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Science

Quarter 4 – Module 1:
Changes on the Surface of the Earth as a Result of Earthquake

ALTERNATIVE DELIVERY MODE
ADM

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Alternative Delivery Mode
Quarter 4 – Module 1: Changes on the Surface of the Earth as a Result of Earthquake
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Science

Quarter 4 – Module 1:
Changes on the Surface of the Earth as a Result of Earthquake

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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 was designed and written with you in mind. It is here to help you describe the changes that occurred on the surface of the Earth, as a result of an earthquake and volcanic eruption (S6ES-Iva-1). The scope of this module allows you to use it 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.

This module is divided into the following lessons:

- **Lesson 1** – How Earthquakes Occur
- **Lesson 2** – Changes of the Earth's Surface as a Result of Earthquake

After going through this module, you are expected to

1. explain how earthquakes occur; and
2. describe the changes that occur on the Earth's surface as a result of an earthquake.

What I Know

Read the following items carefully. Answer the items by choosing the letter of your choice. Write your chosen letters on your answer sheet.

1. Which of the following natural calamities is **NOT** caused by the movement of the Earth's crust?
   A. flooding
   B. landslide
   C. earthquake
   D. volcanic eruption
2. Why do tectonic earthquakes occur?
   A. because of heavy rain in the area
   B. because of landslide down the slope
   C. because of mining in the community
   D. because of the sudden movement of the plates
3. Which type of earthquake occurs when the Earth's crust breaks due to geological forces on rocks and adjoining plates?
   A. volcanic earthquake
   B. tectonic earthquake
   C. artificial earthquake
   D. man-made earthquake
4. Which kind of natural phenomenon will likely happen when ground shaking loosens rocks and soil, which causes them to slide and bury the area below the mountain?
   A. tsunami
   B. landslide
   C. sand blows
   D. ground rupture
5. Which natural phenomenon refers to the huge wave produced when an earthquake occurs under the sea?
   A. flooding
   B. typhoon
   C. tsunami
   D. storm surge

6. Which of the following is an effect of earthquakes?
   A. flooding
   B. ash cloud
   C. fertile soil
   D. ground rupture

For questions number 7 and 8 refer to the diagram below. The diagram shows the occurrence of an earthquake.

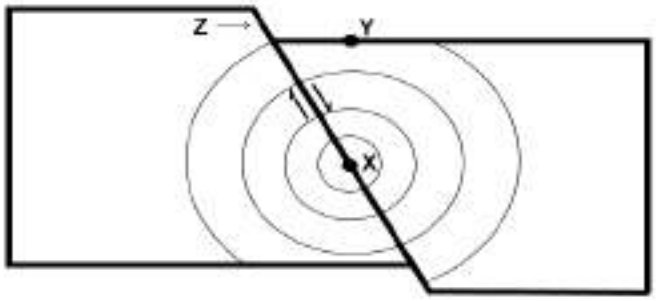


Figure 1. Occurrence of an Earthquake
(Illustrated by Luke D. Granada)

7. Based on the above illustration which is the point of origin of the earthquake?
   A. X
   B. Y
   C. Z
   D. X and Y

8. Which point is the epicenter in the diagram?
   A. X
   B. Y
   C. Z
   D. X and Y

9. Which type of earthquake will occur because of the movement of magma within the volcanoes?
   A. natural
   B. tectonic
   C. volcanic
   D. man-made

10. How do convection currents in the asthenosphere happen?
   A. Heat and pressure cause the movement of molten rocks.
   B. Force and pressure cause the movement of molten rocks.
   C. Energy and pressure cause the movement of molten rocks.
   D. Gravity, force and pressure cause the movement of molten rocks.

Lesson 1 How Earthquakes Occur

The crust of the Earth is always moving. The sudden movement of the Earth's crust can cause masses of rocks to change its position and release a big amount of energy that can cause earthquakes. Earthquakes can bring changes to the surface of the Earth.

After going through this lesson, you are expected to explain how earthquakes occur.

What's In

Have you ever experienced an earthquake? What are the possible things that you will do during an earthquake? Complete the concept map below by preparing a similar illustration and selecting your answers from the choices given below. Write your answers on a separate sheet of paper.

A. run outside **B**. drop, cover, hold **C**. get cover under a sturdy table
D. jump out of the window **E.** go to an open field **F**. use the elevator
G. cover head with a hard object **H**. stay away from falling objects

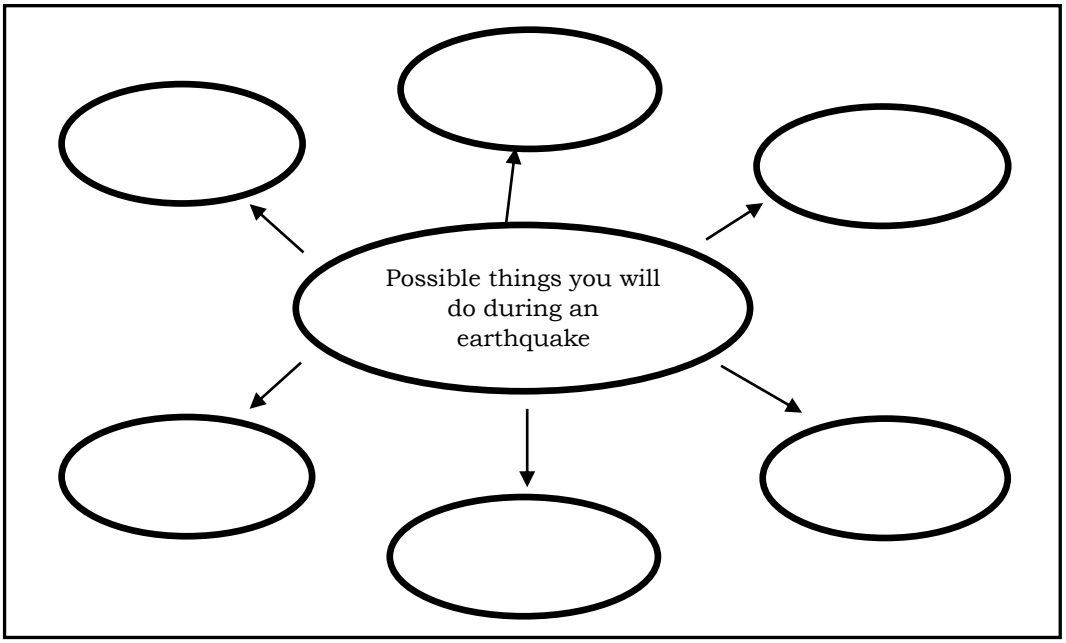


Figure 2. Concept Map

What's New

Activity 1: Inside the Earth

Read the passage and answer the analysis questions that follow. Write your answers on another paper.

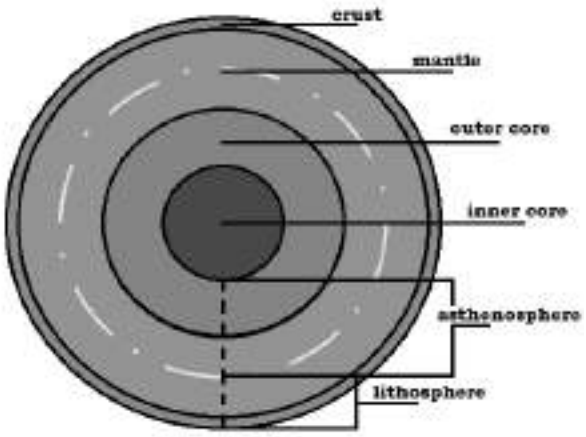


Figure 3. Layers of the Earth
(Illustrated by Luke D. Granada)

The **Earth** has three layers: the **crust**, the **mantle,** and the **core**. They differ in thickness, temperature, physical state, and composition. The outermost layer where living things exist is the **crust**. It is made up of **basalt** and **granite rocks**. The mantle is the second layer. The properties and physical state of the mantle are not uniform throughout due to the difference in temperature.
The **upper mantle** is stable and mostly solid while the **lower mantle** is liquid because of extreme **heat or very high temperature** and **pressure**. The liquid part of the mantle is **hot molten rocks**. The third layer is the core, which is divided into two layers, the outer core and the inner core. The **outer core** is liquid, while the **inner core** is solid.

The crust and the solid, upper part of the mantle make up the **lithosphere**. The liquid part of the mantle and the outer core is the **asthenosphere**. The lithosphere floats in the asthenosphere.

According to the **Plate Tectonic Theory**, the Earth's crust is broken into separate pieces called **tectonic Plates**. These plates move relative to each other at a rate of 5 to 10 centimeters per year, and interact along their boundaries, where they converge, diverge or slip past one another. Plate boundaries are the sites of many processes that shape the surface of the Earth, including Earthquakes.

The three types of tectonic boundaries are **convergent**, **divergent** and **transform plate** boundary. A convergent boundary occurs when two plates move towards each other. A divergent boundary happens when two plates move away from each other. Earthquakes are common along divergent boundaries. Two plates sliding past each other forms transform plate boundary.

Three types of Plate Boundaries

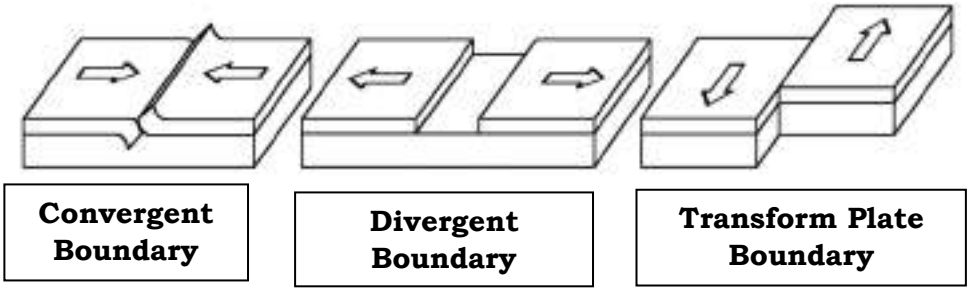


Figure 4. Plate Boundaries
(Illustrated by Luke D. Granada)

Heat and pressure in the asthenosphere cause the movement of molten rocks. The movement is referred to as **convection currents**. The movement of molten material breaks the rocks in faults or cracks in the crust and cause **seismic waves**. Seismic waves are waves that travel through the Earth's layers and give out low-frequency energy. They are recorded using a **seismograph**.

When rocks break in a **fault or crack** in the crust, an earthquake occurs. The point of origin of an earthquake underground is the **focus**. The point directly above the focus on the surface of the Earth is the **epicenter**. It is in the epicenter that an earthquake is felt the strongest.

Read each item carefully. Write your answers to the following questions on a separate paper.

1.Which layers of the Earth make up the lithosphere?
A. mantle and outer core
B. mantle and inner core
C. crust and upper mantle
D. outer core and inner core

2. Which is made up of the liquid part of the mantle and the outer core?
A. outer core
B. inner core
C. lithosphere
D. asthenosphere

3. Which materials make up the liquid part of the mantle?
   A. liquid gases
   B. molten rocks
   C. molten plastics
   D. liquid iron and nickel

4. Why are rocks in the lower mantle molten?
   A. because of gravity
   B. because of too much air
   C. because of high temperature
   D. because water is mixed with it

5. Which causes the sudden breaking of rocks in faults or cracks in the crust?
   A. very heavy rains
   B. strong thunderstorm
   C. overpopulation in an area
   D. movement of molten rocks

6. Which natural phenomenon occurs when rocks break in faults or cracks in the crust due to movement of molten material?
   A. tornado
   B. landslide
   C. earthquake
   D. volcanic eruption

Activity 2: Ground Shaking

Study the diagram below.

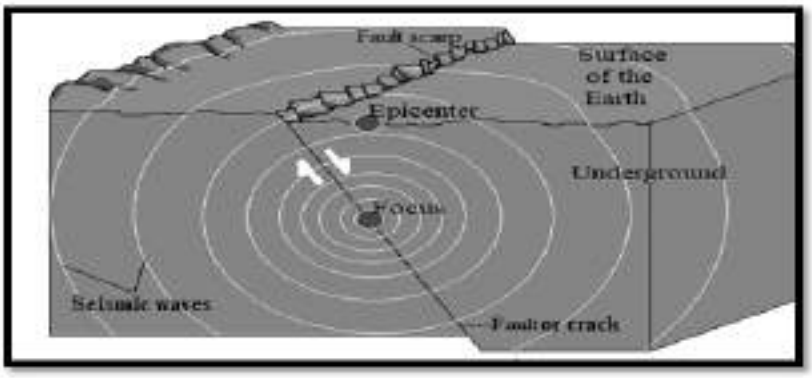


Figure 5. Occurrence of Earthquake

(Illustrated by Luke D. Granada)

Earthquakes happen along faults or cracks when rocks underground break and change in position. The movement of the breaking rocks underground release large amount of energy that cause seismic waves or vibration of the ground.

The plates move relative to each other and interact along their boundaries, where they converge, diverge or slip past one another.

An earthquake originates from a point underneath the ground called the focus. Exactly above the focus is the epicenter. An earthquake is strongly felt in the epicenter.

Answer the questions below. Write your answers on a separate paper.

1. Where do earthquakes originate?
   A. focus
   B. near rivers
   C. near volcanoes

2. What does the underground crack in figure 2 represent?
   A. fault
   B. epicenter
   C. seismic wave

3. What causes seismic waves?
   A. overpopulation
   B. typhoon in our country
   C. movement of rocks underground

4. How does an earthquake occur?
   A. when magma comes out of a volcano and causes a volcanic eruption
   B. when there is flooding in the area that can destroy lives and properties
   C. when rocks underground move causing them to break and release large amount of energy

What is It

What is an earthquake?

An **earthquake** is the vibration or shaking of the Earth's crust caused by the sudden movement of plates that release a large amount of energy.

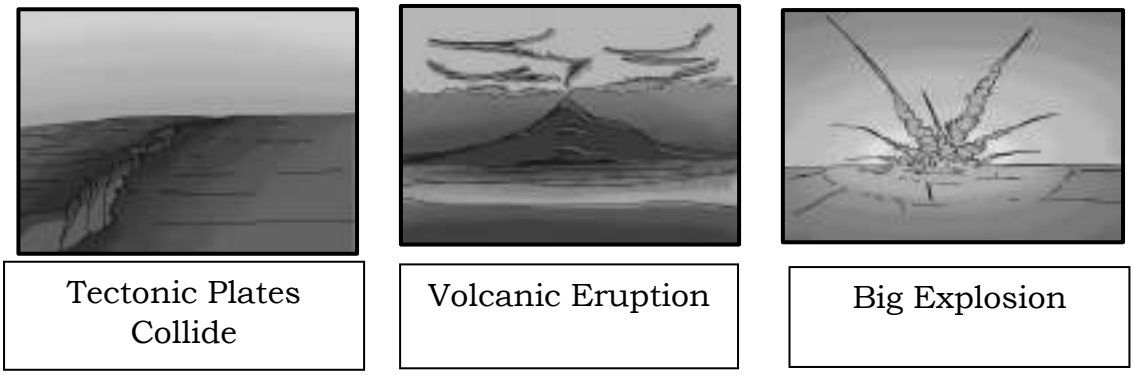
How does an earthquake occur?

An earthquake occurs when rock masses move and change in position. As the rock masses change position, the energy stored in the rock masses is released and transmitted onto the surface in the form of **seismic waves**.

The Earth's crust is broken into separate pieces called tectonic plates. These plates move relative to each other and interact along their boundaries in different plate movements. Earthquakes usually occur along these boundaries.

What are the types of earthquake?

If an earthquake is due to sudden movement of the rocks, or when two **tectonic plates** collide against each other, it is called a **tectonic earthquake**. If it is due to the movement of magma within the volcanoes, it is called a **volcanic earthquake**. Sometimes earthquakes also occur because of human activity. Big explosions and the wrong treatment of the ground may trigger **man-made earthquakes**.



(Illustrated by Luke D. Granada)

Where do earthquakes usually occur?

Earthquakes generally occur along **faults**. Faults are cracks in the Earth's crust between two big plates. When two plates slip past against each other, it releases a big amount of energy that causes the ground to shake. Usually, a **ground rupture** will be created.

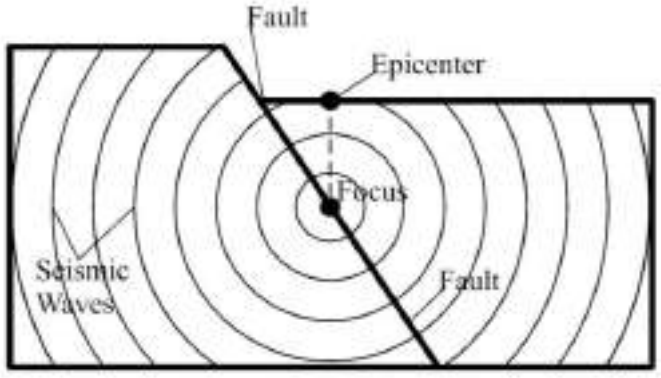


Figure 6. Occurrence of Earthquake
(Illustrated by Luke D. Granada)

The point of origin of an earthquake beneath the surface of the Earth is called a **focus**. The earthquake waves travel from the focus going outward. The

epicenter is the point above the focus on the surface of the Earth. It is at this point where earthquake energy is felt the strongest.

What agency of the government monitors earthquakes?

In our country, the Philippine Institute of Volcanology and Seismology **(PHIVOLCS)** is the agency of the government that monitors earthquakes. Below is the official logo of the agency.

The principal mandate of PHIVOLCS is to mitigate disasters that may arise from volcanic eruptions, earthquakes, tsunami and other related geo-tectonic phenomena.

How do we measure the strength of an earthquake?

The strength and damage caused by an earthquake is measured by magnitude or intensity. Magnitude is recorded by a seismograph in PHIVOLCS station and interpreted using the PHIVOLCS scale. Magnitude is associated with the energy released by an earthquake which is a way to tell its strength. Intensity measures the extent of damage caused by an earthquake on the surface of the ground. It is identified through ocular inspection of the area or the epicenter.

What's More

Prepare three columns on a separate sheet of paper. Write the items on the first column. Identify the type of earthquake as shown in the pictures and write them on the second column. Finally, describe each type on the third column.

Table 1. Types of Earthquake

Item		Type of Earthquake	Description
1			
2			
3			

(All illustrations in this section are made by Luke D. Granada)

What I Have Learned

Complete the following statements by choosing a word from the box below. Write your answers on a separate sheet of paper.

I learned that...

Focus	*Epicenter*	*Earthquake*
Volcanic	*Tectonic*	*Man-made*

1. The shaking or vibration of the crust of the Earth is known as _____.

2. An earthquake due to sudden movement of the rocks or when two tectonic plates collide is known as_____ earthquake.

3. An earthquake due to the movement of magma within the volcanoes is called a_____ earthquake.

4. An earthquake due to human activity is known as _____ earthquake.

5. The point of origin of an earthquake underground is the _____.

6. The point directly above the focus on the surface of the Earth is the _____.

What I Can Do

Directions: Read the task below. Write your output on a separate sheet of paper.

What can I do during an earthquake? Shade the box before the things that you can do during an earthquake.

- ☐ Get an emergency kit
- ☐ Go shopping
- ☐ Move to an open area
- ☐ Take a selfie/video
- ☐ Scream and run around in panic
- ☐ Drop, Cover, and Hold
- ☐ Ignore the commotion
- ☐ Listen to news report
- ☐ Calm down and assess the situation
- ☐ Go near dilapidated buildings

Assessment

Read each item carefully and answer the following questions. Write your chosen letters on your answer sheet.

1. What is the point of origin of an earthquake below the surface of the earth?
   A. fault
   B. focus
   C. crack
   D. epicenter

2. Which phenomenon is caused by a sudden movement or vibration of the earth's crust that causes changes on its surface?
   A. tsunami
   B. tidal wave
   C. earthquake
   D. storm surge

3. Which type of earthquake is caused by a sudden movement of rocks or the movement of tectonic plates?
   A. tectonic earthquake
   B. volcanic earthquake
   C. artificial earthquake
   D. man-made earthquake

4. Where do earthquakes originate?
   A. focus
   B. epicenter
   C. mountains
   D. seismic waves

5. Why do earthquakes occur?
   A. because of heavy rain in the area
   B. because of landslide down the slope
   C. because of over population in the community
   D. because of the sudden movement of the plates

6. What is the exact point above the point of origin where an earthquake is felt the strongest?
   A. focus
   B. crater
   C. fissure
   D. epicenter

7. Which type of earthquake occurs due to the movement of tectonic plates?
   A. volcanic earthquake
   B. tectonic earthquake
   C. artificial earthquake
   D. man-made earthquake

8. Which government agency monitors earthquake activities?
   A. DAR
   B. DENR
   C. PAGASA
   D. PHIVOLCS

9. Which of the following gives rise to volcanic earthquakes?
   A. tectonic plates
   B. landslide rolling
   C. movement of magma
   D. water rushing from springs

10. How do man-made earthquakes occur?
   A. due to human activities such as mining or using explosives
   B. due to volcanic activity and movement of magma
   C. due to movement of tectonic plates
   D. due to over population in a place

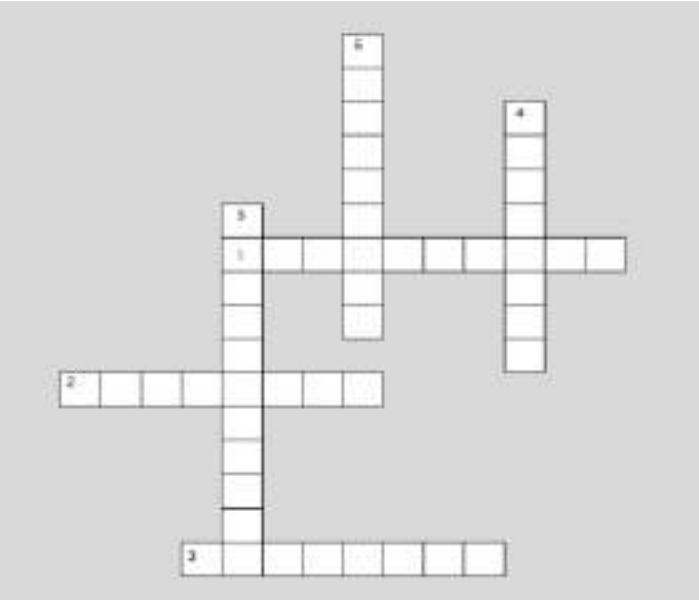
Additional Activities

Earthquake Challenge!
Answer the crossword puzzle below. Place your output on a separate paper.

Across:
1. the sudden movement of the crust of the earth

2. the type of earthquake that happens when two tectonic plates collide against each other

3. the agency of the government that monitors earthquakes



Down:

4. the type of earthquake caused by the movement of magma in volcanoes

5. equipment used to measure magnitude

6. the point where earthquake energy is felt the strongest

Lesson 2 Changes that Occur on the Surface of the Earth as a Result of Earthquakes

Earth has many land forms. The Earth's landmasses are continuously changing due to natural phenomena such as earthquakes and volcanic activities. Earthquakes change the landscape often in a violent manner. It brings changes to the surface of the Earth.

Earthquakes can be very violent. The effect of an earthquake is usually destructive. After going through this lesson, you are expected to describe and enumerate the changes that occur on the Earth's surface as a result of an earthquake.

What's In

Text Twist!

Rearrange the scrambled letters in each number to form a word by answering the question after it. Write your answers on a separate sheet of paper.

1. **PECIETNRE**: What do you call the exact point above the origin of earthquake?

   _____

2. **ARTEHAQKUE** What phenomenon involves shaking of the ground due to plate movement?

   _____

3. **TOCNICET** What type of earthquake occurs during the movement of plates?

   _____

4. **COVPLIHS** What agency of the government monitors earthquake?

   _____

5. **SUFOC** What do you call the origin of the earthquake?

   _____

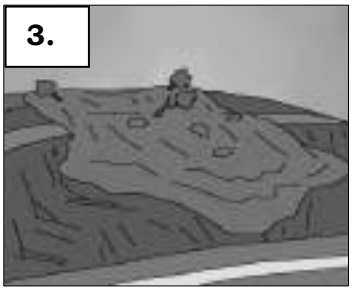
What's New

Activity 1: Altered Landscape

A. Look at the pictures below. Put a check mark (✔) if it shows an effect of earthquakes and (**x**) if not. Write your answers on a separate paper.

Tsunami

Typhoon

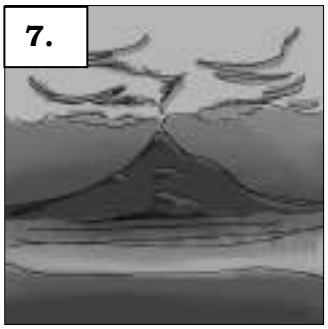


Landslide

Flooding

Storm Surge

Ground Rupture



Ash Cloud

Mud Flow

(All illustrations in this section are made by Luke D. Granada)

B. Describe the effects of an earthquake. Choose the letter of the correct answer in the **description** column. Write your answers on your answer sheet.

Table 1: Effects of Earthquake on the Surface of the Earth

Effects of Earthquake	Descriptions
_____1. Landslide	A. gaps or cracks formed on the ground caused by push and pull of rocks underground
_____2. Ground Rupture	B. movement of a mass of rock or earth down a slope that bury the area below
_____3. Tsunami	C. combination of lava and mud mixed with rainwater that bury villages and farmland
	D. a series of huge waves that sweep inland caused by an undersea earthquake

What is It

Earthquake has many effects on the Earth's surface. Surface effects include *ground shaking, tsunami, landslide, ground rupture, and change in the flow of groundwater*. It can bring significant damage to buildings, bridges, roads, and other infrastructures. It can also indirectly cause *fire* on people's homes. Read the following descriptions of some of the effects of earthquakes on the earth's surface.

A **tsunami** is a series of huge waves, which is an effect of underwater sea earthquakes or undersea volcanic eruptions. The waves become bigger and taller when it reaches shallow water near the land. When it sweeps inland, it causes damage to properties and loss of lives.

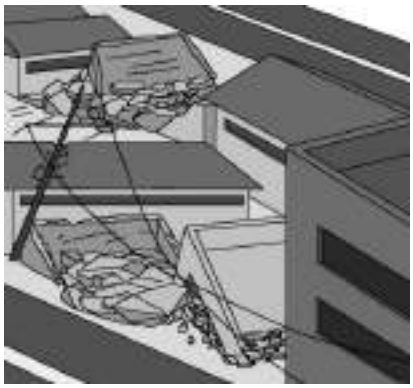
A **landslide** may happen when an earthquake affects or occurs on hilly or steep slopes. It is the movement of a mass of rock or earth down a slope due to ground shaking.

Ground shaking is an effect of earthquake that loosens rocks and soil which causes landslide and bury the area below the mountain. It can cause damage to properties and loss of lives.

A **ground rupture** occurs during an earthquake. It is caused by the push and pull of rocks underground causing the surface to tear apart that form gaps or cracks on the ground. Ground rupture can damage buildings, bridges, houses, roads, and other structures.

What's More

Enumerate four effects of earthquakes on the earth's surface. Write your answers on another paper.



(Illustrated by Luke D. Granada)

Effects of earthquake

1.

2.

3.

4.

What I Have Learned

Directions: Read each item carefully. Choose your answers from the words inside the box and place your answers on a separate sheet of paper.

I learned that...

Ground shaking	*Ground rupture*
Tsunami	*Landslide*
Fire	

1. A series of huge waves caused by undersea earthquake is called _____.

2. _____ are cracks or gaps on the ground caused by an earthquake.

3. Movement of mass of rocks or soil down a slope due to ground shaking and bury the area below is an effect of an earthquake known as _____.

4. An effect of earthquake that causes soil and rocks to loosen is _____.

5. An earthquake can indirectly cause _____ on people's homes.

What I Can Do

Earthquakes often come without warning. It will bring many changes to the surface of the Earth. Most of the time, it is destructive. If it happens, people in the area of calamity will be affected. They might become homeless, injured, and might even die.

Suggest ways on how you can help earthquake victims. Choose your answer from the box below and place them on a separate sheet of paper.

A. donate clothes and other things they need
B. let only the government help them
C. donate money to buy their basic needs
D. donate food for them to survive

1._____

2._____

3._____

Assessment

Read and answer each item carefully. Write your chosen letters on your answer sheet.

1. Which of the following conditions happen when the ground shakes and loosens soil that slides and bury the area below the mountain?
   A. ground rupture
   B. sand bows
   C. landslide
   D. tsunami

2. Which is a series of huge waves caused by earthquakes under the sea?
   A. tsunami
   B. earthquake
   C. storm surge
   D. ground rupture

3. Which of the following effects of earthquake loosens rocks and soil?
   A. ground shaking
   B. ground rupture
   C. tsunami
   D. flooding

4. How do landslides happen?
   A. due to a very strong tornado
   B. due to huge waves from the sea
   C. due to ground shaking that loosens soils and rock
   D. due to typhoon that originates in the Pacific Ocean

5. Which effect of an earthquake happens on steep slopes due to the movement of a mass of rock down the slope?
   A. tsunami
   B. mudflow
   C. Landslide
   D. ash clouds

6. Which of the following is caused by the push and pull of the ground causing the surface to tear apart?
   A. tsunami
   B. landslide
   C. ash cloud
   D. ground rupture

7. Which effect of earthquakes most likely affects people living in a hilly area?
   A. tsunami
   B. landslide
   C. flooding
   D. fissure

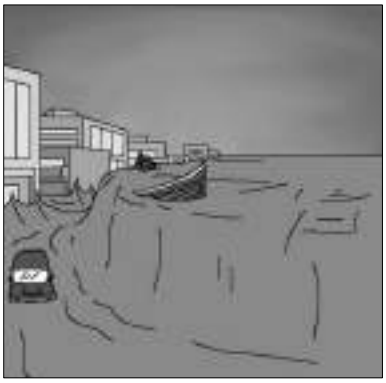
8. Which of the following results will happen when a tsunami sweeps towards the land?
   A. cause mudflow to the area
   B. give people water for home use
   C. more ground rupture to the place
   D. damage to properties and loss of lives

9. Which is a sign of ground rupture?
   A. gaps or cracks on the ground
   B. discoloration of the soil
   C. water on the ground
   D. flooding in the area

10. Which should a family prepare for any emergency?
   A. emergency plan
   B. list of donors
   C. nice clothes
   D. appliances

Additional Activities

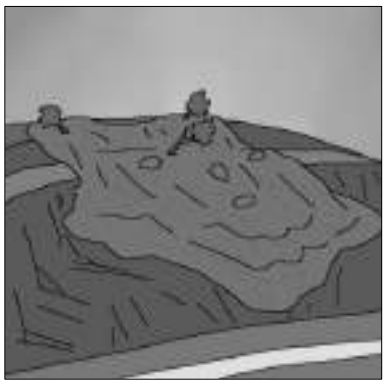
The illustrations below show some of the effects of earthquakes. Name each effect by completing the letters to form a word in each number. Write your answers on a separate sheet of paper.



1. T S __ N__ M__

2. G __ O __ N D

   R __ P T __ R E



3. L __ N D S L I __ E

(All illustrations in this section are made by Luke D. Granada)

Answer Key

Lesson 1: How Earthquakes Occur

What I Can Do 1. get an emergency kit 2. move to an open area 3. drop, cover, hold 4. listen to news report 5. calm down and asses the situation **Assessment** 1. B 6. D 2. C 7. B 3. A 8. D 4. A 9. C 5. D 10. A **Additional Activity:** **Across:** 1. earthquake 2. tectonic 3. PHIVOLCS **Down:** 1. volcanic 2. seismograph 3. epicenter	**What's More:** 1. tectonic earthquake – due to movement of rocks 2. volcanic earthquake – due to movement of magma 3. man-made -due to human activities or explosives **What I Have Learned** 1. earthquake 2. tectonic 3. volcanic 4. man-made 5. focus 6. epicenter	**What I Know:** 1. A 6. D 2. D 7. A 3. B 8. B 4. B 9. C 5. C 10. A **What's In:** 1. A. run outside 2. B. drop, cover, hold 3. C. get cover under a sturdy table 4. E. go to an open field 5. G. cover head with a hard object 6. H. stay away from falling objects **What's New** **Activity 1 – Inside the Earth** 1. C 2. D 3. B 4. C 5. D 6. C **Activity 2 – Ground shaking** 1.A 2.A 3.C 4.C

Lesson 2: Changes of the Earth's Surface as a Result of Earthquake

Lesson Assessment: 1. C 6. D 2. A 7. B 3. A 8. D 4. C 9. A 5. C 10. A **Additional Activities** 1. tsunami 2. ground rupture 3. landslide	**What' More:** 1. landslide 2. tsunami 3. ground rupture 4. ground shaking **What I Have Learned:** 1. tsunami 2. ground rupture 3. landslide 4. ground shaking **What I Can Do** 1. A 2. C 3. D	**What's In:** 1. EPICENTER 2. EARTHQUAKE 3. TECTONIC 4. PHIVOLCS 5. FOCUS **What's New:** A. 1. ✓ 2. x 3. ✓ 4. x 5. x 6. ✓ 7. x 8. x B. 1. B 2. A 3. D

References

PHIVOLCS. (n.d). What is an Earthquake? Retrieved from https://www.phivolcs.dost.gov.ph/html/updates_SOEPD/Archived_EqLatest_files/Earthquake/LatestEQ/2007/28Mar2007_1440nmx.html

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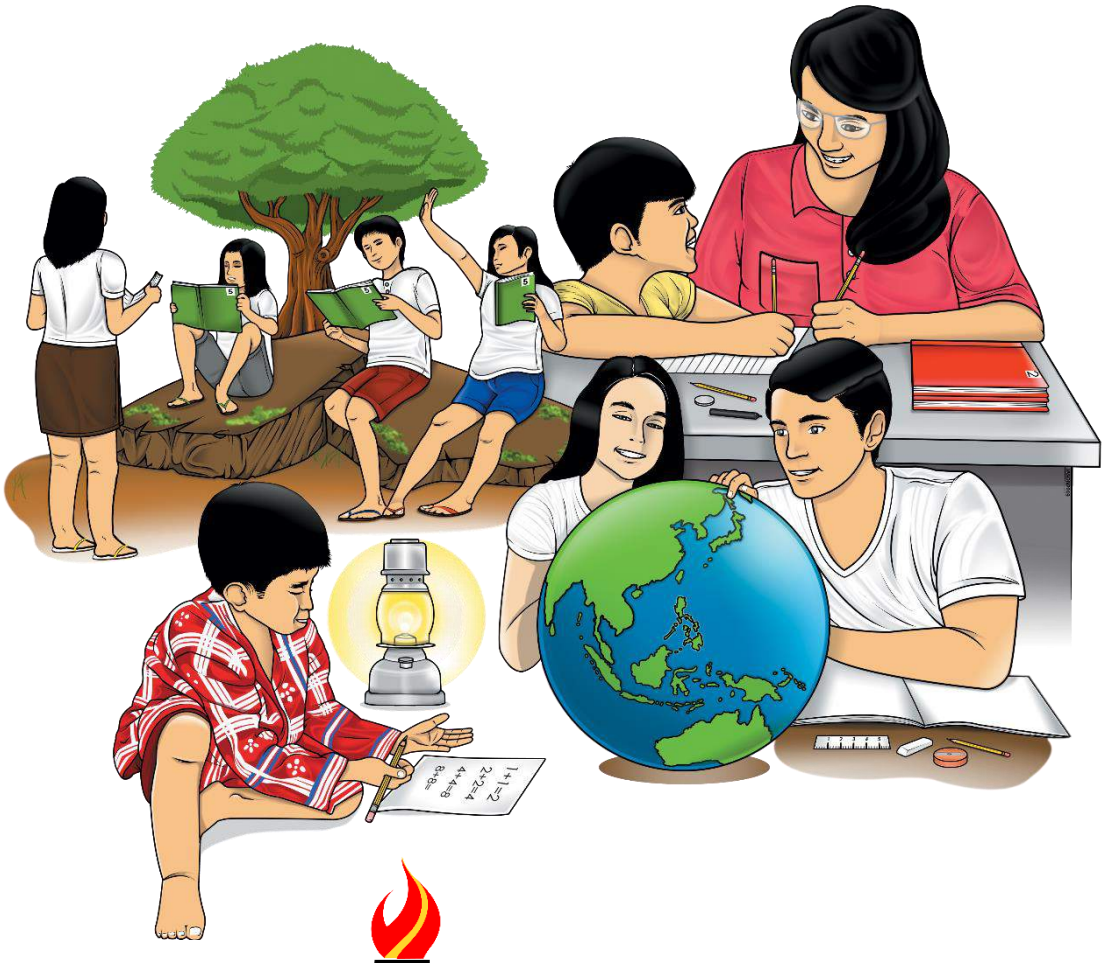
Quarter 4 – Module 1A: Changes on the Surface of the Earth as a Result of Volcanic Eruption



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ADM

Science– Grade 6
Alternative Delivery Mode
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6

Science

Quarter 4 – Module 1A:
Changes on the Surface of the Earth as a Result of Volcanic Eruption

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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 was designed and written with you in mind. It is here to help you master the nature of the Earth. 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 is divided into two lessons, namely:

- **Lesson 1** – How Volcanic Eruptions Occur
- **Lesson 2** – Changes of the Earth's Surface as a Result of Volcanic Eruption

After going through this module, you are expected to:

1. explain how volcanic eruptions occur;
2. describe the changes that occur on the Earth's surface as a result of volcanic eruptions; and
3. show appreciation of the advantages brought about by volcanic eruptions.

What I Know

Read each item carefully. Answer the questions by writing the letter of your choice on your answer sheet.

1. The following are the harmful effects of volcanic eruption **EXCEPT:**
   A. mudflow
   B. ash deposit
   C. volcanic landslide
   D. making the soil fertile

2. Which of the following will likely form when ash from a volcanic eruption, and water from typhoon rains combine?
   A. acid rain
   B. fertilizer
   C. lava flow
   D. mudflows

3. Which volcanic material refers to molten rocks inside a volcano?
   A. magma
   B. lava flow
   C. ash deposit
   D. volcanic rock

4. Which natural phenomenon will happen when lava, rocks, gases, and other hot materials from the interior of the earth are thrown out of the volcano?
   A. tsunami
   B. landslides
   C. earthquake
   D. volcanic eruption

5. Which causes the rocks to melt in the interior of the Earth?
   A. high pressure
   B. gravity of the Earth
   C. very high temperature
   D. forces beneath the surface

6. How can a volcanic eruption bring positive effect?
   A. It emits different gases to the atmosphere.
   B. It can cause damage to the environment.
   C. It makes the soil fertile.
   D. It can displace people.

7. Which volcanic material can rise up to 35-kilometers and cover sunlight to reduce the temperature of the atmosphere?
   A. lava
   B. ash cloud
   C. ash deposit
   D. gas emission

8. Which is referred to as the molten rocks inside the volcano?
   A. lava
   B. rocks
   C. ashes
   D. magma

9. How do volcanic eruptions happen?
   A. because of low temperature inside the Earth
   B. because of high pressure inside the Earth
   C. because of ashes inside the Earth
   D. because of gases inside the Earth

10. What builds up inside the Earth as a result of high temperature?
   A. lava
   B. ashes
   C. gases
   D. pressure

Lesson 1 How Do Volcanic Eruptions Occur

A volcano is an opening in the Earth's crust where lava, pyroclastic materials, and gases are ejected onto the surface during eruptions. Volcanic eruption changes the landscape in a violent manner.

In this module, you will learn to describe how volcanic eruptions occur **(S6ES-IVa-1).**

What's In

Directions: Identify the changes that occur on the surface of the Earth due to earthquakes. Choose your answer from the box and write them on a separate sheet of paper.

tsunami	ground shaking
ground rupture	landslide

_____1. It is series of waves in a body of water such as a large lake or ocean caused by the displacement of a large volume of water.

_____ 2. It is the movement of several forms of mass such as rock, mud and debris, down a slope.

_____ 3. It is caused by the push and pull of the ground causing surface to tear apart.

_____ 4. It is the shaking of the ground as an effect of earthquake.

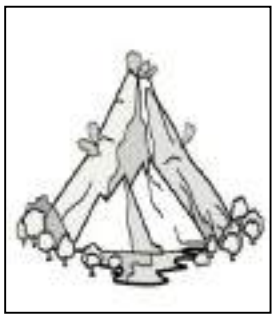
What's New

Activity 1: The Earth Speaks Out!

Due to heat, pressure builds up deep inside the Earth. This causes magma to rise and escape through volcanic craters. This is how volcanic eruption occurs.

Take a look at the illustrations below and do as instructed.

1.A**. Directions:** Based on the description of the given volcanic eruption below each illustration, sequence the events by writing numbers **1**- **4** in the box above it. Alternatively, write your answers on a separate paper.

1 ☐	2 ☐	3 ☐	4 ☐
			
Magma shoots up out of the volcano and runs down the side of the mountain. It also spills ash and gases.	Temperature inside the Earth is very high that causes the rocks to melt. Pressure builds up deep inside the earth reaching a critical status.	Magma rises and escapes through the hole created by colliding plates because of pressure.	The magma that comes out of the volcano flows down the slope of the volcano as lava flow. When a volcano continues to erupt over time, lava will build up forming a mountain.

(Illustrated by Orencio D. Estrera and Francis Gonzales)

1.B. **Directions:** Answer the following questions below. Choose the appropriate description that answers the question from the boxes provided below. Write your answers on a separate sheet of paper.

A. Magma shoots up out of the volcano and runs down the side of the mountain. It also spills ash and gases.

B. The magma that comes out of the volcano flows down the slope of the volcano as lava flow. When a volcano continues to erupt over time, lava will build up forming a mountain.

C. Temperature inside the Earth is very high that causes the rocks to melt. Pressure builds up deep inside the earth reaching a critical status.

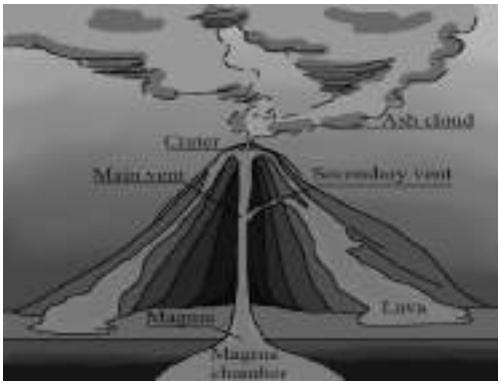
D. Magma rises and escapes through the hole created by colliding plates because of pressure.

	1. When does a volcanic eruption begin?
	2. What will happen to the magma as a result of high pressure beneath the surface of the earth?
	3. What happens to the magma as it rises and escapes from the opening created by colliding plates?
	4. What happens to magma when it comes out of the volcano?

What is It

The eruption of a volcano is a process. A **volcanic eruption** is a way for magma from inside the Earth to escape.

Deep within the Earth the temperature is high that causes the rocks to melt and form magma. There are several factors that can trigger a volcanic eruption. The triggers could be the rising of a less dense magma, the pressure associated with gases in magma and the injection of magma in an already filled magma chamber.



Parts of a Volcano

(*Illustrated by Luke D. Granada*)

The main parts of a volcano are the magma chamber, conduits, vents and craters. The hollow spot within the volcano is the magma chamber where gases and magma accumulates. Magma is less dense compared to rocks making them rise towards the surface of the Earth. **Pressure** builds up deep inside the Earth that causes magma to rise and escape through the openings called volcanic vent. Gases in the magma chamber, such as water vapor and carbon dioxide, expands as temperature rises contributing to higher pressure. In some cases, new magma gets injected to an already filled magma chamber causing pressure to build up and contribute to eruption. During the eruption, magma shoots up out of the volcano and flows down the side of the mountain as hot flowing lava. Magma that reached the surface becomes lava. The volcano also releases ashes and gases.

A volcanic eruption affects people, economy, and the environment. It can pose a threat to people's health. Toxic volcanic ashes and gases can affect human's respiratory system, eyes and skin, as well as psychological well-being. People get sick because of materials released from an erupting volcano. It can affect the economy as well through the destruction it brings by destroying houses, buildings and other properties. Ash ruins crops and becomes a reason for the closure of businesses.

Volcanic eruptions can change the surface of the Earth. It creates new land by lava hardening like mountains and plateaus. It can change the landscape of a place through the lava that flows out from the volcanic vent.

Volcanic eruptions also bring positive effects like creating new land and making the soil fertile. On the other hand, it also causes volcanic landslide, lava flow, mud flow, ash deposits and emits gases that bring changes on the surface of the Earth. It can even bury villages.

The pictures below show the most recent volcanic eruptions in the Philippines.

Taal Volcano Eruption January 12, 2020
Photo Credit: PHILVOLCS- Taal Volcano Observatory

Canlaon Volcano Eruption, June18, 2016
Photo Credit: PHIVOLCS-Kanlaon Observatory

What's More

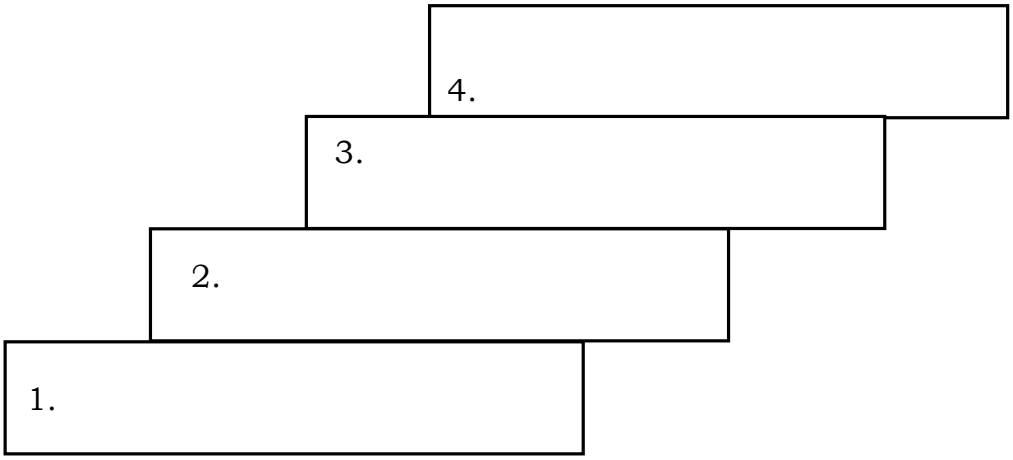
Directions: Volcanic activities are written inside the box below. Using the ladder organizer, sequence the events about how volcanoes erupt. On the first step of the ladder, write what happened first and so on by writing the letters of the activities. Write your answers on a separate paper.

A. The magma that comes out of the volcano's crater flows down the slope of the volcano as lava flow.

B. Magma rises and escapes through the crater because of pressure.

C. Magma, ashes and gases shoots up out of the volcano.

D. Temperature inside the Earth is very high that causes the rocks to melt. Pressure builds up deep inside the earth.



What I Have Learned

Directions: Read and answer the following items by choosing the word that correctly completes the given statements. Write your answers on a separate sheet of paper.

I have learned that...

1. A volcanic eruption occurs because of a very high **(acid, temperature)** inside the Earth.
2. Deep inside the Earth **(pressure, lava)** builds up because of high temperature.
3. Magma is pushed **(up, down)** and escapes through a hole called a vent.

What I Can Do

Directions: Read the task below. Write your output on a separate sheet of paper.

What can I do during a volcanic eruption? Shade the box before the things that you must do to keep you safe during a volcanic eruption.

☐	Cover your nose and mouth with a damp cloth.
☐	Get an emergency kit.
☐	Scream and run around in panic.
☐	Take a video of the erupting volcano.
☐	Calm down and assess the situation.
☐	Evacuate to a safe place or evacuation area.
☐	Ignore the commotion.
☐	Listen to news report.
☐	Pay attention to the warnings of local authority.
☐	Close the doors and windows and stay inside.

Assessment

Directions: The questions below are the description of how volcanic eruptions occur. Read each item carefully. Write the letter of the correct answer on your answer sheet.

1. In what way does magma come out from the interior of the earth?
   A. flooding
   B. Landslide
   C. earthquake
   D. volcanic eruption

2. How would the temperature within the Earth be described?
   A. low temperature
   B. high temperature
   C. average temperature
   D. below average temperature

3. Which of the following are hot, molten rocks found in the Earth's interior?
   A. magma
   B. lava flow
   C. ash deposit
   D. volcanic rock

4. When lava, rocks, gases, and other hot materials from the interior of the earth, are thrown out of the volcano, what phenomenon is happening?
   A. tsunami
   B. landslide
   C. earthquake
   D. volcanic eruption

5. What will build up inside the Earth with the continuous heating and melting of rocks in the Earth's interior?
   A. mudflow
   B. pressure
   C. rocks
   D. lava

6. Which of the following is geologic structure on the surface of the Earth where molten rocks from the Earth's interior come out during eruption?
   A. mountain
   B. landslide
   C. earthquake
   D. volcano

7. Which of the following refers to the molten rocks that reached the surface of the Earth?
   A. fertilizer
   B. acid rain
   C. lahar
   D. lava

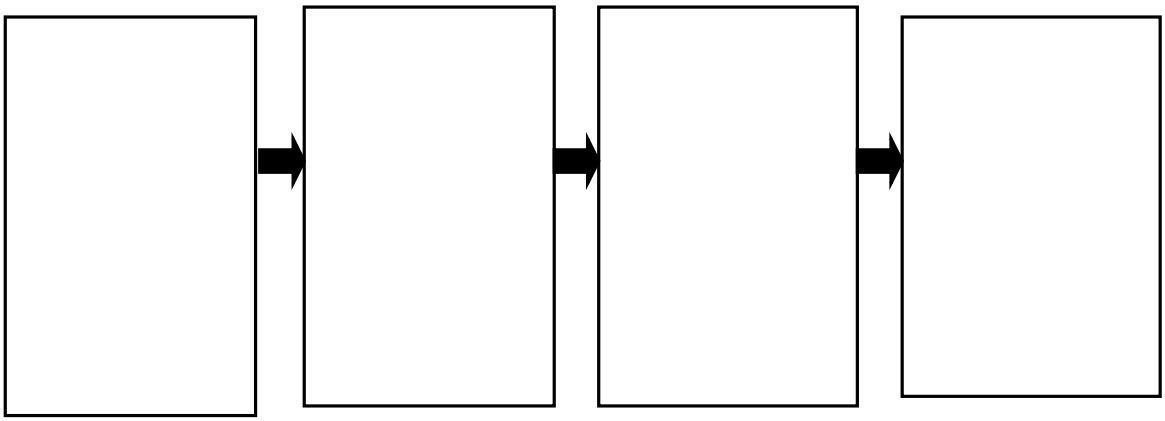
8. What is a volcano?
   A. a very high mountain with trees
   B. a set of plates that bump into each other to form a landform
   C. a violent shaking of the Earth that occurs when two plates collide
   D. an opening in the Earth's crust where magma passes to the surface

9. What is a hot molten material from the Earth's mantle that flows out of volcanoes?
   A. tectonic plate
   B. crustal rock
   C. magma
   D. cinder

10. What causes the rocks to melt inside the Earth?
   A. high temperature
   B. high pressure
   C. weight
   D. force

Additional Activities

Directions: Prepare on a sheet of paper, a similar set of blocks, arrows and blanks as the ones below. Draw inside the boxes you have drawn, the correct sequence of events on how a volcanic eruption occurs. Describe what happens in each event by filling in the blanks under each drawing. Place your output on a separate paper.



1 2 3 4

Lesson 2 Changes that Occur on the Surface of the Earth as a Result of Volcanic Eruption

Volcanic activity changes landforms in an unpredictable and often in a violent manner. For a period of time, the movement of Earth's plates slowly breaks apart continents.

In this lesson, you will learn about the changes that occur on the surface of the Earth as a result of a volcanic eruption **(S6ES-Iva-1).**

What's In

Directions: Sequence the following events of a volcanic eruption by writing **1-4** on the blank, with 1 referring to the first event and 4 as the last event. Write the answers on your answer sheet.

_____1. Because of its lower density compared to its surrounding, magma rises and escapes through the vent of the volcano created by colliding plates.

_____2. Magma shoots up out of the volcano and runs down the side of the mountain. It also spills ash and gases.

_____3. The magma that comes out of the volcano flows down its slope as lava flow. When the volcano continues to erupt over time, lava will build-up forming a mountain.

_____4. The temperature deep in the earth's mantle is high that causes the rocks to melt and form magma with lower density under high pressure.

What's New

Activity 1: Transforming the Earth

Directions: Below is a write-up about the eruption of a volcano and its effects on the environment. Read and study the write-up to answer the activity that follows. Write your answers on a separate sheet of paper.

The Eruption of a Volcano

One of the biggest volcanic eruptions that happened in Philippine history was the eruption of Mt. Pinatubo in Central Luzon on June 15, 1991.

Volcanic landslides, **emission of gas**, **mudflow**, **lava flow**, a **cloud of hot volcanic ash, and ash deposit** are some of the effects of the eruption. Many places, even miles away, were affected. **Volcanic landslide** refers to large masses of rock and soil that fall, slide, or flow rapidly due to gravitational force during a volcanic activity. The hot lava flowing from an erupting volcano reaches surrounding communities and burns or destroys everything in its path, including people and infrastructures like roads and bridges. Gases and ashes are released to the air. **Emission of gases** during a volcanic eruption refers to the release of gases such as carbon dioxide, sulfur dioxide, and hydrogen sulfide to the atmosphere.

An ash cloud estimated to be 35-kilometers rose high into the air. It covers the incoming sunlight, thus reducing the temperature. It affects temperature of places globally.

The eruption causes destruction to the place. It causes volcanic landslide that covers a large area down the slope of the volcano with large heap of volcanic soil. The eruption also causes thousands of roofs to collapse due to the weight of the ash mixed with rainwater. **Ash deposits** and lava when mixed with rainwater form giant mudflows that bring more destruction to the place because it buries villages. **Mudflows** are very rapid to extremely rapid surging movement of debris with significant amount of water. Indeed, the eruption of Mount Pinatubo changed the landscape of the place.

As a result of volcanic eruptions, not just by Mount Pinatubo, new landforms will be created. Landforms created by volcanic eruption include **domes**, **plateaus**, and **volcanoes**. A lava plateau is a wide, flat surface formed when a large amount of highly fluid lava flows over an area.

Eruption of Mt. Pinatubo, June 15, 1991
Source: Wikimedia Commons

The volcanic eruption also provides agricultural benefits as it provides the most fertile soil after an eruption.

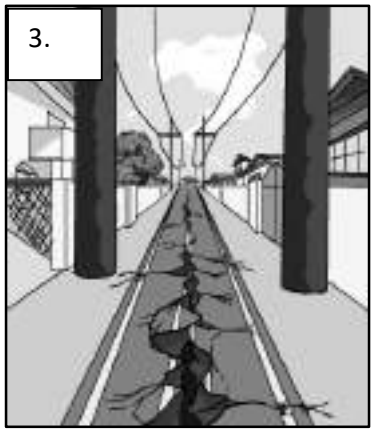
1. A. Directions: The effects of volcanic eruptions are listed in **column A** of the table below and the description of each effect is listed in **column B**. Match the effects with its description by choosing the letter of the correct answer. Write your answers in on a separate paper.

Column A **Effects of Volcanic Eruption**	**Column B** **Description**
_____ 1. lava flow	A. combination of lava, mud, and water that can bury villages
_____2. mud flow	B. The flow of molten rock out of an erupting volcano that can destroy almost everything along its path
_____3. volcanic landslide	C. a wide, flat surface formed when a large amount of highly fluid lava flows over an area
_____4. fertilize soil	D. large heaps of wet or dry rock and soil that slide, or flow speedily down the slope of a due to gravitational force during a volcanic activity
_____5. lava plateau	E. benefit of a volcanic eruption
	F. the fall of ashes after a major volcanic eruption

1. B. Directions: Look at the pictures below. Put a checkmark (✔) if it shows effect of volcanic eruption and (**x**) if not. Write your answers on a separate sheet of paper. *(All illustrations in this section are made by Luke D. Granada)*

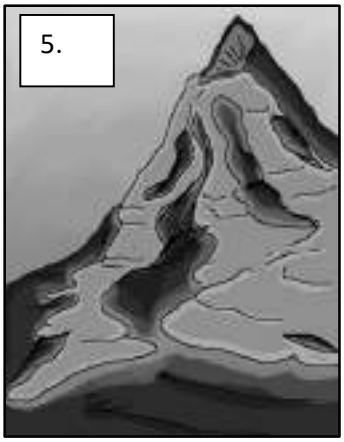
Ash cloud

mudflow

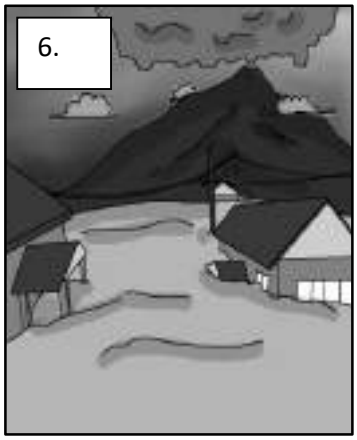


ground rupture

ash deposit

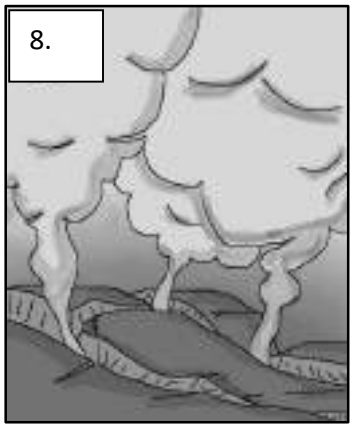


lava flow



buried villages

typhoon

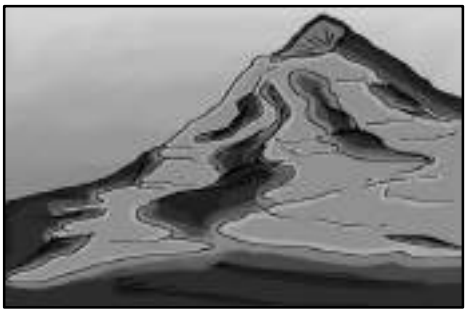


emission of gases

volcanic landslide

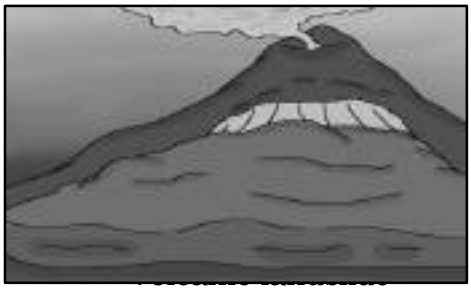
What is It

Volcanic landslides, emission of gas, mudflow, lava flow, clouds of hot volcanic ash, ash deposits, and formation of new landforms are some of the effects of a volcanic eruption. Many places, even miles away, could be affected by a single volcanic eruption. The following describes some of these major effects of volcanic eruptions.

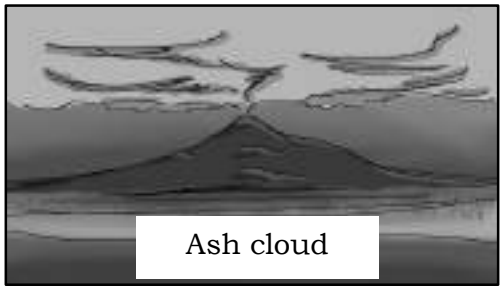


Hot flowing lava

Hot flowing lava from an erupting volcano can reach surrounding communities. Lava that leaves the vent of a volcano can reach around 1,200 degrees Celsius immediately after being released. The temperature of the flowing lava drops significantly as it is exposed to the air but is still able to maintain a significantly high temperature sufficient to burn almost everything on its path, including people and nfrastructures like roads and bridges.



Volcanic eruptions are associated with vibrations of the ground called tremors. These tremors disturb the balance in the soil that results to **Volcanic landslides,** which are large heaps of wet or dry rock and soil that slide, or flow speedily down the slope of a volcano due to gravitational force during a volcanic activity. Volcanic landslides may contribute to mudflow that can travel as much as 200-kilometers downstream.



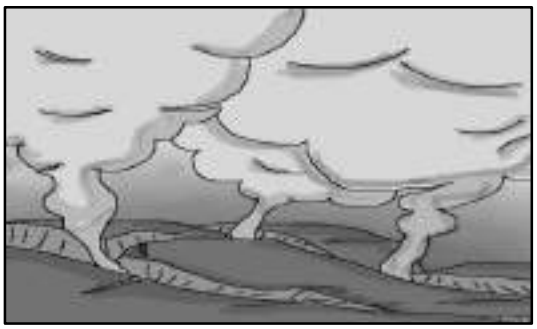
Ash cloud

Volcanic eruptions contribute to burning where ash is a common by product. Violent volcanic eruptions contribute to a significant amount of ash that can be released into the atmosphere forming **ash clouds** that cover the incoming sunlight. Because of this, major volcanic eruptions contribute to a significant reduction in local or even global temperature. With gravitation pull, ashes eventually fall to the ground.

Ash deposit

Ash deposits are ashes that usually deposit on roofs of houses and other buildings. An eruption causes many roofs to collapse because of the weight of the ash deposit made wet by heavy rains. Volcanic eruptions also provide agricultural benefits as the soil becomes fertile after an eruption.

Mudflow



Emission of gases

When ash deposits and mud mix with rainwater, they become **mudflow**. Mudflows cause further destruction than the eruption itself as it buries villages. *Lahar* may also result as an effect of volcanic eruption, which is a violent type of mudflow or debris flow composed of volcanic materials, rock debris, water, etc.

Volcanic eruptions also **emit gases** such as water vapor, carbon dioxide, hydrogen sulfide, hydrochloric acid, sulfur dioxide, and carbon monoxide, which can cause air pollution and is dangerous to human health.

Volcanic eruptions can change the landscape of the Earth. New landforms can be created by volcanic eruptions. Landforms created by lava include domes, plateaus, and volcanoes.

What's More

Directions: Match the effects of a volcanic eruption in column **A** with its description in column **B**. Write your answers on another paper.

A	**B**
_____ 1. lava flow	A. provides fertile soil
_____2. agricultural benefit	B. create lava domes, plateaus, and volcanoes
_____3. volcanic landslide	C. ash deposits and mud mixed with rain water
_____4. mudflow	D. hot flowing molten materials from an erupting volcano
_____5. formation of new landforms	E. large heaps of wet or dry rock fragments that slide down the slope of a volcano due to gravitational force
	F. hot molten materials melt everything on its path

What I Have Learned

Directions: Read each statement and choose the correct answer from the options inside the box. Write your answers on a separate sheet of paper.

I have learned that...

fertile	changes	beneficial
ash deposit	mudflow	loss of lives
harmful	volcanic landslide	lava flow

1. Volcanic eruptions can bring _____ to the surface of the Earth.
2. Volcanic eruption have _____ and _____ effects on the environment.
3. The harmful effects of volcanic eruption are _____, _____, _____, _____, and _____.
4. The beneficial effect of volcanic eruption is making the soil _____.

What I Can Do

A volcanic eruption is a natural calamity that can bring danger to people's lives without warning. Victims are usually left with nothing but their lives.

Directions: Suggest ways on how you can help victims of a volcanic eruption. Choose your answer from the box below. Write the letters of your choice on another paper.

A. donate clothes and other things they need
B. let only the government help them
C. donate money to buy their basic needs
D. donate food for them to survive

1._____

2._____

3._____

Assessment

Directions: Read each item carefully. Write the letter of the correct answer on your answer sheet.

1. Which of the following is a benefit of volcanic eruptions?
   A. attracts tourists
   B. prevents flooding
   C. controls landslide
   D. makes the soil fertile

2. Which material will form when ash deposits and mud from the eruption mixed with rain water from monsoon or typhoon?
   A. fertilizer
   B. acid rain
   C. lava flow
   D. mudflows

3. How can volcanic eruptions change the landscape of the Earth?
   A. It forces people to transfer residence.
   B. It provides agricultural benefits.
   C. It turns gases into islands.
   D. It creates volcanic islands.

4. Which of the following causes roofs to collapse when mixed with rainwater because of its weight?
   A. ash deposit
   B. ash cloud
   C. mudflow
   D. lava

5. Which of the following is a good effect of a volcanic eruption?
   A. It covers the land with lahar.
   B. It makes the soil rich and fertile.
   C. It forces people to transfer residence.
   D. It brings destruction to the environment.

6. What will develop over time when the lava builds up as a result of volcanic eruption?
   A. lakes
   B. Valleys
   C. streams
   D. plateaus

7. Which of the following happens when a large heap of wet or dry rock fragments slides down the slope of a volcano due to gravitational pull?
   A. lahar
   B. mudflow
   C. lava flow
   D. volcanic landslide

8. Which can cause air pollution as a result of volcanic eruptions?
   A. emission of gases
   B. lahar flow
   C. ash cloud
   D. mudflow

9. When released during a volcanic eruption which of the following will cover incoming sunlight and reduce the temperature?
   A. mudflow
   B. ash cloud
   C. lahar flow
   D. emission of gases

10. Why is volcanic eruption dangerous to human health?
   A. It brings out lava to the environment that can burn the skin.
   B. It emits volcanic gases which is dangerous to human health.
   C. It makes the soil in the area fertile which is good for planting.
   D. It forces people to transfer residence very far from their homes.

Additional Activities

Directions: Read the descriptions of the effect of the volcanic eruption below and supply the missing letters to complete the word before it. Write your answers on a separate sheet of paper

1. M_D FL_W	ash deposits and mud mix with rainwater
2. L_ _ A FL_W	hot flowing lava from an erupting volcano
3. A_H CL_ _D	cloud of ash from an erupting volcano
4. _ SH D_PO_ IT	ashes usually stocked on roofs of houses
5. V_LC_NIC L_ND_ L_DE	large masses of soil that slide down the slope

Answer Key

Additional Activity:

1.

Temperature inside the Earth is very high, pressure builds up.

2.

Magma rises and escapes through the hole.

3.

Magma shoots up out of the volcano and runs down the side of the mountain.

4.

The magma that comes out of the volcano flows down the slope.

What's More

1. D
2. B
3. C
4. A

What I have Learned:

1.temperature
2.pressure
3.up

What I Can Do:

1. Cover your nose and mouth with a damp cloth.
2. Get an emergency kit.
3. Calm down and assess the situation
4. Evacuate to a safe place.
5. Listen to news report.
6. Pay attention to the warnings of the local authority.

Assessment:

1.D	6.D
2.B	7.D
3.A	8.D
4.D	9.C
5.B	10.A

What I Know

1. D
2. D
3. A
4. D
5. C
6. C
7. B
8. D
9. B
10. D

What's In

1. tsunami
2. landslide
3. ground rupture
4. ground shaking

What's New

Activity 1 – The Earth Speaks Out

A.

1. 3
2. 1
3. 2
4. 4

B.

1. C
2. D
3. A
4. B

Assessment: 1. D 6. D 2. D 7. D 3. D 8. A 4. A 9. B 5. B 10.B **Additional Activities:** 1. mudflow 2. lava flow 3. ash cloud 4. ash deposit 5. volcanic landslide	**What's More** 1. D 2. A 3. E 4. C 5. B **What I Have Learned:** 1. changes 2. beneficial and harmful 3. ash deposit, lahar, mudflow, volcanic landslide, hot flowing lava 4. fertile **What I Can Do:** 1. A 2. C 3. D	**What's In** 1. 2 2. 3 3. 4 4. 1 **What's New** **Activity 1** **A.** 1. B 2. A 3. D 4. E 5. C **B.** 1. ✓ 6. ✓ 2. ✓ 7. x 3. x 8. ✓ 4. ✓ 9. ✓ 5. ✓

Lesson 2: Changes of the Earth's Surface as a Result of Volcanic Eruption

References

Wikimedia. (November 8, 2015). Eruption of Mount Pinatubo, June 15, 1991. Retrieved from https://commons.wikimedia.org/wiki/File:Eruption_of_Mount_Pinatubo,_June_15,_1991.jpg

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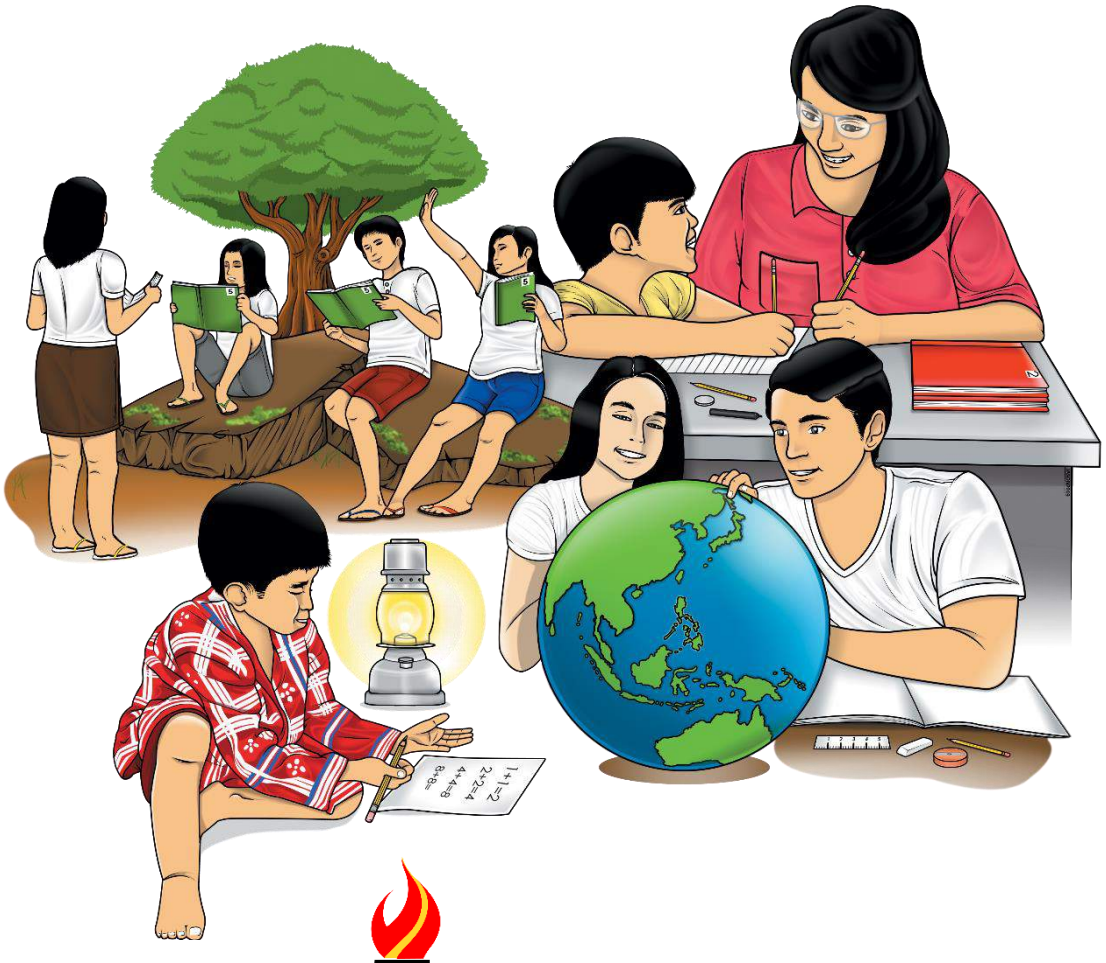
Quarter 4 – Module 2:
What To Do Before, During, and After the Earthquakes and Volcanic Eruptions



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6

Science

Quarter 4 – Module 2:
What To Do Before, During, and After the Earthquakes and Volcanic Eruptions

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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 was designed and written with you in mind. It is here to help you enumerate what to do before, during, and after an earthquake and volcanic eruptions (S6Es-IVb-2). The scope of this module allows you to use it 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.

This module is divided into the following:

- **Lesson 1** – What to do before, during, and after an Earthquake
- **Lesson 2** – What to do before, during, and after Volcanic Eruptions

After going through this module, you are expected to:

1. enumerate what to do before, during, and after earthquakes and volcanic eruptions; and
2. show appreciation about the importance of safety precautions to observe before, during, and after earthquakes and volcanic eruptions.

What I Know

Read and answer the following questions carefully. Write your chosen letter on the answer sheet.

1. Which of the following should **NOT** be done during an earthquake when you are inside a building?

   A. Rush to the door and get inside an elevator.
   B. Be aware of the possibility of open electrical lines.
   C. Seek shelter in a doorway or take cover under a heavy table or desk.
   D. Open the window and leave the building immediately when you smell gas.

2. Which precautionary measures should be done before an earthquake?

   A. Prepare an emergency survival kit.
   B. Cover your nose with a damp cloth.
   C. Do not cross bridges if you are driving.
   D. Check yourself and every family for injury.

3. How should you behave during an earthquake?

   A. Keep calm.
   B. Rush to an overcrowded exit.
   C. Practice an earthquake drill.
   D. Fasten all heavy appliances.

4. Which safety precautions should be done before an earthquake?

   A. Participate in earthquake drills.
   B. Turn on the radio for the latest updates.
   C. Stay away from broken electrical wires.
   D. Check yourself and members of the family for injuries.

5. Which of the following sentences in the box are precautionary measures to be taken BEFORE an earthquake?

I.	*Familiarize yourself with your place of work and residence.*
II.	*Stay away from glass windows, shelves, cabinets and other heavy objects.*
III.	*Know the earthquake hazards in your area.*
IV.	*If you need to evacuate, leave a message stating where you are going and bring emergency supply kit.*

   A. I and II
   B. II and III
   C. I and III
   D. I and I

6. Which is the best thing to do before a volcanic eruption occurs?

A. Avoid contact with the ash.
B. Wear goggles to protect your eyes.
C. Keep important documents in a safe place.
D. Cover your nose with a wet and clean cloth.

7. Which one is NOT a safety precaution during volcanic eruptions?

A. Get on your roof to remove ash.
B. Avoid crossing bridges and rivers.
C. Follow evacuation orders from authorities.
D. Protect yourself from falling ash, if outside.

8. What will you do after a volcanic eruption?

A. Prepare a first aid kit.
B. Stay from volcanic ash fall areas.
C. Store enough food and drinking water.
D. Make the necessary repairs and clean your roof.

9. Which of the following is not a safety precaution during a volcanic eruption?

A. Avoid low lying areas.
B. Stay outside of your home.
C. Cover your head for protection.
D. Wear long-sleeved shirts and long pants.

10. Which precautionary measures listed in the box below should be done after a volcanic eruption?

I.	*Close all windows and doors.*
II.	*Do not drive in heavy ash fall.*
III.	*Keep important documents in a safe place.*
IV.	*Clean everything and check if there's damage.*

A. I only
B. II only
C. III only
D. I and IV

Lesson 1 What to do, Before, During, and an Earthquake

Earthquakes do not happen by chance. They often occur unexpectedly. In the Visayas, one of the strongest earthquakes in 2013 happened in Bohol, with a magnitude of 7.2. The latest report about earthquakes happened in Mindanao in Cotabato last October 29, 2019, which resulted in 24 dead, 11 missing, and 563 injured individuals. The earthquake was due to the movement of the plates of the earth.

Earthquakes can be hazardous, especially if we are not prepared because they can happen anytime and anywhere. It may cause losses of lives, properties, livelihoods, and may even affect our health status. Knowing the precautionary steps to take during earthquakes and other calamities can greatly reduce the danger and worries in the family. It can also protect yourself and your loved ones.

Take note of the changes that occurred before and after an earthquake in the pictures below.

Before an Earthquake

After an Earthquake

Photo credit: Dante G. Arriola II

Photo credit: Pixabay.com

What's In

Direction: Read the following statements below. Write **Yes** if the statement about earthquakes is true and **No** if not. Write your answers on a separate sheet of paper.

_____ 1. An earthquake is the shaking of the earth's crust.

_____ 2. All earthquakes have the same origin.

_____ 3. Plate tectonic movements cause earthquakes.

_____ 4. Not all earthquakes that occur are felt by people.

_____ 5. The movement of tectonic plates causes a volcanic earthquake.

What's New

Activity 1: Know This Tips

Choose the picture that shows what to do before, during, or after the earthquake. Write only the letter that corresponds to the picture below. Write your answers on another paper.


A

B

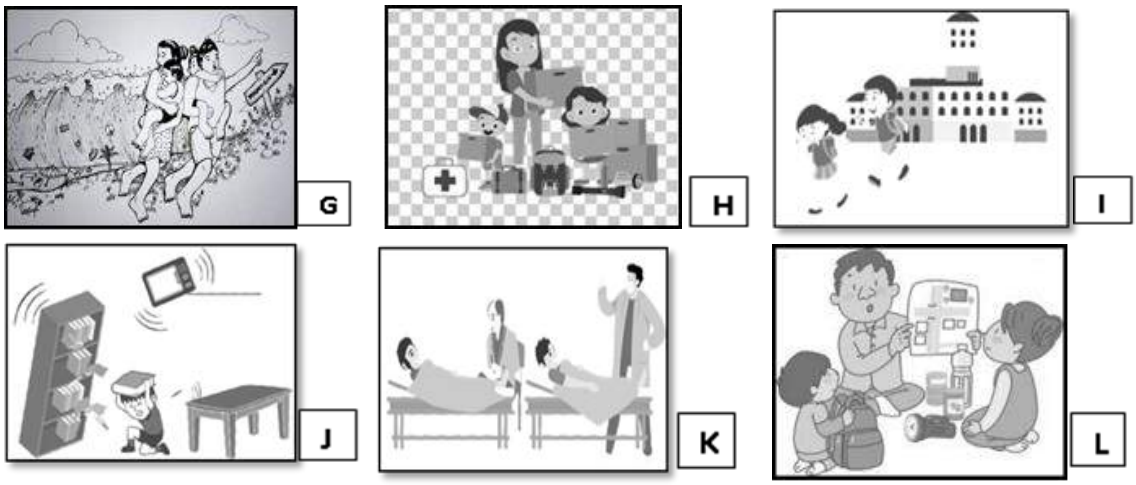

C

D

E


F

Arellano, Ryan Oliver S., *Before, During and After Earthquake.*



Arellano, Ryan Oliver S.; Añasca, Julius *Before, During and After Earthquake.*

What is It

Natural disasters are frightening, but an earthquake is unique because it gives no warning. Therefore, it is important to know what to do before, during, and after an earthquake happens.

Below is the summary of what to do before, during, and after an earthquake.

BEFORE	DURING	AFTER
1. Make a plan of where to meet your family after an earthquake. 2. Familiarize yourself with the safety exits and safe area of your school and house. 3. Fix heavy furniture, cabinets, and appliances to the walls or floor. 4. Keep flammable materials, breakable items, and toxic chemicals in a safe place. 5. Make sure you have an emergency kit at home. 6. Learn how to turn off the gas, water, and electricity.	1. Keep calm. If you are indoors, stay inside. If you are outside, stay in an open field area. 2. Dock, cover, and hold when you feel an earthquake and wait for the trembling to stop before going out. 3. Stay away from anything that may tend to fall, such as unfixed cabinets, glass windows, etc. 4. Evacuate the building and go to an open area away from trees and electric posts.	1. Check yourself and others for injuries. 2. Turn on the radio. Wait for instructions from the authorized government agency. 2. Stay away from damaged buildings (stuff might fall off the building, or the building could fall on you) 3. Move away from the seashore and go to a higher place. A tsunami might occur. 4. Be prepared for some aftershocks.

What's More

Activity: Do's and Don'ts

Identify whether the activities described below should be done before, during and after an earthquake. Write **DO** or **DON'T** on a separate paper.

_____ 1. Fix mirrors, paintings, and other hanging objects securely.

_____ 2. Panic: Run, Push, Talk/Shout.

_____ 3. Hang heavy pictures and other items over beds.

_____ 4. Get out of the classroom in an orderly manner.

_____ 5. Use any elevator.

_____ 6. Bring your GO BAG with you.

_____ 7. Go near buildings, tall trees, power-lines.

_____ 8. Close curtains and blinds of window glass.

_____ 9. Proceed to identified evacuation area.

_____ 10. Run when the shaking starts.

_____ 11. Stay put until the shaking stops.

_____ 12. Locate beds and chairs away from windows.

What I Have Learned

I learned that preparation and proper information on what to do before, during, and after earthquakes could greatly reduce the dangers it can bring to us. Being prepared can help protect ourselves and our loved ones. Complete the following statements. Write your answers on a separate sheet of paper.

Before the earthquake comes, I should…

_____

_____

_____

_____

During the earthquake, I should…

_____

_____

_____

_____

After the earthquake, I should…

_____

_____

_____

_____

What I Can Do

Activity: Assemble One... Emergency Kit

Direction: Below is a GO BAG. Only 20 items can be placed inside the bag. Choose the 20 most important items from the box to be placed in the GO BAG. Write your answers on another paper.

Illustrated by: Ramona I. Mangahas

Basic Emergency Kit Checklist:

Drinking water	first aid kit	whistle	flashlight
ready-to-eat	food	gloves	cash
medicines	sleeping bag	duct tape	candles
blankets	clothes& footwear	radio	rope/cord
underwear	toiletries	emergency map	hand
sanitizer	laminated hotlines	dust masks	spare batteries
keys (car & house)	swiss army knife	garbage bags	matches/lighter

mobile phone & charger

documents (ID, insurance and bank books)

Assessment

Multiple Choice. Read and answer the following questions carefully. Write your chosen letter on your answer sheet.

1. Which of the following safety precautions is NOT an activity done before an earthquake?

   A. practice an earthquake drill
   B. turn on the radio for the latest updates
   C. stay away from broken electrical wires.
   D. check yourself and members of the family for injuries

2. Which of the following should NOT be done during an earthquake when you are inside a building?

   A. Rush to the door and get inside an elevator.
   B. Be aware of the possibility of an open electrical line.
   C. Seek shelter in a doorway or take cover under a heavy table or desk.
   D. Open the window and leave the building immediately when you smell gas.

3. Which of the following statements in the box below are the precautionary measures to take before an earthquake?

I. Familiarize yourself with your place of work and residence.
II. Stay away from glass windows, shelves, cabinets and other heavy objects.
III. Know the earthquake hazards in your area.
IV. If you need to evacuate, leave a message stating where you are going and bring emergency supply kit.

   A. I and II
   B. II and III
   C. I and III
   D. I and IV

4. How should you behave during an earthquake?

   A. Keep calm.
   B. Fasten all heavy appliances.
   C. Rush to an overcrowded exit.
   D. All of the above.

5. Which precautionary measures should be done before an earthquake?

A. Cover your nose with a wet cloth.
B. Prepare an emergency survival kit.
C. Do not cross bridges if you are driving.
D. Check yourself and members of the family for injury.

6. Which of these activities does not show a safety precaution before an earthquake?

A. Drop, cover, and hold.
B. Have an emergency plan.
C. Prepare an emergency survival kit.
D. Familiarize the danger in your area.

7. Which is a safety precaution after an earthquake?

A. Go to the beach.
B. Stay under a sturdy table.
C. Be careful from broken glasses and falling objects.
D. Familiarize yourself with your place of work and residence.

8. Which is **NOT** a safety precaution before an earthquake?

A. Have an emergency plan.
B. Check yourself and others for injuries.
C. Know the earthquake danger in your area.
D. Familiarize yourself with your place of work and residence.

9. Which of these activities must be done during an earthquake?

A. Get an elevator.
B. Stay away from glass and windows.
C. Take time to read about what you can do to prepare.
D. Make sure you have a fire extinguisher and survival kit.

10. Why is it important to know what to do before, during, and after earthquakes?

A. To protect our houses.
B. To prevent earthquakes from occurring.
C. To minimize damages on our appliances.
D. To reduce fear, anxiety, and losses of lives.

Additional Activities

Activity: "Who You Gonna Call?"

Direction: In case of emergency, write the exact address and contact numbers of the following Hotlines in your area. Write your answers on a separate sheet of paper.

Name of Office	Address	Contact No.
1. Family Members • Father		
• Mother		
• Siblings		
2. Bureau of Fire		
3. Police Station		
4. Local Hospital		
5. City / Municipality Ambulance		
6. Philippine Red Cross		
7. Amity Volunteer Fire Brigade		
8. DRRM Office		

Lesson 2 What to do Before, During and After Volcanic Eruption

Philippines is located in an area known as "the **Pacific Ring of Fire**" or "**Circum-Pacific Belt,**" as shown in Figure 1 below. This area is home to almost 75% of the world's active volcanoes, where tectonic plates and faults are also found. It is where volcanic eruptions are frequently experienced.

A **volcano** is a mountain or hill with a vent extending from the top down to the Earth's interior (as shown in the figures below). It expels magma by rumbling under the ground. A volcano can either be **active** or **inactive**. Active volcanoes are those that have erupted within 600 years while inactive are those that have not erupted more than 600 years.

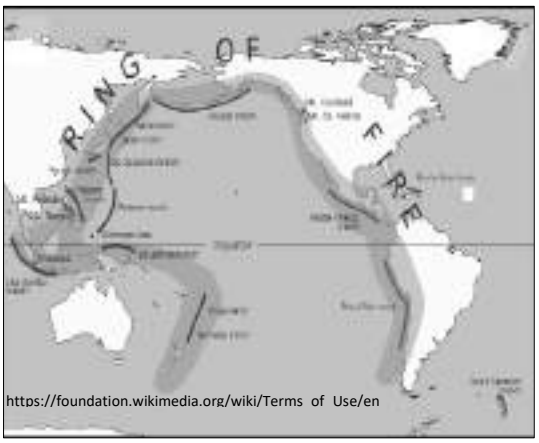


Figure 1. Pacific Ring of Fire

https://upload.wikimedia.org/wikipedia/commons/9/9d/Pacific_Ring_of_Fire_volcanoes.png Illustrated by: Ramona I. Mangahas

Figure 2a. Outside view of a Volcano

Figure 2b. Inside view of a Volcano

A volcanic eruption is the sudden occurrence of a violent discharge of steam and volcanic material. In Philippine history, the 1991 eruption of Mount Pinatubo was a significant volcanic eruption in the Luzon Volcanic Arc, as shown in Figure 3 below. It was the world's largest volcanic eruption to happen in the past 100 years.

Figure 3. Mt. Pinatubo Eruption covered Subic Bay

Photo credits: copyright.com, Dante G. Arriola II,

Figure 4. Cagsawa Church before & after Mayon eruption

The famous Cagsawa Church was buried by the eruption of Mt. Mayon in 1814, as shown in Figure 4 of the previous page. When there is a volcanic eruption, many affected because it can destroy our properties and can affect our health as well as our environment. It is, therefore, important to know what to do before, during, and after volcanic eruptions.

What's In

Read the description of events of a volcanic eruption inside the boxes below. Arrange the events by writing numbers **1** - **4** in the box above it. Place your answer on a separate paper.

a.	b.	c.	d.
The magma that comes out of the volcano flows down the slope of the volcano as lava flow. When a volcano continues to erupt over time, lava will build up forming a mountain.	Magma rises and escapes through the hole created by colliding plates because of pressure.	Temperature inside the Earth is very high that causes rocks to melt. Pressure builds up deep inside the earth.	Magma shoots up out of the volcano and runs down the side of the mountain. It also releases ashes and gases.

What's New

Activity: Impact - Full

Choose your answers from the list of different activities before, during, and after eruptions below. Write only the letters, under the What I Should Do column, on a separate sheet of paper

Stages	Impact of Eruption	What I should do
Before	Occurrences of volcanic tremors are always felt with rumbling sounds and emission of gray smoke at the crater.	
During	Lava and mudflow from the crater of the volcano, and ashes and debris are falling.	
After	Damages were incurred and ash fall accumulated in the community.	

List of Things to do before, during, and after volcanic eruptions:

A. Avoid low-lying places.
B. Seek cover in case ashes and rocks fall.
C. Be ready with emergency kits or GO BAG.
D. Use masks while cleaning ashes and other debris.
E. Stay in the evacuation center until further instructions.
F. Prepare hard hats and masks for ashes and falling debris.
G. Keep all doors closed when there is a heavy ash fall.
H. Prepare all the necessary things to bring once an evacuation is needed.
I. Wear protective clothing, headgear, and high-efficiency dust masks.
J. Strengthen roofs and walls to withstand loading and projectile impacts.
K. Be alert for advisories of possible re-evacuation to safer places.
L. Be aware of the evacuation plans and location of the center in your community.
M. Keep updated on the unusual volcanic activity through TV, newspaper, or radio.
N. Adults may check on the livability and safety of the areas affected before going back home.
O. Participate in community efforts such as cleaning, maintaining peace, and order within the evacuation center.

What is It

Volcanic eruptions, to some extent, maybe predicted. Some signs like frequent tremors near the volcano with rumbling sounds, swelling of the ground, and increase in temperature of surface water, are used to predict a possible eruption. When volcanic eruptions occur, we are all affected but we can reduce the risk brought about by volcanic eruptions.

Below are some activities to do before, during, and after an eruption.

Before the Eruption, I should:	**During the Eruption, I should:**	**After the Eruption, I should:**
*Get ready for emergency kits or GO BAG. *Prepare hard hats and masks for ashes and falling debris. *Prepare all the necessary things to bring once an evacuation is needed. *Strengthen roofs and walls to withstand loading and projectile impacts. *Be aware of the evacuation plans and location of the centers in your community. *Keep updated on the unusual volcanic activity through TV, newspaper, or radio.	*Avoid low-lying places *Seek cover in case ash and rock falls. *Keep all doors closed when there is a heavy accumulation of ash. *Wear protective clothing, headgear, and high-efficiency dust masks. *Be alert for advisories for possible re-evacuation to safer evacuation sites.	*Use masks while cleaning ash and other debris. *Adults may check on the livability and safety of the areas affected before going back home. *Stay in the evacuation center until further instructions. *Participate in community efforts such as cleaning, maintaining peace, and order within the evacuation center.

What's More

Activity 1: What to Do Before, During and After Volcanic Eruption

Directions: Identify the following safety precautions before, during, and after the Earthquake. Write **B** for before, **D** for during, and **A** for after on the space provided. Write the letters of your answer on a separate sheet of paper.

_____ 1. Be aware of the unusual volcanic activity.

_____ 2. Check drinking water and electrical wires at home.

_____ 3. Cover your nose with a wet cloth to prevent inhaling ashes.

_____ 4. Protect yourself from ash falls.

_____ 5. Prepare emergency materials like flashlights, food, and water.

_____ 6. Wait for instructions to return home.

_____ 7. If caught in a rock fall, roll into a ball to protect your head.

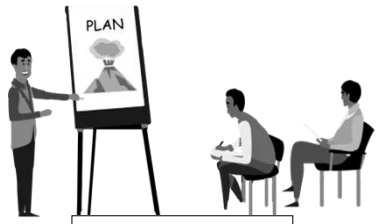
_____ 8. Follow instructions from authorities.

_____ 9. Avoid low-lying places.

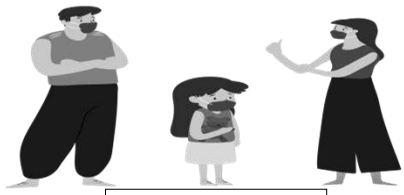
_____ 10. Close all doors and windows to avoid ashes from getting inside.

Activity 2: Picture Clue

Directions: Tell whether the picture shows what to do before, during, and after volcanic eruptions. Choose among the choices: ***before***, ***during,*** or ***after***. Write the letters of your answer on another sheet of paper.



1. _____

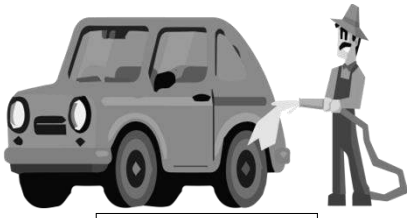


2. _____

3. _____

4. _____

5. _____



6. _____

7. _____

9. _____

10. _____

Arellano, Ryan Oliver S., *Before, During and After Volcanic Eruption.*

What I Have Learned

I learned that readiness and knowledge on what to do before, during, and after volcanic eruptions would help protect ourselves and our family. Complete the following statements. Write your answers on another paper.

Before the volcanic eruption comes, I should...

_____

_____

During the eruption, I should...

_____

_____

After the eruption, I should...

_____

_____

What I Can Do

Activity: Emergency Kit Bag

Draw and put a label on the things that should be placed inside the emergency bag in preparation for a volcanic eruption. Among the different things, you will be needing, select only the 15 most important or essential. Your points will vary depending on your answers. Place your output on another paper.

Illustrated by: Ramona I. Mangahas

Assessment

Multiple Choice. Read and answer the following questions carefully. Write your chosen letter on the answer sheet.

1. Which precautionary measures should be done after a volcanic eruption?

I.	*Clean everything and check if there are damages.*
II.	*Wear goggles or eyeglasses to cover your eyes.*
III.	*Close all windows and doors.*
IV.	*Listen to the radio for the updates.*

   A. I only
   B. II only
   C. III and IV
   D. I and IV

2. Which of the following activities should we do before volcanic eruptions occur?
   A. Avoid contact with the ash.
   B. Wear goggles to protect your eyes.
   C. Keep important documents in a safe place.
   D. Cover your nose with a wet and clean cloth.

3. Which of the following activities should we NOT do during a volcanic eruption?
   A. Avoid low lying areas.
   B. Stay outside the house.
   C. Cover your head for protection.
   D. Wear long-sleeve shirts and long pants.

4. Which is not a safety precaution during volcanic eruptions?
   A. Get on the rooftop to remove ash.
   B. Avoid crossing bridges and rivers.
   C. Follow evacuation orders from authorities.
   D. If outside, protect yourself from falling ash.

5. What will you do after a volcanic eruption?
   A. Bring first aid kit.
   B. Make a family disaster plan.
   C. Store enough food and drinking water.
   D. Make the necessary repairs and clean your roof.

6. Which of the following statements show what to do before volcanic eruptions?
   A. Check and repair any damages.
   B. Prepare masks or cloth to cover your nose or mouth.
   C. Always stay indoors until authorities say it is safe to go outside.
   D. Use mask to cover your mouth or nose to avoid breathing in ashes.

7. Which precautionary measures should be done after a volcanic eruption?
   A. Always stay indoors.
   B. Do not drive in heavy ash fall.
   C. Cover your nose and mouth with a clean wet cloth.
   D. Make sure that your house is still safe for all of you.

8. In case you are inside your house, what will you do during a volcanic eruption?
   A. Do not use masks.
   B. Prepare an emergency plan.
   C. Leave your doors and windows open.
   D. Wear a mask and close all windows and doors.

9. Which of the following activities should you NOT do before volcanic eruption?
   A. Have an emergency plan.
   B. Prepare necessary things like first aid kit and foods.
   C. Stay in the evacuation center until further instructions.
   D. Prepare masks or anything to cover your nose and mouth.

10. Which is NOT a safety precaution during volcanic eruption?
   A. Do not drive in heavy ash falls.
   B. Open your doors and windows.
   C. Use masks while cleaning ash and other volcanic materials.
   D. Always stay indoors until authorities say it is safe to go outside.

Additional Activities

Design an emergency preparedness plan for your family when volcanic eruption comes. Seek the help of your family members. Place your output on a separate paper.

Before the Eruption	During the Eruption	After the Eruption

Answer Key

Lesson 1: What To Do Before, During and After an Earthquake

What I Have Learned *(Answer on a separate sheet of paper)* **What I Can Do** *(Answer on a separate sheet of paper)* **Assessment** 1.A 2.A 3.C 4.A 5.B 6.A 7.C 8.B 9.B 10.D **Additional Activities** (Answer on a separate sheet of paper)	**What's New** Before 1. B 2. F 3. H 4.L During 1. A 2. D 3. E 4. J After 1. C 2. G 3. I 4. K **What's More** 1. Do 2. Don't 3. Don't 4. Do 5. Don't 6. Do 7. Don't 8. Don't 9. Do 10. Don't 11. Do 12. Do	**What I know** 1.A 2.A 3.A 4.A 5.C 6.C 7.A 8.D 9.B 10.D **What's In** 1. Yes 2. No 3. Yes 4. Yes 5. No

What's In

a. 4
b. 2
c. 1
d. 3

What's New

Before (C, F, H, J, L, M)
During (A, B, G, I, K)
After (D, E, N, O)

What's More

Activity 1

1. B
2. A
3. D
4. D
5. B
6. A
7. D
8. D
9. D
10. D

Activity 2

1. During
2. Before
3. During
4. After
5. Before
6. During
7. After
8. Before
9. During
10. After

What I Have Learned

(Answer on a separate sheet of paper)

What I Can Do

(Answer on a separate sheet of paper)

3 points

- Flashlight and extra batteries
- First aid kit and manual
- Emergency food and water
- Easy open canned goods
- Essential medicines
- Sturdy shoes
- Respiratory (breathing) protection e.g. masks
- Eye protection (goggles)
- Battery-powered radio
- Cellular phone

2 points

- Spare batteries
- Duct tape
- Rope/cord
- Toiletries
- Laminated Hotlines
- garbage bags
- Swiss Army Knife
- Documents (ID, insurance and bank books)
- Sleeping bag
- blanket
- Clothes
- Keys (car & house)
- Portable charger (power bank)

1point

- *Other items not mentioned above*

Assessment

1. A
2. C
3. B
4. A
5. D
6. B
7. D
8. D
9. C
10. B

Additional Activities

(Answer on a separate sheet of paper)

References

Ready. “Disasters and Emergencies: Volcanoes” Accessed April 22, 2021. https://www.ready.gov/volcanoes

Ready. “Disasters and Emergencies: Earthquakes” Accessed April 22, 2021. https://www.ready.gov/volcanoes

The American National Red Cross. “Volcano Preparedness” Accessed April 22, 2021. https://www.redcross.org/get-help/how-to-prepare-for-emergencies/types-of emergencies/volcano.html

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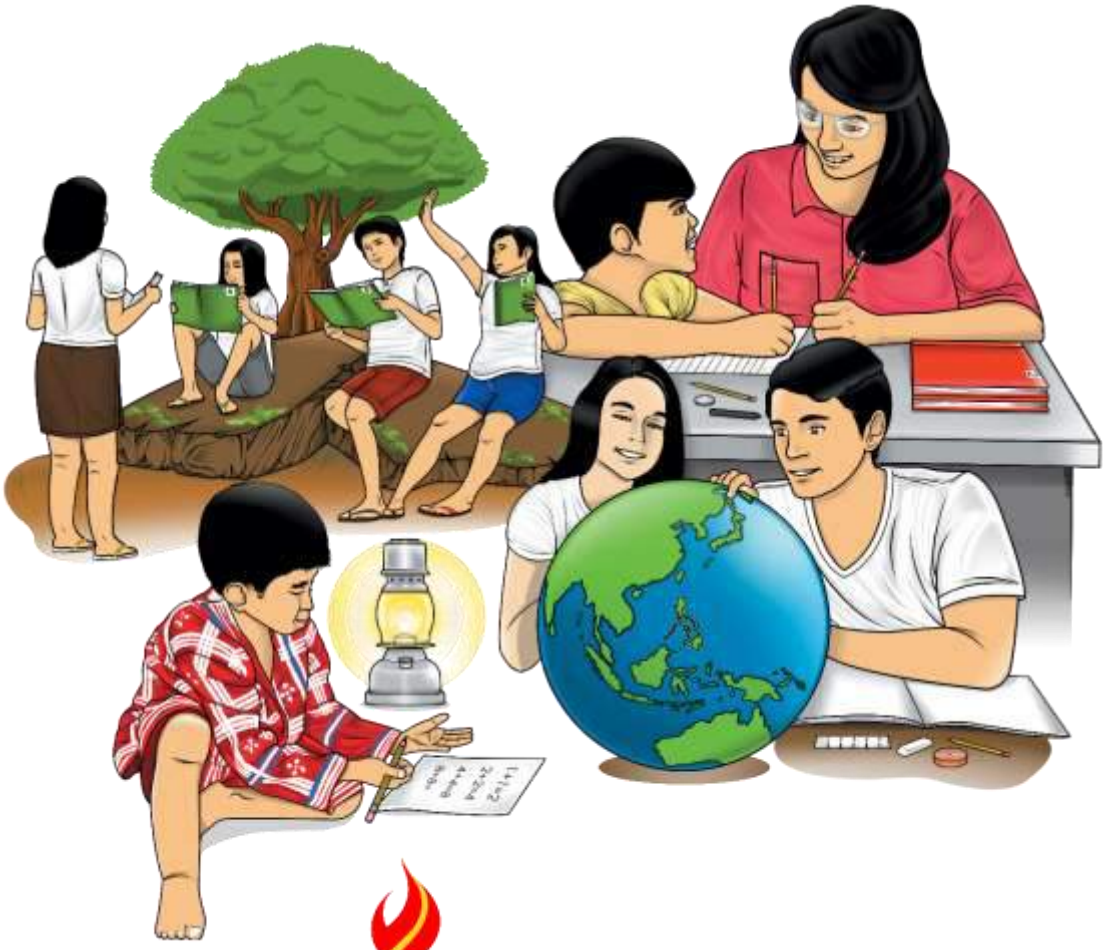
Science

Quarter 4 – Module 3:
Seasons in the Philippines



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ADM

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First Edition, 2020

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6

Science

Quarter 4 – Module 3:
Seasons in the Philippines

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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

Good day, young scientists! Here is a module that was designed and written with you in mind. Through this, you will learn about the seasons in the Philippines

After going through this module, you are expected to describe the different seasons in the Philippines **(S6ES-IV-c-3).**

What I Know

This part of the module will check what you already know about the seasons in the Philippines. Read, understand and answer the following questions. Then, write the letter of your answer on a separate sheet of paper.

1. The rain starts to fall frequently. Farmers begin to plant their crops. People prefer to wear thick clothes and eat warm foods. What season do these events indicate?

   A. spring season
   B. winter season
   C. dry season
   D. wet season

2. Which season is characterized by frequent rainfall?

   A. dry season
   B. wet season
   C. fall season
   D. winter season

3. Which is characterized by infrequent rainfall and warm temperature?

   A. wet season
   B. fall season
   C. dry season
   D. winter season

4. Which are the causes of seasons being experienced by people on certain parts of the Earth?

   A. the Earth's rotation and shape
   B. the Earth's revolution and tilt on its axis
   C. the Earth's rotation and gravity
   D. the continents and water bodies surrounding the place

5. This prevailing wind is warm and moist. It blows from the southwest portion of the country and brings moderate to heavy rains along the western section of the Philippines. What is it?

   A. Trade winds
   B. Hanging Amihan
   C. Hanging Habagat
   D. Northeast Monsoon

6. Which season takes place in the Philippines from December to May?

   A. dry season
   B. wet season
   C. cold season
   D. summer season

7. Which is also known as Hanging Amihan?

   A. Eastwest Monsoon
   B. Northeast Monsoon
   C. Southwest Monsoon
   D. Northsouth Monsoon

8. Which season in the Philippines is the best time for farmers to dry their crops?

   A. dry season
   B. wet season
   C. spring season
   D. autumn season

9. Which is influenced by the Northeast Monsoon?

   A. wet season
   B. dry season
   C. winter season
   D. summer season

10. Which can be experienced during wet season?

A. warm temperature
B. hot cloudless days
C. shortage of water supply
D. heavy rainfall and frequent typhoons

Lesson 1 Seasons in the Philippines

In the previous lessons, you have learned about weather and climate. Now, let's recall what they are.

Weather is the condition of the atmosphere at a particular place over a short period of time. It can change from hour to hour and from one day to another. It is influenced by several factors like temperature (degree of hotness and coldness of the atmosphere), humidity (moisture content of the atmosphere) and precipitation (amount of rain falling over a specific area). On the other hand, climate refers to the average weather pattern of a place over a long period of time (such as months and years).

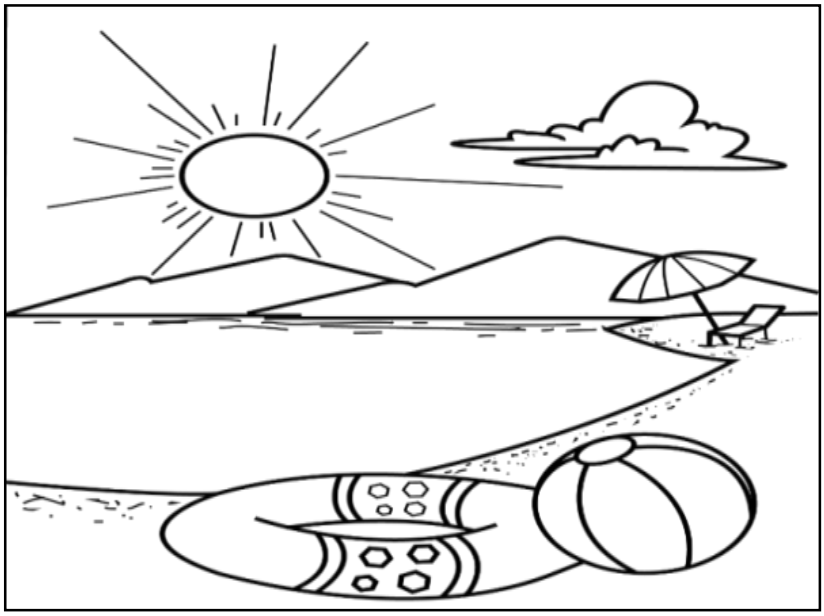
Weather and climate are different from season. Seasons such as summer, autumn, winter, and spring occur in some parts of the Earth. In the Philippines, we only have two seasons, namely, wet season and dry season. In this module, you will learn more about the Philippine seasons and their effects on human activities.

What's In

Directions: Identify the type of weather shown in each picture. Choose your answer from the box. Write your answers on a separate sheet of paper.

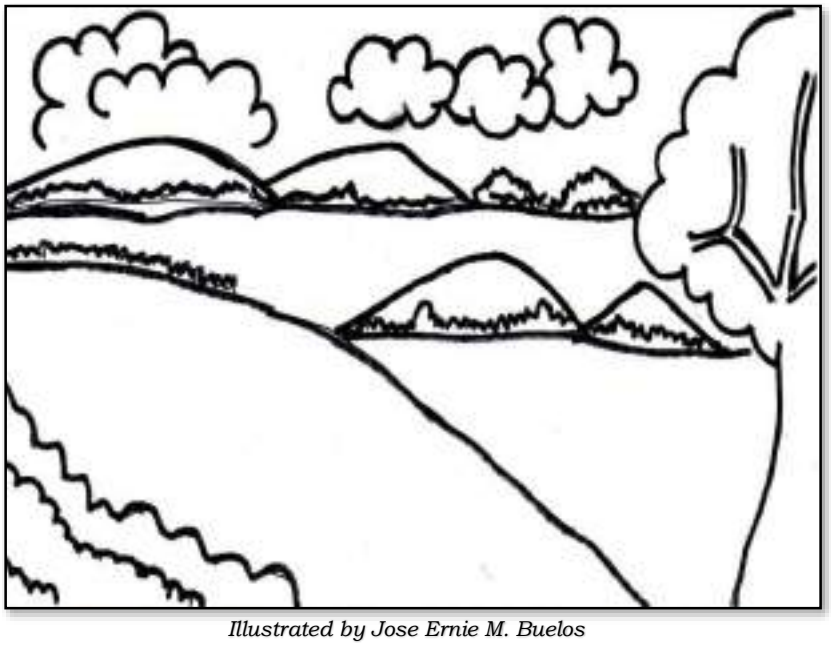
cloudy day	sunny day	rainy day
windy day	stormy day	

1



Illustrated by Jose Ernie M. Buelos

2



Illustrated by Jose Ernie M. Buelos

3

Illustrated by Jose Ernie M. Buelos

4

Illustrated by Jose Ernie M. Buelos

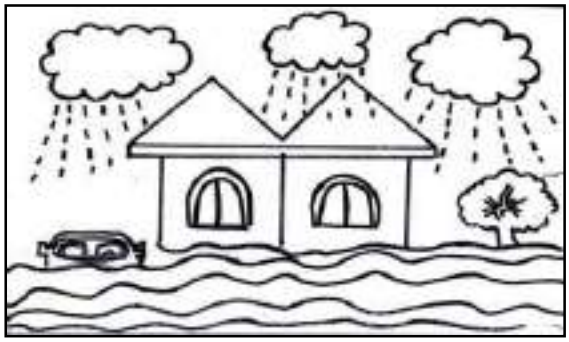
5

Illustrated by Jose Ernie M. Buelos

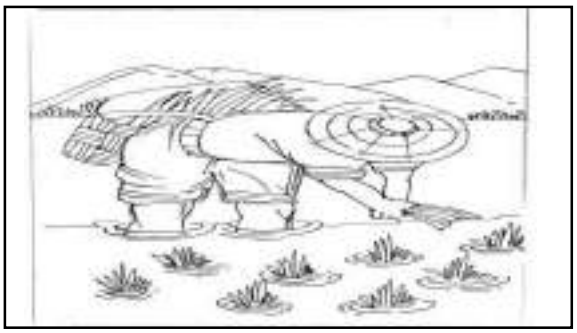
What's New

The Philippines has wet and dry season. Each season has unique characteristics and effects on the environment and people. Can you identify them? Do the activity below.

Study each picture below. Determine if it hints of wet season or dry season. Write "Wet Season" or "Dry Season" for each item on a separate sheet of paper.

1.  _____

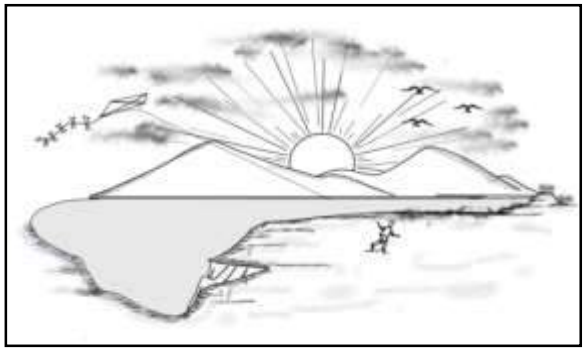
2.  _____

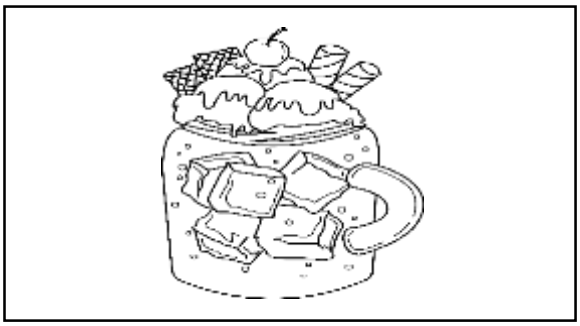
3.  _____

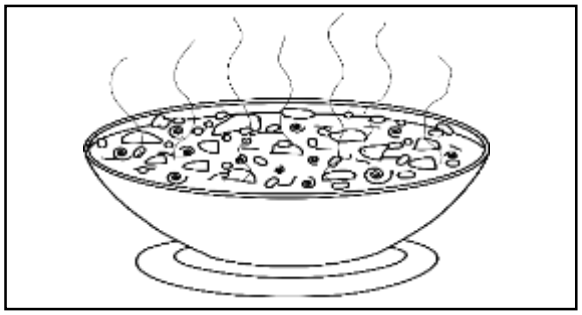
Illustrated by Jose Ernie M. Buelos

4.  _____

5.  _____

6.  _____

7.  _____

8.  _____

Illustrated by Jose Ernie M. Buelos

Guide Question:

Based on the activity, how will you describe wet season and dry season?

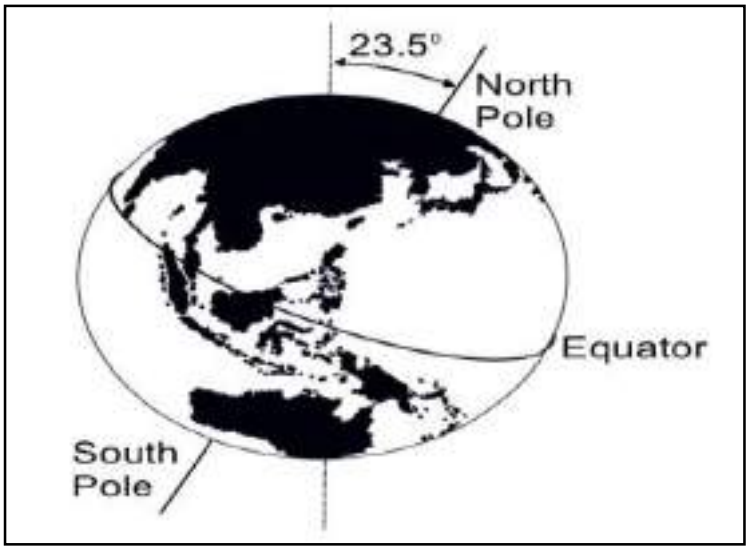
_____

_____

_____

What is It

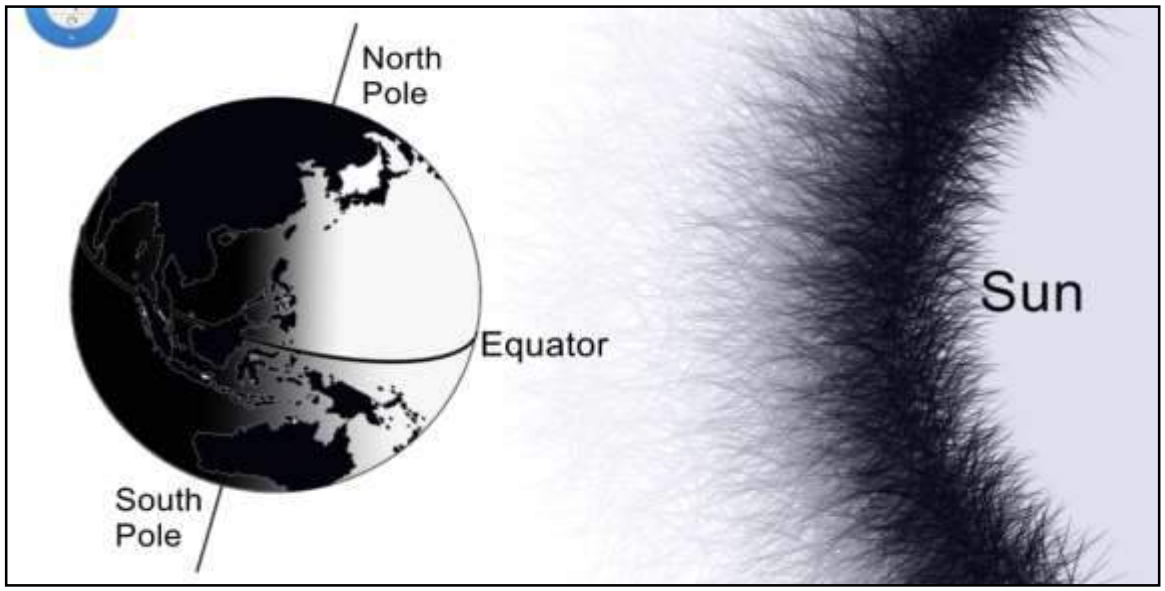
The Earth's axis is tilted 23.5 degrees. This means that the Earth does not stand up straight as it rotates on its axis and revolves around the sun. Instead, it leans over a bit.



Illustrated by Jose Ernie M. Buelos

The Earth's Tilted Axis

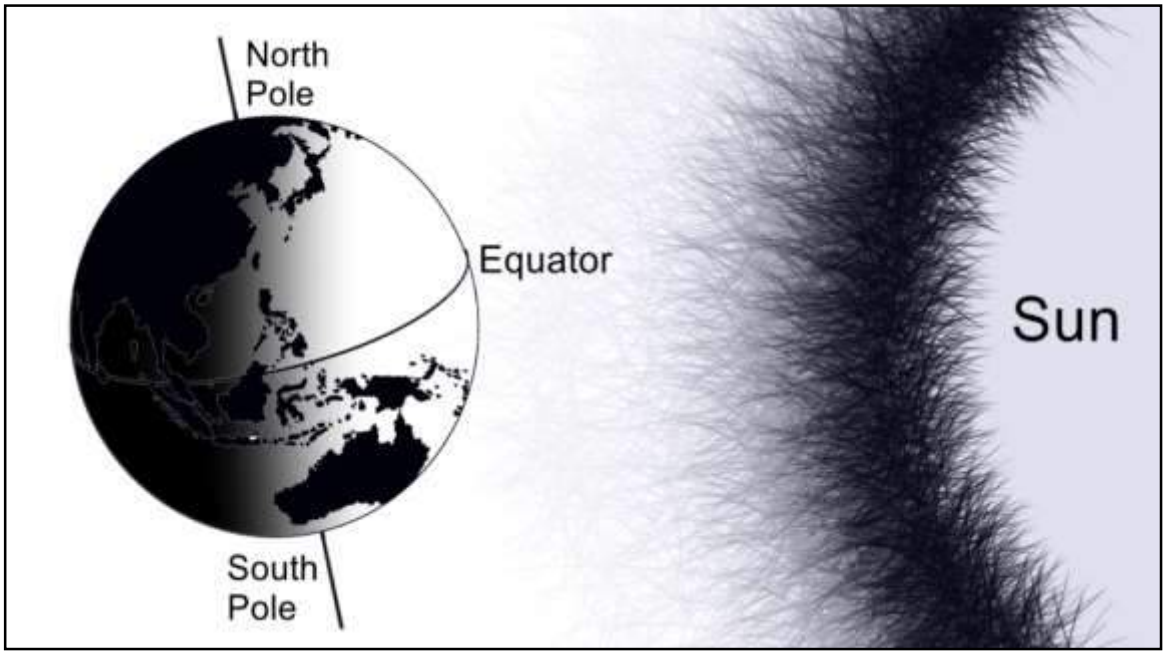
As the Earth revolves around the sun, some areas of the planet experience various changes. These may include changes in temperature, length of day and night, and amount of precipitation (such as rain and snow) For example, when the North Pole tilts towards the sun, it is summer season in most parts of the Northern Hemisphere. During this time, the Northern Hemisphere receives the most direct sunlight and experiences little to no precipitation (rain or snow) at all. Daytime is longer than nighttime.



Illustrated by Jose Ernie M. Buelos

Summer in the Northern Hemisphere

On the other hand, when the North Pole tilts away from the sun, it is winter season in most parts of the Northern Hemisphere. During this time, the Northern Hemisphere receives less direct sunlight and experiences frequent precipitation (rain or snow). Nighttime is longer than daytime. The seasons in the Northern Hemisphere are the opposite of those in the Southern Hemisphere.



Illustrated by Jose Ernie M. Buelos

Winter in the Northern Hemisphere

The examples above tell us that seasons are periods of the year characterized by particular weather patterns and daylight hours. Seasons follow one regular pattern within a year. The earth's tilted axis and revolution around the sun are the causes of the seasons experienced by people in certain parts of the planet. Unlike the places mentioned above, the Philippines has two seasons only, namely, wet season and dry season. This is due to the fact that the Earth's tilted axis does not affect the amount of direct sunlight it receives from the sun.

The seasons in the country are caused by its location on the equator and prevailing winds. Since the Philippines is located just right above the equator, it receives direct heat from the sun throughout the year. This is the reason why we experience relatively high temperature, high humidity and abundant rainfall year-round. The sun's heat also speeds up the evaporation process in surrounding water bodies. This results to infrequent to frequent rainfall all throughout the country.

The Northeast Monsoon and Southwest Monsoon also contribute to the seasons in the Philippines. These prevailing winds blow consistently in specific direction and period over particular areas in the country.

The wet or rainy season takes place from June to November. This is characterized by frequent rainfall, which may bring flood to the lowlands. Typhoons often hit the country during this season. Since the **Southwest Monsoon** or **Hanging Habagat** brings warm and moist air, rains become heavier and typhoons get stronger during the wet season. Hanging Habagat blows from the southwest portion of the country and causes rains in the western portion of the country.

Illustrated by Jose Ernie M. Buelos

Southwest Monsoon (Hanging Habagat)

The wet season affects the activities of people. Farmers plant their crops during this season because the abundance of rainwater makes their crops grow quickly. People prefer to serve and eat warm foods as well as wear thick and long-sleeved clothes. During the wet season, people do most of their activities indoors. When going outdoors, they usually bring umbrellas and raincoats.

Illustrated by Jose Ernie M. Buelos

Activities during Wet Season

The dry season takes place during the months of December to May. This is characterized by less and infrequent rainfall as well as dusty soil. During this season, some of the crops die due to insufficient supply of water. The dry season is influenced by the Northeast Monsoon or Hanging Amihan that brings cool and dry air. Hanging Amihan blows from the northeast portion of the country and causes slight to moderate rainfall in the eastern portion of the country.

Illustrated by Jose Ernie M. Buelos

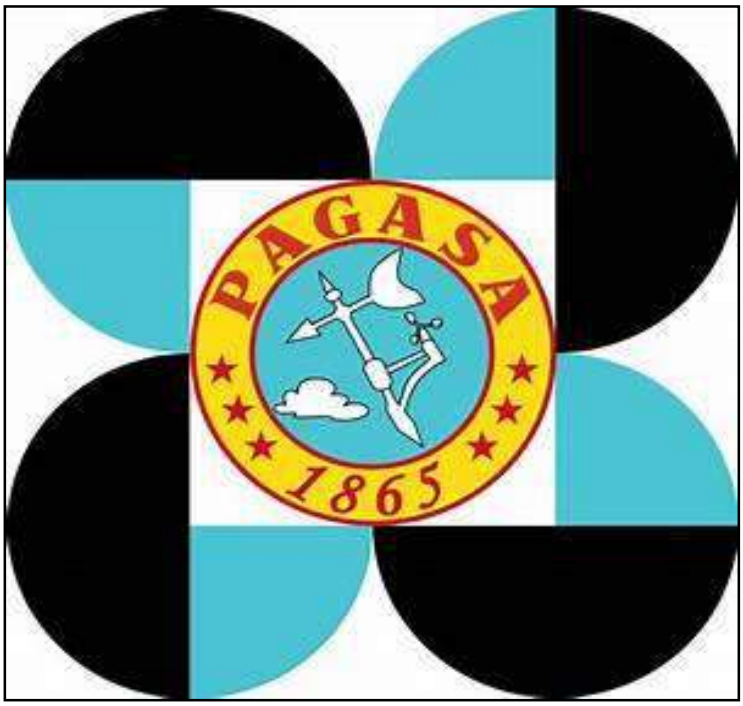
Northeast Monsoon (Hanging Amihan)

The dry season is the best time for swimming, flying kites, and biking. Drying of crops under the sun is usually done during this time. People wear loose and thin light-colored clothes as well as shorts to feel comfortable during hot days. Cold foods and beverages like halo-halo, ice cream, and fruit shakes are usually served during this season.

Illustrated by Jose Ernie M. Buelos

Activities during Dry Season

The change of seasons in the country is studied and monitored by the Philippine Atmospheric, Geophysical and Astronomical Services Administration or PAGASA. This government agency likewise monitors and informs the public about weather disturbances.



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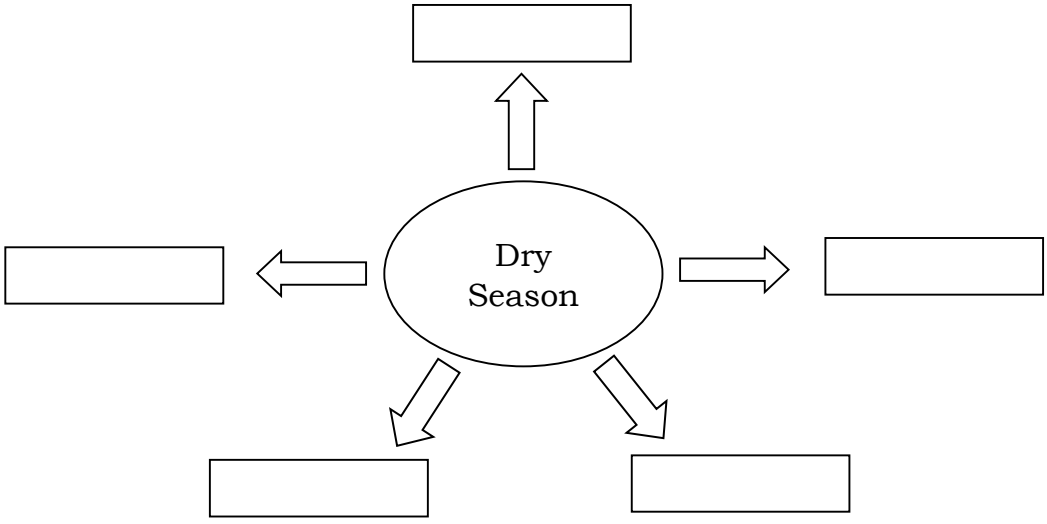
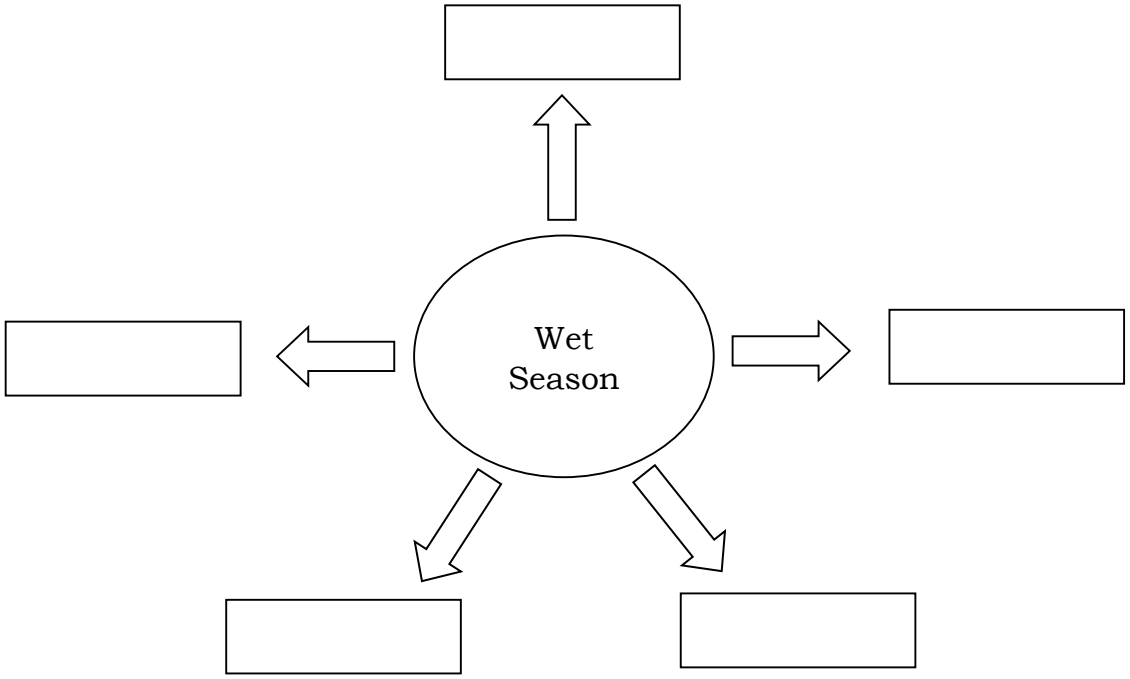
What's More

Draw the following diagrams on a separate sheet of paper. Fill each box with a phrase that relates to the given season. Choose your answers from the box below.





water shortage
heavy rains
flooding
very hot days
cold foods
warm foods
planting of crops
drying of crops
frequent typhoons
cloudless days

What I Have Learned

Complete the sentences by supplying the missing words on the blanks. Choose your answers from the table. Write your answers on a separate sheet of paper.

seasons	wet season	dry season	flood	PAGASA
prevailing winds	Hanging Amihan	Hanging Habagat	location on the equator	water shortage

1. The season in the Philippines that takes place during the months of December to May and is characterized by less rainfall is called _____.

2. The seasons in the Philippines are caused by its _____ and _____.

3. The prevailing wind that blows from the northeast portion of the country and causes slight to moderate rainfall in the eastern regions is called _____.

4. Less and infrequent rainfall during dry season leads to _____ that harms the animals and plants.

5. The prevailing wind that blows from the southwest portion of the country and causes heavy rainfall in the western regions is called _____.

6. The season in the Philippines that takes place during the months June to November and is characterized by frequent rainfall is called _____.

7. Frequent and heavy rainfall during wet season sometimes results to _____.

What I Can Do

On a separate sheet of paper, copy the table shown below. Then, draw your favorite activity during each season. Below the drawing, describe your favorite activity in three sentences.

Wet Season	**Dry Season**

Assessment

Read, understand and answer the following questions. Then, write the letter of your answer on a separate sheet of paper.

1. Which season takes place in the Philippines during the months of June to November?

   A. dry season
   B. wet season
   C. cold season
   D. summer season

2. Which is also known as Hanging Amihan?

   A. Eastwest Monsoon
   B. Northeast Monsoon
   C. Southwest Monsoon
   D. Northsouth Monsoon

3. Which season is characterized by heavy rain and typhoons?

   A. dry season
   B. wet season
   C. autumn season
   D. summer season

4. Which is influenced by the Northeast Monsoon or Hanging Amihan?

   A. dry season
   B. wet season
   C. winter season
   D. summer season

5. The Philippines experiences two seasons only because it is located near the _____.

   A. equator
   B. North Pole
   C. South Pole
   D. temperate Region

6. When is the best season for farmers to start planting their crops?

   A. winter season
   B. spring season
   C. dry season
   D. wet season

7. Which season is characterized by frequent rainfall?

   A. Fall season
   B. Dry Season
   C. Wet Season
   D. Winter Season

8. Which season in the Philippines is characterized by infrequent rainfall and water shortage?
   A. Fall season
   B. Dry Season
   C. Wet Season
   D. Winter Season

9. Which causes the seasons experienced in the Philippines?

   A. people living in the country
   B. oceans that surround the Philippines
   C. continents near the Philippines
   D. location of the Philippines near the equator

10. Which brings warm and moist in the country that makes rains heavier and typhoons stronger?

   A. Cold fronts
   B. Trade winds
   C. Northeast Monsoon
   D. Southwest Monsoon

Additional Activities

A sudden change of season can bring ailments or harm to the body. On a separate sheet of pad paper, copy the table below. Put a check mark (✓) on the second column if the activity prevents ailments or harm to the body and cross mark (X) if it does not.

Activities	**Answer**
1. Drinking enough amount of water	
2. Eating nutritious foods	
3. Bathing under the rain	
4. Sleeping for eight hours a day	
5. Soaking the feet in flood water	
6. Using umbrella when going outdoors on sunny or rainy days	
7. Covering the nose when sneezing	
8. Swimming in the dirty water	
9. Taking a bath every day	
10. Applying sunblock or sunscreen on the skin before going outdoors	

Answer Key

What I Know

1. D
2. B
3. C
4. B
5. C
6. A
7. B
8. A
9. B
10. D

What's In

1. Sunny day
2. Cloudy day
3. Rainy day
4. Windy day
5. Stormy day

What's New

1. Wet season
2. Dry season
3. Wet season
4. Wet season
5. Dry season
6. Dry season
7. Dry season
8. Wet season

Guide Question:

Wet Season is characterized by frequent rainfall and flooding. Activities are done indoor. Planting of food crops are done during this season. Preferred food is warm. However, dry season is characterized by infrequent rainfall. Activities can be done outdoor. Harvesting and drying crops are done during this season. Preferred food is cold.

What's More

Dry Season

1. water shortage
2. very hot days
3. cold foods
4. drying of crops
5. cloudless days

Wet Season

1. heavy rains
2. flooding
3. warm foods
4. planting of crops
5. frequent typhoons

What I have Learned

1. dry season
2. location on the equator and prevailing winds
3. Hanging Amihan
4. water shortage
5. Hanging Habagat
6. wet season
7. flooding

What I Can Do

(*Answers will vary*)

Assessment

1. B
2. B
3. B
4. A
5. A
6. D
7. C
8. B
9. D
10. D

Additional Activities

1. /
2. /
3. X
4. /
5. X
6. /
7. /
8. X
9. /
10. /

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Lozada, B. and Mendoza, A. (2011) *Science for Daily Use 4.* Marikina City: JICA Enterprises.

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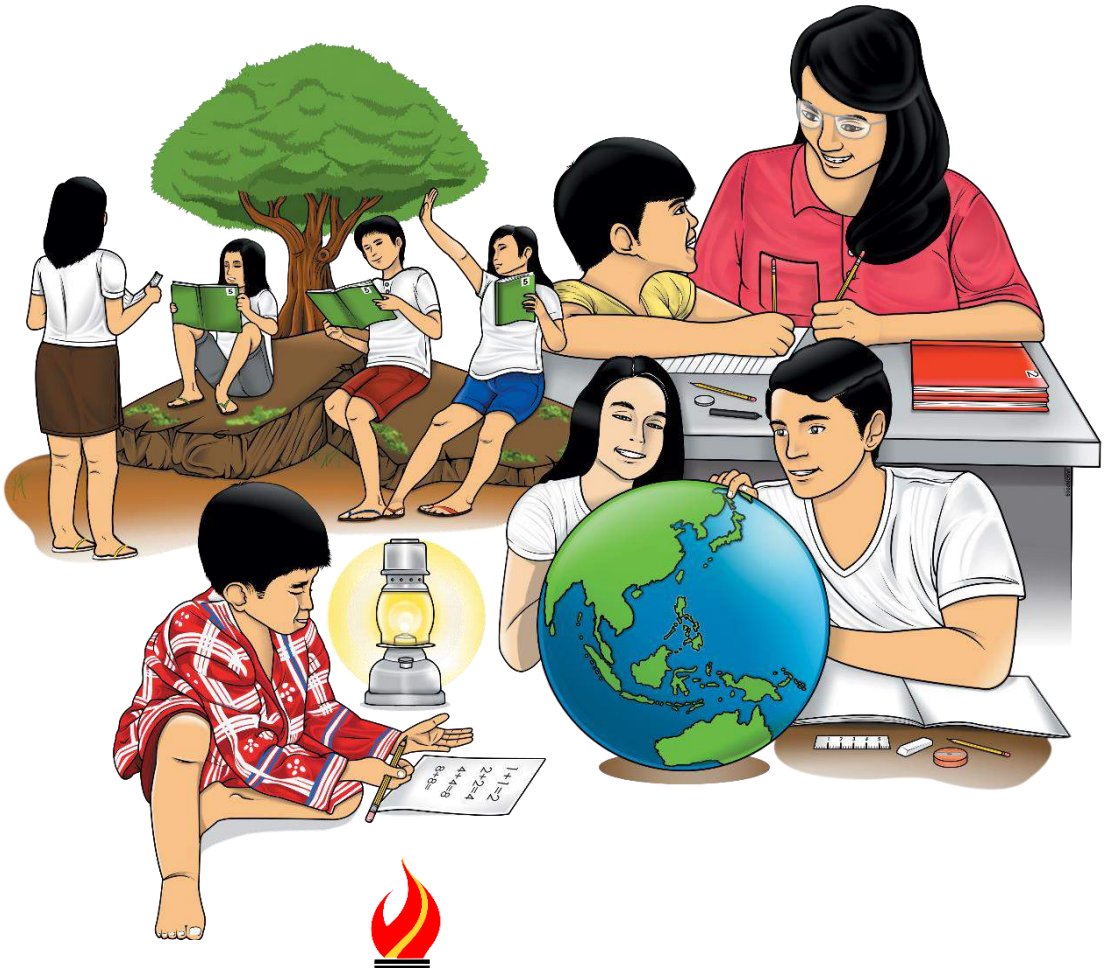
Science

Quarter 4 – Module 4: Appropriate Activities for Specific Seasons in the Philippines



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6

Science

Quarter 4 – Module 4: Appropriate Activities for Specific Season in the Philippines

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Introductory Message

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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 was designed and written with you in mind. It is here to help you discuss appropriate activities for specific seasons in the Philippines **(S6ES-IVd-4)**. 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.

After going through this module, you are expected to:

1. list down specific activities for wet and dry season;
2. discuss appropriate activities for specific seasons in the Philippines; and
3. show appreciation of the importance of knowing the appropriate activities for specific seasons.

What I Know

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

1. What are the two seasons in the Philippines?
   - A. dry and wet
   - B. warm and dry
   - C. cold and warm
   - D. humid and warm
2. How do people dress up during the summer?
   - A. People wear boots.
   - B. People wear coats and jackets.
   - C. People use warmers and sweatshirts.
   - D. People wear light and bright colored shirts.

3. The activity that can be done best during summer is to
    A. flying kites
    B. watching TV
    C. reading books
    D. playing board games
4. Which activity is **NOT** appropriate to do during the dry season?
    A. going on picnics
    B. playing at the park
    C. swimming at the beach
    D. wearing coats and jackets
5. Which activity is appropriate for dry season?
    A. swimming
    B. staying indoor
    C. playing in the rain
    D. planting vegetables
6. Which season is the most appropriate to fly kites?
    A. cold season
    B. dry season
    C. wet season
    D. warm season
7. Which activity is **NOT** appropriate to do in a wet season?
    A. drying fish
    B. swimming
    C. staying indoors
    D. going out for a walk
8. When is the most appropriate time to fix damaged ceilings at home?
    A. wet season
    B. dry season
    C. warm season
    D. warm season
9. Which of the following materials is best to bring the whole year through?
    A. jacket
    B. shades
    C. umbrella
    D. wide hat
10. The following foods are best to eat during rainy season **EXCEPT** _____.
    A. lomi
    B. halo-halo
    C. hot coffee
    D. chicken noodle soup

Lesson 1 Appropriate Activities for Specific Seasons of the Philippines

The seasons affect many aspects of our lives: from the food that we eat to the clothes that we wear, the things that we do, and the things that we see around us. There are four different seasons in the world: winter, spring, summer, and autumn. But in the Philippines, we only have two seasons - the dry and the wet seasons.

DRY SEASON

WET SEASON

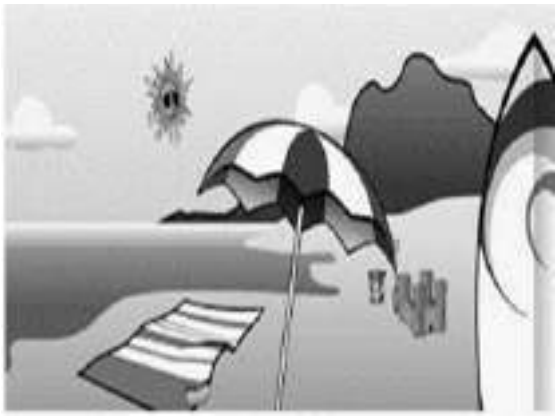
Photo Credit to Dante G. Arriola II and Juvy Weld

What's In

Activity: Seasons in the Philippines

Identify whether the picture shows wet or dry season. Write the answer on your answer sheet.

A



B

Illustrated by Ryan Oliver S. Arellano, Orencio D. Estrera and Mary Grace Prologo

C

D

Illustrated by Ryan Oliver S. Arellano

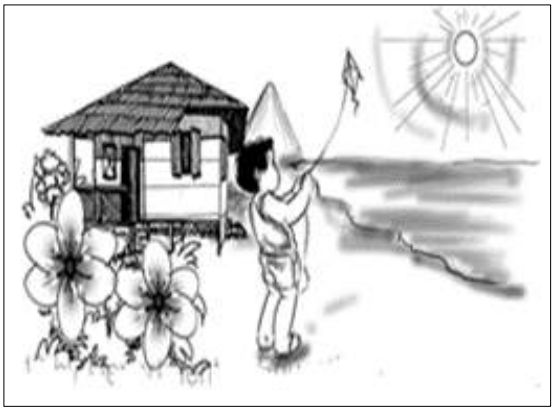
E

F

What's New

Activity: Wet or Dry

Human activities are affected by the seasons. The clothes that we wear as well as the food that we eat also depend on the seasons. In this activity, you are to classify the pictures of the different activities for specific seasons in the Philippines. Write the word wet or dry on your answer sheet.



1. Flying a kite

Illustrated by Orencio D. Estrera

2. Island hopping

Photo Credit to Dante G. Arriola II

3. Building a sand castle

4. Playing in the rain

5. Harvesting grains

6. Plowing the land

7. Sun bathing

8. Mural painting

Illustrated by Ryan Oliver S. Arellano, Michael H. Leoncio, and Ramona I. Mangahas
Photo Credit to Dante G. Arriola

9. Watering the plants

10. Selling ice candy

11. House construction

12. Camping

Illustrated by Ryan Oliver S. Arellano, Psyche Amor L. Distor and Joan S. Honoridez

Photo Credit to Dante G. Arriola II

What is It

Changes in the seasons affect the things we do everyday. These changes in seasons influence our daily activities. For example, there are fruit-bearing trees and vegetables which are seasonal. There are foods which are best to eat in summer but not during rainy days.

During dry season or summertime, people wear light and bright colored clothes like sandos, t-shirts, and shorts for them to feel cool. They like to eat ice cream and cold drinks to quench their thirst and feel cool. There are also tropical flowers, vegetables, and fruits that grow best in this season. It is also an opportunity for farmers to harvest crops, the best time to go to the beach to freshen up, and do ideal outdoor activities such as playing volleyball and basketball.

During the rainy season, people wear coats and jackets to make themselves warm, and when they go out, they use raincoats and umbrellas in order not to get wet. They love to eat hot soup and drink chocolate or coffee. In farming, there are crops best planted during wet or rainy season like rice grains, corn, and wheat. However, this season is also the onset of diseases such as dengue fever, diarrhea. Cough and colds are common at this time. Cleaning the surroundings, especially the breeding places of mosquitoes, is a very important activity during this season.

What's More

Activity: Wet and Dry Season

Study the following pictures. Identify whether the following activities are appropriate for the dry or wet season. Write W if it is for wet Season and D for dry season in your answer sheet.

1. ☐ The farmers are threshing the rice stalk.

2. ☐ The farmer is planting rice.

3. ☐ The family is having a picnic.

4. ☐ The girl is eating halo-halo.

5. ☐ The children are eating ice cream.

6. ☐ The fisherman dries the fish.

Illustrated by Ryan Oliver S. Arellano, Psyche Amor L. Distor and Ramona I. Mangahas

What I Have Learned

The Philippines has two seasons: wet and dry. The activities that we do, the food that we eat, and the clothes that we wear are affected by these seasons.

I learned that the following activities are appropriate for:

WET SEASON	**DRY SEASON**
1.	1.
2.	2.
3.	3.
4.	4.

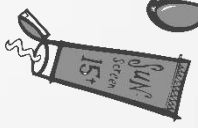
What I Can Do

Choose from the words below to complete the following sentences.

1. When it is sunny day, I use _____ for skin protection.
2. When it is raining, I use my _____ to protect my feet from flood.
3. When I go to the beach, I use _____ to protect my eyes.
4. It is best to harvest the rice field during _____.
5. It is best to stay indoor when there is _____.

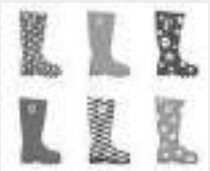

dry season


sun glasses



sun screen lotion


heavy rain


boots

Modified from http://canva.com

Assessment

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

1. How do people dress up during the summer?

   A. People wear boots.
   B. People wear a coat and jacket.
   C. People use warmers and sweat shirts.
   D. People wear light and bright colored shirts.

2. The following activities can be done during the rainy season **EXCEPT** _____.

   A. flying kites
   B. watching TV
   C. reading books
   D. aerobic dancing

3. Which season is the most appropriate time for farmers to prepare their land for planting rice?

   A. cold season
   B. dry season
   C. wet season
   D. warm-season

4. When is the most appropriate time to go on a family outing?

   A. wet season
   B. dry season
   C. cold season
   D. warm-season

5. When do typhoons usually visit our country?

   A. wet season
   B. dry season
   C. cold season
   D. warm-season

6. What are the two seasons in the Philippines?

A. dry and wet
B. warm and dry
C. cold and dry
D. humid and warm

7. Which food is best to eat during summer?

A. lomi
B. halo-halo
C. hot coffee
D. chicken soup

8. Which is the most appropriate thing to do on a dry season?

A. drink much water
B. wear thick clothes
C. stay longer under the sun
D. do not put sunblock while playing at the beach

9. Which activity is suitable to do in a wet season?

A. swimming
B. drying fish
C. staying indoors
D. taking your pet dog for a walk

10. Which of the following materials is appropriate to bring regardless of the season?

A. shades
B. wide hat
C. umbrella
D. thick clothes

Additional Activities

Draw or cut-out and paste a picture of a specific activity for wet and dry season. You may use another sheet of paper. Explain why that activity is appropriate in that particular season.

WET SEASON	**DRY SEASON**

Answer Key

What I Know	**What's New**	**What I have Learned**
1. A	1. Dry	(Answer on a separate sheet of paper)
2. D	2. Dry	
3. A	3. Dry	**What I Can Do**
4. D	4. Wet	1. Sun screen
5. A	5. Dry	2. Boots
6. B	6. Wet	3. Sun glasses
7. A	7. Dry	4. Dry season
8. B	8. Dry	5. Heavy rain
9. C	9. Dry	
10. B	10. Dry	**Assessment**
	11. Dry	1. D
	12. Dry	2. A
What's In	**What's More**	3. C
A. Wet	1. D	4. B
B. Dry	2. W	5. A
C. Dry	3. D	6. A
D. Wet	4. D	7. B
E. Wet		
F. Dry	5. D	8. A
	6. D	9. C
		10. C
		Additional Activities
		(Answer on a separate sheet of paper)

References

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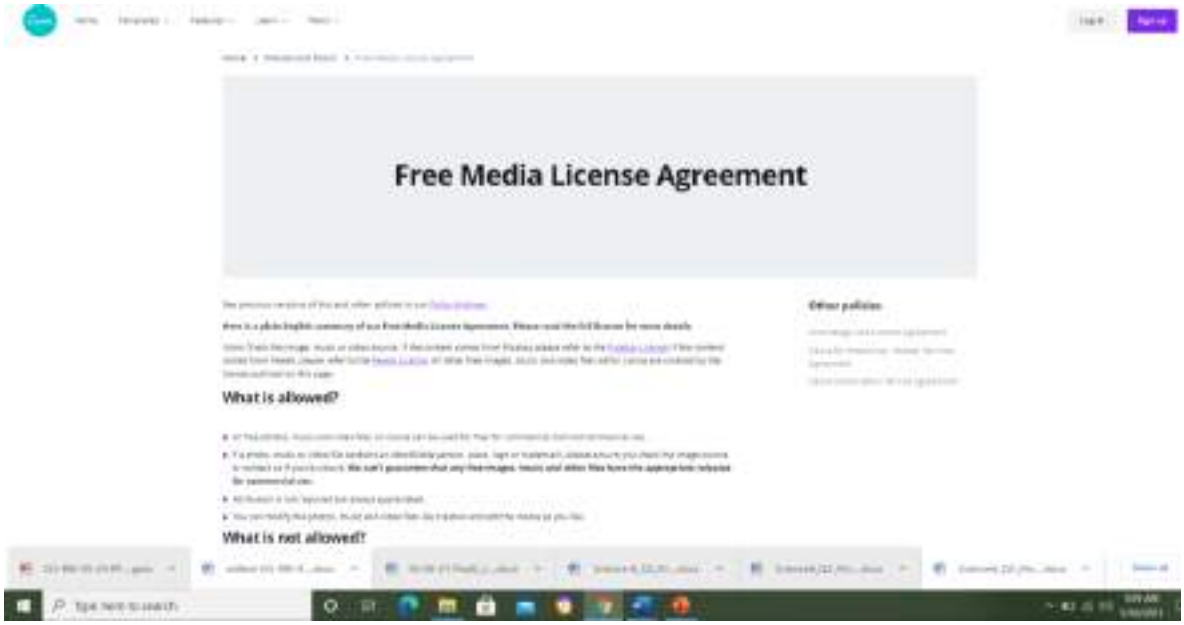

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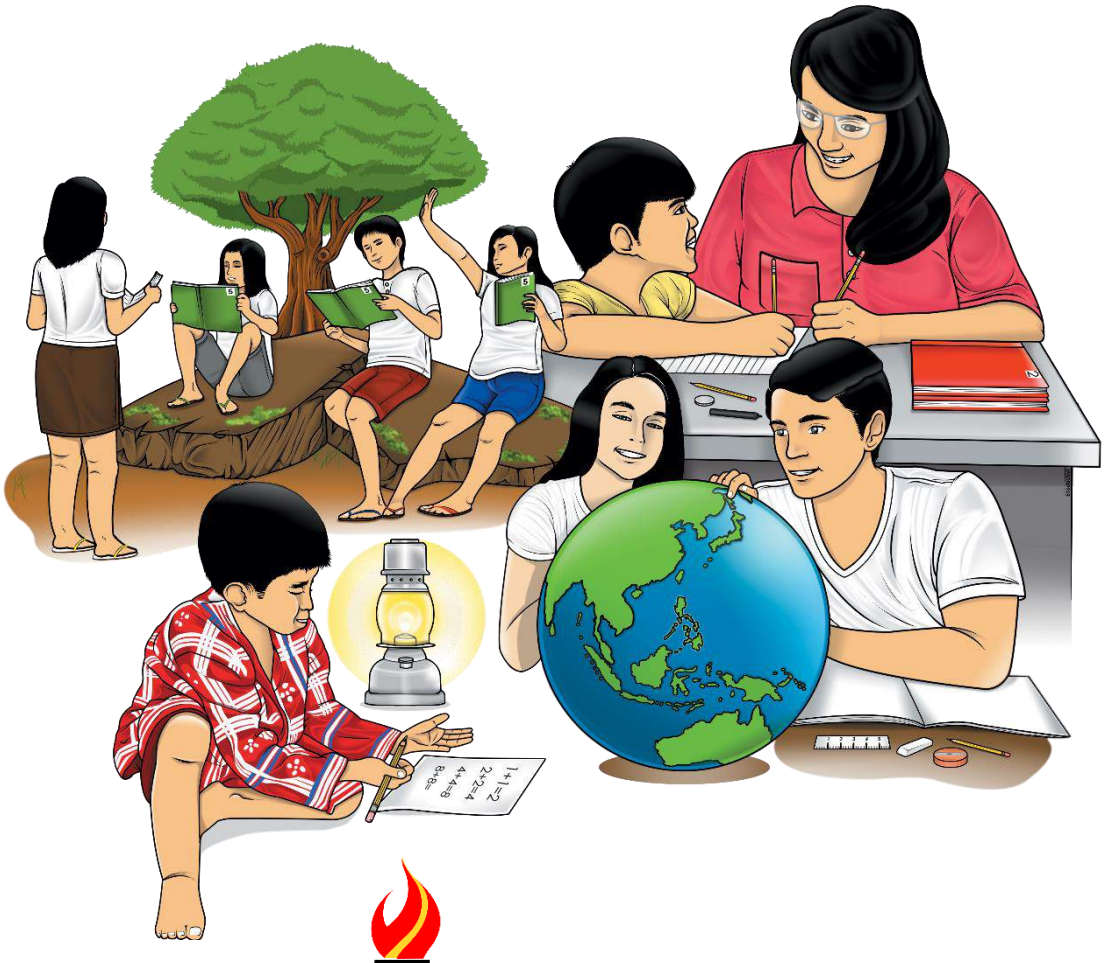
Quarter 4 – Module 5:
Movements of the Earth



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6

Science

Quarter 4 – Module 5:
Movements of the Earth

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Thank you.

What I Need to Know

This module was designed and written with you in mind. It is here to help you differentiate between rotation and revolution and describe the effects of the Earth's motions (**S6ESIVe-f-5**). 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.

This module focused on the following lessons:

- **Lesson 1** – The Earth's Rotation
- **Lesson 2** – The Earth's Revolution

After going through this module, you are expected to:

1. describe the Earth's movement on its axis and orbit;
2. explain how day and night happen as the Earth rotates on its axis;
3. using a globe, demonstrate how the Earth rotates on its axis;
4. demonstrate how the Earth revolves around the sun; and
5. appreciate the importance of the Earth's movements.

What I Know

Directions: Read the questions carefully and choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

1. Which of the following is the effect of the Earth's tilt and revolution?
   A. movement of wind
   B. occurrence of tides
   C. occurrence of seasons
   D. movement of water in seas

2. Which of the following statements is true?
   A. The Earth rotates on its axis once every 12 hours.
   B. The Earth rotates on its axis once every 24 hours.
   C. The Earth rotates on its axis once every 365 hours.
   D. The Earth rotates on its axis once every 365 days.

3. Which of these is the pathway of the Earth around the sun?
   A. Axis
   B. Orbit
   C. Ring
   D. Space

4. Which statement about the Earth is **false**?
   A. The Earth spins on its axis.
   B. The Earth revolves around the sun.
   C. The sun revolves around the Earth.
   D. The Earth travels on its orbit around the sun.

5. How many days would it take for the Earth to complete one revolution?
   A. 7 days
   B. 30 days
   C. 188 days
   D. 365 ¼ days

6. Which of these is the imaginary line where the Earth spins to complete one day?
   A. Axis
   B. Orbit
   C. Poles
   D. Latitude

7. Which of the following refers to the spinning movement of the Earth on its axis?
   A. Tilting
   B. Sliding
   C. Rotation
   D. Revolution

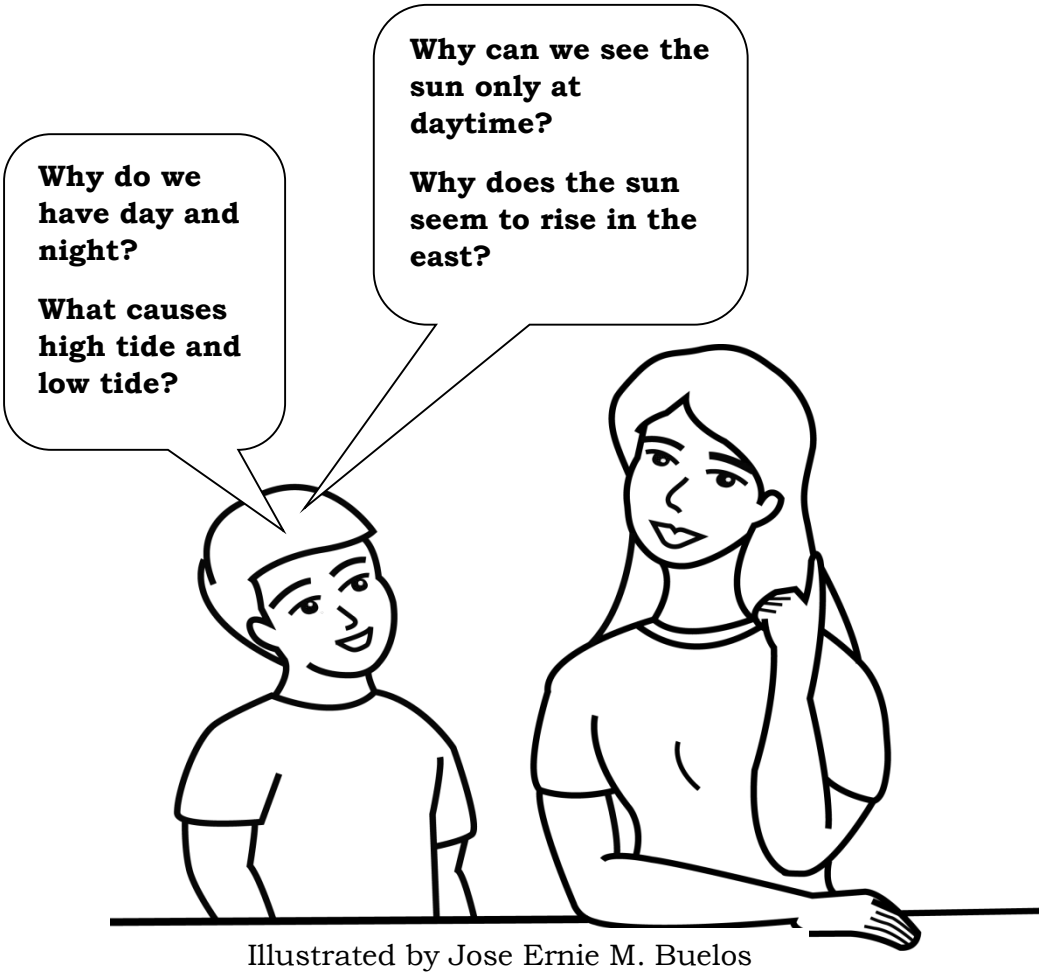
8. Which statement is **true** about the Earth's movement?
   A. Revolution causes day and night.
   B. The Earth rotates in a counterclockwise direction.
   C. Seasonal changes are effects of the Earth's rotation.
   D. Movement of water in the seas and oceans is an effect of the Earth's revolution.

9. Which statement is **false** about the Earth's orbit?
   A. Earth's orbit is slanted 23.5 degrees.
   B. An orbit is a circular path around the sun.
   C. An orbit is an imaginary route of the Earth around the sun.
   D. As the Earth spins on its axis, it also travels around its orbit.

10. Which of the following occur due to the rotation of the Earth on its axis?
   A. All parts of the Earth experience daytime
   B. All parts of the Earth experience nighttime.
   C. Part of the Earth facing the sun experience daytime while the part facing away experience nighttime.
   D. Part of the Earth facing the sun experience nighttime while the part facing away experience daytime.

Lesson 1 The Earth's Rotation

We are very curious about the things around us. We tend to ask how things exist and how they work. Look at the picture below.



Illustrated by Jose Ernie M. Buelos

Have you ever asked your parents similar questions? How did they answer?

The questions above are examples of what we commonly ask our parents as young kids. Seasonal changes and the occurrence of day and night are things we experience that may need to be explained to some. This module will be the key to answering these questions. This will focus on the Earth's movements—rotation and revolution.

What's In

Directions: Answer the following riddles. Select your answer in the box below. Write your answer on a separate sheet of paper.

1. I am the king of the solar system. I have my eight slaves that surround and never leave me. I share to them my heat and light. What am I?
2. I am a straight imaginary line. The Earth spins on me. What am I?
3. I am a circular path. I guide the Earth as it travels around the sun. What am I?
4. I am the third daughter of the sun. Among my siblings, I am the only one with life. I have plants and animals on me, and I am surrounded by many blue seas.
5. I look like your planet but I am small. What am I?

axis	Earth	globe	moon	orbit	sky	sun

What's New

Do you believe that the Earth is moving? How do you know that the Earth is moving? When the position of the stars, the sun and the moon that you observe from Earth changes, you will know that it is moving. Do activity 1 to see another evidence of the movement of the Earth.

Activity 1: The Spinning Earth

Objectives: At the end of this activity, I will be able to:

1. demonstrate how the Earth rotates on its axis using a globe, and
2. explain how day and night happen as the Earth rotates on its axis.

Materials: globe/ball, flashlight

Directions:

- Find a dark room.
- Ask the help of your parents or adult companion at home to turn on a flashlight and point it directly towards the globe or ball.
- Slowly turn the globe, ball or any round objects in a counterclockwise (West to East) movement.
- **Caution:** Do not play with the flashlight. Do not point the light directly to the eyes of your companion.
- The illustration below shows how you will do the activity.
- Answer the questions that follow.

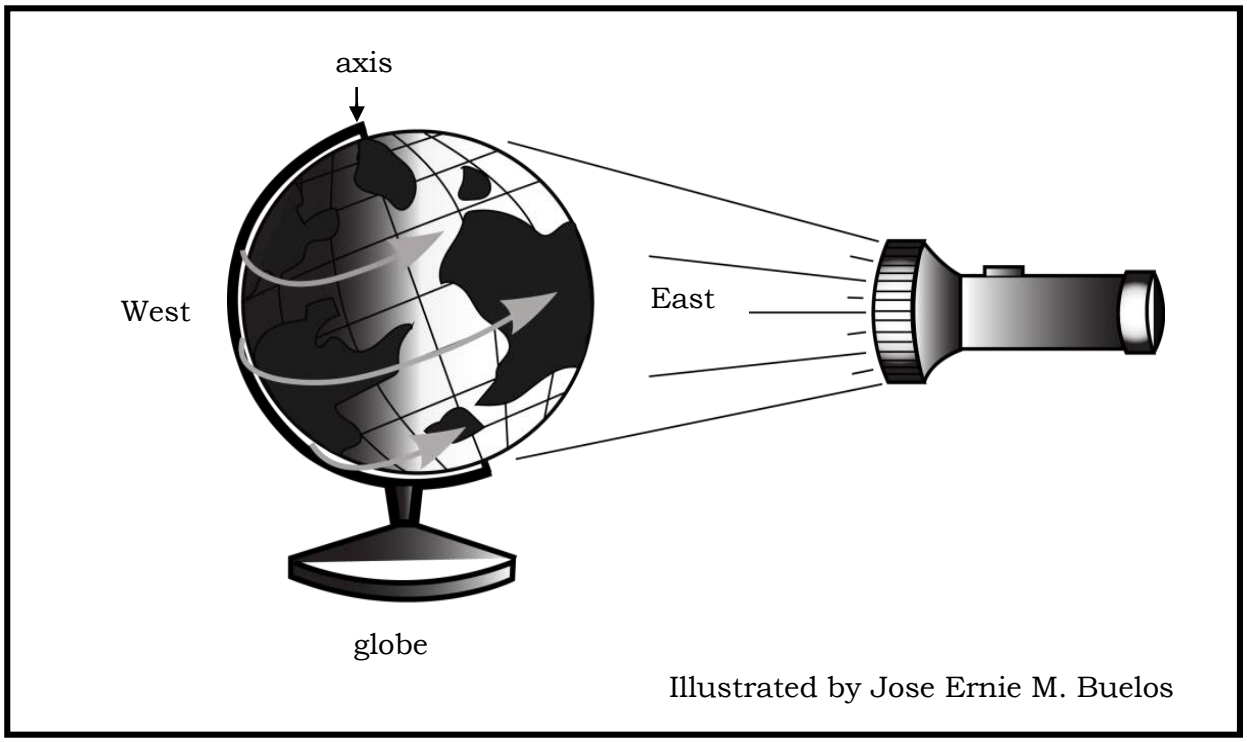


Figure 1. Activity Setup

Guide Questions:

1. What do the following objects represent in the illustration?

   A. Flashlight - _____
   B. Globe - _____

2. Which part of the globe or ball would receive light?

_____

_____

3. Would all parts of the globe or ball receive light at the same time from the flashlight? Why?

_____

_____

4. What would happen to the part of the Earth which receives light?

_____

_____

5. What would happen to the part of the Earth not receiving light?

_____

_____

What is It

In your first activity, the globe or the ball represents the Earth. A **globe** is a representation of our planet. The green areas represent land, while the blue areas represent water. The flashlight represents the sun. The sun gives off light energy to the planets in the solar system. When the globe moves in **counterclockwise** (East to West) motion, there are parts of the globe which directly face the light and there are also parts which are facing away from the light.

When the Earth spins on its axis, the part directly facing the sun experiences **daytime** while the part of the Earth which facing away from the sun experiences **nighttime**. An **axis** is an imaginary line where the Earth spins. It is tilted **23.5 degrees** and it extends from the North Pole to the South Pole. The spinning of the Earth on its axis is called **rotation**. It takes **24 hours** or one day to complete one rotation and this causes day and night. The counterclockwise spinning of the Earth on its axis makes the sun seems to rise in the East and seems to set on the West.

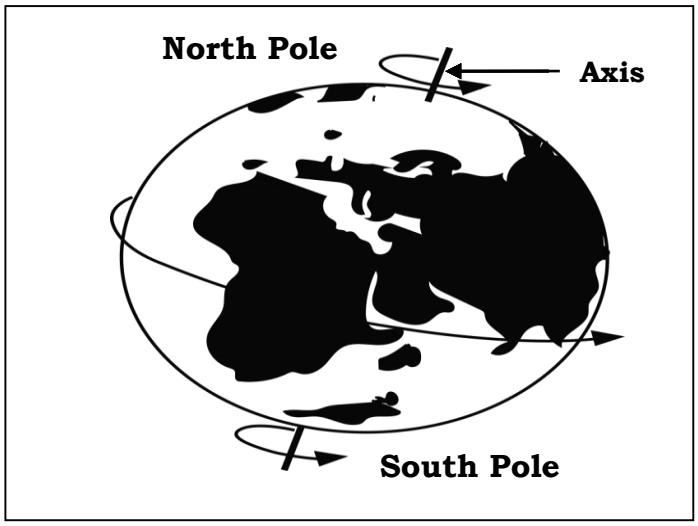


Figure 2. Earth's Rotation on its Axis
Illustrated by Jose Ernie M. Buelos

As the Earth rotates on its axis, objects that are not fixed on the ground such as air get deflected. The deflection of the air is called **Coriolis Effect**. This effect happens because different parts of the Earth move at different speed as it rotates on its axis. ~~Because~~ the Earth is an oblate spheroid, so the part near the equator is much wider compared to the poles. This means that movement of air in the equator is faster compared to the part near the North Pole or South Pole. The farther you go from the equator the slower is the movement of the air. Therefore, air is deflect~~ed~~ towards the right in the Northern Hemisphere and towards the left in the Southern Hemisphere instead of moving in straight patterns.

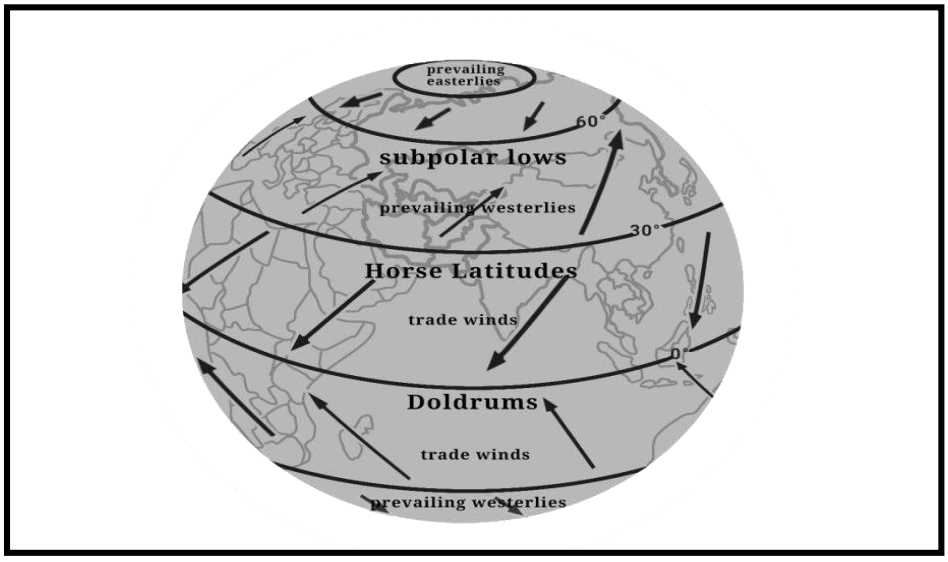


Figure 3. Coriolis Effect
Illustrated by Jomar P. Tajanlangit

The Coriolis Effect contributes to the circular motion of the wind. The deflected air affects the surface ocean currents, which occur on the open seas and oceans influencing the direction of the waves.

Coriolis Effect also influences the spinning directions of typhoons. Typhoons in the Northern Hemispheres spin in counter clockwise direction while typhoons in the Southern Hemispheres spins in clockwise direction.

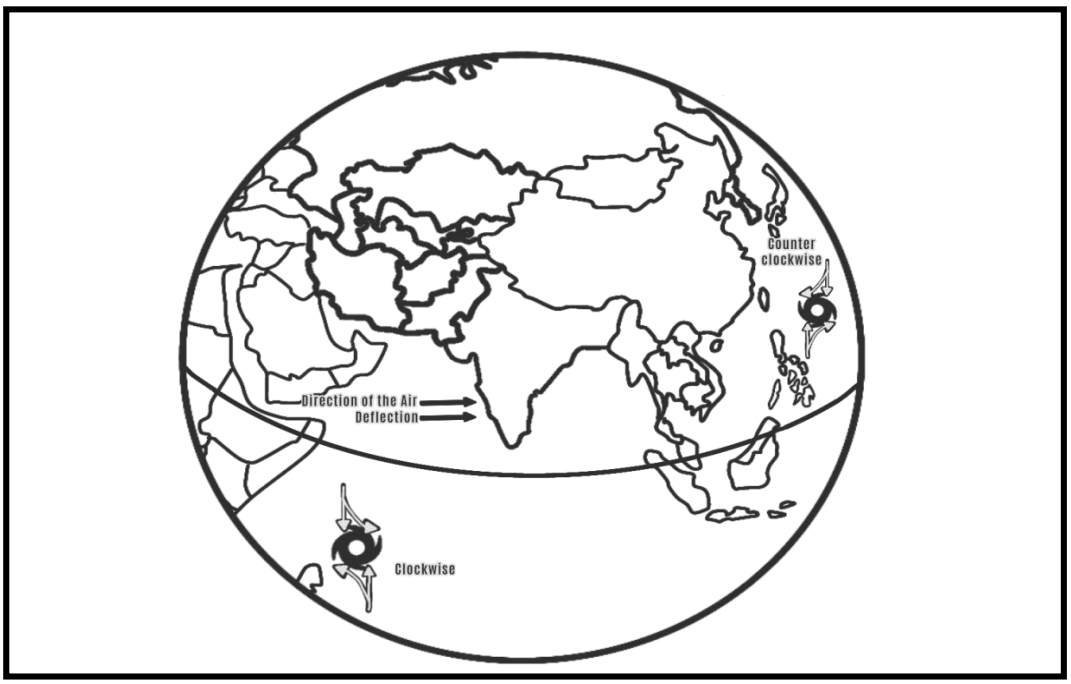
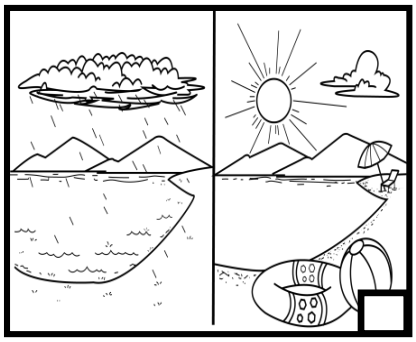


Figure 4. Direction of the Tropical Cyclones Due to Coriolis Effect
Illustrated by Jomar P. Tajanlangit

What's More

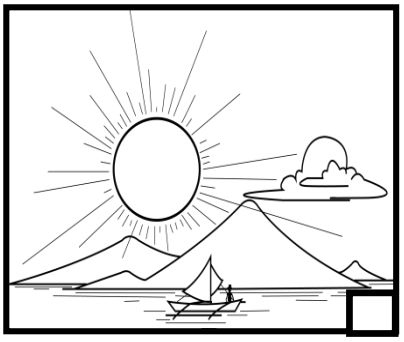
Directions: Write (✓) if the picture shows the effect of Earth's movement on its axis and (**x**) if it's not. Write your answer on a separate sheet of paper.

1



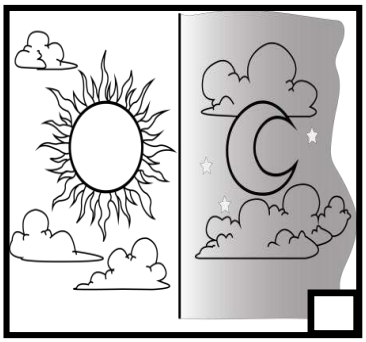
Change of Seasons

2



The sun seems to rise in the East

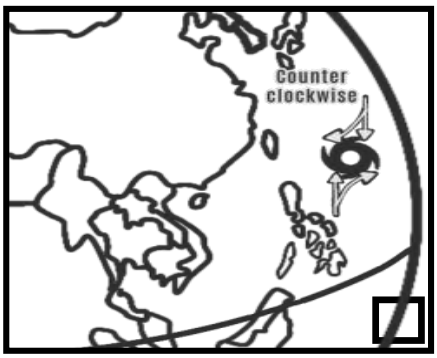
3



Day and Night

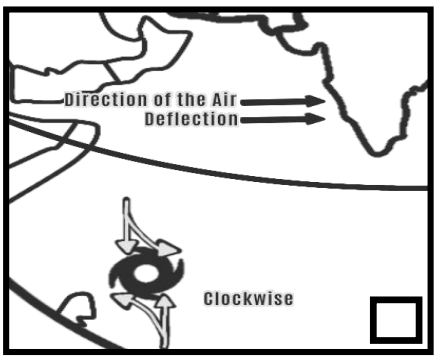
Illustrated by Jose Ernie M. Buelos

4



Direction of the spinning of tropical cyclones

5



Air Deflection

Illustrated by Jomar P. Tajanlangit

Guide question:

What are the different effects of Earth's rotation based on given the activity?

_____

_____

What I Have Learned

Directions: Complete the sentences by writing the correct word from the box. Write your answers on a separate sheet of paper.

24 hours	axis	Coriolis Effect	daytime
nighttime		rotation	

I have learned that:

1. The movement of the Earth on its axis is called _____. It causes day and night.
2. The part of the Earth which is facing the sun experiences _____.
3. The side of the Earth facing away from the sun experiences _____.
4. One complete rotation is equivalent to _____ or one day.
5. The deflection of the air as a result of Earth's rotation is called _____.

What I Can Do

Directions: Draw/illustrate the Earth's movement on its axis. Then, write three (3) effects of Earth's rotation below. Write your answer on a separate sheet of paper.

West

East

1. _____
2. _____
3. _____

Assessment

Directions: Choose the letter of the best answer. Write your answer on a separate sheet of paper.

1. Which of the following causes of day and night?
   A. rotation of the sun on its axis
   B. rotation of the Earth on its axis
   C. revolution of the moon around the sun
   D. revolution of the moon around the Earth

2. Which of the following statements about Earth's rotation is **true**?
   A. The Earth's rotation causes climate change.
   B. The Earth's rotation is equivalent to one day.
   C. The Earth's rotation is equivalent to one year.
   D. The Earth's rotation causes seasonal change.

3. Which of the following refers to imaginary line where the Earth spins?
   A. Axis
   B. Ellipse
   C. Orbit
   D. Pole

4. Which is **not** an effect of the Earth's rotation on its axis?
   A. Day and night
   B. Coriolis Effect
   C. Seasonal Changes
   D. Sun seems to rise on the East and set on the West

5. Which of the following is an effect of the Earth's rotation?
   A. Earthquake
   B. Coriolis Effect
   C. Movement clouds
   D. Change of seasons

6. Which is the effect of the counterclockwise movement of the Earth?
   A. The sun seems to rise in the East.
   B. The sun seems to rise in the West.
   C. The sun seems to rise in the North.
   D. The sun seems to rise in the South.

7. How long does it take for the planet Earth to complete one rotation?
   A. 21 hours
   B. 22 hours
   C. 23 hours
   D. 24 hours

8. Which condition is experienced in places facing the sun during Earth's rotation?
   A. Daytime
   B. Nighttime
   C. Darkness
   D. Cold temperature

9. Which is **true** about Earth's tilt on its axis?
   A. The Earth is tilted 0 degrees.
   B. The Earth is tilted 90 degrees.
   C. The Earth is tilted 22.5 degrees.
   D. The Earth is tilted 23.5 degrees.

10. Which of the following explains Coriolis effect?

   A. As the Earth rotates on its axis, air does not move
   B. As the Earth rotates on its axis, air remains stationary
   C. As the Earth rotates on its axis, air moves back and forth
   D. As the Earth rotates on its axis, air is deflected and changes its direction.

Additional Activities

Directions: Which of following activities can be **BEST** done during daytime or nighttime? Write **DT** if it is best done during daytime and **NT** if it is best done during nighttime.

_____1. Sleeping

_____2. Helping with the household chores

_____3. Sharing bedtime stories to younger siblings

_____4. Watching the stars on the sky

_____5. Eating breakfast

_____6. Playing

_____7. Going to School

_____8. Eating dinner

_____9. Going to mall

_____10. Watching the moon

Lesson 2 The Earth's Revolution

You have learned in your previous lesson about the Earth's rotation on its axis. In this lesson, you will learn another movement of the Earth through its imaginary path around the sun.

What's In

Directions: Arrange the scrambled letters to form the correct words being described. Write your answer on a separate sheet of paper.

No.	Word	Description
1	TATIROON	The spinning movement of the earth on its axis.
2	SIXA	Imaginary straight line where the Earth spins
3	ONRETIVOLU	The journey of the Earth around the sun
4	AREY	The complete travel time of the Earth's revolution
5	BORIT	Imaginary path that guides the Earth around the sun

What's New

You have learned in your first activity that Earth is moving on its axis. However, our planet also moves on its imaginary path around the sun. As you do your next activity, find out what this movement is and its effect.

Activity 2: The Travelling Earth

Objectives: At the end of this activity, I will be able to:

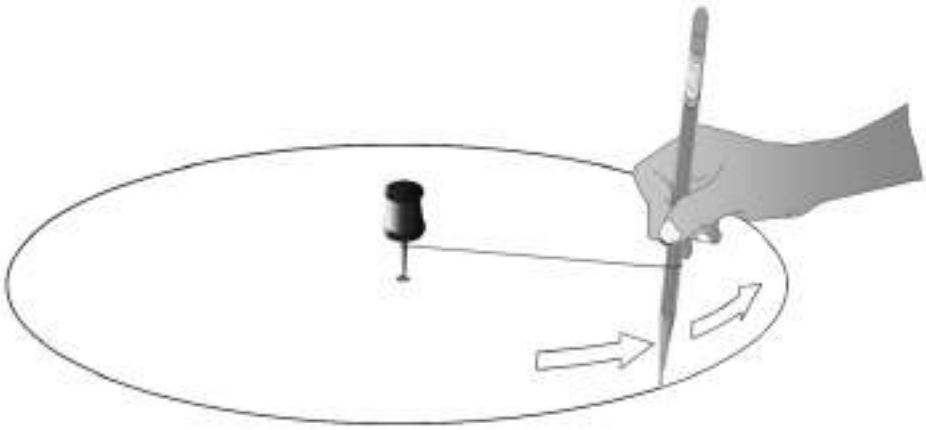
demonstrate how the Earth revolves around the sun

Materials:

- 1 clean sheet of paper
- six (6) inches string
- 1 pushpin
- 1 pencil

Directions:

1. Place the 1 clean sheet of paper on a table.
2. Set the pushpin at the center of the paper.
3. Loop the end of the string around the pushpin and the other end to the body of a pencil.
4. Move the pencil around to form a circular mark on the paper.
5. The illustration below shows how you will do the activity.
6. Answer the questions that follow



Illustrated by Jose Ernie M. Buelos

Figure 5. Activity Setup

Guide Questions:

1. What do the following materials represent in the activity?

   A. Pencil -_____

   B. Pushpin- _____

2. What does the circular path in your drawing represent~~s~~?_____

3. What do you call to the circular movement of the pencil around the pushpin? _____

4. Do you think Earth is also travelling around the sun just like in your activity? What are the evidences that the Earth is indeed travelling around the sun?

   _____

   _____

What is It

In your second activity, you have used the pencil to represent the Earth and the pushpin to represent the Sun. The circular mark around the pushpin represents the Earth's orbit. An **orbit** is an imaginary path of the Earth around the sun. As the Earth moves around the sun, revolution happens.

Revolution is the movement of the Earth on its orbit around the sun while it is tilted 23.5 degrees in its axis. One Earth's revolution is equivalent to **365 1/4 days** or **one year**.

Have you observed that the positions of the stars change from time to time? If the Earth is not moving, then each star will appear to be in the same place relative to other stars. When the Earth is on the other side while it revolves around the sun, star patterns from the other side cannot be seen on Earth. Indeed the Earth is revolving around the sun because the star patterns called **constellations** that can be seen at nighttime seems to change their positions.

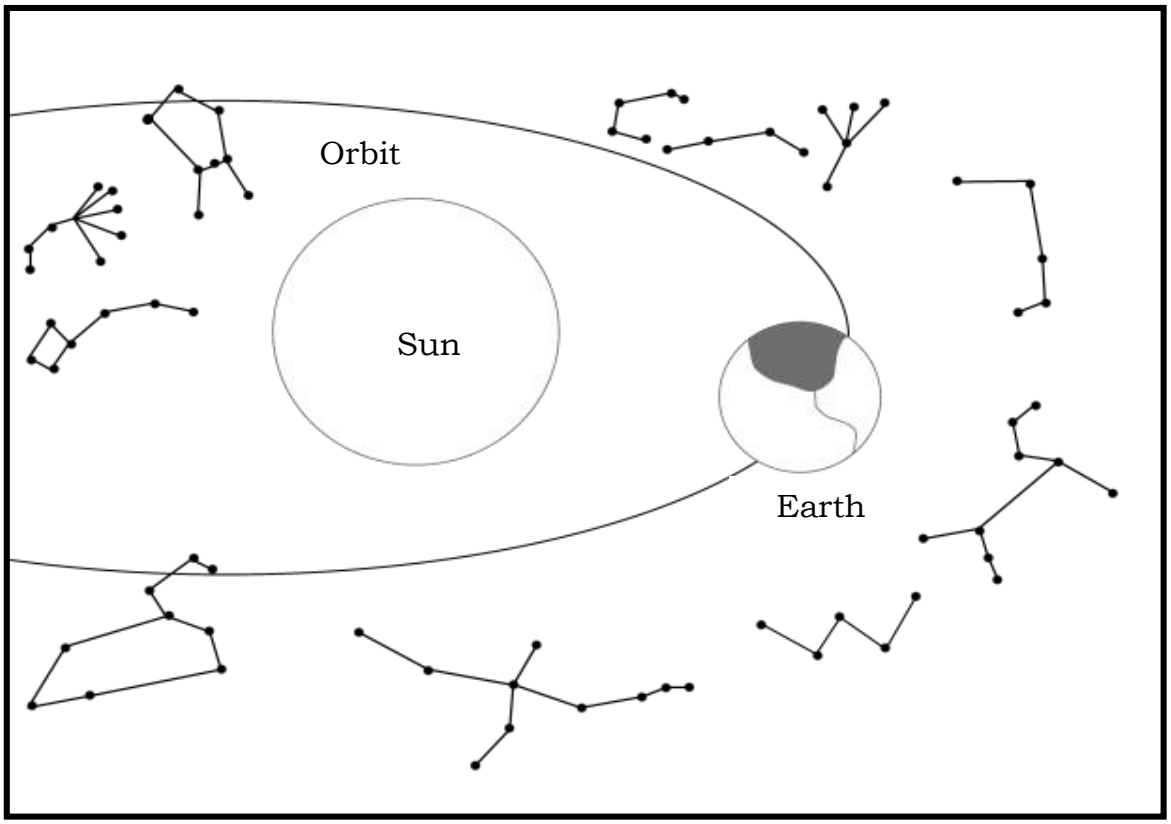


Figure 6. Constellations as Seen from the Earth
Illustrated by Jomar P. Tajanlangit

Another evidence that the Earth is revolving around the sun is the change of seasons. Study the illustration below.

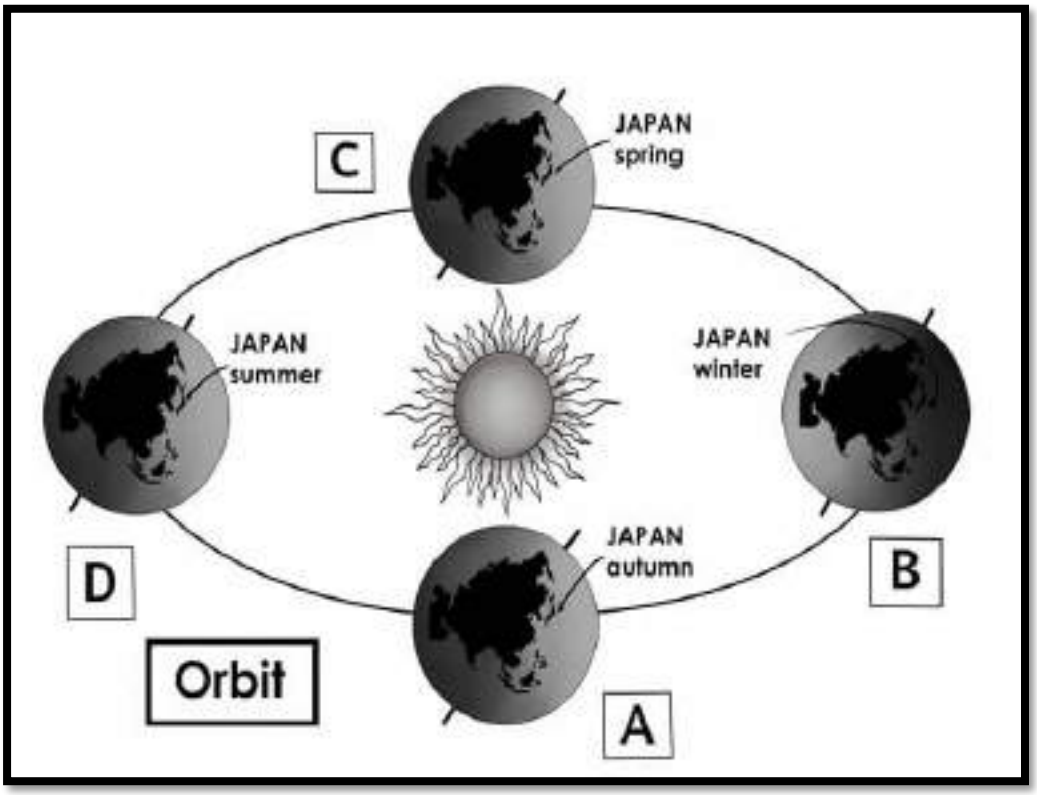


Figure 7. Change of Seasons in a Year
Illustrated by Jose Ernie M. Buelos

In position B, the amount of light received by Japan is lesser. It experiences winter season. In position D, the amount of light received by Japan is greater. It experiences summer season. However, in position A and C, the amount of light received by Japan is neither less or great. It experiences either autumn or spring.

Seasons are a temporary period of change in climate. Seasons change because of the unequal distribution of heat coming from the sun because of the Earth's tilted position as it revolves around the sun. If the Earth is tilted towards the sun, the country experiences summer. If it is tilted away, it is winter, and if it is neither tilted towards nor away, it is autumn or spring. Each season lasts for three months.

However, countries located near the equator, like the Philippines, have only two seasons—the wet and the dry seasons. This is because the equator receives equal amount of light throughout the year.

What's More

Directions: Write **true** if the statement is correct and **false** if it is incorrect. Write your answers on a separate sheet of paper.

_____1. The movement of the Earth around the sun is called rotation.

_____2. The Earth revolves around the sun through its orbit.

_____3. Revolution causes the change of seasons.

_____4. Seasons change because Earth is tilted while it revolves around the sun.

_____5. The Earth spins around its orbit in a clockwise movement.

What I Have Learned

Directions: Complete the sentences by supplying the correct word/s found in the box

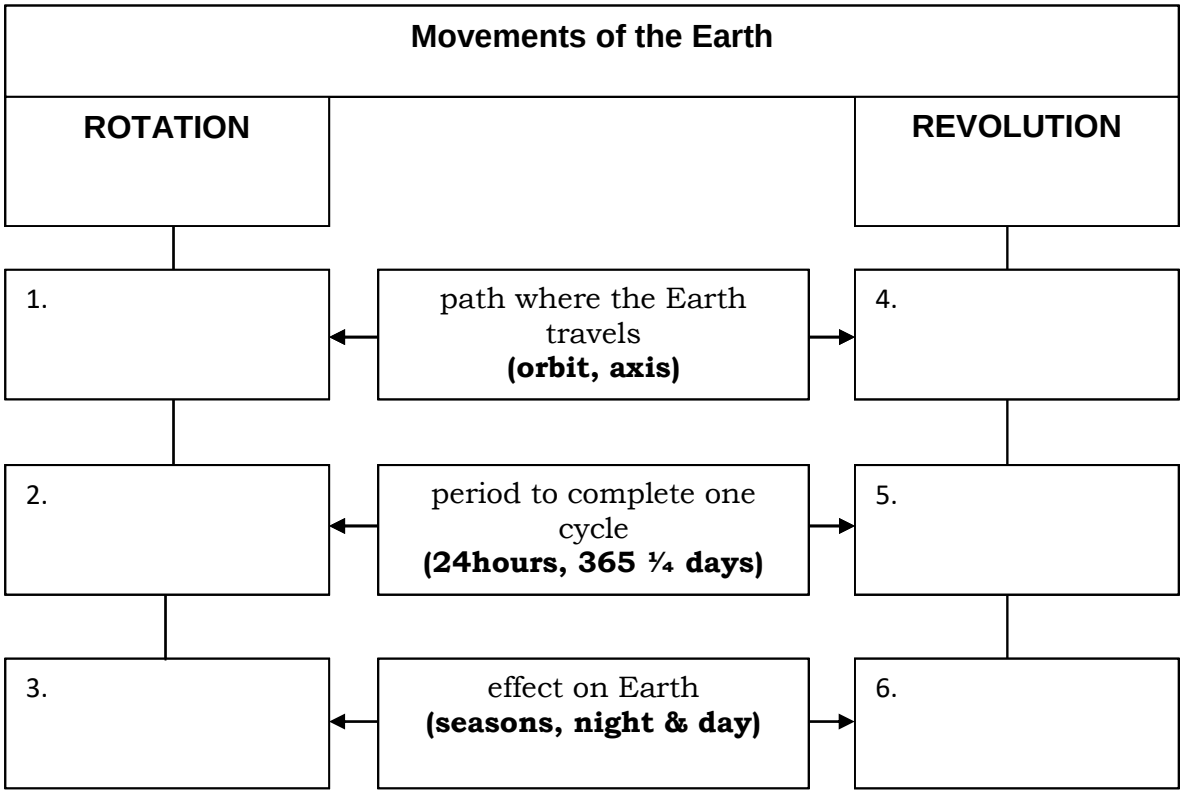
365 ¼ days		axis	orbit
revolution	rotation	season	sun

I have learned that:

1. The movement of the Earth on its orbit around the sun is called _____.
2. An imaginary circular path around the sun where Earth travels is called _____.
3. As the tilted Earth revolves around the _____, unequal distribution of light happens. This causes the change of season.
4. A temporary climatic change in a certain location is called _____.
5. The Earth revolves around its orbit once every _____ or one year.

What I Can Do

Directions: Differentiate Earth's **rotation** from **revolution** by completing the boxes in the diagram below. Select your answer which best describes to each movement from the parenthesis. Put your answers in their proper columns.



Guide Questions:

1. What are the differences between Earth's rotation from revolution?

_____

_____

_____

_____

Assessment

Directions: Choose the letter of the best answer. Write your answer on a separate sheet of paper.

1. Which causes the change of seasons?
   A. Revolution of the sun around the Earth
   B. Revolution of the sun around the moon
   C. Revolution of the Earth around the sun
   D. Revolution of the moon around the Earth

2. Which statement is **true** about the movement of the Earth?
   A. Earth moves around the sun on its axis.
   B. Earth moves around the sun through its ring.
   C. Earth moves around the sun through its orbit.
   D. Earth moves around the sun through its ring.

3. Approximately, how long does it take for the Earth to complete one revolution around the sun?
   A. 88 days
   B. 225 days
   C. 288 days
   D. 365 1/4 days

4. Which are the two seasons experienced in places near the equator?
   A. Wet and dry
   B. Fall and spring
   C. Dry and spring
   D. Summer and winter

5. Which of the following statements about the revolution of the Earth is correct?
   A. As the Earth spins on its axis, it causes climate change.
   B. As the Earth revolves around the sun, it causes day and night.
   C. As the Earth revolves around the sun, it also rotates on its axis.
   D. As the sun revolves around the Earth, it causes seasonal change.

6. Which of these statements is **true?**
   A. Axis is the path of Earth around the sun.
   B. Poles contribute to the unequal distribution of heat from the sun.
   C. The Earth's tilted orbit causes unequal distribution of heat from the sun.
   D. The Earth's tilted axis causes unequal distribution of heat from the sun.

7. How do you call the short climatic changes caused by the Earth's revolution around the sun?
   A. Coriolis
   B. Monsoon
   C. Season
   D. Weather

8. Which of the following is the evidence that the Earth is revolving around the sun?
   A. The climate condition remains the same.
   B. Tides in the ocean and seas changes.
   C. The position of clouds in the sky changes.
   D. The position of constellations changes as seen from Earth.

9. Why do different areas of the Earth receive a different amount of sunlight throughout a year?
   A. because the Earth is tilted
   B. because the Earth is sphere
   C. because the Earth is floating
   D. because the Earth is spinning

10. Which of these is the effect of Earth's revolution around the sun?
   A. direction of the wind changes
   B. direction of the typhoons changes
   C. direction of the ocean current changes
   D. positions of the constellations changes

Additional Activities

Directions: Make the following statements correct by selecting the correct word/words from the parenthesis. Write your answer on the separate sheet of paper.

1. Earth travels in its (orbit, axis) around the sun.
2. (Rotation, Revolution) causes the change of seasons.
3. It takes (24 hours, 365 ¼ days) to complete a period of revolution.
4. The change in position of constellations as seen from Earth is caused by Earth's (revolution, rotation).
5. Countries near the equator experience (two, four) seasons.

Answer Key

Lesson I: Earth's Rotation

What I Can Do *(Drawing/ illustrate on separate sheet of paper and write the three effects of the Earth's rotation below)* **Assessment** 1. B 2. B 3. A 4. C 5. B 6. A 7. D 8. A 9. D 10. D **Additional Activities** 1. NT 2. DT 3. NT 4. NT 5. DT 6. DT 7. DT 8. NT 9. DT 10. NT	4. The part of the Earth receives light experience daytime. 5. The part of the Earth which do not receive light experience nighttime. **What's More** 1. X 2. ✓ 3. ✓ 4. ✓ 5. ✓ Guide question. The different effects of the Earth's rotation are: • The sun seems to rise in the east • Day and night • Direction of tropical cyclones • Air deflection **What I have Learned** 1. Rotation 2. Daytime 3. Nighttime 4. 24 hours 5. Coriolis Effect	**What I Know** 1. C 2.B 3.B 4.C 5.D 6.A 7.C 8.B 9.A 10.C **What's In** 1. Sun 2. Axis 3. Orbit 4. Earth 5. Globe **What's New** 1. a. Flashlight - Sun b. Globe - Earth 2. The part of the globe or ball would receive light is the side facing towards the flashlight 3. No, because the globe is round. Therefore there are parts facing away from the light.

Lesson II: Earth's Revolution

Assessment	What I have Learned	What's In
1. C	1. Revolution	1. ROTATION
2. C	2. Orbit	2. AXIS
3. D	3. Sun	3. REVOLUTION
4. A	4. Season	4. YEAR
5. C	5. 365 ¼ days	5. ORBIT
6. D	**What I can Do**	
7. C	ROTATION	
8. D	1. Axis 2. 24 hours	**What's New**
9. A	3. night and day	1.
10. D	REVOLUTION 4. Orbit 5. 365 ¼ days 6. Seasons	A. Earth B. Sun 2. Orbit 3. Revolution
Additional Activities	Guide Questions:	4. Yes, the evidences are the change of the star patterns in the sky and the change of seasons.
1. Orbit	Rotation is the spinning movement of the Earth on its axis. It causes night and day. One complete rotation is equivalent to 24 hours or one day, however, revolution is the movement of the Earth around the sun in its imaginary path called orbit. One complete revolution is equivalent to 365 ¼ days or 1 year.	**What's More**
2. Revolution		1. False
3. 365 ¼ days		2. True
4. Revolution		3. True
5. two		4. True
		5. False

References

NOTE: All texts and illustrations in this SLM were originally developed and created.

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6

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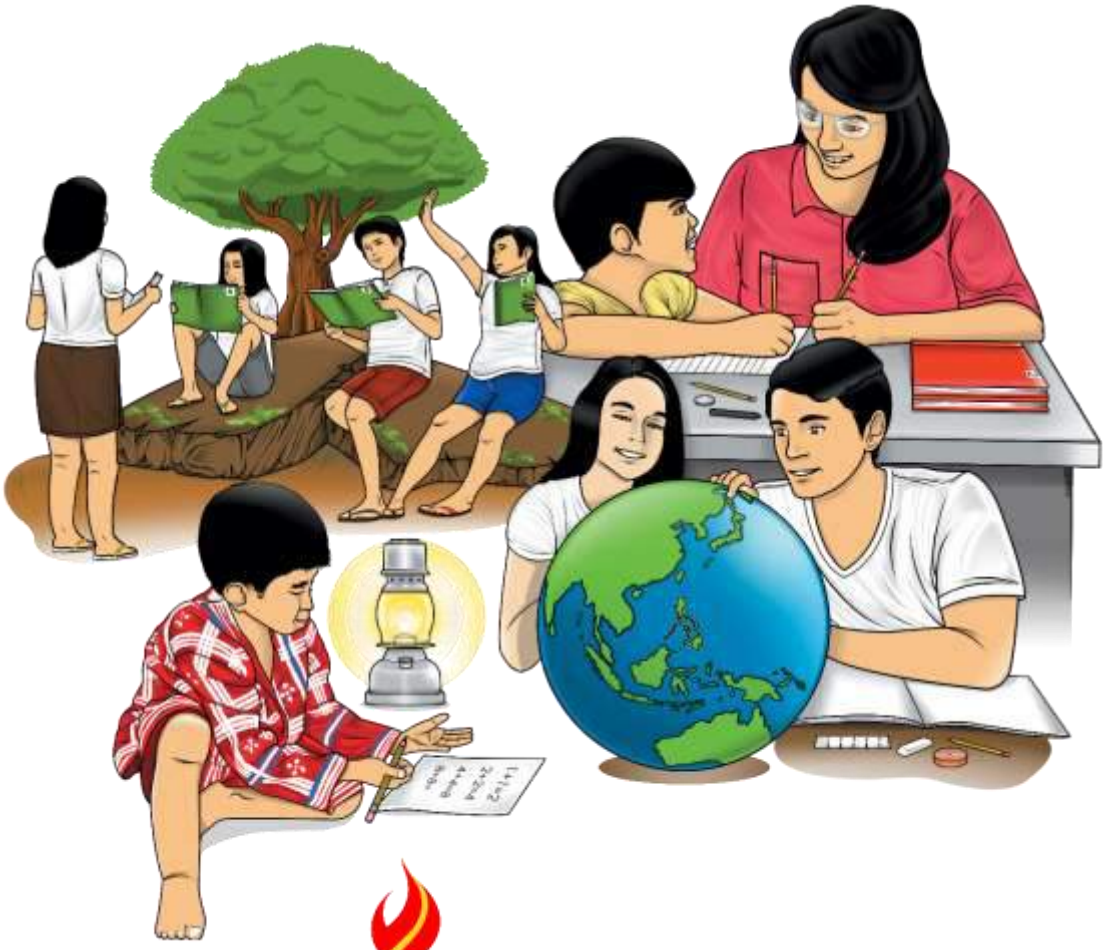
Science

Quarter 4 – Module 6: Compare Planets in the Solar System



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ADM

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First Edition, 2020

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6

Science

Quarter 4 – Module 6: Compare Planets in the Solar System

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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 was designed and written with you in mind. It is here to help you compare the planets in the solar system. 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 focuses on achieving this learning competency:

Compare the planets of the solar system (LC S6ES-IVg-h-6).

After going through this module, you are expected to

1. identify the planets in the solar system,
2. describe the characteristics of the inner planets and outer planets,
3. compare the relative distances, surface temperature and sizes of the inner planets with the outer planets, and
4. show appreciation of the characteristics of planet Earth to support life.

What I Know

Let us check what you know about the solar system and its planets. Read each item carefully. Write the letter of the correct answer in your answer sheet.

1. Which of the following statements describe the outer planets?
   A. They are large and made of rocks.
   B. They are small and made of ice and gas.
   C. They are large and made up mostly of gas.
   D. They are solid and made up of rocks and metals.

2. Which of the following planets has the highest average surface temperature?
   A. Mars
   B. Venus
   C. Jupiter
   D. Mercury

3. How are Earth and Venus similar to each other?
   A. Venus and Earth are Jovian planets.
   B. Venus and Earth have almost the same size.
   C. Venus and Earth have almost the same temperature.
   D. Venus and Earth have the same distance from the Sun.

4. Which of the terrestrial planets is the biggest?
   A. Mars
   B. Earth
   C. Venus
   D. Mercury

5. Which of the following planets is farthest from the Sun?
   A. Venus
   B. Jupiter
   C. Uranus
   D. Neptune

6. Which among the four is the smallest?
   A. Saturn
   B. Jupiter
   C. Uranus
   D. Neptune

7. Which planet is the largest?
   A. Mars
   B. Earth
   C. Jupiter
   D. Uranus

8. Which planet in the solar system supports life?
   A. Earth
   B. Saturn
   C. Jupiter
   D. Uranus

9. Which among the planets have extensive and complex rings?
   A. Saturn
   B. Jupiter
   C. Uranus
   D. Neptune

10. Which of the following are inner planets?
   A. Mercury, Venus, Earth, Mars
   B. Venus, Mars, Saturn, Uranus
   C. Earth, Jupiter, Uranus, Neptune
   D. Jupiter, Saturn, Uranus, Neptune

Lesson 1 Compare Planets in the Solar System

The solar system orbits the center of the Milky Way Galaxy. It is composed of the Sun and the eight planets. These are **Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus,** and **Neptune**. The eight planets of the solar system can be described by their size, distance from the sun, composition and other characteristics. There is more to learn about the planets than just their arrangement in the solar system and their name.

After going through this module, you will learn to compare the planets in the solar system (LC S6ES-IVg-h-6).

What's In

A. Identify the movement of the Earth in the illustration below by writing the letter of the correct answer on your answer sheet.

_____1. Which movement of the Earth shows rotation?

_____2. Which movement of the Earth shows revolution?

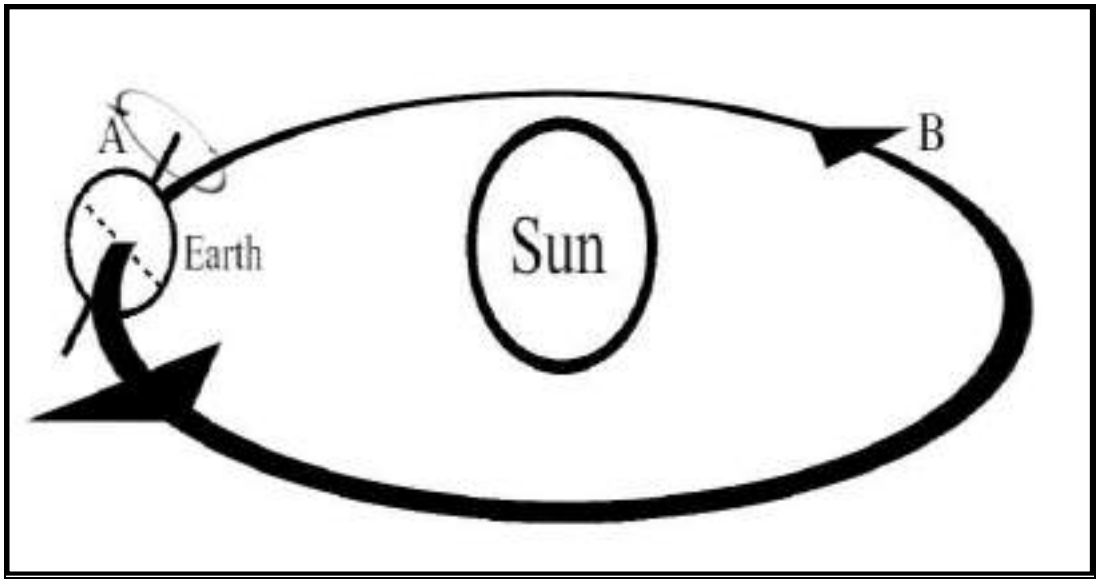


Figure 1. Rotation and Revolution of the Earth
Illustrated by Luke D. Granada

B. Are there other heavenly bodies that revolve around the Sun?

All the words listed below revolve around the sun. Find the words in the word search grid and mark them with a line. The direction of the words can be up, down, to the left, to the right or diagonal.

Venus	Saturn	Mars
Earth	Uranus	Jupiter
Neptune	Mercury	Planets

M	J	T	P	X	C	O	M	S	I	P
A	O	U	Q	O	E	E	A	R	T	H
R	X	U	W	E	X	B	M	R	J	C
S	A	T	U	R	N	E	E	D	F	K
X	A	R	E	O	R	T	V	C	I	T
F	C	U	W	C	I	X	E	C	L	G
A	B	S	U	P	L	A	N	E	T	S
G	D	R	U	R	A	N	U	S	H	E
I	Y	J	V	Q	P	W	S	X	O	X
Z	E	H	E	N	U	T	P	E	N	C

What's New

Our very own planet is one of the members of the solar system. We must understand our neighboring planets in the solar system.

The solar system is composed of the Sun and the eight planets, ~~such as~~ **Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus,** and **Neptune**. These planets are classified as **inner planets** and **outer planets**.

Each of the planets has different characteristics. They differ in their distance from the Sun, size, temperature, and composition. Some planets are rocky and small and do not have rings. Other planets are gaseous and have rings. They even differ in color, as seen on Earth.

Activity 1: Planets of the Solar System

A. Identify the planets and write their names in the box then answer the questions that follow in your answer sheet.

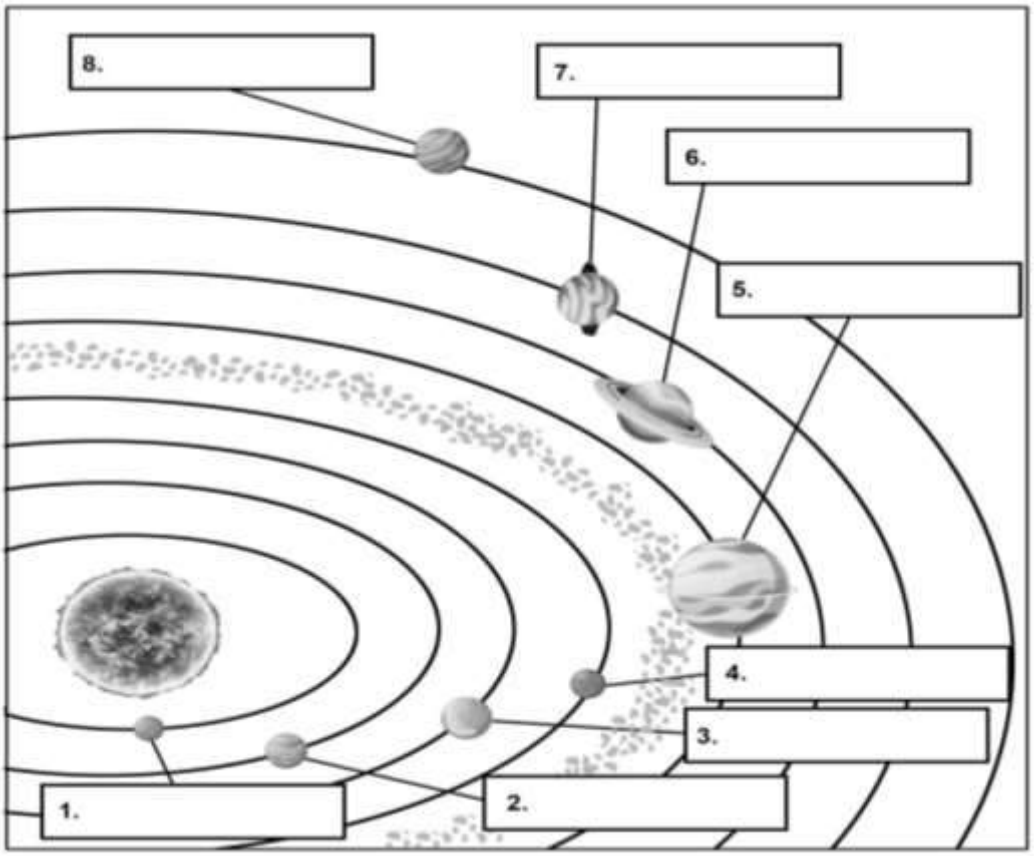


Figure 2. Model of the Solar System
Illustrated by Orencio D. Estrera

B. Answer the following analysis questions.

1. Which are the inner planets?

_____

2. Which are the outer planets?

_____

3. Which planet is closest to the Sun?

_____

4. Which two planets are almost of the same size?

_____

5. Compare the temperature of Saturn and Uranus. Which of the two is colder?

_____

6. What is the largest planet?

_____

7. Which among the inner planets is the hottest?

_____

8. Which planet is the coldest?

_____

9. Which group of planets are smaller?

_____

10. Which group of planets are large and sometimes called gas giants?

_____

Activity 2: Let's Compare and Contrast

Using the T-chart, compare and contrast the characteristics of the inner and outer planets. Choose your answer from the box. Answer the activity in your answer sheet.

Table 1: Comparison of Inner and Outer Planets

Inner Planets	Features	Outer Planets
1.	**Distance from the Sun**	5.
2.	**Sizes**	6.
3.	**Temperature**	7.
4.	**Composition**	8.

A. small, dense, rocky	E. farther from the Sun
B. closer to the Sun	F. large, gas giants
C. silicate mantle, metallic core	G. hydrogen and helium
D. most planets are hot/warm	H. all planets are cold

What is It

What are the components of the solar system?

The solar system is composed of the Sun and all the objects that travel around it. The Sun is orbited by planets and their moons, asteroids, comets and other heavenly bodies.

What are the eight planets in the solar system?

The eight planets in the solar system are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.

What are the inner planets?

The first four planets, Mercury, Venus, Earth and Mars are called terrestrial or inner planets. They are solid and are mostly made up of rocks and metal; they do not have rings. These are the planets closer to the Sun. Among the four terrestrial planets Earth has one moon, Mars has two moons, Mercury and Venus has none. The terrestrial planets have common features such as mountains and volcanoes.

What are the outer planets?

The last four planets Jupiter, Saturn, Uranus, and Neptune are outer or Jovian planets. They are called gas giants. These gas giants are so-called because they are much larger than other planets and are mostly made up of gas. They are set-apart from the terrestrial planets by the **asteroid belt**. All of these gas giants have rings and moons. Of the four gas giants Saturn has the most prominent ring.

What are the compositions of the planets?

The terrestrial or inner planets have **solid surfaces**. These planets are small and mostly made up of **rock and metal**. They have **silicate mantle** surrounding a **metallic core** composed mostly of **iron**.

The Jovian or outer planets are made up of **hydrogen** and **helium** and they have small **rocky core**. Aside from being called gas giants, Uranus and Neptune are also called **ice giants**. The ice giants have interior composition of compounds like **water**, **methane** and **ammonia**.

To further understand the characteristics of each planet, study the table below.

Table 2: Table Characteristics of the Eight Planets

Name of Planets (In order from the Sun)	**Average Distance from Sun ($x10^7$km.)**	**Size/ Diameter ($x10^3$km.)**	**Average Temperature**	**Distinct Characteristics**
Inner Planets				
Mercury	5.79	4.878	-183 °C to 427 °C	barren; crater-covered surface
Venus	10.82	12.104	480 °C	the brightest object in the sky; almost the same size with Earth
Earth	14.96	12.756	14 °C	a planet where life exists; has water on its surface and atmosphere that allowed life to flourish
Mars	22.28	6.794	-63 °C	red planet
Outer Planets				
Jupiter	77.84	142.984	-130 °C	has an ever-changing whirlpool of storms known as Great Red Spot
Saturn	142.70	120.536	-130 °C	has an extensive and complex ring system
Uranus	287.07	51.118	-195 °C	sideways planet
Neptune	449.70	49.532	-201 °C	a blue planet made up of methane

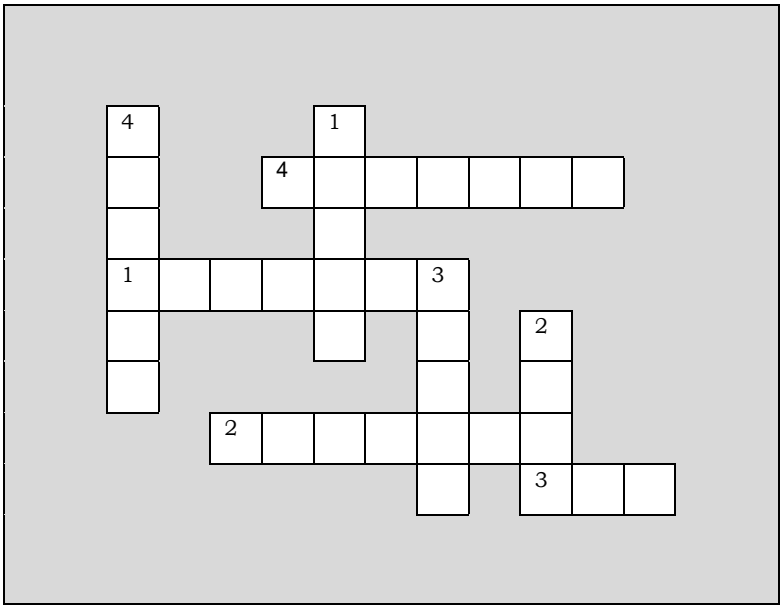
What's More

Know your solar system

Answer the cross word puzzle below in your answer sheet.

Across:
1. the blue planet made up of methane
2. the largest planet in the solar system
3. the center of the solar system
4. the smallest planet

Down:
1. the twin planet of Earth
2. the red planet
3. the planet where we live in
4. the seventh planet from the Sun



What I Have Learned

Fill in the blanks below to complete the first four statements. Underline the correct answer inside the parenthesis to complete the last four statements.

I learned that:

size	atmosphere	water	temperature
Earth	distance from the Sun	Mars	Characteristics

1. The different planets in the solar system have different _____.
2. The different characteristics of the planets are _____, _____, _____.
3. The planet in the solar system that can support life is _____.
4. Earth is unique because it has _____ and _____.
5. The inner planets are **(smaller, bigger)** than the outer planets.
6. The inner planets are **(nearer, farther)** from the Sun.
7. The outer planets are **(smaller, bigger**) than the inner planets.
8. The outer planets are **(nearer, farther)** from the Sun

What I Can Do

Earth is the only planet in the solar system where human beings live. This is the only planet we can call our home. There are water, oxygen, and the right condition that can support life, which other planets do not have.

How can you show appreciation to our very own planet Earth? How will you take care of the Earth?

Make a poster that shows your appreciation of the planet Earth to support life and how to take care of it. Use one whole sheet of long bond paper and any coloring materials of your choice. Be guided by the following rubrics:

Rubrics for Poster Making

CRITERIA	5 Points	4 Points	3 Points
Content	Shows great understanding of concept/great appreciation of the Earth to support life	Shows a fair understanding of concept/ fair appreciation of the Earth to support life	Hardly shows an understanding of concept/ hardly shows appreciation of the Earth to support life
Clarity	Easy to understand	Make sense	Hardly make sense
Creativity	Quality of work is competent showing great creativeness and originality	Quality of work is fair showing little creativeness and originality	Quality of work is poor showing no creativeness and originality
Total			

Assessment

Read each item carefully and answer the following questions by writing the letter of the correct answer.

1. Which planet in the solar system has the characteristics that can support life?
   A. Earth
   B. Jupiter
   C. Mercury
   D. Neptune

2. Which of the following statements describes the inner planets?
   A. They are small and made of ice and gas.
   B. They are large and made up mostly of gas.
   C. They are large and made of gases and metal.
   D. They are solid and made up of rocks and metals.

Table 3: Characteristics of Planets in the Solar System

Name of Planet	Average Distance from Sun ($x10^7$km.)	Diameter ($x10^3$km)	Average Temperature	Distinct Characteristics
Mercury	5.79	4.878	-183 °C to 427 °C	barren; crater-covered surface
Venus	10.82	12.104	480 °C	the brightest object in the sky; almost the same size with Earth
Earth	14.96	12.756	14 °C	a planet where life exists; has water on its surface and atmosphere that allowed life to flourish
Mars	22.28	6.794	-63 °C	red planet
Jupiter	77.84	142.984	-130 °C	has an ever-changing whirlpool of storms known as Great Red Spot
Saturn	142.70	120.536	-130 °C	has extensive and complex ring system
Uranus	287.07	51.118	-195 °C	coldest planet
Neptune	449.70	49.532	-201 °C	blue planet made up of methane

3. Which one has the highest average temperature among the inner planets?
   A. Mars
   B. Earth
   C. Venus
   D. Mercury

4. Which planet is farthest from the Sun?
   A. Venus
   B. Uranus
   C. Mercury
   D. Neptune

5. Based on Table 2, what is the smallest planet in the solar system?
   A. Earth
   B. Jupiter
   C. Mercury
   D. Neptune

6. Which of the following is the largest planet?
   A. Mars
   B. Jupiter
   C. Uranus
   D. Neptune

7. Which planet has a surface temperature of -63 C?
   A. Mars
   B. Earth
   C. Venus
   D. Neptune

8. Which among the planets has extensive and complex ring system?
   A. Saturn
   B. Jupiter
   C. Uranus
   D. Neptune

9. Which planet is the brightest object in the sky?
   A. Venus
   B. Uranus
   C. Mercury
   D. Neptune

10. Which of the eight planets is known as the blue planet?
   A. Earth
   B. Jupiter
   C. Mercury
   D. Neptune

Additional Activities

Use the Venn diagram to compare the inner and outer planets. The middle section represents the characteristics of the inner and the outer planets have in common. **A** represents the characteristics of the inner planets that are different from the outer planets. **B** represents the characteristics of the outer planets that are different from the inner planets. Choose your answer from the box.

A. gaseous planets	E. without rings
B. made up of rocks	F. closer to the Sun
C. with rings	G. farther from the Sun
D. revolve around the sun	H. rotate on its axis

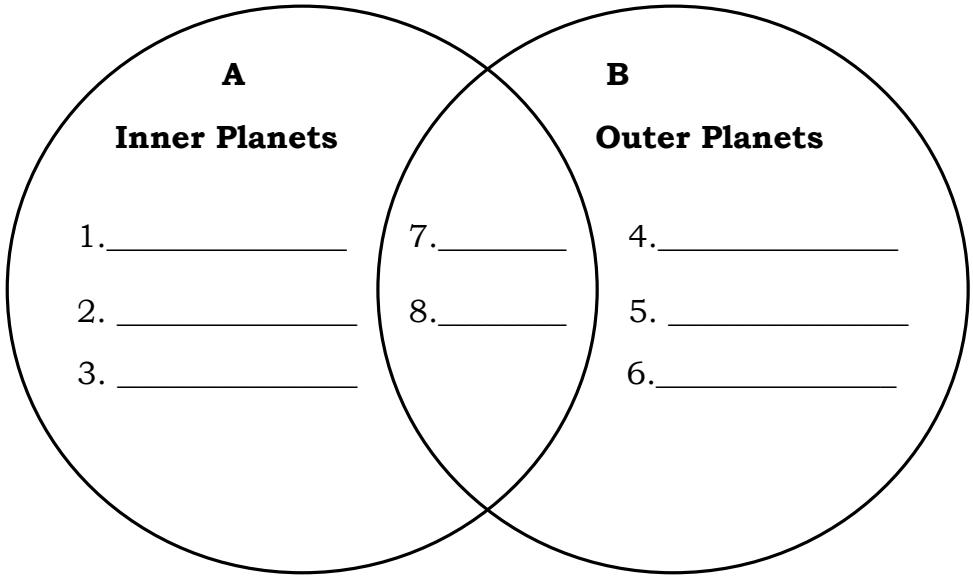


Figure 3. Similarities and Differences of the Inner and Outer Planets

Answer Key

Lesson 1: Compare Planets in the Solar System

What I Have Learned 1. characteristics 2. size, distance, Temperature 3. Earth 4. water and atmosphere 5. smaller 6. nearer 7. bigger 8. farther **What I Can Do** (Rate poster based on Rubrics) **Assessment** 1. A 2. D 3. C 4. D 5. C 6. B 7. A 8. A 9. A 10.D **Additional Activities** 1. B 2. E 3. F 4. A 5. C 6. G 7. D 8. H	**B.** 1. Mercury Venus Earth Mars 2. Jupiter Saturn Uranus Neptune 3. Mercury 4. Earth and Venus 5. Uranus 6. Jupiter 7. Venus 8. Neptune 9. Inner Planets 10. Outer Planets **Activity 2: Let's Compare and Contrast** 1. B 2. A 3. D 4. C 5. E 6. F 7. H 8. G **What's More** **Across** 1.Neptune 2.Jupiter 3.Sun 4.Mercury **Down** 1.Venus 2. Mars 3. Earth 4. Uranus	**What I Know** 1. C 2. B 3. B 4. B 5. D 6. D 7. C 8. A 9. A 10. A **What's In** **A.** 1. A 2. B **B.** **What's New** **Act. 1- Planets of the Solar system** **A.** 1. Mercury 2.Venus 3. Earth 4. Mars 5. Jupiter 6. Saturn 7. Uranus 8. Neptune

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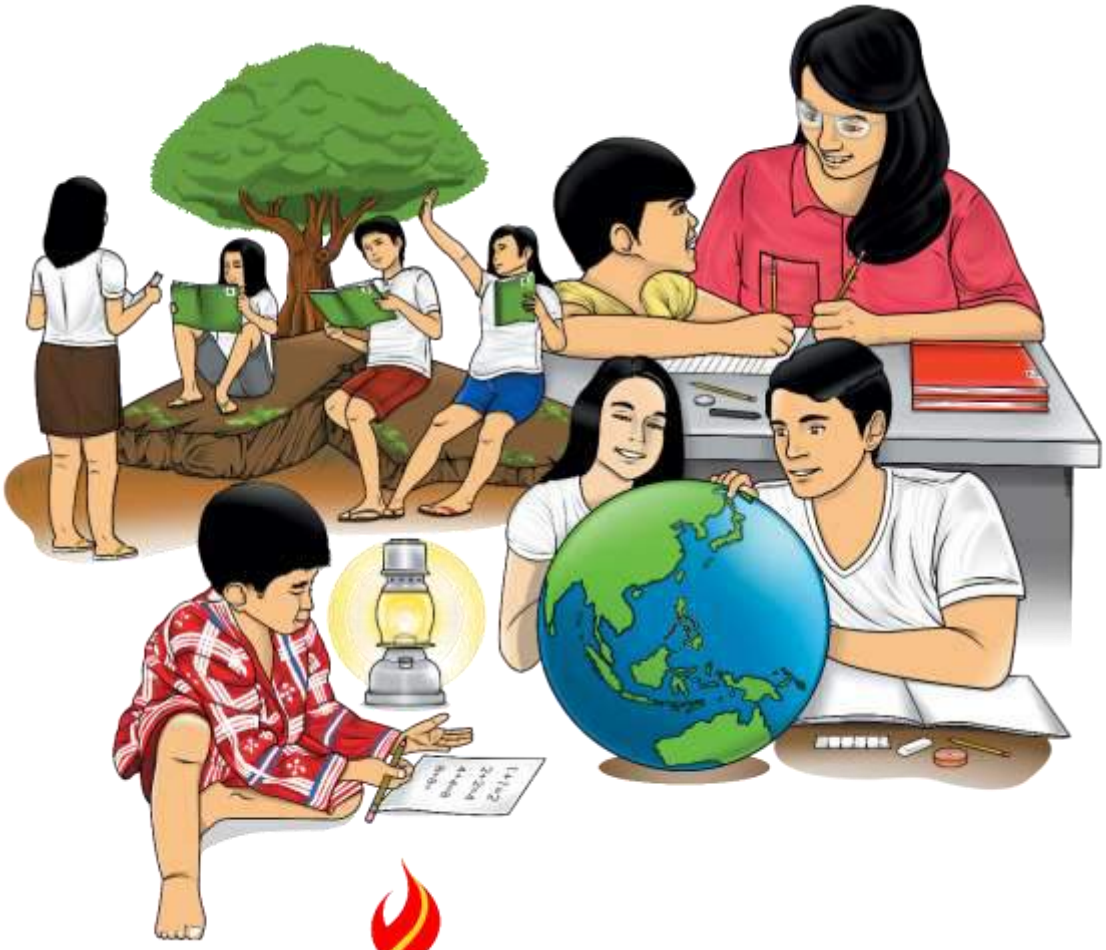
Quarter 4 – Module 7: Construct a Model of the Solar System



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6

Science

Quarter 4 – Module 7: Construct a Model of the Solar System

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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 was designed and written with you in mind. It is here to help you construct a model of the solar system showing the relative sizes of the planets and their relative distances from the Sun (S6ES-IVi-j-7). The scope of this module allows you to use it 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.

After going through this module you are expected to:

1. identify the position of each planet in the solar system; and
2. make a model of the solar system showing relative sizes of the planets and their relative distances from the Sun.

What I Know

Read each item carefully. Write the letter of the correct answer.

1. Nathan is making a model of the solar system. Which planets in the diagram are not in its proper order?

Mercury-Earth-Venus-Mars-Jupiter-Saturn-Uranus-Neptune

A. Earth and Venus
B. Mercury and Earth
C. Saturn and Jupiter
D. Uranus and Neptune

2. How does a solar system model help us?
A. They show which planet are rocky.
B. They show how to go to other planets.
C. They show which planets are colorful.
D. They show the relative size and distance of the planets.

3. Which of the following are the inner planets of the solar system?
A. Mercury, Venus, Earth, Mars
B. Sun, Mercury, Jupiter, Saturn
C. Neptune, Uranus, Earth, Mars
D. Jupiter, Saturn, Uranus, Neptune

For questions No. 4 and 5 refer to Figure 1.

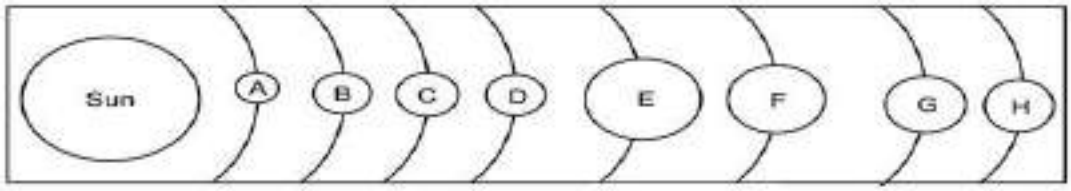

Figure1. Diagram of the Solar System
Illustrate by Orencio D. Estrera

4. Which planet in Figure 1 represents the Earth?
A. B
B. C
C. D
D. E

5. In Figure 1, which planet represents Neptune?
   A. E
   B. F
   C. G
   D. H

6. Which of the following is the center of the solar system?
   A. Sun
   B. Jupiter
   C. Asteroid
   D. Mercury

7. Which of the following is the largest planet in the solar system?
   A. Earth
   B. Saturn
   C. Jupiter
   D. Neptune

8. Which of the following is the fourth planet from the Sun?
   A. Mars
   B. Earth
   C. Venus
   D. Jupiter

9. Which of the following is the seventh planet in the solar system?
   A. Earth
   B. Jupiter
   C. Uranus
   D. Neptune

10. Which of the following is the fourth largest planet in diameter?
   A. Earth
   B. Jupiter
   C. Uranus
   D. Neptune

Lesson 1 Construct a Model of the Solar System Showing the Relative Sizes of the Planets and their Relative Distances from the Sun

The eight planets travel around the Sun and comprise the solar system. The planets are held in orbit by the Sun's gravity.

There are four inner or terrestrial planets. They are called terrestrial planets because they have a compact, rocky surface like Earth's solid surface and relatively small but massive. The four outer planets are Jovian planets. They are called Jovian planets because have relatively small, dense cores surrounded by massive layers of gas.

What's In

In the past lesson, you have learned that the solar system is composed of the eight planets that revolve around the Sun.

Answer the questions below about the solar system. Select the correct answer inside the parenthesis and write your answer in your answer sheet.

1. Which planet in the solar system is closest to the Sun?
   (Mercury, Neptune, Earth, Saturn)

2. Which of the following is located in the outermost part of the solar system?
   (Venus, Earth, Mars, Saturn)

3. What is the third planet from the Sun?
   (Mercury, Venus, Earth, Mars)

4. Which of the four planets has the hottest temperature?
   (Venus, Earth, Mars, Jupiter)

5. Which is the largest planet in the Solar System?
   (Mars, Jupiter, Uranus, Neptune)

What's New

The eight planets in the solar system are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. The planets are classified into inner and outer planets.

The inner or terrestrial planets are Mercury, Venus, Earth, and Mars. They are solid and are mostly made up of rocks and metal; they do not have rings. These are the planets closer to the Sun.

The outer or Jovian planets are Jupiter, Saturn, Uranus, and Neptune. They are called gas giants. These gas giants are so-called because they are much larger than the terrestrial planets and are mostly made up of gas. All of these gas giants have rings.

Activity 1: Space in Between

Study closely the model of the solar system below then answer the questions that follow.

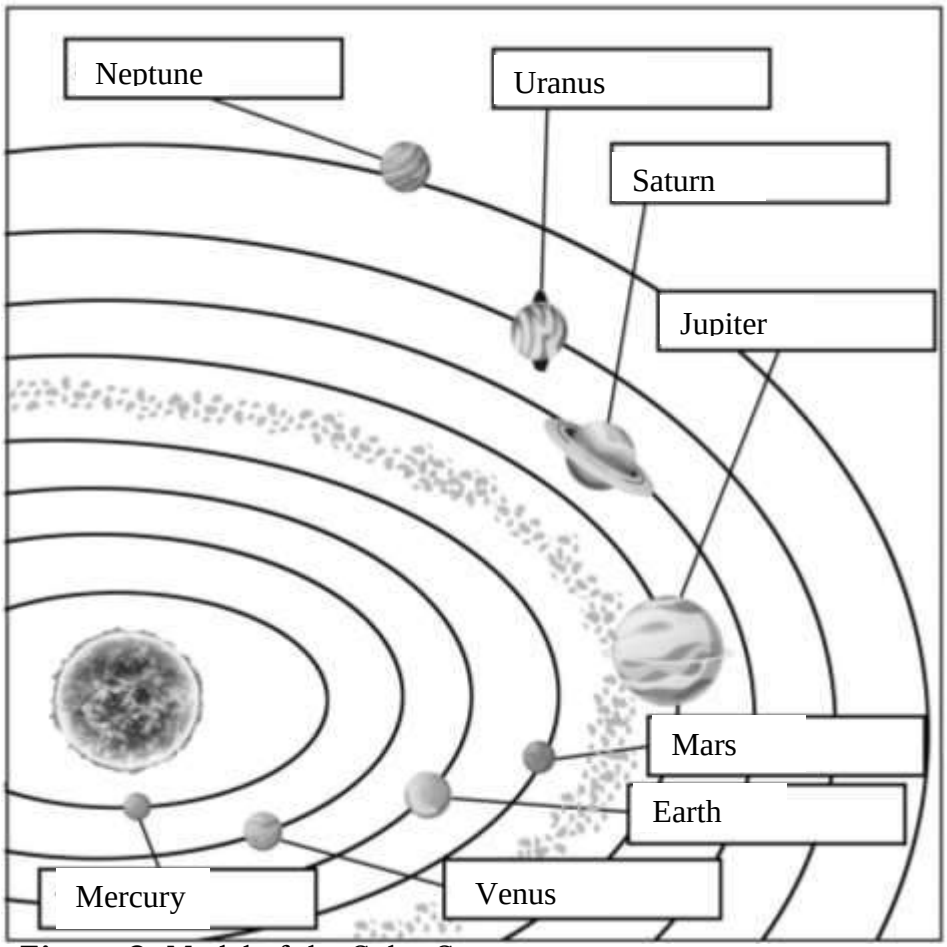

Figure 2. Model of the Solar System
Illustrated by Orencio D. Estrera

Analysis questions:

1. Which heavenly body do all the planets in the solar system revolve?
   A. Sun
   B. Pluto
   C. Earth
   D. Asteroid

2. Which of the following planets has prominent rings?
   A. Mars
   B. Earth
   C. Saturn
   D. Mercury

3. Which planet is between Venus and Mars?
   A. Venus
   B. Earth
   C. Jupiter
   D. Uranus

4. Which planets are large and have rings?
   A. Planetarium
   B. Solar System
   C. Inner planets
   D. Outer planets

5. Which of the four planets below is an outer planet?
   A. Mars
   B. Earth
   C. Jupiter
   D. Mercury

6. Which is the closest planet to the Sun?
   A. Mars
   B. Earth
   C. Jupiter
   D. Mercury

7. Which of the eight planets is farthest from the Sun?
   A. Mars
   B. Earth
   C. Neptune
   D. Mercury

What is It

The planets in the solar system, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune, are divided into two groups – the inner planets and the outer planets.

The inner planets are closer to the Sun, smaller in size, rock-like structure and dense. The four inner planets, Mercury, Venus, Earth, and Mars, are called terrestrial planets because their surfaces are solid, and mostly made up of silicate rocks while the core is made of iron and nickel.

The outer planets are farther away, larger in size, and made up mostly of gas. These planets - Jupiter, Saturn, Uranus, and Neptune are sometimes called Jovian planets or gas giants because they are very large and are mostly made up of gas. They are huge planets with dense core wrapped by thick gaseous materials.

A simplified number is used to describe a planet's distance from the Sun. It is called an **astronomical unit** or **AU**. It is a unit of length equal to the average distance of Earth from the Sun which is approximately 149,600,000 kilometers or 14.96 x 10^7 Km. Earth is assigned 1 AU. The planets closer to the Sun has less than 1 AU while the planets farther away would have a distance greater than 1 AU. Using AU can help scientists keep the numbers manageable or smaller because distances in the solar system are very large. **Table 1** shows these numbers in kilometers, AU, and scaled distances in centimeters.

Table 1: Scale Model of Distances from the Sun

Name of Planets (In order from the Sun)	**Average Distance from Sun** (x10^7km.)	**Distance AU**	**Model Distance from the sun**
Mercury	5.79	0.38	38 millimeters
Venus	10.82	0.72	72 millimeters
Earth	14.96	1.0	1.0 centimeters
Mars	22.28	1.5	1.5 centimeters
Jupiter	77.84	5.2	5.2 centimeters
Saturn	142.70	9.5	9.5 centimeters
Uranus	287.07	19.2	19.2 centimeters
Neptune	449.70	30.1	30.1 centimeters

Planet sizes can be determined from its diameter. A diameter is the distance from one end of a circle or sphere to another side passing through the middle. **Table 2** shows these numbers in kilometers, relative diameter, and scaled sizes in centimeters.

Table 2: Scale Model of Relative Diameters of Planets

Name of Planets	**Diameter in Kilometers**	**Relative Diameter Compared to Earth**	**Size in cm**
Mercury	4800	0.376	0.4 cm
Venus	12100	0.949	0.9 cm
Earth	12750	1.00	1 cm
Mars	6800	0.533	0.5 cm
Jupiter	142800	11.2	11 cm
Saturn	120660	9.46	9 cm
Uranus	51800	4.06	4 cm
Neptune	49500	3.88	3 cm

What's More

Activity 2: Space Neighbors

In this activity, you will need the following materials:

1. 1/2 of Manila paper or old newspaper
2. Ruler (cm)
3. String or thread
4. Glue
5. Any coloring material available to you

Direction: Construct a model of the solar system showing the relative distances of the planets from the Sun and their relative sizes. Follow the procedure below.

Procedure:

1. Prepare all materials needed.
2. Draw the Sun in the Manila paper.
3. Measure the distances of the planets from the Sun and put a mark labeling it with the name of the planet. Make sure you follow the scaled distances. Refer to Table 1 for the scaled planet distances.
4. Measure the sizes of the planets and draw a circle according to the scaled size where you put the label. Make sure you followed the scaled sizes. Color your work. Refer to Table 2 for the scaled planet sizes.
5. Attach the string from the Sun to each planet using the glue.
6. Label each planet.
7. Your work will be rated following the rubric.

Rubrics for Constructing a Solar System

Name_____ Grade and Section:_____

Criteria	Possible Points	Points Received
Title, Name, Planet Label	10	
Planets are in correct order following the scaled distances in Table 1	25	
Planets show relative sizes following the scaled sizes in Table 2.	25	
Creativity, use of color	20	
Neatness	20	
Total	100	

What I Have Learned

Fill in the blanks below to complete the first three statements. Underline the correct answer inside the parenthesis to complete the last three statements.

large	small
rocky	without rings
inner planet	gaseous
outer planets	with rings

1. I have learned that the two groups of planets in the solar system are _____ and _____.
2. I have learned that the inner planets are _____, _____, and_____.
3. I have learned that the outer planets are_____, _____, and _____.
4. I have learned that the inner planets are **(smaller, bigger)** than the outer planets.
5. I have learned that the inner planets are **(nearer, farther)** from the Sun.
6. I have learned that the outer planets are **(nearer, farther)** from the Sun.

What I Can Do

Supply **column B** with the planet's corresponding distance from the Sun in AU units and arrange the planets in order in **column C** by providing their position from the sun (1st, 2nd, 3rd, 4th…).

Table 3. Order of Planets in the Solar System

A **The Eight Planets of the Solar System**	**B** **Distance from the Sun AU**	**C** **Correct Order of the Eight Planets based on Distance from the Sun**
Saturn		
Earth		
Mercury		
Mars		
Venus		
Neptune		
Jupiter		
Uranus		

Assessment

Read each item carefully.

The diagram below represents the Sun and planets of our solar system.

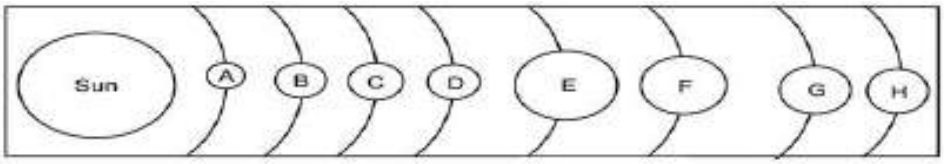

Figure 3: Diagram of the Solar System
Illustrated by Orencio D. Estrera

1. Which planet on Figure 3 represents Jupiter and Saturn?
   A. B and C
   B. C and D
   C. D and E
   D. E and F
2. In Figure 3, which planet represents Neptune?
   A. E
   B. F
   C. G
   D. H
3. Which is the largest planet in the solar system?
   A. Sun
   B. Jupiter
   C. Mercury
   D. Asteroid
4. Kevin is making a model of the solar system. Which two planets in the model below are missing?

   Mercury-_____-Earth-Mars-Jupiter-Saturn-_____-Neptune

   A. Earth and Venus
   B. Venus and Uranus
   C. Mercury and Earth
   D. Uranus and Neptune
5. Which planet is the third planet from the Sun?
   A. Earth
   B. Venus
   C. Saturn
   D. Jupiter
6. How does a solar system model help us?
   A. They show which planet are rocky.
   B. They show how to go to other planets.
   C. They show which planets are colorful.
   D. They show the relative size and distance of the planets.

7. Which of the following are the outer planets of the solar system?
   A. Mercury, Venus, Earth, Mars
   B. Neptune, Uranus, Earth, Mars
   C. Venus, Mercury, Jupiter, Mars
   D. Jupiter, Saturn, Uranus, Neptune

8. Which of the following planets is the fifth planet from the Sun?
   A. Mars
   B. Jupiter
   C. Uranus
   D. Neptune

9. Which of the following is the last planet in the solar system from the Sun?
   A. Earth
   B. Uranus
   C. Jupiter
   D. Neptune

10. Which of the following is the smallest planet in the solar system?
   A. Earth
   B. Jupiter
   C. Neptune
   D. Mercury

Additional Activities

Identify objects at home that can represent the scaled planet sizes. Write the names of the objects in the third column.

Planets	**Scaled Planet Sizes**	**Items at home that may represent scaled planet sizes**
Mercury	.4 cm	
Venus	.9 cm	
Earth	1 cm	
Mars	.5 cm	
Jupiter	11 cm	
Saturn	9 cm	
Uranus	4 cm	
Neptune	3 cm	

Answer Key

Lesson 1: Construct a Model of the Solar System

What I Know 1. A 2. D 3. A 4. B 5. D 6. A 7. C 8. A 9. C 10.D	**What's More** **Activity 2- Space Neighbors** (Rating for scale model will be based on rubric) **What I Have Learned** 1. inner and outer planets 2. small, rocky, without rings 3. large, gaseous, with rings 4. smaller 5. nearer 6. farther **What I Can Do** **Column B:** 1. 9.5 AU 2. 1.0 AU 3. 0.38 AU 4. 1.5 AU 5. 0.72 AU 6. 30.1 AU 7. 5.2 AU 8. 19.2 AU	Column C: 1. 6th 2. 3rd 3. 1st 4. 4th 5. 2nd 6. 8th 7. 5th 8. 7th **Assessment** 1. D 2. D 3. B 4. B 5. A 6. D 7. D 8. B 9. D 10. D **Additional Activity** Answers may vary.
What's New **Activity 1-Space in Between** 1. A 2. C 3. B 4. D 5. C 6. D 7. C **What's In** 1. Mercury 2. Saturn 3. Earth 4. Venus 5. Jupiter		

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