

5Es

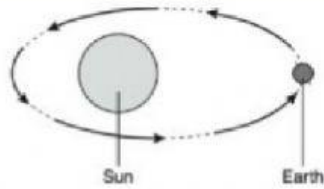


SOL: 4.6 Earth and Space Systems (Sun, Moon, Earth)

Scientists at Work:

Time: 50 minutes

Evaluate 4.6a The motions of Earth, the moon, and the sun



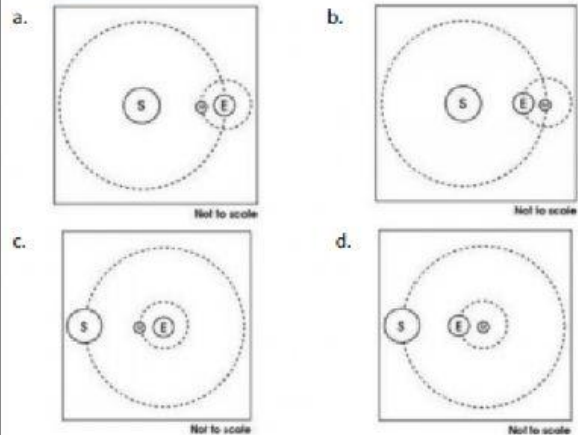
1. The motion of the Earth around the Sun most affects the-

- a. timing of tides
- b. length of a month
- c. cycle of the seasons
- d. phases of the Moon

2. Which movement causes Earth to have day and night?

- a. Earth's rotation on its axis
- b. Earth's orbit around the sun
- c. the sun's rotation on its axis
- d. the sun's orbit around the Earth

3. Which diagram correctly shows the orbits of Earth (E), the moon (M) and the Sun (S)?



Evaluate 4.6b: The causes for Earth's seasons

1. The seasons change on Earth because of predictable patterns.

Select the two statements that explain why the seasons change on Earth.

- ☐ The distance from the Earth to the sun changes.
- ☐ The distance from the Earth to the moon changes.
- ☐ Different places on Earth get different amounts of direct sunlight.
- ☐ The amount of heat given off by the sun changes with the seasons.
- ☐ Earth's tilt causes the sun to be higher or lower in the sky as seasons change.

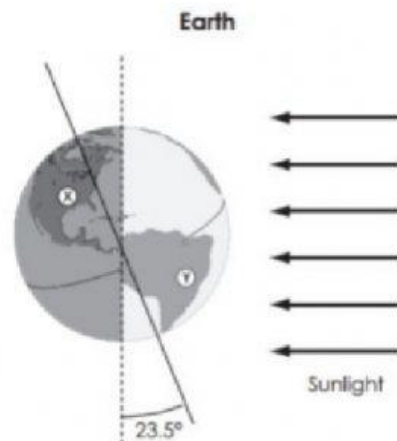
2. The sun heats the Earth unevenly, making the poles cold and the tropics hot, because

- a. the tropics face more directly toward the sun
- b. the poles are covered with ice which causes cold air
- c. seasons change
- d. weather changes

3. Throughout the year, areas of the Earth's surface are either tilted away from the Sun or toward the Sun. This is a result of the Earth tilting on its axis. What is the main impact of this phenomenon?

- a. It influences ocean currents.
- b. It produces seasons.
- c. It causes tides.
- d. It generates winds.

4. The diagram shows Earth receiving light from the sun.

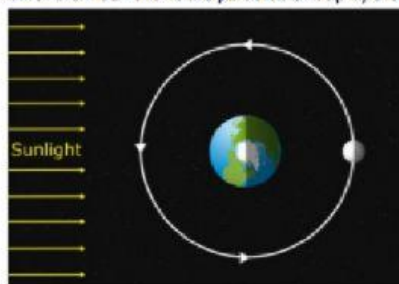


Identify the current season at location X.

Then, explain what causes the season at location X.

Evaluate 4.6c: The causes for the four major phases of the moon and the relationship to the tide cycles

1. The model below shows the moon at one position in its orbit around Earth. The white half of the moon shows the part that is lit up by the Sun.



Select the phase of the Moon shown in the model.



2. A tide table shows the time and height of the high and low tides at a certain location. The tide table below shows this data for Virginia Beach.

Date	Time	Tide Height (feet)
Aug 7	2:00 pm	4.2
Aug 7	8:15 pm	0.4
Aug 8	2:30 am	3.3
Aug 8	8:45 am	0.1
Aug 8	3:00 pm	4.1

Data courtesy of NOAA

Which of these best describes the pattern of the tides?

- ☐ A. High tides happen about 12 hours after low tides.
- ☐ B. Low tides happen only once every 24 hours.
- ☐ C. High tides happen less often than low tides.
- ☐ D. Low tides happen about six hours after high tides.

3. The table shows the heights of the high and low tides on different days at Virginia Beach. It also shows the phase of the Moon on each day.

Date	High Tide Height (feet)	Low Tide Height (feet)	Moon Phase
Oct. 21	3.0	1.0	last quarter
Oct. 28	5.0	0.0	new moon
Nov. 4	3.0	1.0	first quarter
Nov. 12	4.5	0.5	full moon
Nov. 19	3.0	1.0	last quarter
Nov. 26	5.2	0.0	new moon

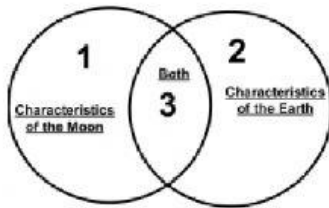
Based on the data in the table, which of these best explains the relationship between tides and the phases of the Moon?

- ☐ A. The difference between high and low tide is smallest when the Earth, Moon, and Sun are in a line.
- ☐ B. The difference between high and low tide is biggest when the Earth, Moon, and Sun are in a line.
- ☐ C. The highest high tides and highest low tides happen during the first quarter and last quarter moons.
- ☐ D. The lowest high tides and lowest low tides happen during the first quarter and last quarter moons.

4. Which statement is true?

- ☐ a. Highest tidal ranges are associated with the full and new moons.
- ☐ b. The phases of the moon do not affect the tides.
- ☐ c. Highest tidal ranges are associated with the quarter moons.
- ☐ d. The gravity of the moon does not pull on the ocean.

Evaluate 4.6d: The relative size, position, age and makeup of Earth, the moon, and the sun



Which of these would best fit in area 3 of this Venn diagram?

- a. rocky surface
- b. active volcanoes
- c. liquid water present
- d. oxygen in the atmosphere

Isaac is learning about the Solar System in his science class. He goes home after school one day and tells his little brother that he learned that the diameter of the Sun is about 400 times larger than the diameter of the Moon.

Isaac's little brother asks how the Sun can be larger than the Moon when they look about the same size from the Earth. How can Isaac best answer his little brother's question?

- a. The Moon is much farther from the Earth than the Sun is.
- b. The Moon is much closer to the Earth than the Sun is.
- c. The Moon is much hotter than the Sun.
- d. The Moon is much brighter than the Sun.

The table shows some of the characteristics of four different objects in our solar system.

object	size	temperature	orbit
1	small	cold	around a planet
2	small	cold	around the sun
3	large	hot	none
4	medium	warm	around the sun

Which object is a moon?

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

Compared with Earth, the Moon

- a. is two times larger.
- b. is four times larger.
- c. is smaller.
- d. is about the same size.

