

What is the winter solstice?

By NASA.gov, adapted by Newsela staff on 12.20.17

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Image 1. For the Northern Hemisphere, the winter solstice is the shortest day of the year. Photo by: Pixabay/public domain

People have always been looking at the stars. Stonehenge, an arrangement of massive stones in England, may have been designed partially to pay special honor to the solstices and equinoxes. The solstices and equinoxes are how we mark our seasons.



For the Northern Hemisphere, the winter solstice is the shortest day of the year. Over a year in the Arctic, the days slowly grow shorter between June and December and then plunge into the complete darkness of winter. The trend reverses upon the winter solstice, which is the point during the year when the Northern Hemisphere is the most inclined away from the sun.

After the solstice, which falls on December 21 or 22 every year, the days begin to lengthen. Many cultures celebrate a holiday near winter solstice, including Christmas, Hanukkah and Kwanzaa.

But What Is The Solstice Exactly?

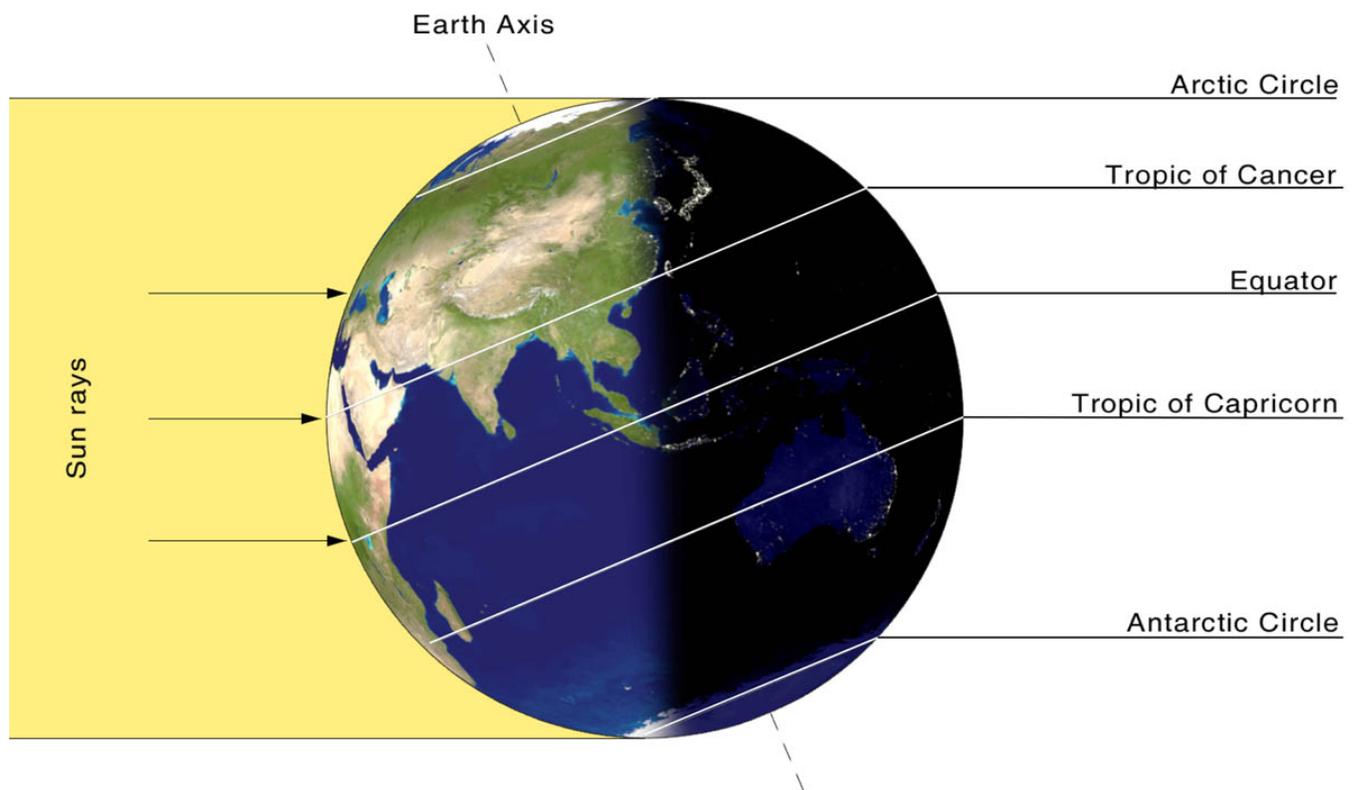
It has to do with some imaginary lines on our planet. These lines are important, because they help people navigate and measure time.

The equator is an imaginary line drawn right around Earth's middle, like a belt. It divides Earth into the Northern Hemisphere and the Southern Hemisphere.

Another imaginary line drawn straight through Earth is Earth's axis of rotation. It connects the North Pole to the South Pole. This line is tilted 23.5 degrees from Earth's orbital path around the sun. This tilt is the cause of Earth's seasons.

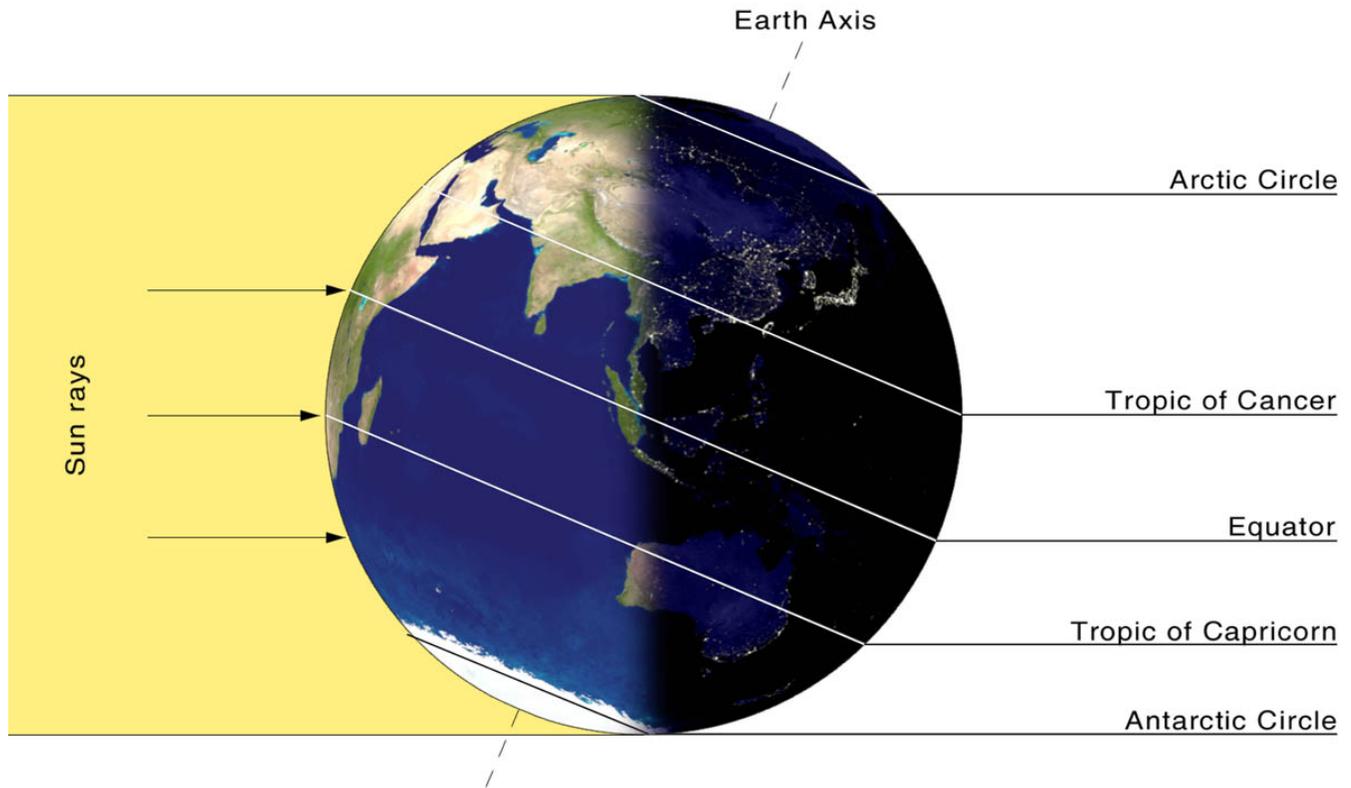
Other useful, but imaginary, lines around Earth that are parallel to the equator are called lines of latitude. They are numbered from 0 degrees to 90 degrees. The one at 0 degrees is the equator itself. The higher the number, the farther north (if it's a positive number) or south (if it's a negative number). You may have noticed two special lines of latitude on a globe of the world. One in the Northern Hemisphere is called the Tropic of Cancer at +23.5 degrees latitude. The other one in the Southern Hemisphere, called the Tropic of Capricorn, is at -23.5 degrees latitude.

These are the latitudes where, once per year, the sun is directly overhead at noon. In the Northern Hemisphere, on the Tropic of Cancer, that is the summer solstice, usually June 21. In the Southern Hemisphere, on the Tropic of Capricorn, that is the winter solstice, usually December 21. These solstice days are the days with the most (for summer) or fewest (for winter) hours of sunlight during the whole year.



Spring, or vernal, equinox is usually March 20, and fall, or autumnal, equinox is usually September 22. Except at the equator, the equinoxes are the only dates with equal daylight and dark. At the equator, all days of the year have the same number of hours of light and dark.

Who Came Up With The Name Tropic Of Cancer?



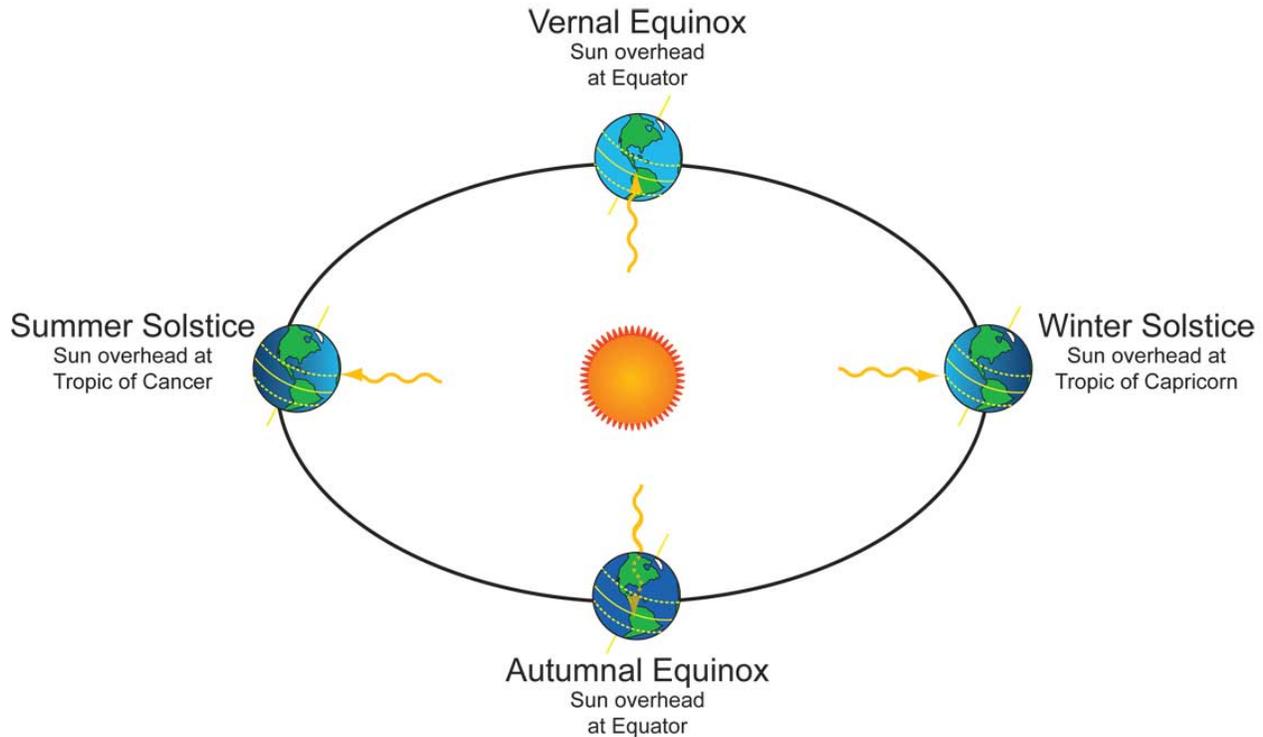
These names were thought up about 2,000 years ago. At that time, on the summer solstice, people noticed the sun was in the direction of a constellation, or group of stars, known as Cancer. However, the sun no longer points toward Cancer. Earth's axis wobbles a bit. It is always slowly changing the direction in which it points.

The word "tropic" itself comes from the Greek word *tropi*, meaning turn, referring to the fact that the sun appears to "turn back" at the solstices.

When the Tropic of Capricorn was named, the sun appeared to be entering the constellation Capricorn at the winter solstice in December. In modern times the sun appears in the constellation Sagittarius during this time.

Two other significant lines of latitude are the Arctic Circle, around the North Pole, and the Antarctic Circle, around the South Pole. These circles are as far from the poles as the Tropic of Cancer and the Tropic of Capricorn are from the equator. On the Arctic Circle, the sun does not

set at all on the summer solstice. On that one day, the sun traces a complete circle just above the horizon as the Earth rotates. On the Antarctic Circle, the sun does not set at all on the winter solstice.



As you go closer to the poles, you have more and more days when the sun does not set or rise.

Is The Summer Solstice Also The Hottest Day Of The Year?

The summer solstice is the longest day of the year in the Northern Hemisphere. That part of Earth receives more sunlight than on any other day of the year. Then shouldn't that day be the hottest?

Actually, the hottest days are usually in July and August. That's because Earth's oceans and air absorb and re-distribute the sun's energy over time. So even though the Northern Hemisphere is absorbing lots of sunlight on the summer solstice, it takes several weeks to release it.

Quiz

- 1 Which sentence from the introduction [paragraphs 1-3] suggests that the solstices play a role in modern traditions?
- (A) People have always been looking at the stars.
 - (B) Stonehenge, an arrangement of massive stones in England, may have been designed partially to pay special honor to the solstices and equinoxes.
 - (C) The solstices and equinoxes are how we mark our seasons.
 - (D) Many cultures celebrate a holiday near winter solstice, including Christmas, Hanukkah and Kwanzaa.
- 2 Read the section "Is The Summer Solstice Also The Hottest Day Of The Year?"
- Which sentence shows why the summer solstice is usually not the hottest day of the year?
- (A) Summer solstice is the longest day of the year in the Northern Hemisphere.
 - (B) That part of Earth receives more sunlight than on any other day of the year.
 - (C) Actually, the hottest days are usually in July and August.
 - (D) That's because Earth's oceans and air absorb and redistribute the sun's energy over time.
- 3 Which selection from the article is BEST illustrated by Images 3 and 4?
- (A) Other useful, but imaginary, lines around Earth that are parallel to the equator are called lines of latitude.
 - (B) These are the latitudes where, once per year, the sun is directly overhead at noon.
 - (C) Except at the equator, the equinoxes are the only dates with equal daylight and dark.
 - (D) At the equator, all days of the year have the same number of hours of light and dark.

- 4 How does Image 5 help the reader develop a coherent understanding of solstices and equinoxes?
- (A) It shows the only moments in the Earth's yearly cycle where the sun hits the Earth directly.
 - (B) It shows how the cycle of solstices and equinoxes relates to the Earth's rotation around the sun.
 - (C) It illustrates how the sun influences the length of Earth's seasons over the course of the year.
 - (D) It illustrates how the Earth's position relative to the sun determines the tilt of the Earth's axis.