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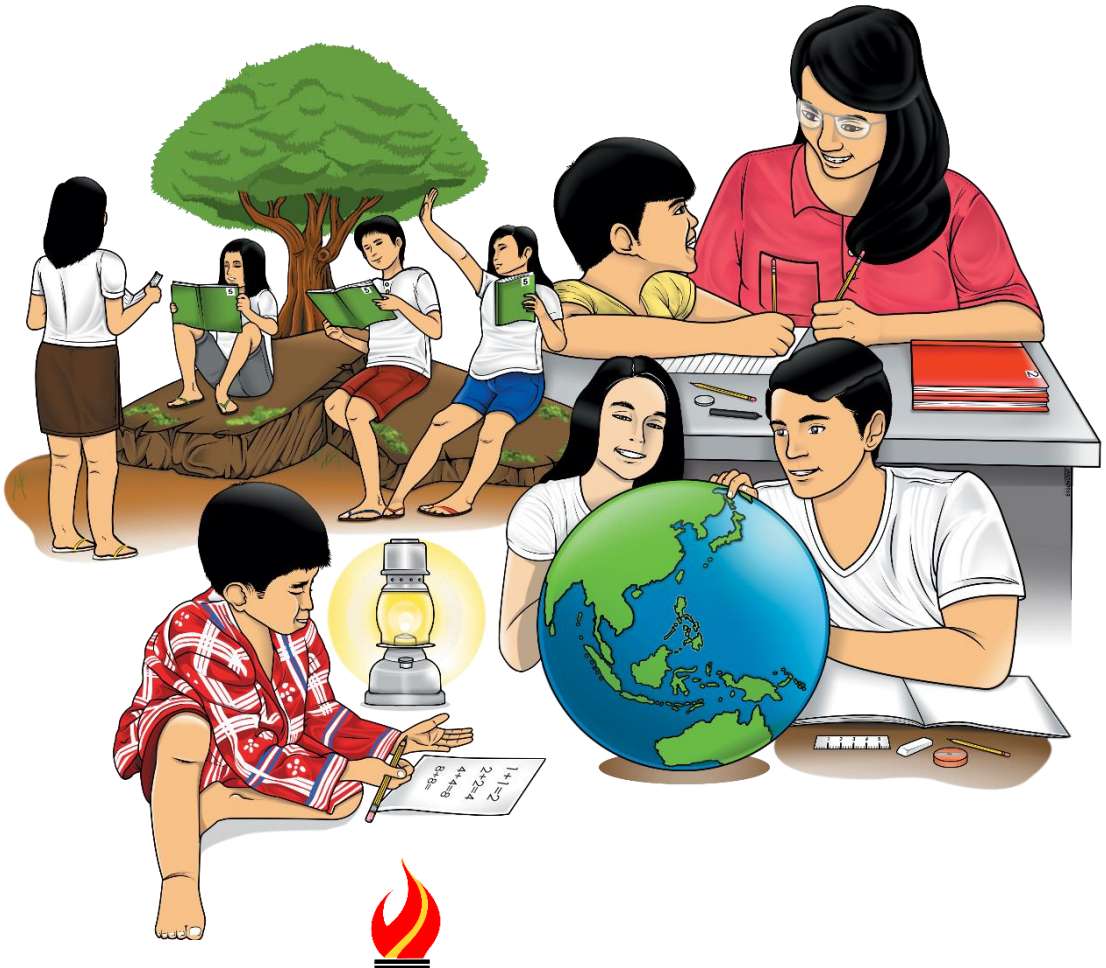
Science

Quarter 4 – Module 4:
Phases of the Moon:
Its Characteristics



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Science

Quarter 4 – Module 4:
Phases of the Moon:
Its Characteristics

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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

In this module you will learn about the different phases of the moon and its characteristics. This is designed and developed to provide the learning that you need to know and to give you ample opportunities to enrich your knowledge in Science that includes studying the Phases of the Moon: Its Characteristics.

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 will help you infer the pattern in the changes of the appearance of the moon.

The module is divided into two lessons, namely:

- **Lesson 1** – Phases of the Moon and its characteristics
- **Lesson 2** – Beliefs and practices with the phases of the moon

After going through this module, you should be able to infer the pattern in the changes of the appearance of the moon. Specifically, you shall:

1. identify the different phases of the moon and its characteristics;
2. describe the different phases of the moon; and
3. evaluate superstitious beliefs and practices associated with the different phases of the moon.

What I Know

I. Directions: Read and analyze each question carefully and identify the letter of the **BEST** answer. Write your answers in your Science notebook.

1. What causes the shape of the moon to change?
   A. The shape of the moon changes as it orbits the Earth.
   B. Some of its part break when the moon reflects light from the sun.
   C. Only the lighted part of the moon is visible when the Earth moves.
   D. All of the above

2. What do you call the change in the appearance of the moon?
   A. Illuminated moon
   B. Phases of the Moon
   C. Shapes of the Moon
   D. Structures of the Moon

3. What do you call when the moon seems to be growing?
   A. crescent
   B. gibbous
   C. waning
   D. waxing

4. The Earth is between the sun and the moon. What phase of the moon will occur when this happens?
   A. new moon
   B. first quarter
   C. full moon
   D. last quarter

5. In which phase does the moon appear dark?
   A. first quarter
   B. full moon
   C. last quarter
   D. new moon

II. Directions: Write **<u>True</u>** if the statement is correct and **<u>False</u>** if it is not.

6. All beliefs and practices about the moon have a scientific basis.
7. During the new moon, you can see the side of the moon, which is facing the Earth, is completely lit up by the sun.
8. In the waxing phase, the moon looks bigger because more parts of the moon are lit up by the sun when facing the Earth.
9. In the waning crescent phase, only a small part of the moon is visible.
10. When the moon is in a specific phase, farmers do their planting because it may bring a good harvest.

Lesson 1 Different Phases of the Moon: Its Characteristics

Do you ever catch a glimpse of the moon at night? Have you ever wondered why the presence of the moon varies over time?

The moon is not a planet but a satellite. A satellite is an opaque (objects that absorb light and produces shadow) object that orbits a planet. The only natural satellite that the Earth has is the moon. It is a huge object that circles the Earth and normally a fraction of its size.

The moon does not have its light source. It receives all of its light from the sun. The location of the moon varies in relation to the observer on Earth as it rotates and revolves around the Earth. As a result, the shape of the moon changes over time. It is because the moon passes across the Earth, the illuminated part of the moon shifts. The apparent variation in the shape of the moon is referred to as ***phases*** of the moon.

What's In

Directions: Analyze the picture below. Record your answers to the questions based on your observation of the picture. Write your answers in your science notebook.

Illustrated by Reyson Joe G. Cañedo

Answer the following questions:

1. Based on the picture above, how often do you see this moon phase in a month?
2. Where does its light come from?
3. Is the moon always a circle in shape? What other shapes of the moon do you see at night?
4. Why do you think the moon changes its shapes?

What's New

Directions: Here are some facts about the moon. On your Science notebook, draw a smiley face (☺) if you already know the fact, and a wow face (😮) if this is new to you. Place your answers in your science notebook.

The sun may be the closest star to the Earth, but it is certainly not our closest neighbor in space. Here are some facts about the moon:

1. It is the natural satellite of the Earth. A satellite is an object in space that revolves around another object.
2. Our closest neighbor in space is the moon, a rocky ball about one-fourth size of the Earth.
3. It is the sixth-largest moon in the solar system.
4. The moon is one of the heavenly bodies reached by man. The first person to step on the Moon on July 21, 1969, was Neil Armstrong, an American astronaut.
5. Like Earth, the moon does not have the light of its own. The moon can be seen in the sky because it reflects lights from the sun.
6. The moon is the second brightest object in the sky next to the sun. Its name is Luna.
7. It is about 406,676 kilometers away from the Earth with a diameter of 3,476 kilometers, approximately ¼ of the Earth's diameter, it is almost as large as Mercury.
8. It has no air and water.
9. It revolves around the Earth.
10. It makes one complete revolution every 27 days and 7 hours, and 43 minutes.

What is It

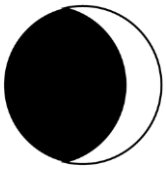
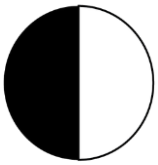
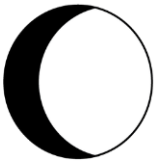
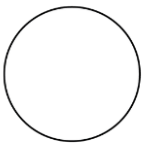
A **moon** is a massive, heavy rock ball that orbits a planet. The Earth has only one moon, while Mars has two, and Jupiter has a whopping 67! The moon doesn't have its own light source. It absorbs the light of the sun and reflects it to us.

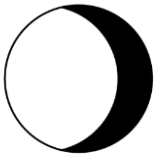
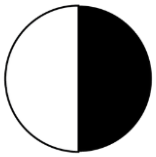
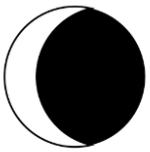
The Earth and the moon are 384,400 kilometers apart. The Earth revolves around the moon. It completes one full revolution every 27 days, 7 hours, and 43 minutes. It orbits the Earth at a distance of 406,676 kilometers and has a diameter of 3,476 kilometers, or around 14% of the Earth's diameter. It is almost as large as Mercury.

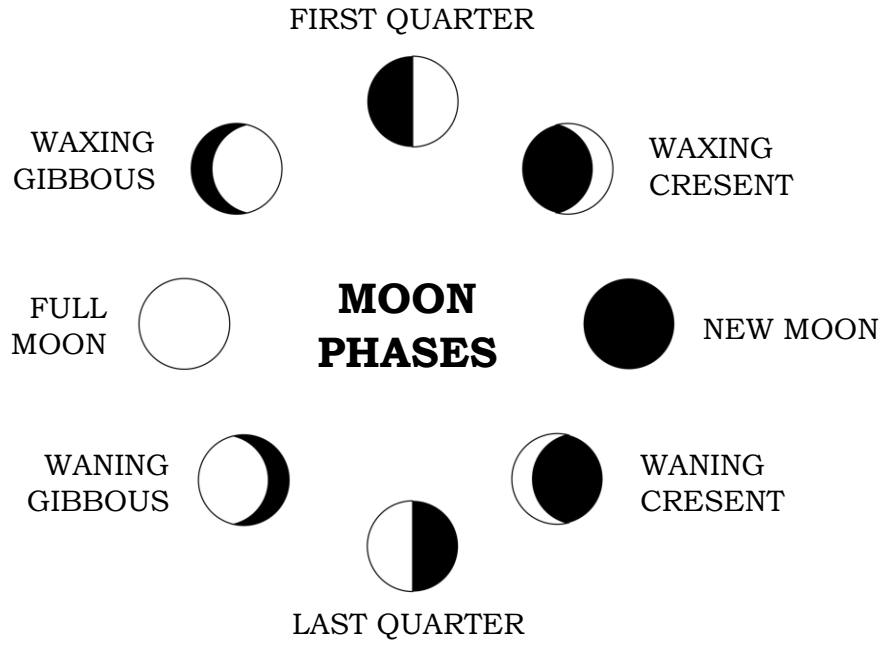
When it orbits around the Earth, the moon rotates from west to east. The shape of the moon appears to change as it rotates and orbits around the Earth. The various "shapes" of the moon are referred to as *phases*.

The shape of the moon that is illuminated and visible to the observer is known as the *phases of the moon*. New Moon, Waxing Crescent, First Quarter, Waxing Gibbous, Full Moon, Waning Gibbous, Last Quarter and Waning Crescent are the eight lunar phases.

The various phases of the moon, as well as their characteristics and illustrations, are shown below. *(All illustrations in this section are made by Mr. Reyson Joe G. Cañedo)*

Name of Phases of the Moon	**Characteristics**	**Illustration**
New Moon	In this phase, we cannot see the moon between the sun and the Earth. The sun shines on the side of the moon, which is away from the Earth.	
Waxing crescent	In this phase, we could see a tiny edge of the moonlight one or two days after a new moon. The moon appears to be growing, and it is in the midst of a waxing phase, wherein the moon started to take on a semicircular shape.	
First quarter moon	In this phase, we can see half of the moon's illuminated side about a week after the new moon.	
Waxing gibbous	In this phase, more than half of the moon is visible in the sky.	
Full Moon	In this phase, we can see the full lighted side of the moon a week after the first quarter moon when the Earth is between the moon and the sun throughout	

Name of Phases of the Moon	Characteristics	Illustration
	this phase. The full moon appears in the sky as a perfect circle.	
Waning gibbous	In this phase, it occurs when the lighted part of the moon becomes smaller.	
Last quarter moon	In this phase, the half lighted part of the moon can be seen again on the third week of the month. The moon soon disappears. Only then can it be replaced by another new moon.	
Waning crescent	In this phase, most of the moon is visible in the sky but decreasing every night time.	



What's More

Directions: Perform the following activities properly. Write your answers to the guide questions in your science notebook. ***(All illustrations in this section are made by Mr. Reyson Joe G. Cañedo)***

Activity 1. Describing the Characteristics of the Different Phases of the Moon

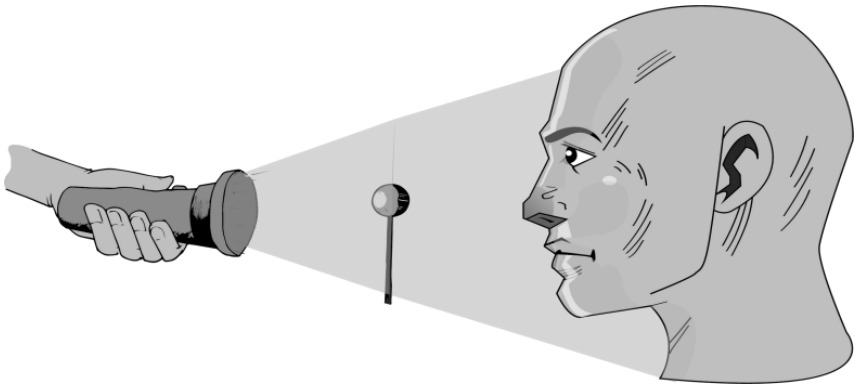
You Will Need:

- Human head (represents the Earth)
- Flashlight (represents the sun)
- Small ball (represents the moon)

Reminder: *Make sure NOT to focus the light directly towards the eyes*

What to Do:

1. Prepare the materials needed.
2. Turn off the lights in the room. Make sure that the room is dark enough to allow the flashlight's light to shine brightly.
   Note: It works best if you prepare a very dark set up.
3. Get the small ball (Moon) and let it orbit around the head (Earth).
4. Turn on the flashlight. Be sure to focus its light on the head.
5. Hold the small ball in between the head and the flashlight.
6. Turn the small ball slowly around the head. DO NOT MOVE THE FLASHLIGHT.
7. Observe what portion of the small ball reflects the light.
   (Note: human head represents the Earth, the small ball represents the moon, and the flashlight represents the sun)



Guide Questions:

1. On a piece of paper, draw the lighted portion of the small ball in different positions.
2. Did the small ball change its shape as it turned around the human head? Why?
3. What portion of the small ball reflects the light? Did the ball change its shape? Why?

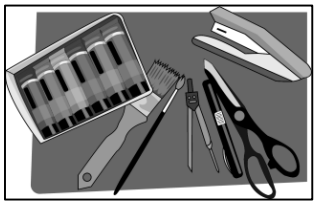
Activity 2. Moon Phases Slider

You Will Need:

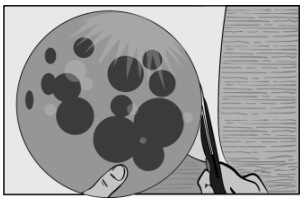
- Colored paper (blue, black)
- Bond paper
- Glue
- Scissor
- Staple
- Pencil
- Crayons

What to do:

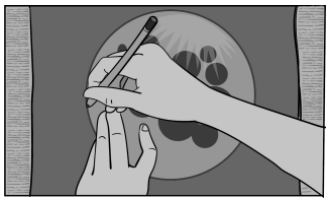
1. First, prepare the materials needed.



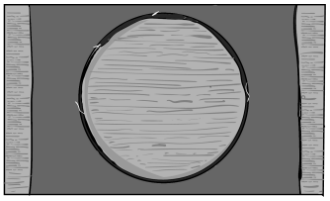
2. Draw a large circle (represent the moon) in a bond paper and cut it out.



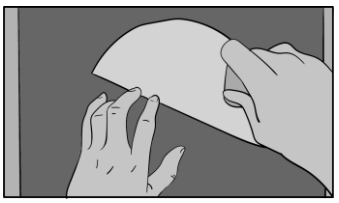
3. Using a pencil, trace the outline of your moon onto the center of a piece of rectangular-shaped blue colored paper.



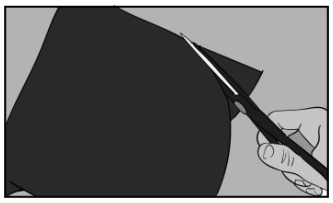
4. Now that you have the circle drawn onto the blue colored paper cut it out. (Be extra careful in using sharp objects).



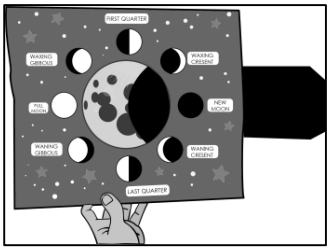
5. Glue your picture of the moon onto the center of bond paper. (You may put additional designs such as stars).



6. Take a large piece of black colored paper and cut it to the same width as your picture of the Moon. Trim the corners so that they are curved to form a half-circle. This long black piece of colored paper will act as the slider.



7. Lastly, take both pieces of colored paper and staple them together at the bottom and top. (making sure not to staple the sides, they should be left open). Move the slider back and forth to cast a shadow over the moon.



Guide Questions:

1. Did you enjoy the activity?
2. Using your improvised/finished moon phases slider, have you seen on it the different phases of the moon?
3. What are the different phases of the moon?

Lesson 2 Moon-Related Beliefs and Practices

Since they have such a significant influence on the lives of the people, the different phases of the moon are frequently associated with superstitious practices.

What's In

Directions: Let us look at your current understanding of the following topics by answering the questions below. Place your answers in your science notebook.

1. Have you ever heard of moon superstitions?
2. Do you believe in superstitions? Why?
3. Can you tell a story or stories about superstitions related to the moon?
4. Do you believe these stories about the moon? Why or why not?

What's New

Directions: List down at least three (3) superstitious beliefs that are associated with the moon. You may ask your parents or grandparents regarding moon-related superstitious beliefs. Write your answers in your science notebook.

What is It

Did you know that the moon is often associated with superstitious beliefs that influence our everyday lives? Why is this so? Superstitions are beliefs and traditions that existed before our ancestors. It has been passed on from generation to generation till modern times. People used to believe that the moon had a significant effect on their lives. The moon is used as a guide for them. It provides weather signals as well as information as to when to plant, harvest and catch fishes. Some of these beliefs and traditions are still practiced by some people nowadays.

The following are some of the moon-related superstitious beliefs:

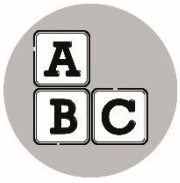
1. The moon influences our weather. When the Sun, Moon, and Earth are aligned, and the moon is closest to the Earth, you could expect lower temperatures. It's due to the Moon and the Sun's combined gravitational force. The moon has an impact on the atmosphere in the same way that it affects our oceans. The moon's gravitational pull causes the Earth and its waters to bulge during the full or new moon, and the same thing happens with the atmosphere.

2. The moon affects the occurrence of high and low tides. Tides are the rise and fall of sea level caused by the combined effect of the moon and sun's gravitational forces, as well as the Earth's rotation. There are two different types of tides. The moon is responsible for the ***low*** and ***high*** tides. High tides produce water bulges. Our fishermen believed that the increased number of fish they could catch is attributed to the moon.

3. Our farmers' ancestors believed that planting when the moon was in those phases was beneficial and would yield a good harvest. It is because they affect the rate of plant growth. According to them, from the new moon to the full moon, the soil moisture is at a higher level. Since it could help plant growth and production, many farmers prefer to sow their crop seeds at this time.

4. For a long time, people believed that the phases of the moon were related to the menstrual cycle in some way. The lunar cycle is about the same length as a woman's average menstrual cycle, which inspired this concept.

5. The full moon influences animal behavior. They howled at the moon and even in the dark sky, just like wolves. The presence of the moon influences certain animals, but it is the light that affects them, not the moon. They are more active and more likely to be out when there is more light.



What's More

Activity 1. Guided Practice

Directions: Explain the superstitious beliefs cited below. The rubrics below could serve as your scoring guide. Write your explanation in your science notebook.

1. It is favorable to plant seed between the new moon and the full moon.
2. The moon is responsible for the occurrence of high tide.

Rubrics for Activity 1

Criteria	5 points	3 points	1 point
Accuracy	The concept is very evident.	The concept is evident.	The concept is not so evident.
Delivery	Completeness of ideas explain is presented.	Some ideas are not presented/delivered.	The idea presented is not coherent with the explanation's made.

Activity 2. Independent Practice

Directions: Write a short paragraph about a belief that is related to the moon. The rubrics below could serve as your scoring guide. Place your output in your science notebook.

Rubrics for the Activity 2

Criteria	5 points	3 points	1 point
Accuracy	All given concepts are correct.	Most of the given concepts are correct.	Most of the given concepts are not correct.
Organization	Completeness of ideas explain is presented.	Some ideas are not presented/delivered.	The idea presented is not coherent with the explanation's made.

What I Have Learned

A. Directions: Read each statement carefully. Fill in the blank spaces with the missing terms or identify what is/are asked. Choose the correct answer inside the box below. Write your answers in your science notebook.

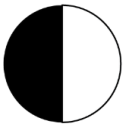
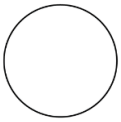
Phases	Moon	Superstitious	Bulge
High Tides	High and Low	Good Harvest	

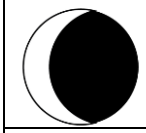
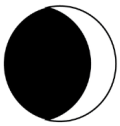
1. There are different _____ of moon.
2. _____ are beliefs based on opinions, observations, and experiences but have no scientific explanation.
3. The _____ are often associated with superstitious beliefs and practices.
4. Many farmers believe that planting when the moon is in specific phases may bring _____.
5. There are two types of tides. The _____ and _____ tides.
6. _____produce these water bulges.
7. When the phase of the moon is full Moon or new Moon, it causes a _____ in an ocean.

B. Directions: Give at least three (3) superstitious beliefs and practices associated with the moon. Write your answers in your science notebook.

What I Can Do

A. Directions: Give the name of the different Phases of the Moon. Number 1 is done for you. Place your answers in your science notebook.

 1. <u>New Moon</u>	 5. _____
 2._____	 6._____

 3._____	 7._____
 4._____	 8._____

B. Directions: Give at least two (2) beliefs and/or practices related to the moon that you are most likely to believe. Write your answer in your science notebook.

Assessment

I. **Directions:** Match the descriptions in Column A with the Phases of the Moon in Column B. Write the letter of the correct match on your science notebook.

Column A	**Column B**
1. A phase of the moon between the last quarter and the new moon.	A. First Quarter
2. The quarter phase of the moon is between the new moon and full moon.	B. Full Moon
3. The quarter phase of the moon is between the full moon and the new moon.	C. Last Quarter
4. A phase when the moon is not visible.	D. New Moon
5. A phase where you see the whole lighted side of the moon.	E. Waning Gibbous
	F. Waning Crescent

II. **Directions:** Write **T** if the statement is true and **F** if the statement is false. Write your answers in your science notebook.

6. Superstitions are beliefs having scientific explanation.
7. Moon can produce its light.
8. Ancient people believe that the moon has a direct influence on their lives.
9. The moon affects the moisture content of the soil.
10. During ancient times the moon served as a guide when to plant and to harvest.

Additional Activities

Directions: Observe the Moon for a week. Draw and describe its shape every night and place your output in your science notebook like the table below.

DAY	DRAW THE SHAPE OF THE MOON	DESCRIPTION

Answer Key

What I Know

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

Lesson 1

What's New

Answers may vary from learner's point of view.

What's More

1. Answers may vary from learner's point of view.
2. Yes, because as the light moves around the human head, it changes its shapes.
3. Yes, it is at the left side of the small ball that reflects the light. It changes the shape because as the lights move around the head, it creates another shape on the small ball.

What I Have Learned

1. Every night
2. We can see the moon up above the sky during night time.
3. No, it changes its shape. Sometimes it is half lighted and sometimes it is crescent and gibbous.
4. It changes its shape because of the different amount of light it reflects from the sun as it revolves around the Earth.

What I Can Do

Illustrated by Reyson Joe G. Cañedo

Assessment

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

Additional Activities

Answers may vary from learner's point of view.

Lesson 2 What's New

POSSIBLE ANSWER

1. During the ancient times, people believed that during full moon mythical creatures like aswang, encanto, kapre, tikbalang and tiyanak mostly appear.
2. Fishermen believe that the moon also affect the number of fishes they could catch.
3. Couples should marry during full moon because more blessing will be given to them.

LESSON 2

What's In

Answers may vary from learner's point of view.

1. Yes or No
2. Yes. I believe in superstitions.
   No. I don't believe in superstitions.
3. The moon controls fertility.
4. Yes. Because the elderly share stories about their experiences about the moon.
   No. Because I don't believe in superstitions.

Lesson 1 What's More Activity 2

1. Answers may vary from the lerner's point of view.
2. Yes I see different phases of the moon.
3. The different phases of the moon are new moon, waxing crescent, first quarter,waxing gibbous, full moon, waning gibbous, last quarter, and waning crescent.

What I Can Do

A.

1. New Moon
2. Full Moon
3. Waning Crescent
4. Waxing Crescent
5. First Quarter
6. Last Quarter
7. Waning Gibbous
8. Waxing Gibbous

B. *Possible answers:*

1. Planting when the moon was in those phases was beneficial and would yield a good harvest.
2. The moon influences animal behavior.

Assessment

1. f
2. a
3. c
4. d
5. b
6. F
7. F
8. T
9. T
10. T

What I have Learned

A.

1. Phases
2. Superstitions
3. Moon
4. Good Harvest
5. High and low
6. High Tides
7. Bulge

B. Possible Answer

- It is good to plant and may bring good harvest when the moon is in specific phases.
- Wolves howled during full moon and when the sky is dark.
- Fishermen believes that the moon affect the increased number of fishes they could catch

Lesson 2 What's More Activity 1

(Possible answers)

1. This belief tells us that a farmer has to plant their crops when moon is in its specific phases like full moon etc. and believes that this may bring good harvest.
2. Through the gravitational forces exist between the moon and earth to hold each other in their respective positions that affect Earth's tides. When one side of the Earth is close to the moon, the other side will be pulled towards moon causing to bulge which cause the ocean to rise and the other side experiences low water.

Additional Activities

(Possible Answer)

AUGUST	DESCRIPTION
Illustrated by Reyson Joe G. Cañedo	The other side of the moon is a little bit lighted and it started to increase its size.
Illustrated by Reyson Joe G. Cañedo	The moon started to increases its size and waiting to be a full moon.
Illustrated by Reyson Joe G. Cañedo	The moon is a little bit round. It starts to be a full moon.
Illustrated by Reyson Joe G. Cañedo	The moon is whole lighted side of the moon. The full moon appears as an entire circle in the sky.
Illustrated by Reyson Joe G. Cañedo	The full moon starts to disappear by decreasing its size.
Illustrated by Reyson Joe G. Cañedo	After the full moon it started to decreases its size until it becomes a gibbous moon.
Illustrated by Reyson Joe G. Cañedo	The moon decreases in size and now becomes a gibbous moon.

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