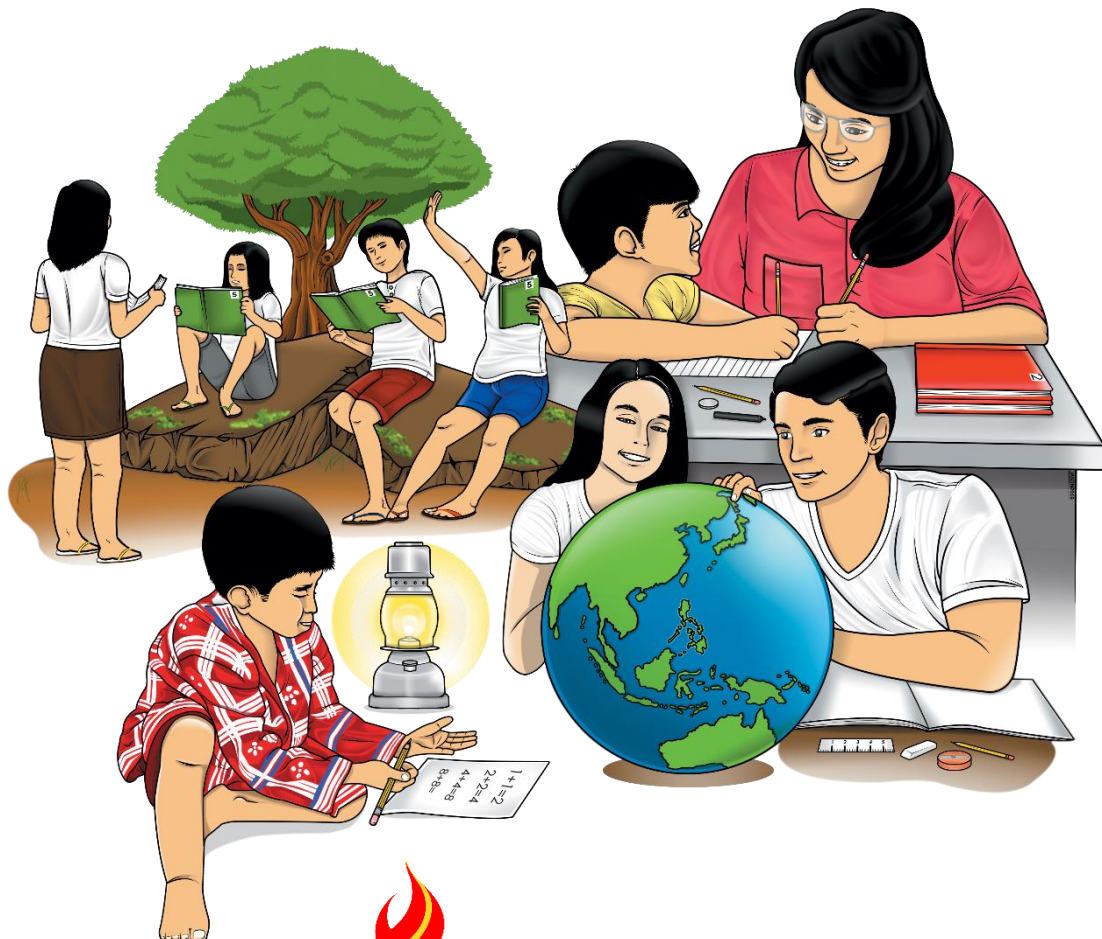


Science

Quarter 4 – Module 6: Light and Shadow



Science – Grade 4
Alternative Delivery Mode
Quarter 4 – Module 6: Light and Shadow
First Edition, 2020

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Development Team of the Module

Writers: Christian M. Espiritu

Editor: Noel V. Ibis

Reviewers: Chozara P. Duroy

Illustrators: Kristal Grace C. Ilao

Layout Artist: Jogene Alilly C. San Juan, Jacqueline E. Libut

Management Team: Gilbert T. Sadsad

Francisco B. Bulalacao Jr.

Grace U. Rabelas

Ma. Leilani R. Lorico

Emma T. Soriano

Ellen G. De la Cruz

Amy B. Dumail

Printed in the Philippines

Department of Education – Region V

Office Address: Regional Center Site, Rawis, Legazpi City 4500

Telefax: (033) 336-2816, (033) 509-7653

E-mail Address: region5@deped.gov.ph

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Science

Quarter 4 – Module 6: Light and Shadow

Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.



What I Need to Know

This module contains lessons and activities that will enable you to empower your scientific mind in describing the position and length of shadows in different times of the day and explain why the position and length of the shadow changes. Enjoy, learn, and discover.

The module will focus on:

- **Lesson 1:** Describe the changes in the position and length of shadows in the surroundings as the position of the sun changes (S4ES-IVh-9)

After going through this module, you are expected to be able to:

1. describe the changes in position of shadows as the position of the sun changes; and
2. describe the length of the shadows as the position of the sun changes.



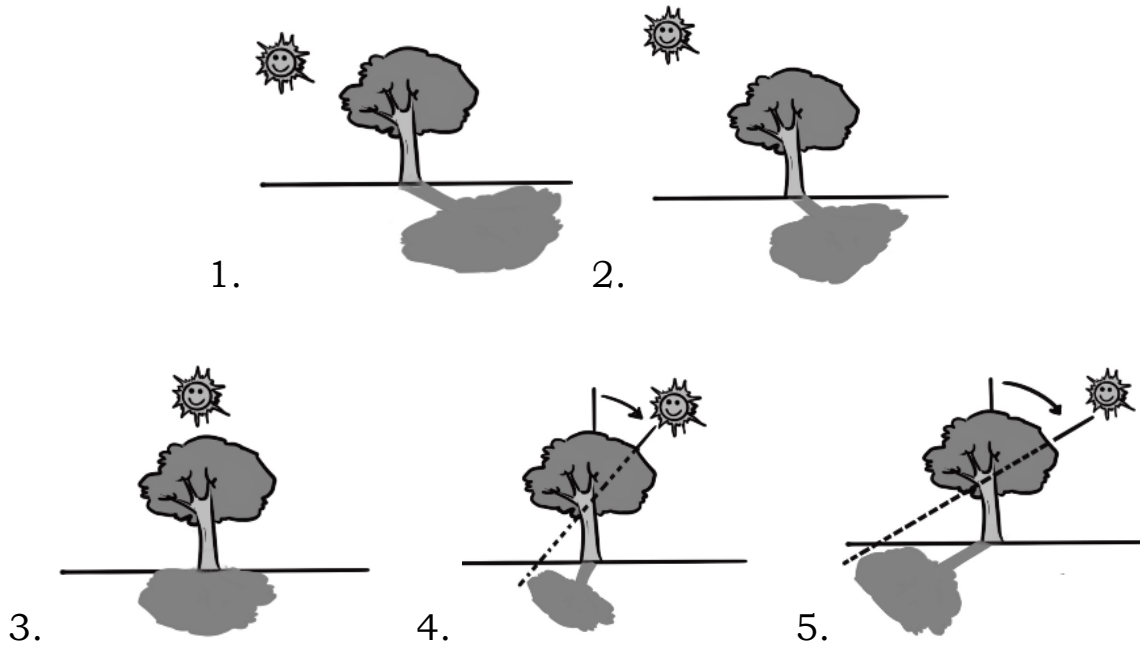
What I Know

A. Directions: Fill in the blanks with the correct word which will make each statement correct. Choose your answer from the box below. Do it in your science notebook.

sun	things	temperature	shadow	opaque
position	slanted	above	angle	weather

1. The _____ is the main source of heat and light.
2. Sunlight brightens the earth and helps us see the _____ in our surroundings.
3. The rising of the sun in the east and setting on the west also affects the _____ in every direction of the earth.
4. The change in temperature in every part of the earth changes the _____.
5. _____ is a dark area formed when straight light rays are blocked by opaque objects.
6. Shadows are formed when light strikes on _____ objects.
7. Shadows “move” or change _____ during the day because of the position of the sun.
8. The length of the shadows varies during the day. In the morning, the light rays are _____, so the shadow is long.
9. At noon, when the sun is directly _____ the horizon, there is no visible shadow.
10. The changes in position and length of shadow depend on the _____ at which the sunlight strikes the object to the ground.

B. Directions: Choose the statement that best describe the position and length of shadows of the sun in each picture. Write only the letter. Do it in your science notebook.



Illustrated by: Kristal Grace C. Ilao

- During noon time, you can see the shadow under the tree.
- In the morning, the sun is low in the horizon and longer shadow is formed.
- When the sun rises or sets in the afternoon, its light rays are slanted as it hits the ground resulting to a longer shadow.
- As the sun moves up or nearly above the horizon, the shadow becomes shorter.
- The sunlight strikes the ground at nearly right angle so shadow
- becomes shorter.

Great answers! These words are related to our lesson. Be ready to show your excellent skills.

Lesson

1

Light and Shadow

As we watch the sun rises in the morning and sets in the evening, we always observe it as it moves along the horizon and creates shadows as it hits objects on the ground.

Have you tried standing in a wide clear field during fine summer day? What have you observed in your shadow? Do you know what shadow is? Why do shadows change in position and length in different times of the day in our surroundings? We are going to find out why in this module.



What's In

A. Directions: The following are safety precautions when there is a typhoon. Identify whether it is to be done **Before**, **During** or **After** a typhoon. Write the answers in your science notebook.

- _____ 1. Watch out for live wires.
- _____ 2. Stay calm and stay indoors.
- _____ 3. Repair all damages in the house.
- _____ 4. Monitor the movement of the typhoon.
- _____ 5. Know the location of evacuation centers in town.
- _____ 6. Check and clean community drainage system to prevent flood.

- _____ 7. Prepare flashlights, batteries, candles, and kerosene lamps.
- _____ 8. Store adequate supply of ready-to-eat food, clean water, and clothing.
- _____ 9. Clean up and dispose things that may be breeding places of mosquitoes.
- _____ 10. Electric-powered items should be stored in higher areas and refrain from using them during flood.



What's New

Note to Parent/Guardian: Guide your children in doing this activity. Remind them of the following precautionary measures. Be careful in handling the materials while performing the activity.

To the Learner:

Activity 1: “How Are Shadows Formed?”

Directions: Perform this activity in a dark room. Be guided by the instructions on **What to do** part.

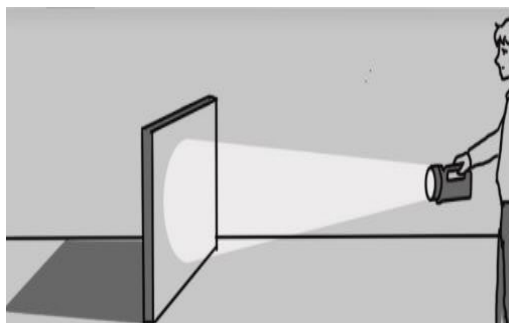
What you need:

- dark room
- flashlight with new batteries
- a piece of cardboard (8 cm x 10 cm)
- a piece of thin clear plastic sheet (8 cm x 10 cm)

What to do:

1. Close all the windows and door of your room.
2. Hold the cardboard 30 cm away from the wall of your room.

3. Assign a sister/brother or any family member to hold the flashlight 30 cm away from the cardboard.



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4. Switch on the flashlight and focus directly on the center of the cardboard.

5. Observe what happens to the light and write your observations in your science notebook.

6. Repeat steps 2 and 5 with a piece of clear plastic sheet. Observe what happens.

7. Write your observations in your science notebook.

8. Repeat steps 2 and 5 outside the room and observe what happens?

9. Write your observation in your notebook.

Guide Questions:

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

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

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

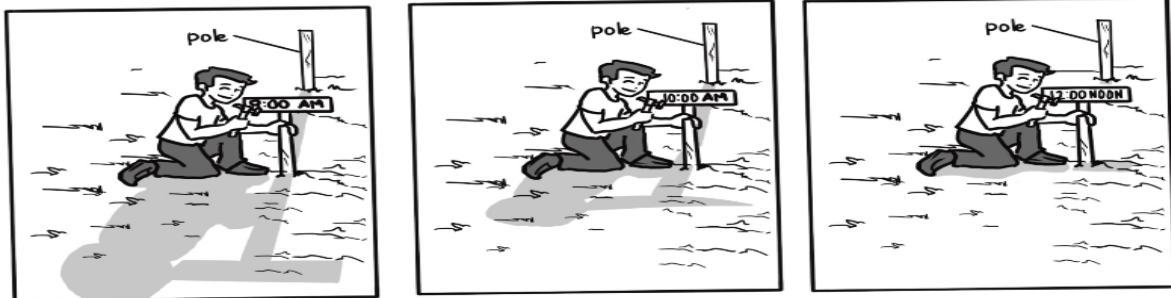
4. What are shadows?

5. How shadows are formed?

6. Do all objects form shadows? Why?

Activity 2: “Why Do Shadows Change in Position and Length?”

Directions: Describe the three pictures below and answer the following guide questions in your notebook.



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Copy the table in your science notebook and record your answer.

Time	Descriptions
8:00 A.M.	
10:00 A.M.	
12:00 N.N.	

Guide Questions:

1. Describe the shadow of the pole at 8:00 A.M., 10:00 A.M., and 12:00 noon.
2. At what time is the shadow of the pole the longest? Why is this so?
3. At what time is the shadow shortest? Why?
4. What have you noticed about its position at different times of the day? Did it stay in one place throughout the day?
5. How do you relate the changes in position and length of shadows with that of the changes in position of the sun?

Very well done! You are doing great.



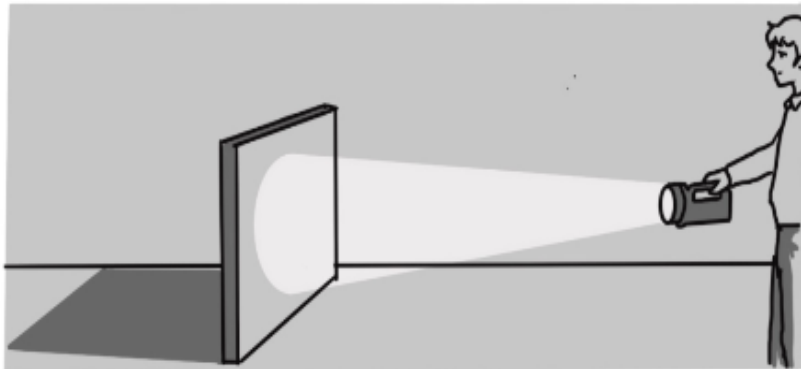
What is It

Points to Remember:

The sun is the main source of heat and light. Almost all living things rely on the steady heat and light from the sun. Sunlight brightens the earth and helps us see the things in our surroundings.

On the other hand, the rising of the sun in the east and setting on the west also affects the temperature in every direction of the earth causing the changes in the weather.

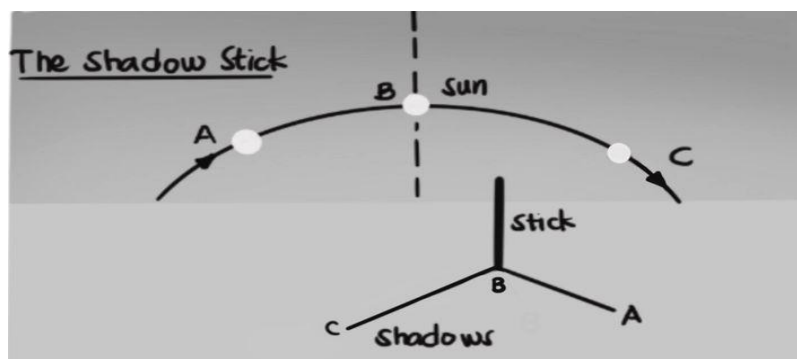
Shadow is a dark area formed when straight light rays are blocked by opaque objects.



Illustrated by: Kristal Grace C. Ilaio

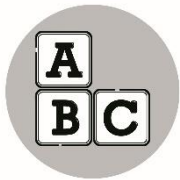
*Shadows are formed when light strikes on **opaque** objects.*

Shadows “move” or change position during the day because of the position of the sun.



Illustrated by: Kristal Grace C. Ilaio

The length of the shadows varies during the day. In the morning, the light rays from the Sun (point A) makes an angle with the object thus creating a long shadow (shadow A). When the sun is directly above the horizon at noon (point B), the light rays are in line with the object, thus it will not cast any visible shadow (shadow B). In the afternoon at point C, the light rays from the sun, makes an angle with the object thus creating a long shadow (shadow C). **Therefore, the position and the length of the created shadow would depend on the angle at which the sunlight strikes the object to the ground.**



What's More

A. Directions: Write **T** if the statement is true and **F** if it is not. Write your answers in your science notebook.

- ___ 1. The sun is the main source of heat and light.
- ___ 2. Plants, animals, and humans can survive even without the sun.
- ___ 3. The effect of the sun's heat and light to the environment causes the changes in temperature.
- ___ 4. Without the sun the earth will be dark, cold, and lifeless.
- ___ 5. You can have the shortest shadow at 8:00 am in the morning.
- ___ 6. An object cast a longer shadow when light rays are slanted.
- ___ 7. Opaque objects form shadows because they reflect the light.

- _____ 8. Shadows are formed when light rays hit an opaque object.
- _____ 9. At noon, when the sun is directly above the horizon, the shadow is very long.
- _____ 10. The changes in the position and length of shadow depend on the angle at which the sunlight strikes the object to the ground.

B. Directions: Complete the statement below by writing what is needed in the space provided. Write your answers in your science notebook.

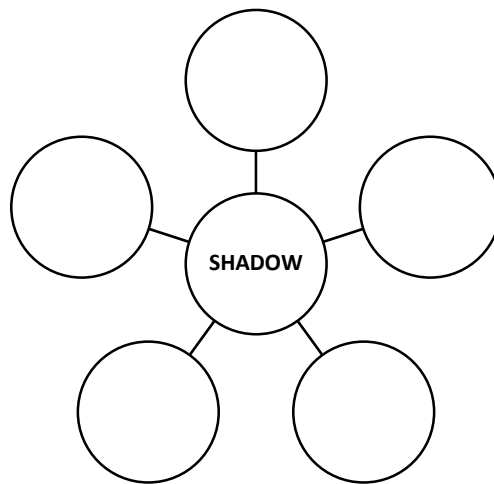
1. When the light strikes on _____ objects, shadows are formed.
2. In the morning, the light rays are _____ , so longer shadows are formed.
3. When the sun rays are directly above the horizon, no _____ are formed.
4. The changes in the position and length of shadows in the surroundings depend on the _____ at which the sunlight strikes the object to the ground.
5. Shadows “move” or change position during the day because of the _____ of the sun.

You've got it. Just keep moving because you are gearing towards the finish line.



What I Have Learned

A. Directions: Complete the Graphic Organizer by writing some facts about shadow. Write your answers inside each blank circle. Do this in your science notebook.



Wow! You did it!



What I Can Do

Directions: Do this activity outside. Describe the length of your shadow at different times of the day for three days. Write your answer in your science notebook.

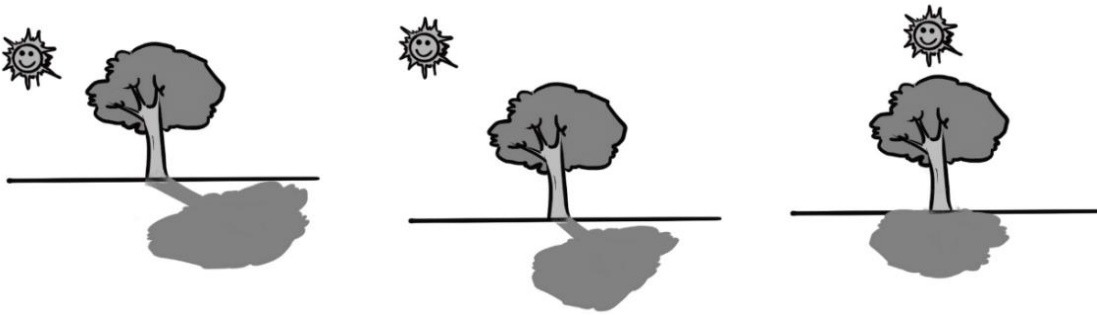
Time of the Day	Day 1	Day 2	Day 3
7:00 A.M.			
12:00 N.N.			
4:00 P.M.			

Awesome! Keep up the good work.



Assessment

A. Directions: Look at the picture below. In five sentences, describe the length and the position of the sun as it moves along the horizon throughout the day. Note of the changes of the shadow created by the sunlight and the object. Write your answers in your science notebook.



Illustrated by: Kristal Grace C. Ilao

1. _____

2. _____

3. _____

4. _____

5. _____

B. Directions: Read and understand each question. Write the letter of the correct answer in your science notebook.

- ____ 1. At which time of the day can you have the shortest shadow?
- 9:00 A.M.
 - 10:00 A.M.
 - 2:00 P.M.
 - 12:00 N.N.
- ____ 2. Why do opaque objects form shadows?
- Because they reflect the light.
 - Because they bend the light that hit them.
 - Because they cover the light that hits them.
 - Because they absorb the light that hit them.
- ____ 3. When does an object cast a longer shadow?
- When light rays are on top.
 - When light rays are slanted.
 - When light rays are trapped.
 - When light rays are sideways.
- ____ 4. When are shadows formed?
- When light rays hit hard objects.
 - When light rays hit opaque objects.
 - When light rays hit translucent objects.
 - When light rays hit the transparent objects.
- ____ 5. At what time of the day would the shadow become shorter?
- at noontime
 - in the evening
 - in the morning
 - in the afternoon

C. Direction: In your science notebook answer the following questions below.

1. When do you usually see the longest shadow?
2. Why is the shadow short at 12:00 noon?
3. What do you observe in the shadow in the morning and at noon?
4. Which was the shortest and which was the longest?
5. Describe the position and length of your shadow during the day?

Spectacular! You are great.



Additional Activities

Direction: Make an investigation based on the given statement below.

Have you seen a puppet show? Puppeteers use shadow figures and dialogue to tell a story. If you were one of them and you would like to present a shadow puppet show about a tree that grows larger over time. However, you have only one available paper tree cut out. Investigate how the size of the tree's shadow can be changed in terms of its position from the source of light.

Wonderful! You certainly did well in this module.



Answer Key

1. It blocked the light. When the light hits the objects in the dark room, it formed a shadow.
2. No, because there is light outside so no dark area was formed on the wall.
3. The light directly passed the clear plastic sheet and no shadow was formed.
4. Shadows are dark areas formed when straight light rays blocked by opaque objects.
5. Shadows are formed when light rays are blocked by opaque objects.
6. No, only opaque objects form shadows.

Guide Questions:

Activity 1 "How Shadows are Formed?"

What's New

- Do not play in the rain.
- Do not wade in dirty water.
- Do not eat cold foods.

Rainy days

- Do not wear thin clothes.
- Do not walk under the trees.
- Do not burn dried leaves.

Windy days

- Do not wear thick clothes.
- Do not expose yourself to too much heat of the sun.

Sunny days

What's In

5. c

4. e

3. a

2. d

1. b

B.

position	flashlight
shadow	light
length	angle
opaque	horizon
sun	rays

What I Know

A.

Activity 2 “Why Do Shadows Change in Position and Length?”

Guide Questions:

1. 8:00am the shadow at the pole is the longest, 10:00 am, the shadow at the pole is shorter, and at 12:00 noon the shadow is the shortest.
2. At 8:00 am because the light rays are slanted, so the shadow is longest.
3. At 12:00 noon because the sun is directly above the horizon, so there is no visible shadow.
4. The position of the shadow varies at different times of the day and did not stay in one place throughout the day.
5. Shadows move or change position during the day because of the position of the sun.

What’s More

1. T
2. F
3. T
4. T
5. F
6. T
7. F
8. T
9. F
10. T

What I Have Learned

- slanted
- shadow
- angle

What I Can Do

Answers may vary.

Assessment

A. 1-5: Answers may vary

B.

1. c
2. a
3. a
4. a
5. c

C.

1. in the morning/afternoon
2. because the sun is directly above the horizon
3. in the morning, the shadow is longer; at noon no shadow
4. shadow at noon; shadow in the morning
5. The changes in the position and length of shadows in the surroundings depend on the angle at which the sunlight strikes the object.

Additional Activities

Answers may vary.

References

Abutay, L., Bonao, D., Crucis, E., Eslabra J., Gramaje, E., Guadamor, M., Hernandez, A., Ilagan, L., Llamera, F., Manawatao, R., Panganiban, H., Rojo, J., Tosco, R. R., & Zape, J. (2015). *Science grade 4: Learner's material* (1st ed., pp. 301-305). Department of Education.

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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