

Name _____

Day 1

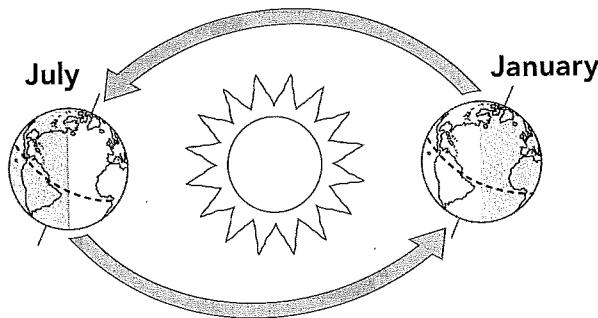
Weekly Question

Are the seasons reversed on the other side of the world?

The imaginary line that is Earth's equator divides the planet into two halves. Each half is called a **hemisphere**. Within the Northern Hemisphere lie North America, the northern tip of South America, Europe, Asia, and two-thirds of Africa. In the Southern Hemisphere are most of South America, a third of Africa, Australia, and Antarctica.

The North and South Poles are the points in the Northern and Southern Hemispheres where Earth's **axis** meets its surface. But Earth's axis is not actually vertical. Instead, it tilts at an angle of 23.45 degrees. This means that one hemisphere is tilted toward the sun, while the other is tilted away. As Earth travels in its 12-month **orbit** around the sun, the hemispheres' positions change in relation to the sun. In other words, whichever way each hemisphere is positioned right now, it will be in the exact opposite position in relation to the sun six months from now.

A. Look at the diagram and answer the questions.



1. Does the angle of Earth's axis change during its orbit? _____
2. Which hemisphere is tilted toward the sun in January? _____
3. Name two continents that are completely tilted toward the sun in July.
_____ and _____

B. Write a vocabulary word to complete the sentence.

Earth's equator divides the planet into two _____.

Vocabulary

axis

AK-sis

an imaginary line that passes through the center of Earth from the North Pole to the South Pole

hemisphere

HEM-ih-sfeer
the northern or southern half of Earth

orbit

OR-bit
the circular path of one object around another larger object, such as Earth's movement around the sun

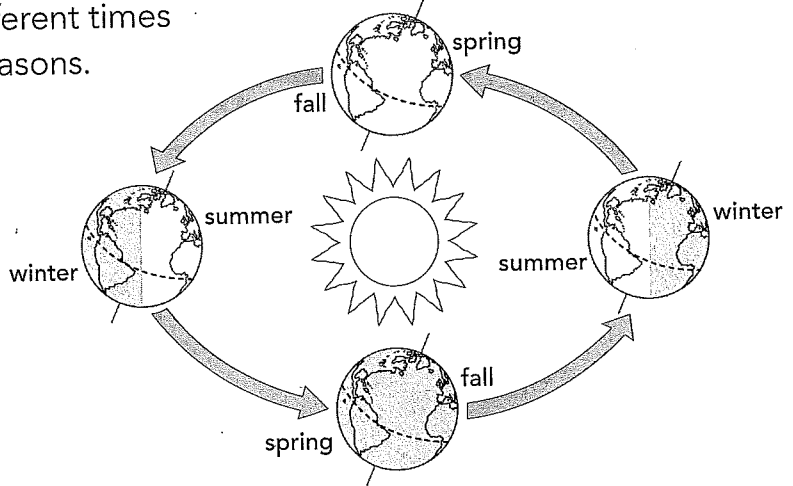
Name _____



Day 2 **Weekly Question** **Are the seasons reversed on the other side of the world?**

Because of Earth's tilt, the amount of sunlight each hemisphere gets changes throughout the year. The hemisphere that is tilted toward the sun receives direct sunlight, while the other hemisphere receives only indirect sunlight. As Earth progresses along its orbit, the hemisphere in direct sunlight begins to tilt away from the sun, and solar energy decreases. At the same time, the hemisphere that is in indirect sunlight begins to tilt toward the sun, and solar energy becomes more intense.

For any place on Earth, the varying amounts of solar energy result in different temperatures at different times of the year. This is the cause of the seasons. Summer is the season during which a hemisphere tilts toward the sun and therefore receives the most direct sunlight and reaches its highest temperatures. In winter, the same hemisphere tilts away from the sun and therefore receives the least direct sunlight and reaches its lowest temperatures.



Answer the questions.

1. During fall, does a hemisphere receive more or less solar energy than during winter? Explain your answer.

2. What do you think would happen if Earth's axis were tilted in the opposite direction?

Name _____

**Day
3**

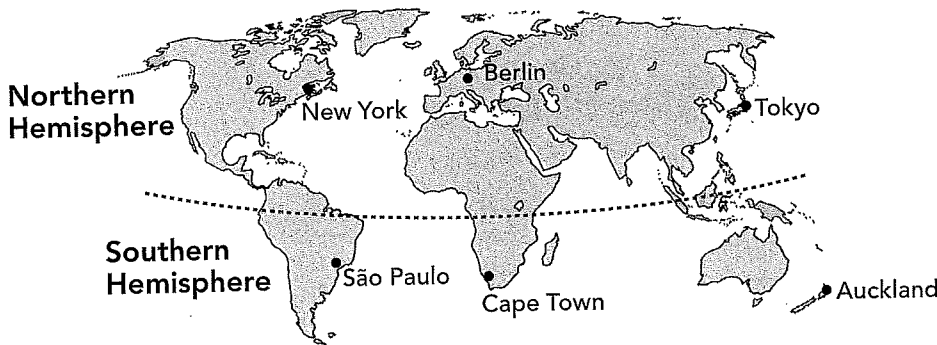
Weekly Question

Are the seasons reversed on the other side of the world?

At a certain point in Earth's orbit, on or around June 21st every year, the Northern Hemisphere reaches its maximum tilt toward the sun. At the same time, the Southern Hemisphere reaches its maximum tilt away from the sun. This is the longest day of the year in the Northern Hemisphere, known as the summer **solstice**. In the Southern Hemisphere, it is the shortest day of the year, so it is the winter solstice. On or around December 21st, the situation is reversed. In the Northern Hemisphere, it is the winter solstice. In the Southern Hemisphere, it is the summer solstice.

Twice each year, on or about March 20th and again around September 22nd, Earth's axis is tilted neither toward nor away from the sun. At these times, the sun shines directly over the equator. Day and night are of equal length all around the world, except near the poles. These two days are called the vernal **equinox** and the autumnal equinox in spring and fall, respectively.

A. Use the map to decide whether December 21st is the *summer or winter solstice* in each city listed below.



- | | |
|----------------------------|----------------------------------|
| 1. Tokyo, Japan _____ | 4. Berlin, Germany _____ |
| 2. New York, U.S. _____ | 5. Auckland, New Zealand _____ |
| 3. São Paulo, Brazil _____ | 6. Cape Town, South Africa _____ |

B. On or around which day of the year does the vernal equinox occur in the Southern Hemisphere? _____

Vocabulary

solstice

SOLE-stiss
an event that occurs twice each year when Earth's axis is tilted directly toward or away from the sun

equinox

EE-kwih-nahx
an event that occurs twice each year when Earth's axis is tilted neither toward nor away from the sun

Name _____

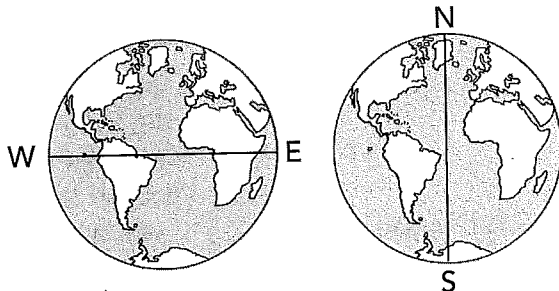
**Day
4**

Weekly Question

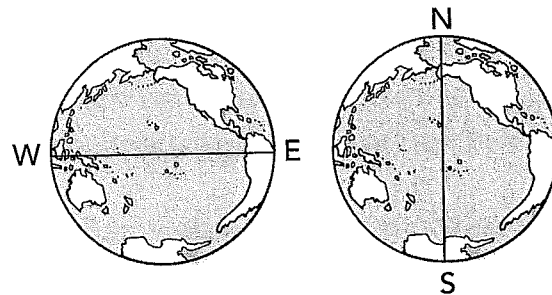
Are the seasons reversed on the other side of the world?

Yes, it's true that the seasons are reversed on the other side of the world—depending on what you mean by “the other side of the world.” If you split Earth in half along a plane that goes through the North and South Poles, then China would be on the other side of the world from the United States. But China has the same seasons as the U.S. And although Argentina would be on the same side of the world as the U.S., its seasons are reversed from ours. That's because Argentina is in the Southern Hemisphere. So the seasons are only reversed when “the other side of the world” means “the opposite side of the equator.”

Atlantic View



Pacific View



A. Write true or false.

1. The seasons in the United States are the reverse of the seasons in India. _____
2. The seasons are the same in the United States and Egypt. _____
3. The seasons in the United States are the reverse of the seasons in Peru. _____
4. The seasons are the same in the United States and Australia. _____

B. In your own words, explain how the answer to the question “Are the seasons reversed on the other side of the world?” could be either yes or no.

Name _____



Day 5

Weekly Question

Are the seasons reversed on the other side of the world?

A. Use the words in the box to complete the paragraph.

axis equinox Hemisphere orbit solstice

In the Southern _____, December 21st marks the summer _____, and the autumnal _____ occurs in March. At this time of year, because of Earth's position in its _____, Earth's _____ points neither toward nor away from the sun.

B. Rewrite the following sentences to make them true.

1. After its summer solstice, a hemisphere starts to tilt toward the sun.

2. After the winter solstice, the days become shorter.

3. The autumnal equinox is the longest day of the year.

4. The vernal equinox follows the summer solstice.

C. Explain in your own words how the tilt of Earth's axis is the reason for the seasons.

