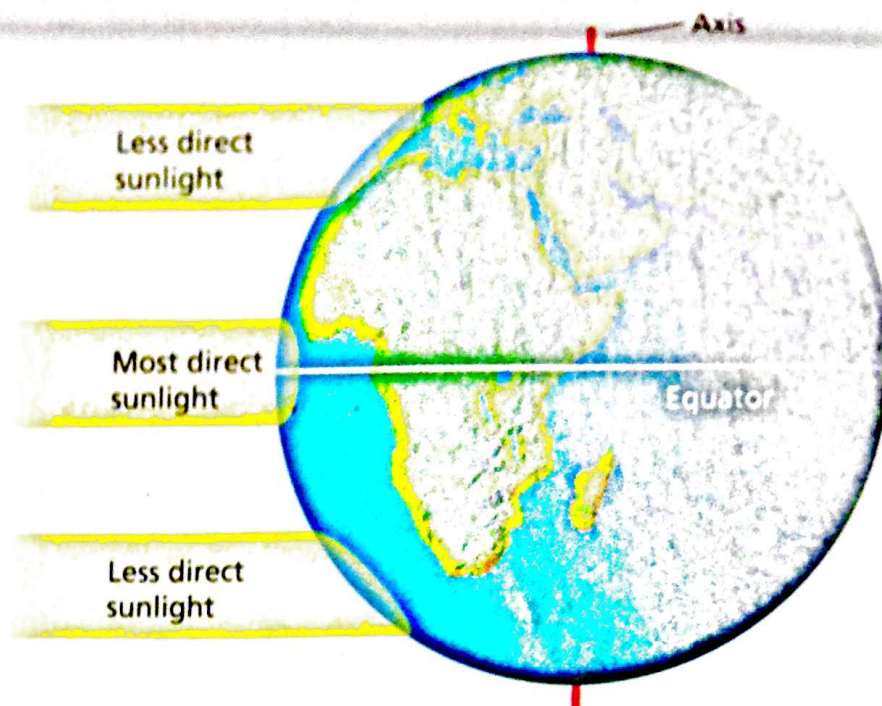


**FIGURE 4**

### Sunlight Striking Earth's Surface

Near the equator, sunlight strikes Earth's surface more directly and is less spread out than near the poles.

**Relating Cause and Effect** Why is it usually colder near the poles than near the equator?



**Lab zone**

## Try This Activity

### Sun Shadows

The sun's shadow changes predictably through the day.

1. On a sunny day, stand outside in the sun and use a compass to find north.
2. Have your partner place a craft stick about one meter to the north of where you are standing. Repeat for east, south, and west.
3. Insert a meter stick in the ground at the center of the craft sticks. Make sure the stick is straight up.
4. Predict how the sun's shadow will move throughout the day.
5. Record the direction and length of the sun's shadow at noon and at regular intervals during the day.

**Predicting** How did the actual movement of the sun's shadow compare with your prediction? How do you think the direction and length of the sun's shadow at these same times would change over the next six months?

## The Seasons on Earth

Most places outside the tropics and polar regions have four distinct seasons: winter, spring, summer, and autumn. But there are great differences in temperature from place to place. For instance, it is generally warmer near the equator than near the poles. Why is this so?

**How Sunlight Hits Earth** Figure 4 shows how sunlight strikes Earth's surface. Notice that sunlight hits Earth's surface most directly near the equator. Near the poles, sunlight arrives at a steep angle. As a result, it is spread out over a greater area. That is why it is warmer near the equator than near the poles.

**Earth's Tilted Axis** If Earth's axis were straight up and down relative to its orbit, temperatures would remain fairly constant year-round. There would be no seasons. **Earth has seasons because its axis is tilted as it revolves around the sun.**

Notice in Figure 5 that Earth's axis is always tilted at an angle of  $23.5^\circ$  from the vertical. As Earth revolves around the sun, the north end of its axis is tilted away from the sun for part of the year and toward the sun for part of the year.

Summer and winter are caused by Earth's tilt as it revolves around the sun. The change in seasons is not caused by changes in Earth's distance from the sun. In fact, Earth is farthest from the sun when it is summer in the Northern Hemisphere.



**Reading Checkpoint**

When is Earth farthest from the sun?