



Republic of the Philippines  
Department of Education

Regional Office IX, Zamboanga Peninsula



**JANUARY**  
*Makugiton*

**FEBRUARY**  
*Mahigugmaon*

**MARCH**  
*Matinabangon*

**APRIL**  
*Matinahuron*

**MAY**  
*Mahapsay og Malinpygo*

**JUNE**  
*Maabtik og Musunod sa Oksaktong Oras*

**JULY**  
*Maantigo og Maabilidad*

**AUGUST**  
*Maginhunahunaon para sa Urban*

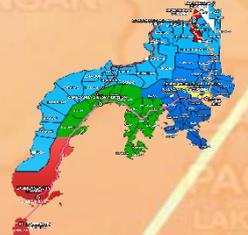
**SEPTEMBER**  
*Madaginoton*

**OCTOBER**  
*Matinud-anon*

**NOVEMBER**  
*Masaligan*

**DECEMBER**  
*Maatampoon*

**4**



Zest for Progress  
Zeal of Partnership

# SCIENCE

## Quarter 4 Module 7

### Light and Shadow



Name of Learner: \_\_\_\_\_

Grade & Section: \_\_\_\_\_

Name of School: \_\_\_\_\_



**What I Need to Know**

After going through this module, you are expected to:

Describe the changes in the position and length of shadows in the surroundings as the position of the Sun changes **S4ESIVh-9**



**What's In**

**Activity 1: "FILL ME UP"**

Score:

5

**Directions:** Fill the blanks with the appropriate word from the box that is being described by the statement.

Translucent	Shadow	Sun
Opaque	Transparent	

1. source of light	___ _ _
2. permitting light to pass through but diffusing it so that persons or objects on the opposite side are not clearly visible.	___ _ _ _ _ _ _ _ _ _
3. dark figure or image	___ _ _ _ _
4. objects behind can be easily seen	___ _ _ _ _ _ _ _ _ _
5. not able to be seen through	___ _ _ _ _



**What's New**

Are you eager to learn something new in this module? Come on, let's do this.

Score:

6

**Activity 2: "Fun with a flashlight"**

**Materials Needed:**

- Darkroom
- Flashlight with new batteries
- A piece of cardboard (8cm x 10 cm)
- A piece of thin clear plastic sheet (8cm x 10 cm)

**What to do:**

1. Close the windows and the door of your room.
2. Hold the cardboard 30 cm away from the wall of your room.
3. Assign a member of your family to hold the flashlight 30 cm away from the cardboard.
4. Switch on the flashlight and focus directly on the center of the cardboard.
5. Observe what happens and note your observations.
6. Repeat steps 2 and 3 with a piece of clear plastic sheet. Observe what happens.
7. Note your observations.
8. Repeat steps 2 and 3 outside the room and observe what happens. Note your observations.

**Guide Questions:**

1. What do you observe on the wall when light strikes an object in the darkroom? Describe what you observed.

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2. Did you get the same result outside the room? Why?

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3. What did you observe when light strikes a clear plastic sheet? What was formed and why?

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4. What are shadows?

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5. How are shadows formed?

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6. Do all objects form shadows? Why?

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Score:

12

### Activity 3: Playing with shadows

#### Materials Needed:

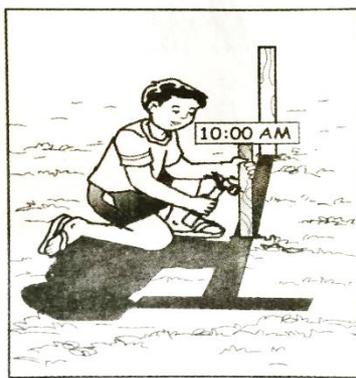
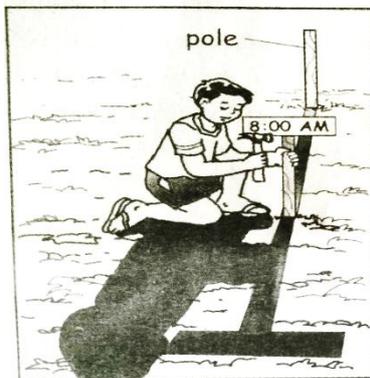
One (1) meter bamboo pole  
4 pieces 1 ft bamboo pegs  
Marker

Meter stick  
Manila paper  
Wrist watch

Compass  
Hammer

#### What to do:

1. Post a one (1) meter bamboo pole on your home ground.
2. Locate the East and West direction in your place with a compass.
3. Observe the position of the sun during the designated time.
4. Measure the length of the shadow formed by the pole at the designated time of the day. See the table below for the designated time. Mark the length of each shadow with a peg. See the figure on the next page.
5. Calculate the difference between the actual length of the bamboo and the shadows formed at different times of the day.



Record your observations on the table below.

Time	Actual length of pole (cm)	Length of the shadow of the pole (cm)	Difference in length (cm)
8:00 AM			
10:00 AM			
12:00 noon			
2:00 PM			



### What is It

Hello learner! This time you have come to learn that as the sun rises in the morning, or sets in the afternoon, it is low on the horizon, and its light rays are slanted as they hit the ground, so longer shadows are formed. When the sun is high or nearly above the horizon, the sunlight strikes the ground at nearly a right angle, so shorter shadows are formed.

When the sun is directly above the horizon, the light rays of the sun strike directly above the objects so no visible shadow is seen on the ground since the shadow of the entire body would fit in its footprints.

The changes in the position and length of shadows in the surroundings depend on the angle at which the sunlight strikes the object to the ground.



## What's More

Score:

8

### Activity 4: Say something!

**Directions:** Answer the following questions based on what you have observed in Activity 3.

#### Guide Questions:

1. Describe the pole's shadow at 8:00 AM, 10:00 AM, 12 noon and 2:00 PM.

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2. At what time is the shadow of the pole longest? Why is this so?

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3. At what time is the shadow shortest? Why?

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4. What did you observe with the position and length of shadows at different times of the day?

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5. What have you noticed about its position at different times of the day? Did it stay in one place throughout the day?

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6. What do you think would likely happen when you continue to measure the shadow of the pole until the sun had set at 6:00 PM? Do you think the pole forms its shadow? Why?

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## What I Have Learned

Score:

8

### Activity 5: Fill me up, buttercup!

**Directions:** Fill in the blanks with the correct answers. Use the terms inside the box to complete the paragraph.

low	above	slanted	visible
right	angle	shorter	longer

As the sun rises in the morning or sets in the afternoon, it is (1) \_\_\_\_\_ in the horizon, and its light rays are (2) \_\_\_\_\_ as they hit the ground so (3) \_\_\_\_\_ shadows are formed. When the sun is high or nearly above the horizon, the sunlight strikes the ground at nearly an (4) \_\_\_\_\_ angle so (5) \_\_\_\_\_ shadows are formed. When the sun is directly (6) \_\_\_\_\_ the horizon, the light rays of the sun strike directly above the objects, so no (7) \_\_\_\_\_ shadow is seen. The changes in the position and length of shadows in the surroundings depend on the (8) \_\_\_\_\_ at which the sunlight strikes the object to the ground.

Score:

10



## Assessment

### Activity 6: "Stick with the truth."

**Directions: A.** Read each statement and put an **O** on the box before the number if it is **TRUE** and an **X** mark if it is **FALSE**.

<input type="checkbox"/>	1. The sun is not a source of light.
<input type="checkbox"/>	2. Light travels through transparent objects/ materials.
<input type="checkbox"/>	3. The shadow of the object is larger when the object is near to the light source.
<input type="checkbox"/>	4. At sunset, the shadow of an object is the shortest.
<input type="checkbox"/>	5. At sunrise, the shadow of an object is the shortest.

**Directions: B.** Read each statement, then put ☆ if the statement is correct and if the statement is incorrect, encircle the word that makes it incorrect.

<input type="checkbox"/>	1. Fire is another source of light.
<input type="checkbox"/>	2. We can only see things when there is light.
<input type="checkbox"/>	3. Light cannot travel through transparent materials.
<input type="checkbox"/>	4. Shadows are the same size with the object blocking the light.
<input type="checkbox"/>	5. Shadows are the same shape with the object blocking the light.

## Answer Key- Gr4Q4W7 Science

1. Description of the length of the pole's shadow at the different times of the day should be taken from the tabulated data after the activity.
2. The shadow of the pole was longest at 8:00 am, when the sun is low or near the horizon. This is because the light rays are slanted as they strike the ground during the daytime.
3. The shadow was shortest at noontime when the sun is high above the horizon. The light rays are directly above the ground.
4. The position and length of the shadows change at different times of the day.
5. The position of the sun changes throughout the day.
6. No, because the sun is behind the horizon
7. The lower the sun at the horizon, the longer is the shadow in the surroundings. The higher the sun in the horizon the shorter is the shadow.
8. We can determine the time anywhere through the changes in the position and length of shadows.

### Activity 4 (Possible answer to guide questions)

1. Dark area was formed on the wall. The cardboard blocked the path of light that struck it.
2. No, because it was too bright outside the room so, no dark area was formed on the wall.
3. The clear plastic sheet did not form a dark area because the wall was lighted. It allowed the light to pass through.
4. Shadows are dark areas formed by the objects that block the straight path of light.
5. Shadows are formed when the straight light rays are blocked by opaque objects.
6. No, some objects only.

### Activity 2 (Possible answer to guide questions)

- |   |   |  |   |
|---|---|--|---|
| <p><b>Activity 6</b></p> <ol style="list-style-type: none"> <li>1.  /</li> <li>2.  /</li> <li>3. cannot</li> <li>4. the same</li> <li>5.  X</li> </ol> | <p>Set A</p> <ol style="list-style-type: none"> <li>1. X</li> <li>2. /</li> <li>3. /</li> <li>4. X</li> <li>5. X</li> </ol> | <p><b>Activity 5</b></p> <ol style="list-style-type: none"> <li>1. Low, 2. slanted, 3. longer</li> <li>4. Right, 5. shorter</li> <li>6. Above, 7. visible</li> <li>8. Angle</li> </ol> | <p><b>Activity 1</b></p> <ol style="list-style-type: none"> <li>1. sun</li> <li>2. translucent</li> <li>3. shadow</li> <li>4. transparent</li> <li>5. opaque</li> </ol> |
|---|---|--|---|

## REFERENCES

Abutay, Lelani R., Bonao, Dinah C., Crucis, Editha B., Eslabra, Jimmie C., Gramaje, Ester T., Guadamor, Michelle H., Hernandez, Aniano I., Ilagan, Ligaya G., Llamera, Ferdinand M., Manawatao, Raylene S., Panganiban, Hermogenes M., Rojo, Jennifer M., Tosco, Regin Rex P., and Zape, Jos S., "Science-Grade 4, Learner's Material", First Edition 2015, pages 301- 305

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### The Footprints Prayer

One night I had a dream. I dreamed that I was walking along the beach with the LORD. In the beach, there were two (2) sets of footprints – one belongs to me and the other to the LORD. Then, later, after a long walk, I noticed only one set of footprints. "And I ask the LORD. Why? Why? Why did you leave me when I am sad and helpless?" And the LORD replied "My son, my son, I have never left you. There was only one (1) set of footprints in the sand, because it was then that I CARRIED YOU!

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