Engage: What Do You Know?

Which statement is true?

A. The Sun revolves around Earth once a day.

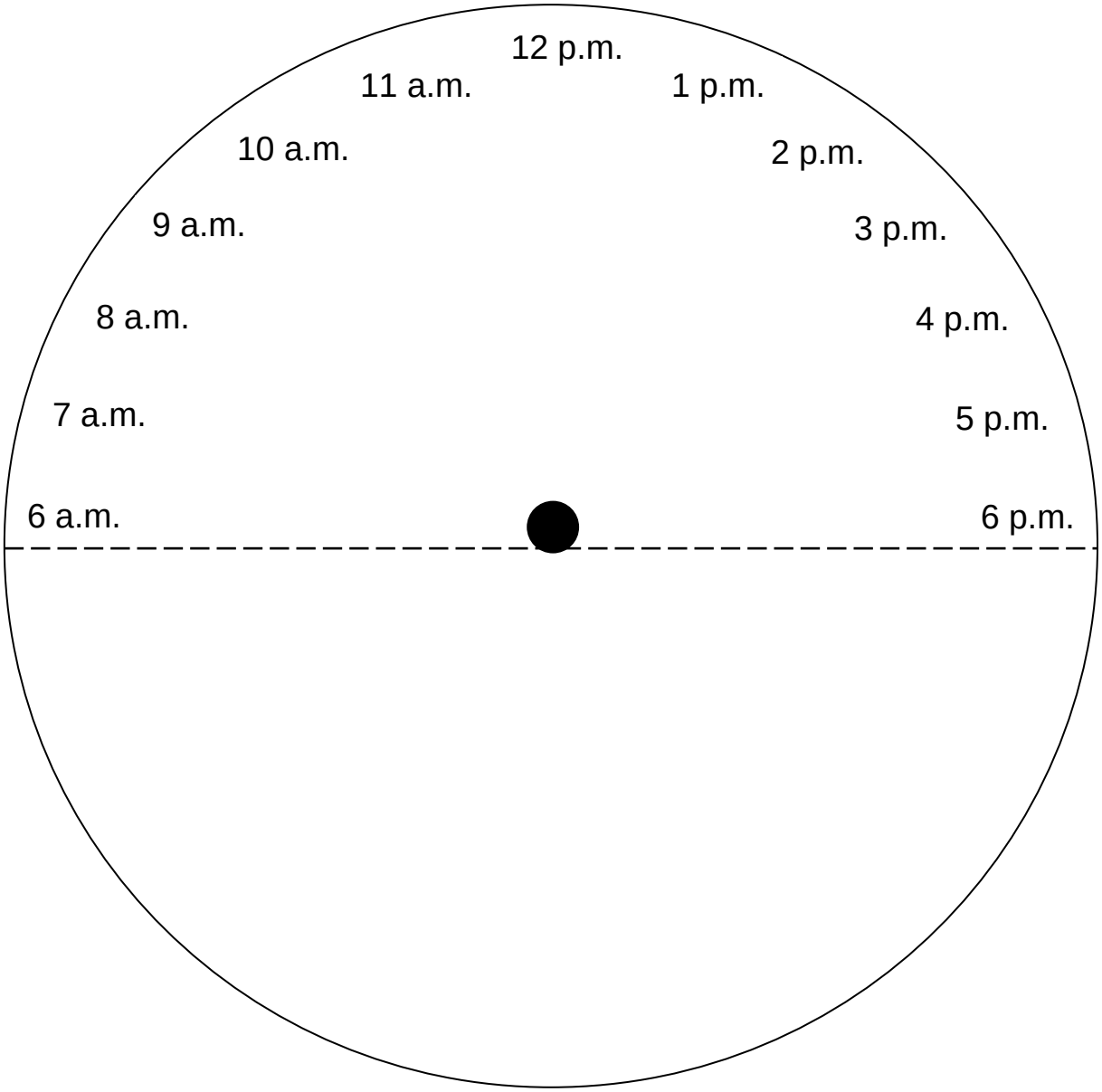
B. Earth rotates on its axis approximately every 24 hours.

C. Day and night are caused by the revolution of Earth.

D. The Sun rotates once a year, causing seasons.

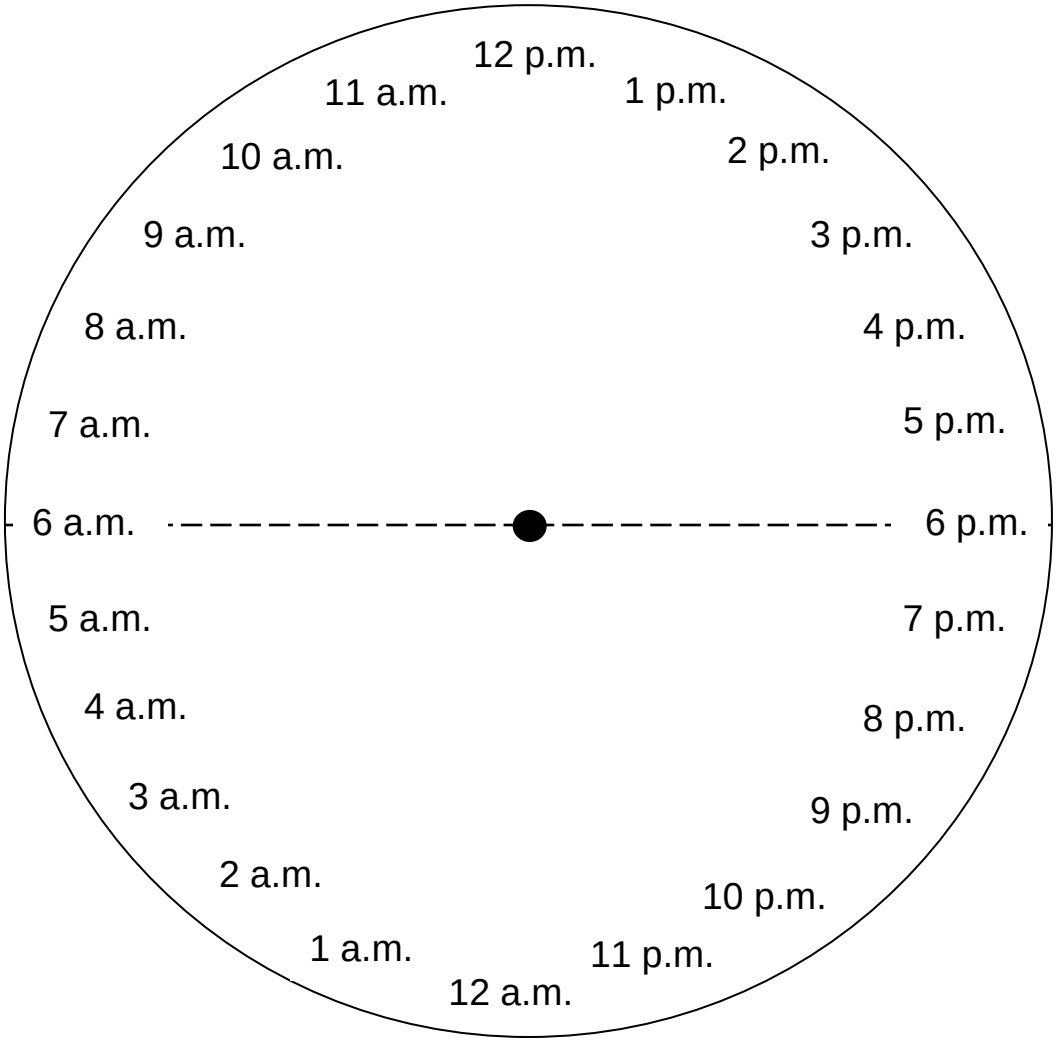
Explore: Activity 1—Timeline

Directions: Cut out the circle and fold it over the dotted line.



Explore: Activity 2—Timeline

Directions: Cut out the circle.



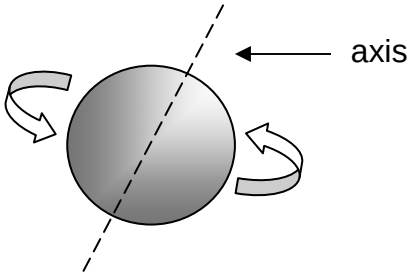
Explain: Rotation of Earth

Solar System

Our solar system consists of the Sun and eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. The Sun is positioned in the center of the solar system with the planets orbiting around it.

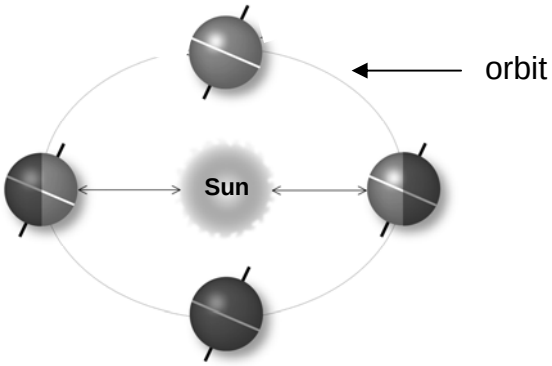
Rotation

Planet Earth has one moon that acts as a natural satellite. The Sun, Earth, and Moon all *rotate*, or spin, on an axis. An *axis* is an imaginary line that runs through the center of an object. It takes Earth approximately 24 hours, or 1 day, to rotate. This creates the day/night cycle. It takes the Moon approximately 28 days, or 1 month, to rotate. The Sun rotates approximately every 25 days.



Revolution

Earth *revolves*, or travels on an orbit, around the Sun. An *orbit* is the path along which an object travels around another object. For Earth to make one full revolution around the Sun, it takes about 1 year. This creates seasons. The Moon revolves around Earth in about 28 days, or 1 month. This creates moon phases.



Perspective from Earth

From here on Earth, the Sun appears to move across our sky as the day progresses. It rises in the east and sets in the west. This movement creates a day/night cycle that occurs every 24 hours.

Perspective Away from Earth

From outside the Earth/Sun system, we can clearly see that Earth is rotating and revolving. The Sun only rotates, which means that the apparent movement of the Sun across the sky is actually due to the rotation of Earth.

Elaborate: Using the Sun to Tell Time

1. Use a compass to find north. If you are in the Northern Hemisphere (North America, Europe, Asia, Northern Africa), face south toward the equator. If you are in the Southern Hemisphere (South America, Australia, Southern Africa, Antarctica), face north toward the equator. The Sun most closely tracks the equator, which is why you want to face it.

   Hemisphere: northern or southern **Face the equator:** north or south

2. Use a compass to determine east and west. The Sun rises in the east and sets in the west. If the Sun is in an easterly position in the sky, it's still morning. If the Sun is in a westerly position in the sky, it's afternoon.

   Position of Sun in the sky: east or west **Time of Day:** morning or afternoon

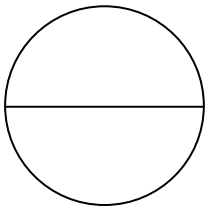
3. Determine the season in your area. In Texas, summer days tend to be about 14 hours long. Fall and spring days are about 12 hours long. Winter days are about 10 hours long.

   Season: summer, fall, winter, or spring **Length of day:** _____ hours

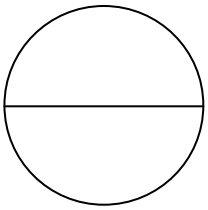
4. Use the Internet or daily newspaper to find out what time the Sun rises and sets each day. Round off to the nearest hour. For example, if the Sun rises at 6:08 a.m. in your area, round off to 6:00 a.m.

   Sunrise: _____ **Sunset:** _____

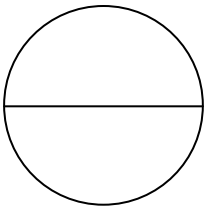
5. Using a metric ruler, divide the plate in half. Draw a line across the center of the plate with a dry erase marker. Be careful not to smudge the marker as you hold the plate.



6. If you are in the Northern Hemisphere, label the left end of the line with the time of sunrise and the right side with the time of sunset. If you are in the Southern Hemisphere, label the left end of the line with the time of sunset and the right side with the time of sunrise.

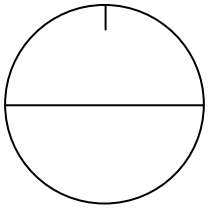
Sunrise  Sunset

From the Northern Hemisphere

Sunset  Sunrise

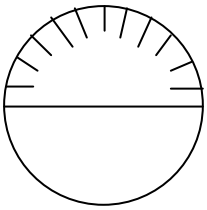
From the Southern Hemisphere

7. Divide the top of the plate in half. Make a mark at the center of the top of the plate, creating two quarters.



8. Label the top center mark as the halfway point of the day. For example, if the Sun rises at 6:00 a.m. and sets at 6:00 p.m., the top center mark would be 12:00 p.m. because that is halfway between sunrise and sunset.

9. Determine how many segments to divide each quarter into depending on the number of hours of daylight. For example, if the days are 12 hours long, each quarter would have six segments. Make small marks along the edge of the plate using a dry erase marker.



10. Label each mark with an hour of the day.

11. Put on your sunglasses and take your plate and metric ruler outside when your teacher and classmates are ready.

12. Do NOT look directly at the Sun because it could damage your eyes.

13. Try using your plate clock to tell the time based on the Sun's position in the sky. Hold the plate vertically with the top edge pointed straight up toward the sky. Place one end of the metric ruler in the center of the plate and point the other end toward the Sun. What time does it indicate? Are you within an hour or two of the actual time?

Name _____ Date _____

Evaluate: Rotation of Earth

Choose the best answer for each question.

1 Why does the Sun appear to move across the sky?

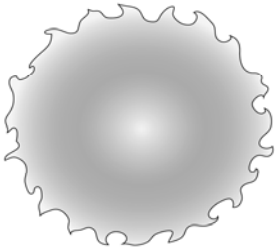
(A) The Sun revolves around Earth.

(B) Earth revolves around the Sun.

(C) The Sun rotates on its axis.

(D) Earth rotates on its axis.

2 If you were standing near "X" on Earth, it would be —



Sun

Earth

(A) spring

(B) daytime

(C) Sunday

(D) nighttime

3 How long does it take Earth to rotate approximately once on its axis?

(A) 1 hour

(B) 1 day

(C) 1 month

(D) 1 year

4 The day/night cycle is caused by the —

A rotation of Earth

B rotation of the Sun

C revolution of the Moon

D revolution of the planets

5 Explain the difference between rotation and revolution. Use the words *orbit* and *axis* in your answer.

_____

_____

_____

_____