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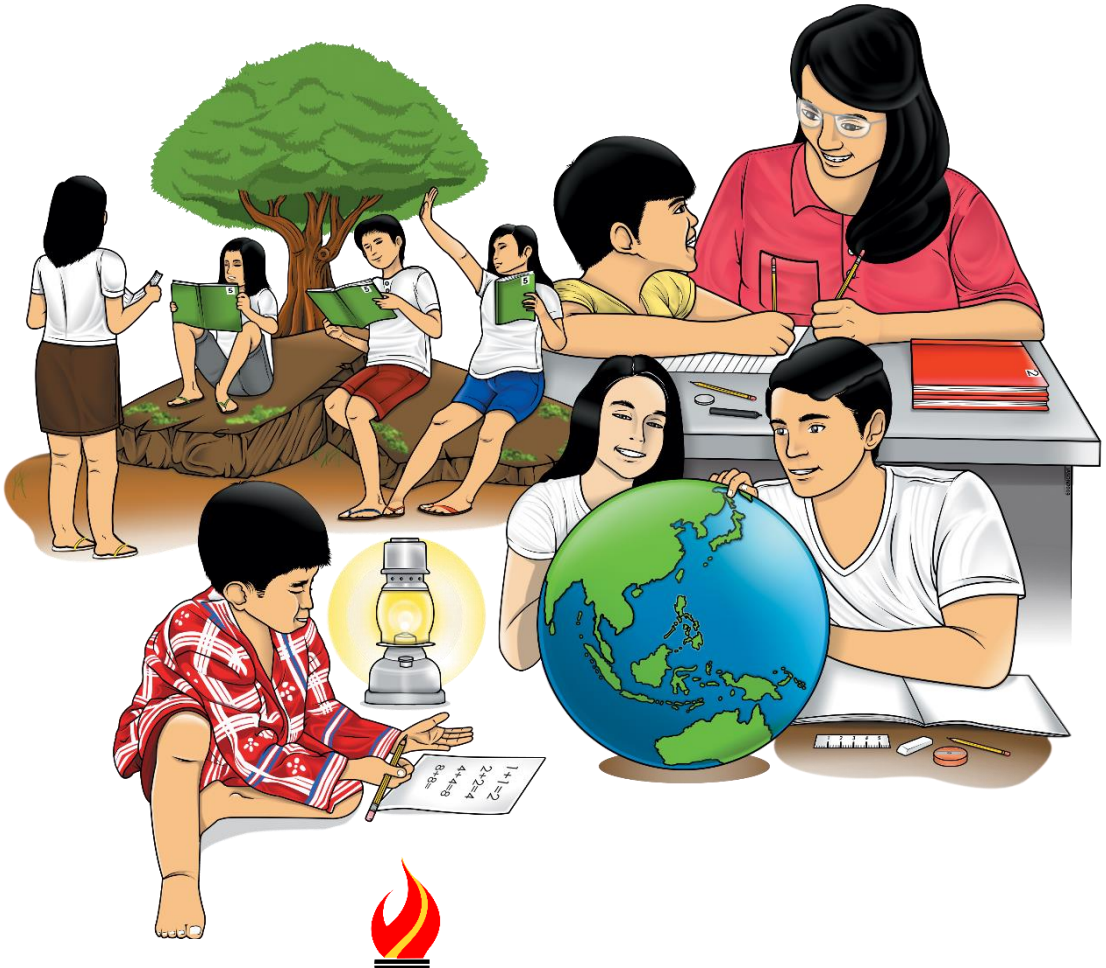
Science

Quarter 4 – Module 10:
Lights On or Lights Off?



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Science

Quarter 4 – Module 10:
Lights On or Lights Off?

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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

Hello my dear learner! How are you? Have you experienced being in dark and bright places? Do you observe that somehow behind you are something dark portion that is formed on the ground? If yes, that is a shadow. A shadow is formed when an opaque object is hit by light. This shadow formation is related to an astronomical phenomenon called eclipses. In this module you will understand how shadows are formed. And how it is related to the formation of eclipses.

Most Essential Learning Competency:

- Explain how solar and lunar eclipses occur using models.

This module is divided into two:

- **Lesson 1** – Solar Eclipse
- **Lesson 2** – Lunar Eclipse

After going through this module, you are expected to:

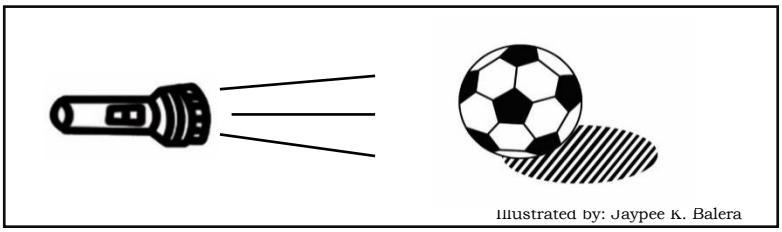
1. describe how shadows are formed;
2. describe solar eclipse;
3. describe lunar eclipse; and
4. determine the conditions for an eclipse to occur

What I Know

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

1. What will be formed when an opaque object blocks the path of light?
   A. Drawing
   B. Shadow
   C. Sound
   D. Wave

For items 2-3. Refer to the illustration below



2. Where does the shadow come from with respect to light?
   A. The source of light.
   B. The object that blocks the light.
   C. The given distance of the source of light.
   D. The position where the set-up is located.

3. Which of the following statements BEST describe a shadow?

> I. It is formed when light passes through a transparent object
> II. It is formed when an opaque object blocks the path of light
> III. It is the dark area beside an opaque object when the surrounding is bright
> IV. It is an area where light does not reach

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

4. Where can we mostly see shadows?

> I. Dark places where there is no source of light
> II. Bright places where opaque objects are present
> III. Dim places where opaque objects are present

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

5. Which of the following astronomical phenomena shows shadow formation?
   A. Eclipses
   B. Birth of a star
   C. Collision of asteroids
   D. Rotation of Earth on its axis

6. Which part of a shadow has all light been blocked?
   A. Umbra
   B. Penumbra
   C. Black Shadow
   D. Very Light Shadow

7. What do we call the outer part of the shadow where only part of the light is blocked?
   A. Umbra
   B. Penumbra
   C. Black Shadow
   D. Very Light Shadow

8. Which of these BEST shows solar eclipse?
   A. The sun is in between the moon and earth
   B. The moon is in between the sun and earth
   C. The earth is in between the sun and earth
   D. The earth is in between the moon and sun

9. Karen heard on the news that there will be an eclipse happening today. She has observed on the television that a black circle has covered the sun. She concludes that this phenomenon is solar eclipse. Is her conclusion TRUE?
   A. No, because solar eclipse can happen even without black circle.
   B. Yes, because the black circle is the shadow created during solar eclipse.
   C. No, because solar eclipse happens when the moon and the earth formed a black shadow.
   D. Yes, because the black circle~~s~~ is the moon that aligns with the sun creating a solar eclipse.

10. Jaypee performs an experiment about solar eclipse. He cut different sizes of circles where the sun is biggest followed by the earth and the moon. He aligned the three circles, with the earth in between the sun and the moon. Is his set-up CORRECT?
   A. Yes, because there is the sun.
   B. No, because the moon must be absent during solar eclipse.
   C. No, because the moon should be ~~is~~ at the center.
   D. Yes, because the three astronomical objects have different diameter and the alignment of the three where the earth is at the center causes solar eclipse.

Lesson 1

Solar Eclipse

What's In

Hello my dear learner! In the previous module, you have learned that the earth is the only living planet with different seasons. As it spins on its axis and goes around with the sun, its seasons are affected. The motion of the Earth with respect on its orbit really makes a difference. The key factor of this entire phenomenon is the main source of light which is the Sun. The Sun contributes on the formations of shadows which allows for eclipses to happen.

Aside from the sun which is the primary source of light can you list down 5 other objects that also produce light and contribute in the formation of shadows? Write it in a separate sheet of paper.

1.
2.
3.
4.
5.

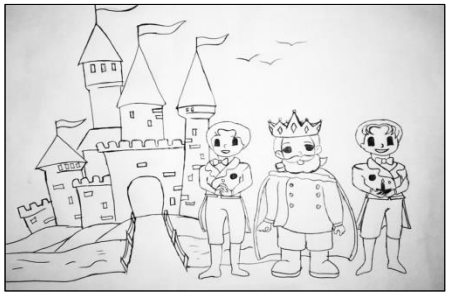
What's New

Hello! We have a little problem to face but I know you can do this. Read the story carefully and choose the best answer needed on the story by writing a big check on the circles found inside the box. I know that you're excited. Let's start!

The Brave Kingdom

by: Jaypee Kadalem Balera

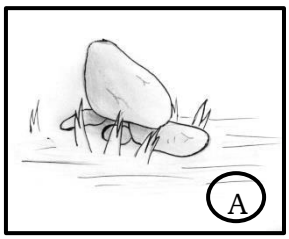
Once upon a time in a faraway land, there was a beautiful Kingdom. It was a Kingdom full of brave people. This Kingdom is named as the Brave kingdom of King Oculus. The King has two brave sons named Prince Dark-O and Prince Bright-O. Their father was already very old and at this time he needed to choose between them who would be the new King. Their father gave them a mission that whoever would defeat the queen of shadow and



Illustrated by: Jaypee K. Balera

eliminate fear from the kingdom would be crowned as the new King. Before they proceed with the mission, their father told them the top secret in order to defeat the queen. They should be able to fill everything inside the cave of shadow where the queen lived without leaving any space. With bravery and love for their father as well as the kingdom, the two princes followed the order of their father and went to the kingdom of the queen Darkesta.

Can you help the two princes decide which weapon should they use in order to defeat the Queen? Choose the letter of the correct answer and write it in a separate sheet of paper.



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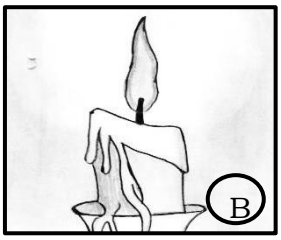

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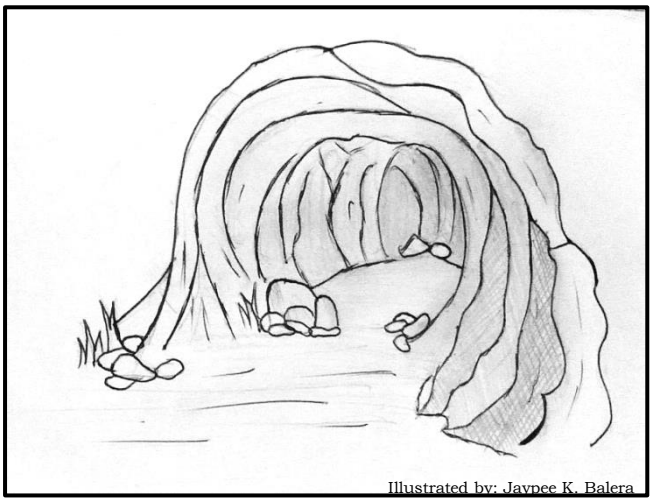
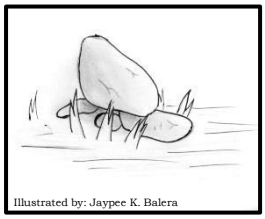

Illustrated by: Jaypee K. Balera

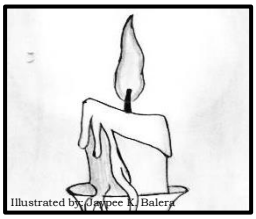
At this time, Prince Dark-O starts the battle with the Queen; he used the first weapon by using an opaque object which is big rocks. He filled and closed the whole cave with big rocks but unfortunately the queen is very powerful in terms of filling the empty spaces with darkness. Prince Dark-O failed because he was not be able to fill all the empty spaces inside the cave. Prince Bright-O used the second weapon, he lighted the candles and fortunately he was able to brighten the cave and fill all the empty spaces inside. The powerful queen was not able to defeat the powerful weapon of prince Bright-O and was defeated. The kingdom of the Brave lived happily with Prince Bright-O as the new crowned king. The darkness was already covered with brightness and the shadow and fear was already filled with brightness and gladness until the source of light was present inside the cave. But behind it, when the source of light strikes an opaque object, the shadow of darkness will remain a threat. So, King Bright-O ordered all his people not to go into the cave forever.

- Supplemental Activity:

Directions: Read and understand the questions carefully. Write the letter of your answer on a separate sheet of paper.

1. What is an example of an opaque object?


Illustrated by: Jaypee K. Balera
A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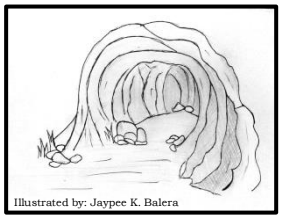
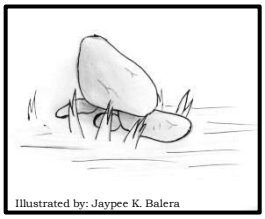
B


Illustrated by: Jaypee K. Balera
C


Illustrated by: Jaypee K. Balera
D

2. Which of the following object emits light?

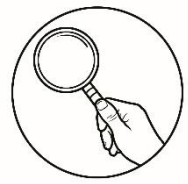


A

B

C

D



What is It

Shadows are present whenever light is blocked by an opaque object. It is the area where light does not reach. The best example is when you stand underneath the sunlight; you are able to see your shadow behind you. When the Sun is lowest in the sky, it makes the longest shadows. Shadows are formed when an opaque object comes in the path of light or an object or material is placed in the path of rays of light.

Opaque objects do not allow light to pass through them. Transparent objects allow light to pass through them and we can see through these objects clearly. The light rays that go past the edges of the opaque object makes an outline for the shadow. When objects block light, shadows are made.

Let us bear in mind that opaque or translucent objects can make shadows. An opaque material makes a dark shadow. A translucent material makes a faint shadow. A transparent material cannot make any shadow.

When the sun, the moon and the earth are aligned and the moon blocks the sunlight, and the moon casts a shadow on earth as seen on Figure 1. This is what we call solar eclipse.

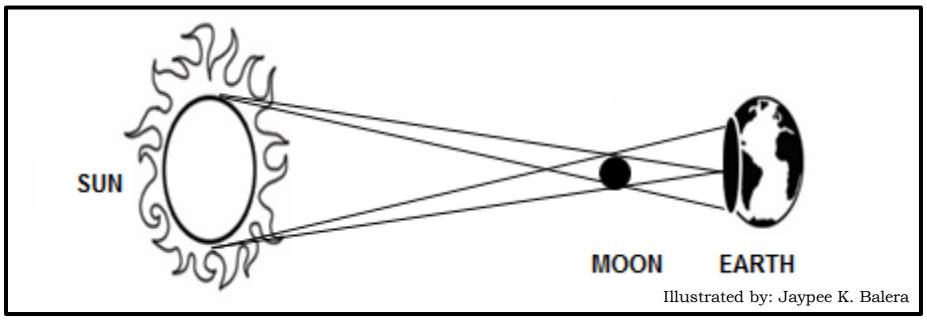


Fig.1 Solar Eclipse

A solar eclipse only happens during day time when the position of the Moon is in between the sun and the earth. However, a solar eclipse does not happen every time the moon is in between the sun and the earth. The three astronomical objects needs to be perfectly aligned for it to happen. If the Sun, the earth and the moon are not aligned, eclipses will not happen. They do not happen every month because the Earth's orbit around the sun is not in the same plane as the Moon's orbit around the Earth.

When shadows are formed, there are areas where the light is totally blocked while other areas are still partially lighted. Umbra is a part of a shadow in which all light has been blocked, while Penumbra is when only a part of the light is blocked so the light is dimmed but not totally absent.

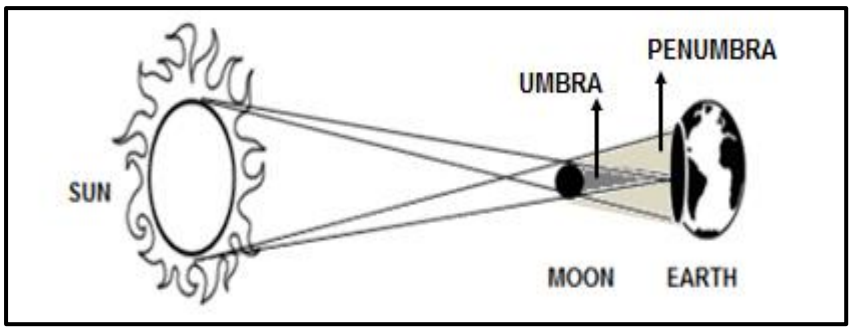


Fig 2. Umbra and Penumbra

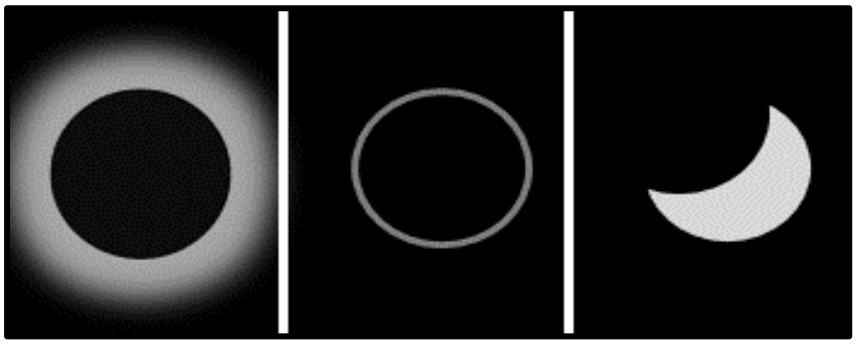


Fig. 3 Types of Eclipse Illustrated by: Jaypee K. Balera

There are three types of solar eclipse as shown above. A total solar eclipse occurs when the Moon completely covers the Sun, as seen from Earth. However, a partial solar eclipse happens when the Moon only partially covers the disk of the Sun and annular solar eclipse occurs when the moon covers the Sun's center, leaving its outer edges to form a "ring of fire" or annulus. The phase of the moon during a solar eclipse is New moon.

Solar eclipse is one spectacular astronomical phenomenon, but viewing eclipses using our naked eye is not advisable because of its damaging effect in the human eye. When you want to look at this phenomenon please be careful and bear in your mind of the following precautionary measures; do not stare directly at the sun; do not use homemade or improvised filters or ordinary sunglasses, even very dark sunglasses rather use special-purpose solar filters, such as eclipse glasses or handheld solar viewers or you may make a pinhole projector by poking a hole in a piece of paper and project an image of the sun onto another paper to view the eclipse as shown below.

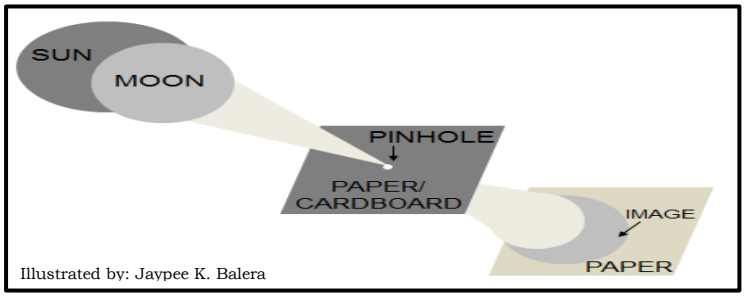


Fig. 4 Pinhole Projector

What's More

Directions: Find any device that can produce light (cellphone or flashlight). Draw and cut two circles made of paper with different sizes or any spherical objects with different sizes. The bigger size will be the Earth and the smaller size will be the moon. Then, put a stand at the back of the circles made of paper or on the spherical objects align them. Arrange the materials as shown in figure 4.

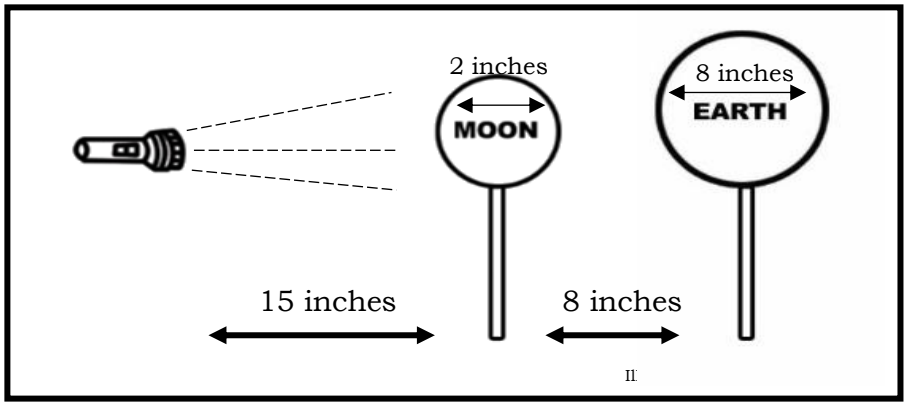


Fig. 4. Solar Eclipse Set up

Guide Questions:

1. What does the flashlight represent?
2. What happened when the flashlight shined on the aligned circles?
3. What is the object that produces shadow?
4. What is the object that is hit by the shadow?
5. How does a solar eclipse occur?

Rubric in scoring guide question number 5.

	4	3	2	1
Content	Shows thoughtful analysis, connections and more evidences presented.	Shows analysis, connections and some evidences presented.	Shows inconsistent analysis, connections and few evidences presented.	Does not include adequate analysis, connections and no evidences presented.
Organizations	Well-organized information's was included.	Organized information's was included.	Poorly organized information's was included.	Misleading and confusing information was included.
Style	Strong word choice and smoothly written sentences.	Good word choice, sentence easy to read.	Inconsistent word choice, some bumpy sentences.	Poor word choice.

What I Have Learned

Directions: Read the paragraph carefully and identify the correct words that fit in the given sentences in the box below. Write your answer on a separate sheet of paper.

shadow	longest	opaque	dark
faint	transparent	day time	not
umbra	penumbra	damaging	moon
precautionary	Pinhole projector	significant	light
sun	star		

(1) _____ is the result when the light is blocked by an opaque object. when the Sun is lowest in the sky, it makes the (2) _____ shadows. Shadows are formed when an (3) _____ object comes in the path of light or an object or material is placed in the path of rays of light.

Shadow formation is affected by the types of materials the light hits. An opaque material makes a (4) _____ shadow. A translucent which material makes a (5) _____ shadow and a (6) _____ material cannot make any shadow.

A solar eclipse only happens during (7) _____ as the Moon moves between the sun and the earth. However, if the Sun, the earth and the moon are not aligned, eclipses will (8) _____ happen.

There are two types of shadows formed during eclipses called the umbra and penumbra. (9) _____ is a part of a shadow in which all light has been blocked, while (10) _____ is when only a part of the light is blocked so the light is dimmed but not totally absent.

Solar eclipse is one spectacular astronomical phenomenon we experience but viewing this phenomenon using our naked eye is not advisable because of its (11) _____ effect in the human eye. Let us follow (12) _____ measures; do not stare directly at the (13) _____. We may use special-purpose solar filters, such as eclipse glasses or handheld solar viewers or you may make a (14) _____ by poking a hole in a piece of paper and project an image of the sun onto another paper to view the eclipse.

What I Can Do

Directions: Explain why we don't have eclipses every month. Write tour answer on the space provided.

_____

_____

_____

_____

_____

_____

_____

	4	3	2	1
Content	Shows thoughtful analysis, connections and more evidences presented.	Shows analysis, connections and some evidences presented.	Shows inconsistent analysis, connections and few evidences presented.	Does not include adequate analysis, connections and no evidences presented.
Organizations	Well-organized information's was included.	Organized information's was included.	Poorly organized information's was included.	Misleading and confusing information was included.
Style	Strong word choice and smoothly written sentences.	Good word choice, sentence easy to read.	Inconsistent word choice, some bumpy sentences.	Poor word choice.

Assessment

Directions: Read and understand the questions carefully. Write the letter of your answer on a separate sheet of paper.

1. Which of the following astronomical phenomena shows shadow formation?
   A. Eclipses
   B. Birth of a star
   C. Collision of asteroids
   D. Rotation of Earth on its axis

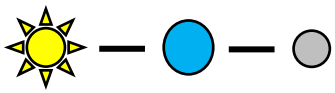
2. What part of a shadow has all light been blocked?
   A. Umbra
   B. Penumbra
   C. Black shadow
   D. Dimmed shadow

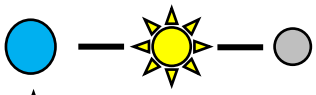
3. What part of the shadow is dimmed but light is not totally absent.
   A. Umbra
   B. Penumbra
   C. Black shadow
   D. Dimmed shadow

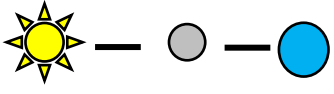
4. Which of the following is an astronomical phenomenon's that produce shadows on earth?
   A. Lunar eclipse
   B. Total black out
   C. Umbra and Penumbra
   D. Solar Eclipse

5. Which of the following astronomical bodies produces light?
   A. Asteroid
   B. Earth
   C. Moon
   D. Sun

6. Which of the following is the correct alignment for solar eclipses to occur? The blue circle represents Earth and the small gray circle represents the moon

A. 

B. 

C. 

D. 

7. Which of the following is the best way to view an eclipse?

A. Using mirrors
B. Using naked eye
C. Using sun glasses
D. Using pinholes projectors

8. What is the best position of the sun in the sky if you want to observe a longest shadow?

A. Absent in the sky
B. Middle in the sky
C. Lowest in the sky
D. Highest in the sky

9. Which of the following objects makes faint shadow?

A. Opaque
B. Solid
C. Translucent
D. Transparent

10. Which of the following objects makes dark shadow?

A. Opaque
B. Solid
C. Translucent
D. Transparent

11. Which of the following shows why some objects don't form shadows?

I. It is because some objects is transparent II. It is because some objects do~~es~~ not block the light III. It is because some objects is made from opaque materials

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

12. Which of the following statements shows scientific basis on the things to do during eclipses?

I. During eclipse a big disaster will happen. II. The moon produced shadow to the earth. III. Focusing our eyes to solar eclipse is prohibited.

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

13. Which of the following statement shows why eclipses don't happen every month?

A. The Earth's orbit around the sun is not in the same plane as the Moon's orbit around the Earth.
B. The Sun orbit around the Earth is not in the same plane as the Earth's orbit around the Moon.
C. The Moon's orbit around the sun is not in the same plane as the Sun orbit around the Earth.
D. The Moon's orbit around the Earth is not in the same plane as the Sun orbit around the Moon.

For items number 14-15. Read the selection carefully.

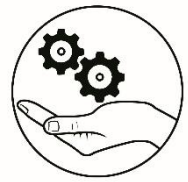
Toby is asked to observe an astronomical phenomenon. Without using any device, he observed that the Moon covers the sun and it produced a huge shadow on the earth. He concluded that the phenomenon is called Solar Eclipse.

14. Was his conclusion CORRECT?

A. No, because the phenomenon is called lunar eclipse.
B. No, because the earth must cover the moon to be called solar eclipse.
C. Yes, because when there is a shadow formation it is always called solar eclipse.
D. Yes, the moon covers the sun and produce shadows to the earth.

15. Was his method in observing the eclipse using his naked eye RIGHT?

A. Yes, because it is the best way.
B. Yes, because it is the safest and recommended way of observing.
C. No, because using our naked eye in observing solar eclipses is not recommended by the faith healers.
D. No, because our eye may be damaged due to solar radiation.



Additional Activities

Directions: List down 5 occurrences of solar eclipse in the Philippines. Write the letter of your answer on a separate sheet of paper.

Date and time
1.
2.
3.
4.
5.

Guide Questions:

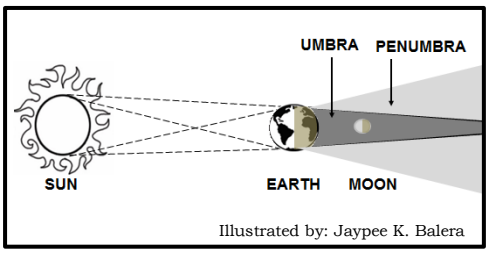
Directions: Read the questions carefully. Write the letter of your answer on a separate sheet of paper.

1. When do solar eclipses happen?
2. Is a solar eclipse a common occurrence in the Philippines? Why or why not?

What I Know

Directions: Read and understand the questions carefully. Write the letter of your answer on a separate sheet of paper.

1. What is the correct alignment for a lunar eclipse to occur?
   A. Sun – Moon – Earth
   B. Earth – Moon - Sun
   C. Sun – Earth - Moon
   D. Earth – Sun – Moon



2. Looking at the figure above, what is the main source of light?
   A. Asteroid
   B. Earth
   C. Moon
   D. Sun

3. Which of the following statements best describes a lunar eclipse?

I.	The moon must pass within the shadow of the earth
II.	The earth must be between the sun and moon
III.	III. The arrangement must be sun, earth and the moon.

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

4. Where can we mostly experience lunar eclipse?

I. When night time.
II. When the earth is aligned and in between the sun and moon
III. When the moon is aligned and in between the sun and earth

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

5. What astronomical object is not included during lunar eclipse?
   A. Asteroid
   B. Earth
   C. Moon
   D. Sun

6. What astronomical objects produce shadow during lunar eclipse?

A. Corona
B. Earth
C. Moon
D. Sun

7. Which of the following statements describe lunar eclipse?

I. During this phenomenon the Moon is the one gives off light
II. During this phenomenon the Moon moves into the Earth's shadow
III. During this phenomenon the Sun, Earth, and Moon are exactly or very closely aligned with the Earth between considering only on the night of a full moon.

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

8. Jaypee and Karen perform an experiment about lunar eclipse. They cut different sizes of circles where the sun is biggest followed by the earth and the moon. They align the circles starting from the sun, the earth and the moon. Was the set-up CORRECT for lunar eclipse?

A. Yes, because there is the sun.
B. Yes, because the earth is at the center during lunar eclipse.
C. No, because the moon must be at the center during lunar eclipse.
D. No, because the set-up shows solar eclipse because the earth is at the center.

9. What phase of the moon does lunar eclipse occur?

A. New moon
B. Full Moon
C. Third Quarter
D. Waxing gibbous

10. When does lunar eclipse occur?

A. Sunset
B. Night time
C. Noontime
D. Sunrise

Lesson 2

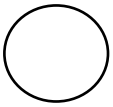
Lunar Eclipse

What's In

Hello my dear learner! In the previous lesson, you have learned that shadows are nothing but space when the light is blocked by an opaque object. Opaque objects do not allow light to pass through them. Translucent objects allow light to pass through them and we can see through these objects clearly. An opaque material makes a dark shadow, a translucent material makes a faint shadow and a transparent material cannot make any shadow. A solar eclipse is one example of an astronomical phenomenon involving shadows, and it only happens during daytime when the position of the moon is in between the sun and the earth. However, if the Sun, the earth and the moon are not aligned, eclipses will not happen. They do not happen every month because the Earth's orbit around the sun is not in the same plane as the Moon's orbit around the Earth.

This time we will talk about the other type of eclipse. As we go along you will be oriented with another phenomenon that happens during night time involving shadow formation.

Using the astronomical objects below, arrange them according to the arrangement of lunar eclipse. Write your answer on a separate sheet of paper.

		
EARTH	SUN	MOON

Illustrated by: Jaypee K. Balera

_____ - _____-_____

What's New

Directions: Read and understand the poem carefully in order to answer the guide questions. Write your answer on a separate sheet of paper.

LIFE AT NIGHT

by: Jaypee Kadalem Balera

When I was in the dark
Light is dimmed with less spark
I feel you have me your mark
Seeing you and me are not apart

Shadows in the night
When I see you above, why you are so bright?
You lead me like you are my light
Your always perfect at my sight

They say you're a strange blood moon
Your color is red and be back soon
You always light even my dark room
Make my surroundings at night bloom

You are really an amazing phenomenon
Witnessing your beauty that is in gloom
When you move into the Earth's shadow
You make yourself always in glow

Guide Questions:

1. What is the characteristic of light as it is presented in first stanza?
2. What is the position of the light as presented in second stanza?
3. What astronomical objects presented in third stanza?
4. What is the color of the astronomical objects in third stanza?
5. What is the astronomical object that produces the shadow in fourth stanza?
6. What time did the astronomical phenomenon happen according to the poem?

What is It

When there is an eclipse happening during daytime, there is also an eclipse during nighttime. It is called lunar eclipse. A lunar eclipse occurs when the Moon moves into the Earth's shadow. This can occur only when the Sun, Earth, and Moon are exactly or very closely aligned with the Earth between considering only on the night of a full moon.

Lunar eclipses can only happen when the moon is opposite the Sun in the sky, during a full moon phase. But lunar eclipses do not occur every month because the Moon's orbit is tilted five degrees from Earth's orbit around the Sun. Without the tilt, lunar eclipses would occur every month. In most calendar years there are two lunar eclipses; in some years one or three or none occur. During a total lunar eclipse, the Earth moves between the Sun and the Moon and cuts off the Moon's light supply. When this happens, the surface of the Moon takes on a reddish glow instead of going completely dark.

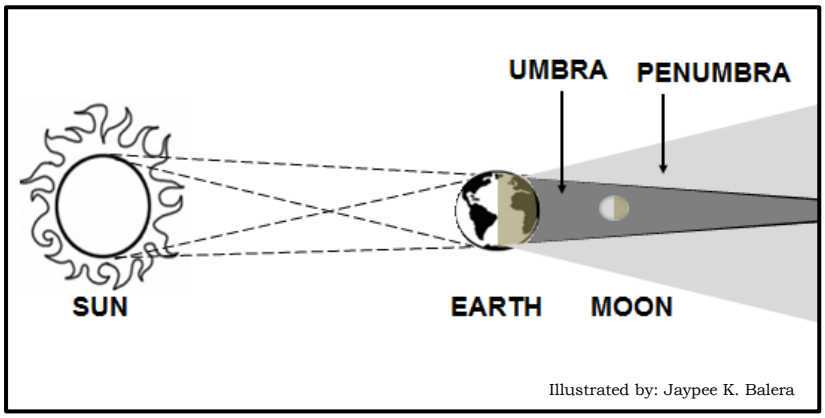
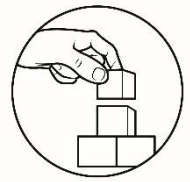


Fig. 6. Lunar Eclipse

The figure above shows the formation of shadows on the three astronomical objects. A lunar eclipse only happens during nighttime as the position of the Earth is at the center of the sun and the moon, unlike the solar eclipse which happens during daytime. A lunar eclipse can be seen from Earth at night. There are three types of lunar eclipses: total lunar eclipses, partial lunar eclipses and penumbral lunar eclipse.

A total lunar eclipse occurs when the moon and the sun are on exact opposite sides of Earth and the mon is within the umbra of the shadow of the Earth. Although the moon is in Earth's shadow, some sunlight reaches the moon. The sunlight passes through Earth's atmosphere, which causes Earth’s atmosphere to filter out most of the blue light. This makes the moon appear red to people on Earth while a partial lunar eclipse happens when only a part of the moon enters Earth's shadow. In a partial lunar eclipse, Earth's shadow appears very dark on the side of the moon facing Earth. What people see from Earth during a partial lunar eclipse depends on how the sun, Earth and moon are lined up. On the other hand, penumbral lunar eclipse occurs when the moon become completely immersed in the penumbral cone of the earth’s shadow without touching the umbra. Since the penumbra is much fainter than the dark core of the Earth’s shadow, the umbra, a penumbral eclipse of the moon is often difficult to tell apart from a regular full moon.

Even though lunar eclipse is perfectly safe to watch with the naked eye it is better to use proper instruments and follow safety precautions like eclipse glasses for your eye protection.



What's More

Find any device that can produce light (cellphone or flashlight) that will serve, as the sun. Draw and cut two spherical objects made of paper with different sizes. The bigger size will be the Earth and the smaller size will be the moon. Then, put a stand at the back of the circles made of paper and align them accordingly. It is advised that you do this activity in a dark area/room. Arrange the materials as shown in figure 7.

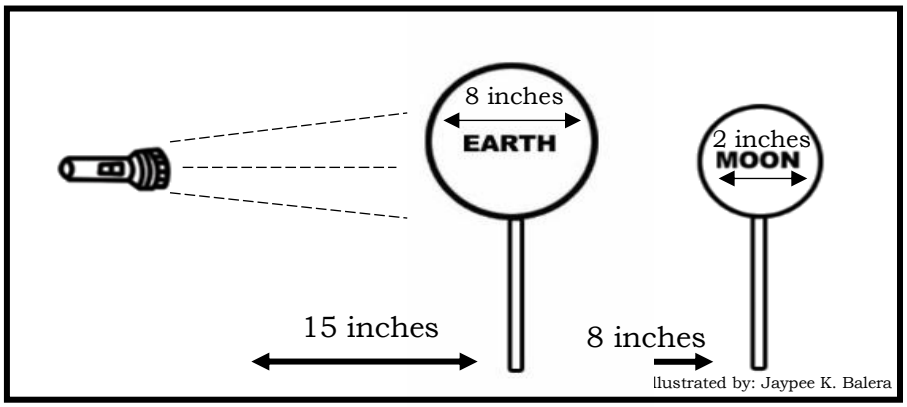


Fig. 7. Lunar Eclipse Set up

Guide Question:

1. What does the flashlight represent?
2. What happened when the flashlight shined on the aligned circles?
3. What is the object that produces shadow?
4. What is the object that is hits by the shadow?
5. How does a lunar eclipse occur?

Rubric in scoring guide question number 4.

	4	3	2	1
Content	Shows thoughtful analysis, connections and more evidences presented.	Shows analysis, connections and some evidences presented.	Shows inconsistent analysis, connections and few evidences presented.	Does not include adequate analysis, connections and no evidences presented.
Organizations	Well-organized information's was included.	Organized information's was included.	Poorly organized information's was included.	Misleading and confusing information was included.

What I Have Learned

Directions: Read the paragraph carefully and identify the correct words that fit in the given sentences in the box below. Write your answer on a separate sheet of paper.

night time	Earth	full moon	tilted
light	reddish	total	partial
between	aligned	daytime	Sun

Lunar eclipse happens during (1) _____. It is a type of eclipse that occurs when the Moon moves into the (2) _____ shadow. This can occur only when the Sun, Earth, and Moon are exactly or very closely (3) _____ with the Earth in between considering only on the night of a (4) _____.

Lunar eclipses do not occur every month because the Moon's orbit is (5) _____ five degrees from Earth's orbit around the Sun. During a total lunar eclipse, the Earth moves (6) _____ the Sun and the Moon and cuts off the Moon's (7) _____ supply. When this happens, the surface of the Moon takes on a (8) _____ glow instead of going completely dark. There are two types of lunar eclipses: total lunar eclipses and partial lunar eclipses. A (9) _____ lunar eclipse occurs when the moon enters the umbra of the Earth's shadow while (10) _____ lunar eclipse happens when only a part of the moon enters the umbra of Earth's shadow. Even though lunar eclipse is perfectly safe to watch with the naked eye it is better to use proper instruments and follow safety precautions like eclipse glasses for your eye protection.

What I Can Do

Directions: Between solar and lunar eclipse, which is harder to observe. Explain Write your answer on the space provided.

_____

_____

_____

_____

_____

_____

_____

	4	3	2	1
Content	Shows thoughtful analysis, connections and more evidences presented.	Shows analysis, connections and some evidences presented.	Shows inconsistent analysis, connections and few evidences presented.	Does not include adequate analysis, connections and no evidences presented.
Organizations	Well-organized information's was included.	Organized information's was included.	Poorly organized information's was included.	Misleading and confusing information was included.
Style	Strong word choice and smoothly written sentences.	Good word choice, sentence easy to read.	Inconsistent word choice, some bumpy sentences.	Poor word choice.

Assessment

Directions: Read and understand the questions carefully. Write your answer on a separate sheet of paper.

1. Which astronomical object~~s~~ produces light?
   A. Asteroid
   B. Earth
   C. Moon
   D. Sun

2. What astronomical phenomenon will happen when the earth is in between the sun and moon?
   A. Solar eclipse
   B. Annular eclipse
   C. Lunar eclipse
   D. Partial-solar eclipse

3. Which astronomical object~~s~~ produces a shadow during a lunar eclipse?
   A. Asteroid
   B. Earth
   C. Moon
   D. Sun

4. Which of the following statements, BEST describes a lunar eclipse?

I. It is a phenomenon when moon moves into the shadow of the earth.
II. It is phenomenon when earth moves in between the sun and moon.
III. It is a phenomenon when the sun strikes the earth and produce shadows.

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

5. Which of the following astronomical object moves into the shadow~~s~~ of the earth during lunar eclipse?
   A. Asteroid
   B. Meteor
   C. Moon
   D. Sun

6. What astronomical object~~s~~ turns in reddish color during lunar eclipse?
   A. Earth
   B. Meteor
   C. Moon
   D. Star

7. Which of the following astronomical object is NOT involved during lunar eclipse?
   A. Mars
   B. Earth
   C. Moon
   D. Sun

8. Which of the following statements shows the movement of the moon during lunar eclipse?

I. Moon passes through sun's shadow. II. Moon passes through earth's shadow. III. Moon moves behind its own shadow. IV. Moon moves behind the earth's shadow.

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

9. Which of the following is the correct alignment of lunar eclipses?
A. Sun – Moon – Earth
B. Earth – Sun - Moon
C. Earth – Moon – Sun
D. Sun – Earth – Moon

10. During lunar eclipse, the sunlight passes through Earth's atmosphere, which causes Earth's atmosphere to filter out most of the blue light. With blue light filtered out, how will the moon look during a lunar eclipse?

A. The moon will look red
B. The moon will look gray
C. The moon will look yellow
D. The moon will still look the same

11. What phase of the moon does lunar eclipse happen?
A. New Moon
B. Full Moon
C. Waxing Crescent
D. Waning Crescent

12. Which of the following statements shows the occurrence of lunar eclipse?

I. It happens during nighttime. II. It happens when moon moves into the earth's shadow. III. It happens when earth moves into the moon's shadow.

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

13. Which of the following statements shows scientific basis on the things to do during eclipses?

I. During eclipse the moon is crying. II. Moon moves into the earth's shadow. III. Observing lunar eclipse with our naked eye is safe.

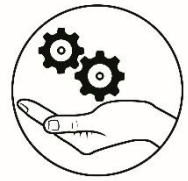
A. I and II only
B. I and III only
C. II and III only
D. I, II and III

For items number 14-15. Read the selection carefully.

Cloe, Karlee and Toby are asked to observe an astronomical phenomenon that happens tonight. They directly observed the Moon turning red thus, she concluded that the phenomenon is called Lunar Eclipse.

14. Is their conclusion CORRECT?
    A. No, because the phenomenon is called solar eclipse.
    B. No, because the moon must be brownish color to be called lunar eclipse.
    C. Yes, because when there is a shadow formation it is always called lunar eclipse.
    D. Yes, because it happens at night and the color of the moon that time is a manifestation that there is a lunar eclipse.

15. Do their procedure in observing the eclipse using their naked eye RIGHT even during nighttime?
    A. Yes, because it is safe to observe lunar eclipse.
    B. Yes, because but make sure it is only your right eye.
    C. No, because using our naked eye is not recommended by the expert.
    D. No, because our naked eye is not an instrument to use and observe eclipses.



Additional Activities

Directions: List down 5 occurrences of lunar eclipse in the Philippines. Write your answer on a separate sheet of paper

Date and time
1.
2.
3.
4.
5.

Guide Questions:

Directions: Read the questions carefully. Write the letter of your answer on a separate sheet of paper.

1. When do lunar eclipses happen?

2. Is a lunar eclipse a common occurrence in the Philippines? Why or why not?

Answer Key

Lesson 1

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

What's New
1. A
2. B

What's More
1. Sun
2. It produces shadow
3. Moon
4. Earth
5. When the three astronomical bodies aligned together. (Sun-Moon-Earth)

What I Have Learned
1. Shadow
2. Longest
3. Opaque
4. Dark
5. Faint
6. Transparent
7. Daytime
8. Not
9. Umbra
10. Penumbra
11. Damaging
12. Precautionary
13. Sun
14. Pinhole projector.

What Can I Do
(answers may vary)
An eclipse does not happen every month because the Earth's orbit into the Sun is not the same place as the moon orbits to the Earth.

Assessment
1. A
2. B
3. B
4. D
5. D
6. C
7. D
8. C
9. C
10. A
11. D
12. C
13. C
14. D
15. D

Additional Activity
(data may vary)
1. June 10, 2002
2. July 22, 2009
3. Jan 15, 2010
4. May 20, 2012
5. May 20, 2013
Guide questions:
1. Daytime
2. No

Lesson 2

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

What's In
SUN- EARTH- MOON

What's More
1. Sun
2. It produced shadow
3. Earth
4. Moon
5. When the Sun-Earth- Moon aligned together

What's New
1. dark or bright
2. up above
3. Moon
4. Red
5. Night

What I Have Learned
1. Nighttime
2. Earth
3. Alligned
4. Full Moon
5. Tilted
6. Between
7. Light
8. Reddish
9. Total
10. Partial

What I Can Do
It is the Penumbral Lunar Eclipse because of this, it can be difficult to spot, and the eclipsed Moon can look like a regular Full Moon.

Assessment
1. D
2. C
3. B
4. C
5. C
6. C
7. A
8. C
9. D
10. A
11. B
12. A
13. C
14. D
15. A

References

BOOKS

Asuncion, Alvie J., Ph.D. Catalan, Maria Helen D.H. et.al. *K to 12 Grade 7 Science Learner's Material.* First. Pasig City, NCR: Department of Education, 2017.

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