

You know that Earth orbits the Sun, right? And that it takes a full year for our planet to complete its orbit.

Earth also rotates, like a slightly tilted, spinning top. Earth remains tilted in the same direction all year round as we orbit the Sun. But that means the Sun's light shines differently on Earth at different times of the year.

Let's look at Earth when it's winter in the northern hemisphere. Observe how the North Pole tips away from the Sun?

This means that sunlight strikes the northern hemisphere at a shallow angle, for a short period of time. This is why winter weather is generally cool, with short days and long nights.

As Earth orbits the Sun, we move toward spring in the northern hemisphere... Now Earth is tilted neither toward nor away from the Sun, and day and night are about equal in length.

As we make our way to the summer months, notice that Earth is still tilted in the same direction, only now on the other side of our orbit.

The North Pole is tipping toward the Sun.

Sunlight strikes the northern hemisphere more directly, and the Sun stays in the sky for a longer time. Compared to winter, summer days are warmer, and the Sun stays in the sky much longer.

Notice, too, that while it's summer in the northern hemisphere, it's winter in the southern hemisphere: because of Earth's tilt, the seasons are reversed.

We observed how Earth's tilt creates the different seasons throughout the year.

How does this affect life? Plant life and other photosynthesizers—we call them primary producers—depend on sunlight. They respond to the changes in the seasons.

Earth-orbiting satellites can measure the amount of carbon dioxide absorbed by these primary producers.

Bright regions on this map show where they devour the most carbon dioxide, turning light from the Sun into oxygen and natural sugars.

In spring, when sunshine strikes the cold waters of the North Pacific, productivity skyrockets. Phytoplankton and other microscopic photosynthesizers form the base of the ocean food web and all ocean life responds to changes in the seasons.

On land, forests grow green during the spring, brightening the continents. During winter, continents in this view turn dark from a lack of photosynthesis.