

Ever wondered why days get shorter in winter?

By Rachel Feltman, Washington Post on 12.17.18

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December 21 is the shortest day of the year in the Northern Hemisphere. At this time of year, playing outside after school might mean playing in the dark. Photo by: Klaus Vedfelt/Getty Images

December 21 is the winter solstice, and that means it's the shortest day of the year on our part of the planet. But why do days and nights get longer and shorter?

From our perspective, it looks like the sun moves in the sky all the time. But we're the ones moving: Earth orbits, or revolves, around the sun at 67,000 miles per hour. It also spins around on an imaginary line called an axis at 1,000 miles per hour (slower at places closer to the poles). Imagine a basketball player twirling the Earth on her finger while also running in a circle around a spot on the floor. That spot is the sun, and our planet is the doubly twirling basketball! Each twirl on the player's finger makes up one day, while each circle she completes on the floor is a year. The sun doesn't move, but we experience different levels of light — a burst of sunshine at noon, the pitch-black of night and everything between — because we're spinning.

If half the world were facing the sun and the other half were facing out into darkness at any given time, you'd expect days and nights to be equal. But our orbit is a little more complicated than that.

The tricky bit is that Earth's axis — the imaginary line it spins on like a basketball player's finger — is tilted instead of standing straight. Instead of the top and bottom of the planet each being half in darkness and half in light, one end is always skewed more into the sun's rays than the other. The sunnier side gradually flips in the course of the Earth's orbit around the sun, slowly shifting from one part of the planet to the other.

Right now, the top half of the Earth (the Northern Hemisphere) is tilting almost as far away from the sun as possible. The opposite is true for the Southern Hemisphere, where days have been getting longer — and will start getting shorter just as we steal our precious daylight back. This angle change also creates the seasons by shifting how directly the sun's light hits us, which is why summer in the Southern Hemisphere falls during our winter.

Not all parts of the world experience the solstice quite like we do. Near the equator — an imaginary belt going around the planet's middle — days and nights always stay close to 12 hours each, because the way the top or bottom of the planet is tilting doesn't much change where the middle sits. But up at the North Pole, it's been totally dark since October — and for a few weeks before then, the area was in perpetual twilight. It won't really feel like daytime there until March, but then the sun will seem to stay up all summer long! Be glad you live in a place where the sun always comes out — even if it'll be out for a little less time tomorrow.

Quiz

- 1 How do shifting seasons occur? How do you know?
- (A) The Earth moves too quickly for the sun's light in the winter but more slowly in summer; But we're the ones moving: Earth orbits, or revolves, around the sun at 67,000 miles per hour.
 - (B) The poles and the equator control the Earth's movement; Instead of the top and bottom of the planet each being half in darkness and half in light, one end is always skewed more into the sun's rays than the other.
 - (C) The rotation of the Earth on its axis causes winter in the Western Hemisphere and summer in the Eastern Hemisphere; The sunnier side gradually flips in the course of the Earth's orbit around the sun.
 - (D) The tilt of a hemisphere toward the sun causes summer and the tilt away causes winter; The Earth's angle shifts how directly the sun's light hits us, which is why summer in the Southern Hemisphere falls during our winter.
- 2 Which selection from the article suggests that some parts of the world experience days and nights that seem to last months at a time?
- (A) If half the world were facing the sun and the other half were facing out into darkness at any given time, you'd expect days and nights to be equal. But our orbit is a little more complicated than that.
 - (B) Right now, the top half of the Earth (the Northern Hemisphere) is tilting almost as far away from the sun as possible. The opposite is true for the Southern Hemisphere, where days have been getting longer — and will start getting shorter just as we steal our precious daylight back.
 - (C) Not all parts of the world experience the solstice quite like we do. Near the equator — an imaginary belt going around the planet's middle — days and nights always stay close to 12 hours each, because the way the top or bottom of the planet is tilting doesn't much change where the middle sits.
 - (D) But up at the North Pole, it's been totally dark since October — and for a few weeks before then, the area was in perpetual twilight. It won't really feel like daytime there until March, but then the sun will seem to stay up all summer long!

- 3 What is the MOST likely reason the author included the description of the basketball player twirling a ball?
- (A) to elaborate on the light and heat that are provided by the sun
 - (B) to emphasize the speed and angles with which the Earth moves
 - (C) to illustrate the Earth's movements through a visual description
 - (D) to introduce the effect of the winter solstice on our activities
- 4 What does the author do build understanding of WHY days get shorter in winter?
- (A) The author describes how the Earth's movements affect the amount of light from the sun that hits the hemispheres at different times of the year.
 - (B) The author explains how the specific number of hours of sunlight the hemispheres experience each day is affected by the spin of the Earth on its axis.
 - (C) The author provides a contrast between the weather and climate of countries in the Northern Hemisphere with those in the Southern Hemisphere.
 - (D) The author outlines a chronological timeline of the year to show that the winter and summer solstices always fall on the same days each year.