

Name: _____ Date: _____ Pd. _____

The Moon

The Moon is Earth's natural _____.

The Moon _____ around Earth every _____ days. It _____ on its axis every _____, too!

This means that we always see the _____ side of the Moon.

We see the Moon because it _____ light from the _____.

Moon Phases

Each month, the Moon _____ in appearance.

These changes are called _____.

The phase of the Moon you see depends on how much of the _____ side of the Moon faces us.

Copy the Waxing and Waning Moon phases below.

Copy the cycle of Moon Phases below.

Name: _____ Date: _____ Pd. _____

Reading Comprehension - Unit E, Chapter 2.2 (pgs. E52-E57)

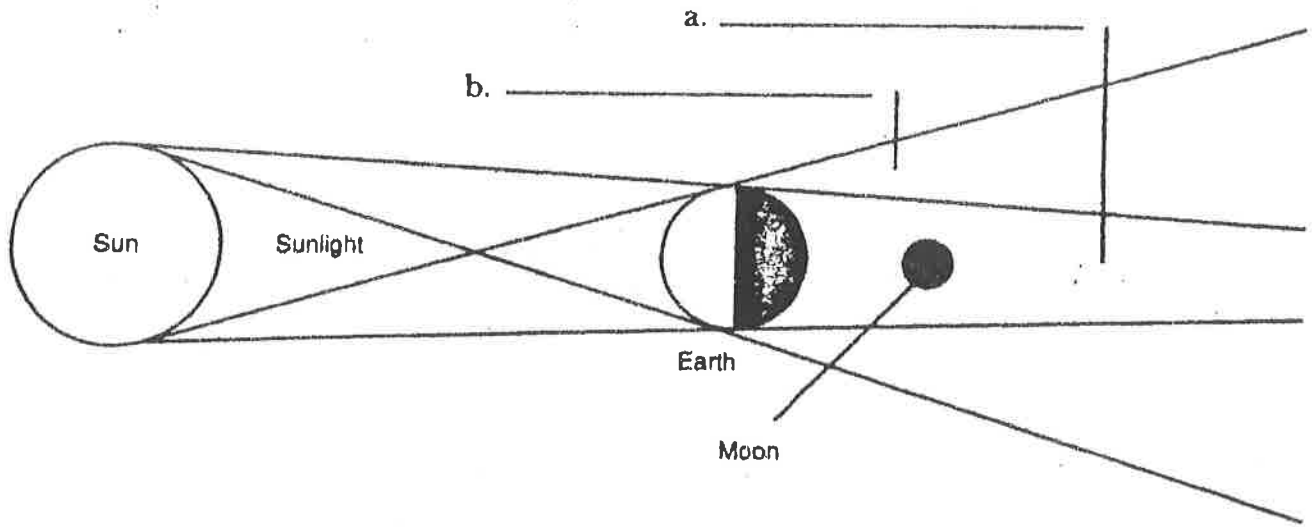
1. How many times does the Moon rotate on its axis during one trip around Earth?
2. What are the dark spots and the light areas on the Moon called?
3. Describe the Moon's layers and draw a sketch of the Moon's layers.
4. Describe the 3 main steps of the Moon's formation.
5. How have the Moon rocks that astronauts brought back to Earth helped scientists understand the history of the Moon?
6. Challenge: Scientists use indirect methods to learn about the cores of Earth and the Moon. Imagine you have several Styrofoam balls, some with steel balls hidden inside. Without breaking a ball open, how might you tell whether it contains a steel ball?

ACTIVITY ■ Earth and Its Moon

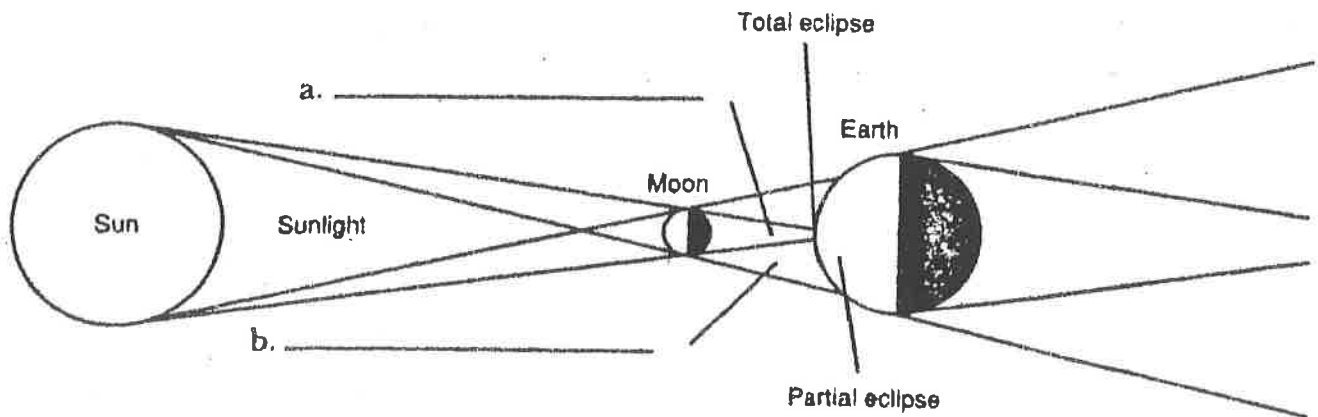
Lunar and Solar Eclipses

The two drawings below depict either a lunar or a solar eclipse. Identify which drawing refers to which type of eclipse. Then fill in the correct term beside each letter.

1. _____ eclipse



2. _____ eclipse



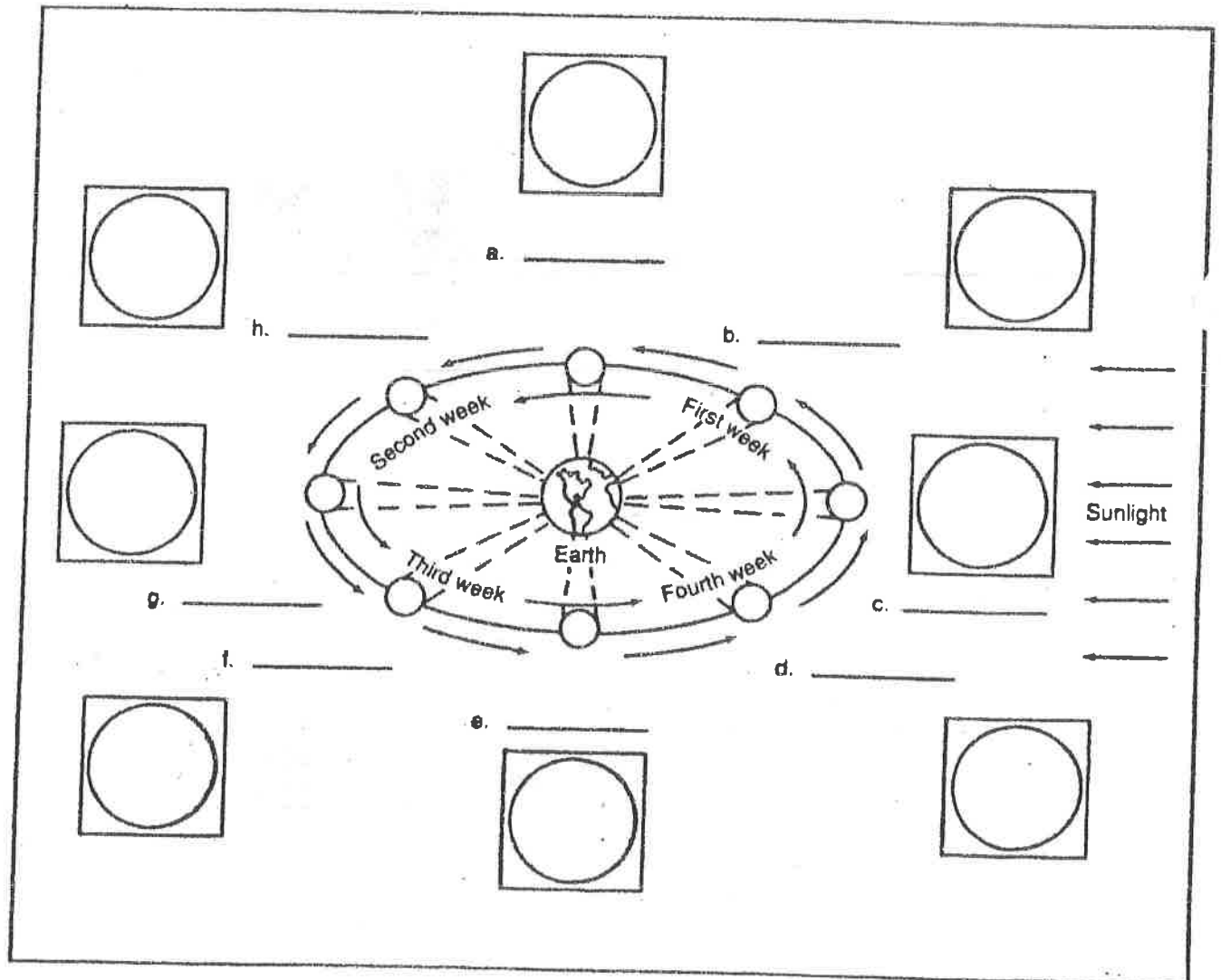
ACTIVITY ■ Earth and Its Moon

Phases of the Moon

Choose the phase of the moon from the list below and write it on the appropriate line in the drawing.

first quarter
full
last quarter
new

waning crescent
waning gibbous
waxing crescent
waxing gibbous



Name: _____ Date: _____ Pd. _____

Eclipses

_____ is simply a _____ cast in space.

An eclipse can occur in _____ ways:

1. When the _____ shadow hits the Earth.
2. When the _____ shadow hits the Moon.

A _____ eclipse occurs when the Moon comes in a direct line between the Sun and Earth.

Draw the Diagram of a Solar Eclipse

_____ eclipse occurs when the Earth comes in a direct line between the Sun and the Moon.

Draw the Diagram of a Lunar Eclipse

Name: _____ Date: _____ Pd. _____

Unit E, Chapter 2.3 (pgs. E59-E66)

Vocabulary

Eclipse-

Umbra-

Penumbra-

Comprehension

1. When the Moon is full, where is it in its orbit around the Earth?
2. Where is the Moon in its orbit at the time of a solar eclipse?
3. If it is high tide where you are, is the tide high or low on the side of the Earth directly opposite you?
4. If you were on the Moon's near side during a new moon, how much of the side of Earth facing you would be sunlit?
5. Predict. If Earth did not turn, how would the pattern of tides be affected?
6. Predict. Would we see lunar phases if the Moon did not rotate while it orbits Earth?

The Moon Video

Bill Nye, the science guy

Name _____ Period _____

1. Moonlight is really _____ light.
2. Why does the moon reflect so much light?
3. Tides are caused by _____.
4. Why don't we get an eclipse every month?
5. How did ancient astronomers figure out that the earth is round?
6. The moon has _____ the gravity of earth.
7. If you weigh 60 lbs on earth, you would weigh _____ lbs on the moon.
8. If you can jump 2 feet high on earth, you can jump _____ feet on the moon.
9. How does the gravity of earth affect the moon?

Notes - Tides

The Moon also creates _____ on Earth.

Tides are the _____ of the ocean's water every _____ hours or so.

As the Earth _____, the Moon's _____ pulls on water on the side of the Earth _____ to it.

The Moon's gravity pulls _____ on the side _____ away.

Draw the diagram of the Earth, Moon, High Tide, Low Tide.

Twice a month, the Moon, Earth and the Sun are all in a _____ line.

The combined forces of gravity of the Moon _____ the _____ produce a very _____ tide. This is called a _____ Tide.

Draw diagram of Spring Tide.

And twice a month, the _____ is true.

The gravity of the Moon is at _____ angles to the Sun's gravity, producing a very _____ tide. This is called a _____ Tide.

Draw diagram of Neap Tide.

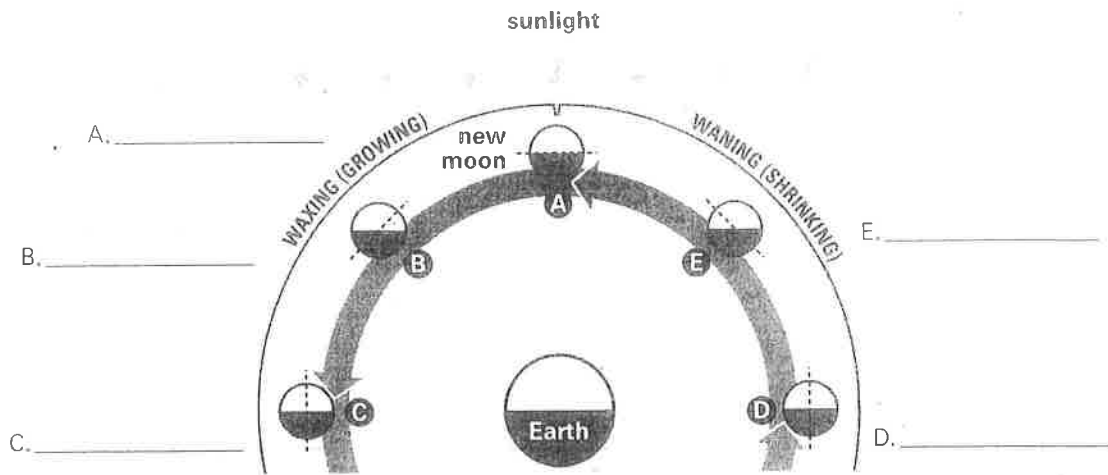
SECTION POSITIONS OF THE SUN AND MOON AFFECT EARTH.

2.3 Reinforcing Key Concepts

BIG IDEA Earth and the Moon move in predictable ways as they orbit the Sun.

KEY CONCEPT Positions of the Sun and Moon affect Earth.

1. **Phases are different views of the Moon's sunlit half.** If you could watch the Moon from high above its pole, you would always see half the Moon in sunlight and half in darkness. From Earth, in the middle of the Moon's orbit, the Moon's shape seems to change. The diagram below shows some of the lunar phases as seen from the Earth. Label each phase in the space provided.



2. **Shadows in space cause eclipses.** If the Moon, the Sun, and Earth line up exactly, a shadow crosses Earth or the Moon. An eclipse occurs when a shadow makes the Sun or Moon seem to grow dark. In a lunar eclipse, the Moon darkens. In a solar eclipse, the Sun seems to darken. Complete the table below that describes lunar and solar eclipses.

Type of Eclipse	Position of Earth, Sun, and Moon	What Happens?
Lunar Eclipse		
	Sun-Moon-Earth	

3. **The Moon's gravity causes tides on Earth.** Tides occur because the Moon's gravity changes the shape of Earth's oceans. In 24 hours, how many low tides would you expect a beach to experience?

Was Moon Born From Planet's Crash Into Earth?

The moon is not made of green cheese, as myth suggests. But the real story of the moon's creation may hardly be more probable.

Many scientists have thought for years that the moon was formed during the early days of the solar system when another planet collided with Earth, ejecting fragments of rocky material that condensed into Earth's only satellite.

The effect would have been as though a lousy cosmic golfer tore up a giant chunk of turf and sent it hurtling into orbit.

[However,] none of [the scientists'] models have offered a completely satisfying explanation. Now, new research offers a scenario that may work. Robin Canup, a researcher at Southwest Research Institute in Boulder, Colorado, and her colleague have fashioned an improved model using a sophisticated computer-modeling technique. It explains the size, composition, and orbital properties of both Earth and the moon. "We determined that a Mars-sized impactor would work the best," said Canup.

"Giant impact" theories explaining the moon's formation were first proposed in the mid-1970s. The two best models that emerged, however, both had inherent problems.

In one model, the mass of the Earth was right, as was the composition of the moon. But the Earth's rotation rate after the collision was unrealistically fast. An improbable second impact would have been required to slow the Earth's spin.

A second scenario suggested that the impact occurred when Earth was only half formed. That idea better explained the Earth's modern rate of rotation and the moon's orbit, but it required Earth to continue accumulating matter after the impact. That material would have been rich in iron, which composes 30 percent of Earth's mass. But the moon, which contains almost no iron, would [also] have iron-rich rock. The model offers no way to explain the moon's confounding dearth of iron.

[Now, the scientists] have proposed that the impact came from an object that was smaller than in the previous models. At one-tenth the mass of the Earth, it was about the size of Mars, the two researchers say.

The collision occurred 4.5 billion years ago, only 50 million years after the solar system formed. The colossal impact must have nearly rent the young Earth apart.

"It didn't break the Earth up, but it came pretty close," Canup said.

by Ben Harder, *National Geographic News*

Answer the following questions about the reading.

1. What is the general theory about how the moon was formed?

2. How is the difference in composition of Earth and the Moon a problem for one of the giant impact theories?

3. What factors must any giant impact theory take into account?

4. What is different about the current giant impact theory?

5. Describe the impact that scientists currently think led to the moon's formation.



CHAPTER 2 | EARTH, MOON, AND SUN
2 Vocabulary

axis of rotation	equinox	eclipse
revolution	solstice	umbra
season	mare	penumbra

A. DEFINITIONS

On the line, write the vocabulary word that matches the definition.

1. A dark area on the Moon is still called this, even though it is not a body of water.

2. When the Moon passes through Earth's shadow during a lunar eclipse, this is the darker of the two parts of Earth's shadow. _____
3. This occurs when a shadow makes the Sun or the Moon seem to grow dark.

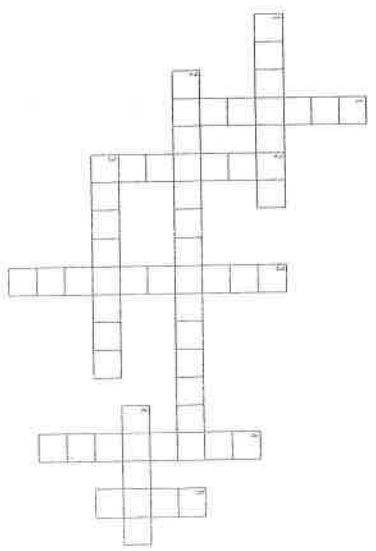
4. At this time, the area of sunlight is at a maximum in one hemisphere and a minimum in the other hemisphere. _____
5. In astronomy, this is the motion of one object around another. _____
6. During a lunar eclipse, this is the spreading cone of lighter shadow around the umbra. _____
7. Earth rotates around this imaginary line running through its center.

8. At this time, sunlight shines equally on the northern and southern hemispheres. _____
9. The patterns of temperature changes and other weather trends over the course of a year. _____

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B. A CROSSWORD PUZZLE

Read the clues below. Then complete the puzzle with the vocabulary words.



ACROSS

1. During a lunar one of these, the Moon darkens; during a solar one of these, the Sun seems to darken.
2. The ends of this are the north and south poles.
3. This June event marks the beginning of summer in the Northern Hemisphere.
4. As the Moon moves into this, Earth's dark shadow seems to creep across and cover the Moon.

DOWN

1. This September event marks the beginning of autumn in the Northern Hemisphere and the beginning of spring in the Southern Hemisphere.
2. These change as sunlight shifts between hemispheres during the year.
3. This can also mean the time it takes an object to go around once.
4. When the Moon moves into this during a lunar eclipse it becomes slightly less bright.
5. This Moon feature reflects very little light and appears dark.

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