

# THE MOVEMENT OF THE EARTH

There are two significant movements made by the Earth. The first movement is the Earth's **rotation** on its axis. It takes the Earth about 24 hours to complete one rotation. The second significant movement is Earth's **revolution** around the Sun. One revolution takes one full year (365  $\frac{1}{4}$  days). The movements made by Earth determine changes in weather, ecology, and in the number of daylight hours.

## Earth's Rotation: Night and Day

The Sun is an average-sized star that lies in the center of the solar system providing heat and light energy to Earth and the other planets in the solar system. The Earth is the third planet from the Sun, about 150 million kilometers away. Earth rotates from west to east on an imaginary line called its axis. The axis passes through the center of the Earth from the North Pole to the South Pole. It takes 24 hours or one full day and night for the Earth to make one complete rotation around itself. At any given time of day, half of the Earth faces the Sun and the opposite half faces away from the Sun. The half of the Earth closest to the Sun experiences daytime, while the other half of the Earth is experiencing nighttime. It is Earth's rotation that causes day and night.

## Earth's Revolution: Seasons

Earth and everything else in our solar system revolves around the centrally-located Sun due to the Sun's strong gravitational pull. Earth takes one full year (365  $\frac{1}{4}$  days) to make a complete trip or revolution around the Sun. The seasons are caused by the tilt of the Earth on its axis as it revolves around the Sun. Earth does not sit straight up, but it is tilted 23  $\frac{1}{2}$  degrees on its axis. Earth moves counter-clockwise in an ellipse-shaped pattern around the Sun. This tilt affects the amount of sunlight different areas of Earth receive at different times during the year causing the four seasons: winter, spring, summer, and fall. When the Northern Hemisphere is tilted toward the Sun, it is summer there, but winter in the Southern Hemisphere. Seasons in the Southern Hemisphere are opposite those in the Northern Hemisphere.



### STARS IN THE NIGHT SKY

There are two key motions affecting the objects seen in the night sky. The first of these motions is **the rotation of the Earth** on its axis. This motion causes the stars to have the appearance of moving across the sky. The second motion involved is **the revolution of the Earth around the Sun**. Earth's orbit around the Sun is responsible for the varying parts of the sky that are seen during the different seasons.

As the **Earth rotates** from west to east on its axis, the stars will appear to move in the opposite direction. The stars rise in the east and set in the west as a result of Earth's rotation. The North Star, known as Polaris lies almost directly above the Earth's rotational axis and appears to remain motionless in the sky. All of the stars appear to rotate around the North Star. The stars appear to be moving in different points but the cause is actually the rotation of the Earth.

The **Earth's revolution** causes visual variations of parts of the sky. As the Earth revolves, different groups of stars may be seen at different times of the year. The Sun blocks groups of stars for up to six months at a time. The visibility of stars is solely dependent upon the latitude of the position on Earth, as it revolves around the Sun.

### The Movement of Earth

# Graphic Organizer

Cause

Effect

Winter

The season after winter where both hemispheres of the Earth are being heated equally causing milder temperatures.

Summer

The season after summer where both hemispheres of the Earth are being heated equally causing milder temperatures.



# Vocabulary Drill

- \_\_\_\_\_ 1. The motion of one object around another object.
- \_\_\_\_\_ 2. A division of the year into four periods marked by changes in the weather.
- \_\_\_\_\_ 3. An imaginary line about which a body rotates.
- \_\_\_\_\_ 4. The spinning of an object on its axis.

## KEY VOCABULARY

- A. Rotation
- B. Revolution
- C. Seasons
- D. Axis

## Writing to Tie It Together

Explain how the rotation and revolution of the Earth and the apparent movements of the Sun, Moon, and stars are connected.

---

---

---

---

---

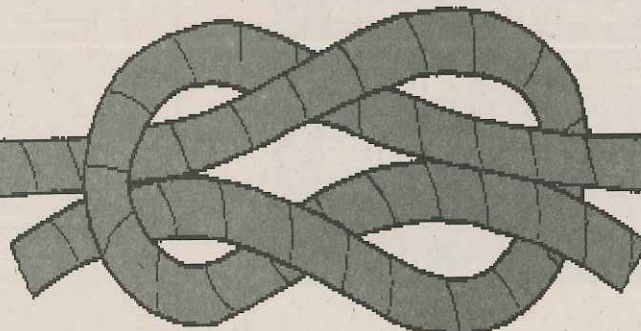
---

---

---

---

---

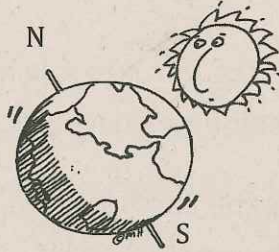


# PRACTICE QUESTIONS

SC.4.E.5.3/SC.4.E.5. /SC.4.E.5.1

1 What is the season in the Southern Hemisphere as seen in the picture below?

- (A) winter
- (B) spring
- (C) summer
- (D) fall

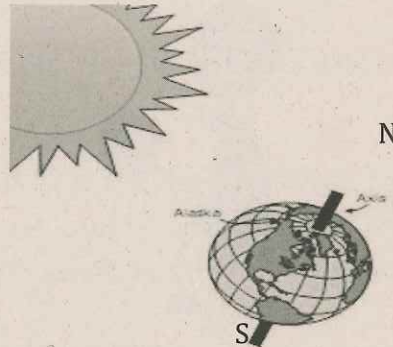


2 The Northern and Southern Hemispheres of Earth experience four seasons during the year. What is the **main** reason for the change in seasons?

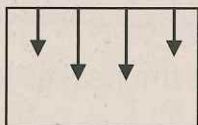
- (A) the rotation of the Earth on its axis
- (B) the rotation and the revolution of the Earth around the Sun
- (C) the distance of the Earth to the Sun
- (D) the tilt of the Earth on its axis as it revolves around the Sun

3 Which season is it in the polar region of the Earth?

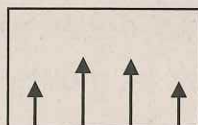
- (A) winter
- (B) spring
- (C) summer
- (D) fall



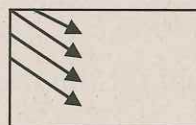
4 Which of the following angles of light energy represents those seen during the summer in the North Pole?



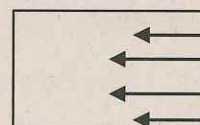
(A)



(B)



(C)



(D)



## PRACTICE QUESTIONS

SC.4.E.5.3/SC.4.E.5. /SC.4.E.5.1

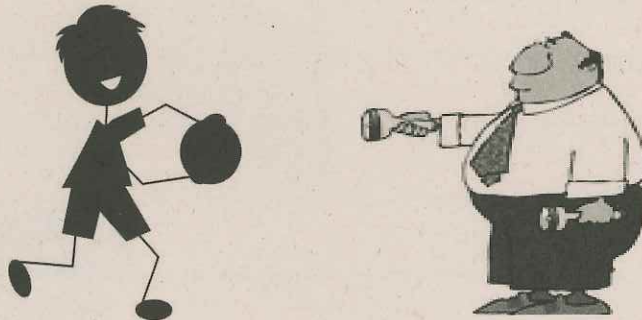
5

Night and day and the seasons are caused by the rotation and revolution of the Earth on its axis. Explain the difference between Earth's rotation and its revolution.

- (A) **Rotation** is the Earth revolving around the Sun whereas; **revolution** is the Earth spinning on its axis.
- (B) **Rotation** is the Earth spinning on its axis whereas; **revolution** is the Sun orbiting around the Earth.
- (C) **Rotation** is the Earth spinning on its axis whereas; **revolution** is the Earth orbiting around the Sun.
- (D) **Revolution** is the Earth spinning on its axis whereas; **rotation** is the Earth orbiting around the Sun.

6

Julian and Mr. Bassani wanted to demonstrate to the class how the Earth moves to create the seasons of the year. To demonstrate the process, Julian holds a basketball to represent the Earth and Mr. Bassani holds a flashlight to represent the Sun.



How should Julian move the ball to demonstrate summer in the Northern Hemisphere?

- (A) Julian should tilt the top part of basketball towards the flashlight as he moves it around the flashlight counter-clockwise.
- (B) Mr. Bassani should tilt the flashlight as he moves around the basketball.
- (C) Julian should tilt the basketball as he moves it around the flashlight clockwise.
- (D) Julian should stand in one spot as he spins the basketball in his hands.