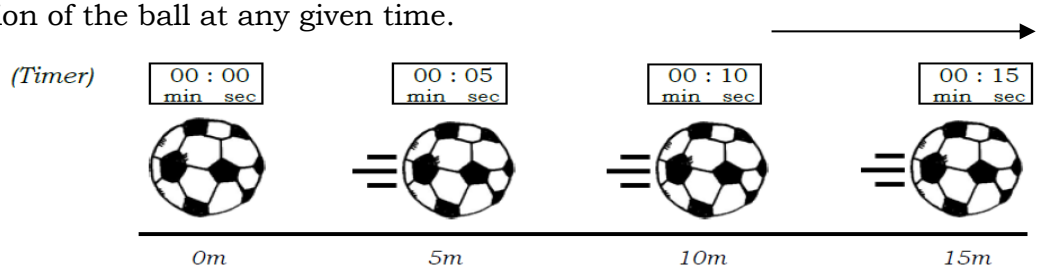


Figure 3. Position of a rolling ball for the same time interval.

Directions. Answer the following questions. Write the answer on your answer sheet.

1. What is the initial position of the ball?

_____

2. What is the position of the ball at 10 seconds?

_____

3. At what time is the position of the ball equal to 5 meters?

_____

4. What is the total distance travelled by the ball?

_____

Distance refers to the length of the entire path the object travelled. It has a magnitude but no direction. **Displacement** refers to the shortest distance between the object's two positions, like the distance between its point of origin and its point of destination, no matter what path it took to get to that destination. It has a magnitude and direction.

The figure below illustrates the difference between distance (represented by broken lines) and displacement (represented by continuous lines).

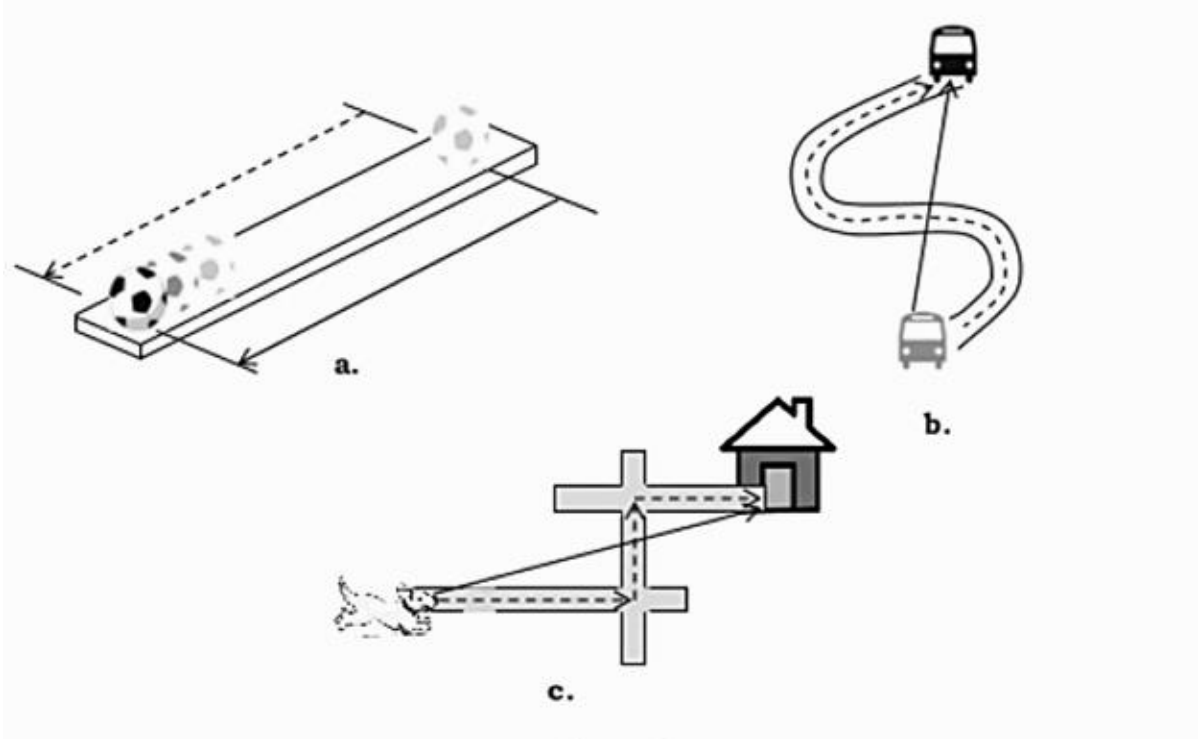


Figure 4. Distance and displacement

Activity 2

Distance vs Displacement

Directions. Study Liza's route from her home to school. Her house, labelled as point O, is the reference point.

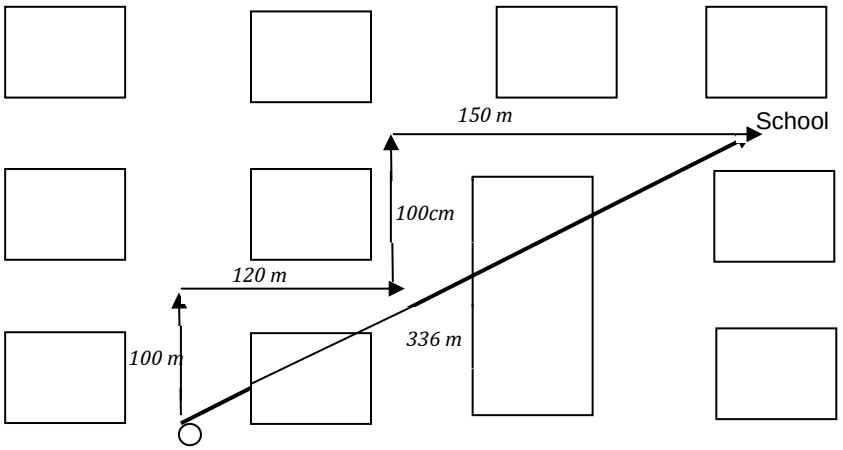


Figure 5. Liza's route from home to school

Directions. Answer the following questions. Write your answer on your answer sheet.

1. What is the total distance travelled by Liza from her house to school?

_____

2. What is her displacement? How do you compare it with distance?

_____

After knowing how far the object moves, it's time to know how fast it moves. This information can be provided by the object's speed or velocity. **Speed** is defined as distance travelled divided by the time of travel.

$$\text{Speed} = \frac{\text{Distance travelled}}{\text{Time of travel}}$$

The units of speed can be miles per hour (mi/hr), kilometers per hour (km/hr) or meter per second (m/s).

If you solve the total distance travelled by an object over the total time it took to cover such distance, then you are computing for the object's **average speed**. During the object's travel, there are instants that its speed would vary. The speed at an instant is called **instantaneous speed**. The instantaneous speed may be equal, greater than, or less than the average speed. **Speedometer** is a device used to measure instantaneous speed of a vehicle.

In describing the motion of an object, you do not just describe how fast the object moves, you should also consider the direction to where it is going. Speed with direction is referred to as **velocity**.

The succeeding activity will show you how important not just speed but also direction, particularly when tracking the path of an impending storm.

Activity 3

Speed vs Velocity

Directions. Study the weather bulletin below. It shows both the speed and direction of Typhoon Yolanda. Can you still remember when this typhoon happened and how your family prepared for it? If not, you may ask your parents and for sure they have some things to say about how everybody, during that time, keep themselves updated not only about the typhoon's speed but also its direction.

Table 1. Weather Bulletin for Typhoon Yolanda

Weather Bulletin: Super Typhoon "Yolanda" Thursday, 07 November 2013 at 5:00 AM	
Location of Center	975 km southeast of Tacloban City, Leyte
Coordinates	8.4^0N, 133.4 ^{0}E
Strength of the winds	Max. wind speed of 280 km/hr near the center and gustiness of up to 335 km/hr
Movement	35 km/hr going West-Northwest
Forecast	On Friday AM: Expected to make landfall over the northeastern shores of Leyte, about 35 km of Tacloban City between 10 AM to 11 AM and will cross Northern Leyte passing over or very close to Ormoc City around noontime Friday.

Source: http://weather.com.ph/announcements/super-typhoo-haiyan-yolanda-update-number-007

The weather bulletin above states the location of the center of the storm on a given day, the strength of the typhoon which is determined by its circular speed and the movement along its path.

Directions. Answer the following questions. Write the answer on your answer sheet.

1. What is the speed for the circular motion of the typhoon winds?

_____

2. What is the speed for the motion of the typhoon as along its path?

_____

3. Whta is the velocity for the motion of the typhoon along its path?

_____

4. What is the difference between speed and velocity?

_____

In reality, objects do not always move at constant velocity. The rate at which speed changes is termed as **acceleration**.

$$\text{Acceleration (a)} = \frac{\text{Change in speed } (\triangle v)}{\text{Change in time } (\triangle t)}$$

Change in speed is the difference between the final speed (v_f) and the initial speed (v_i)

$$a = \frac{v_f - v_i}{t_2 - t_1}$$

where:
a = acceleration
v_f- final velocity v_i- initial velocity
t_1- initial time t_2-final time

Any change in a velocity of the object results in an acceleration. This includes change in speed (increasing speed or decreasing speed which is also called deceleration) or change in direction. Even if there is no change in speed, but there is change in direction, acceleration is achieved. Acceleration is expressed in m/s^2 or $\frac{m/s}{s}$, km/hr^2 or $\frac{km/hr}{hr}$ or $\frac{\text{km/hr}}{s}$.

Activity 4

Doing Detective Work

Directions. Study the situation below.

Suppose you were having your on-the-job training in a private investigating company. You were asked to join a team assigned to investigate a "hit and run" case. The alleged suspect was captured by a CCTV camera driving down the road leading to the place of incident. The suspect denied the allegations saying that he was then driving very slowly with a constant speed. Because of the short time difference when he was caught by the camera and when the accident happened, he insisted that it was impossible that he could already be in the place when the crime happened. But when you were viewing the scene again, you noticed that his car was leaving oil spots on the road. When you checked these spots on site, you found that thay are still evident. So, you began to wonder if the spots can be used to investigate the motion of the car of the suspect and check whether he was telling the truth.

Here's the activity that you can do to help you with your investigation. You will analyze the motion using strips of papers with dots. For this activity, you will assume that the dots represent the 'oil drops' left by the car down the road.

Procedure:

1. Label each dot in the paper strip drawn below. Start from 0, then 1, 2, 3, and so on. Each dot occurred every 1 second.

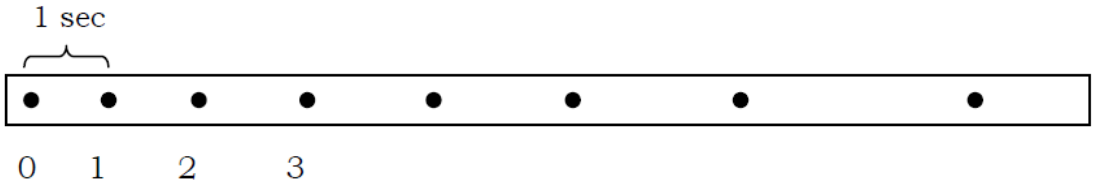


Figure 4. A tape chart representing the motion of the car.

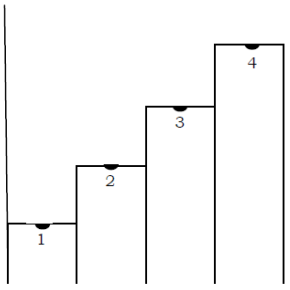
2. Examine the distance between successive dots.

Directions. Answer the following questions. Write the answer on your answer sheet.

a. How will you compare the distances between successive dots?

_____

When the paper strip is cut at each drop, starting from the first to the last drop, and paste them side by side on a graph paper, it will form a tape chart.



b. How do the lengths of the tape compare?

_____

Figure 5. Sample tape chart

c. If ea ıce travelled by the object for 1 second, and the length represents the distance traveled, then what 'quantity' each piece of tape provides?

_____

d. What does the tape chart tell you about the speed of the car?

_____

The difference in the length between two successive tapes provides the object's **acceleration** or its change in speed or velocity for a time interval of 1 second.

e. How would you compare the changes in the lengths of two successive tapes?

_____

f. What can you say about the acceleration of the moving car?

_____

g. If you found out in your investigation that the oil drops left by the car is similar to what you used in this activity, was the suspect telling the truth when he said that he is moving in a constant speed? Why?

_____

V. Reflection

Directions. Complete the following statements. Write the answer on your answer sheet.

I have learned that…

_____

I have realized that…

_____

I will apply…

_____

VII *Answer Key*

Activity 1	**Activity 2**	**Activity 4**
(Questions) A. 1. -10 m 2. 5 m 3. The dog is 25 meters to the left of the house. 4. The tree is 15 metersto the right of the dog. B. 1. The initial position of the ball is at 0 meter. Its final position is at15 meters. 2. 10 meters 3. 5 seconds 4. 15 meters	Questions) 1. 470 meters 2. 336 meters Northest. It is shorter than distance **Activity 3** (Guide Questions) 1. 280 km/hr up to 335 km/hr 2. 35 km/hr 3. 35 km/hr West-Northwest 4. Speed is the distance travelled by an object divided by the time of travel while velocity is speed with direction.	(Questions) **a**. The distance between two successive dots increases uniformly. **b**. The length of the strips of tape in the chart increases uniformly. **c**. Each strip of the tape provides the speed (or velocity) of the object every 1 second. **d.** Because the length of the tape increases uniformly, it means that the speed (or velocity) of the object increases uniformly. **e**. The change in length of the tape is constant. The change in speed isconstant. Or The length of the tape increases by the same amount in each timeinterval. The speed increases by the same amount in each time interval. **f.** The car is moving in constant acceleration. g. No. the tape chart shows that its speed is increasing in a unform rate.

VII. **Links and/or Other References**

http://weather.com.ph/announcements/super-typhoo-haiyan-yolanda-update-number-007