

March equinox: All you need to know

Equinox is an event that happens on our sky's dome and a seasonal marker in Earth's orbit around the Sun. Although there's nothing official about it, it's also traditional to say the March or vernal equinox signals the beginning of spring in the Northern Hemisphere and autumn in the Southern Hemisphere. This equinox does provide a hallmark for the Sun's motion in our sky, marking the passage of the Sun across the celestial equator, going from south to north. The March 2019 equinox happens on March 20 at 21:58 UTC.

In the Northern Hemisphere now, we're enjoying earlier sunrises, later sunsets, softer winds, sprouting plants. Meanwhile, you'll find the opposite season – later sunrises, earlier sunset, chillier winds, dry and falling leaves – south of the equator.

For all of us on this March 2019 equinox, the full moon will come less than four hours after the equinox: on March 21 at 1:43 UTC. What's more, this will be the final in a series of three full moon supermoons.

The equinoxes and solstices are caused by Earth's tilt on its axis and ceaseless motion in orbit. You can think of an equinox as happening on the imaginary dome of our sky.

The Earth-centred view is that the celestial equator is a great circle dividing Earth's sky into northern and southern hemispheres. The celestial equator wraps the sky directly above Earth's equator. At the equinox, the Sun crosses the celestial equator, to enter the sky's Northern Hemisphere.

The Earth-in-space view is that, because Earth doesn't orbit upright, but is instead tilted on its axis by 23 1/2 degrees, Earth's northern and southern hemispheres trade places in receiving the sun's light and warmth most directly, as Earth orbits the Sun. We have an equinox twice a year – spring and fall – when the tilt of the Earth's axis and Earth's orbit around the sun combine in such a way that the axis is inclined neither away from nor toward the Sun.

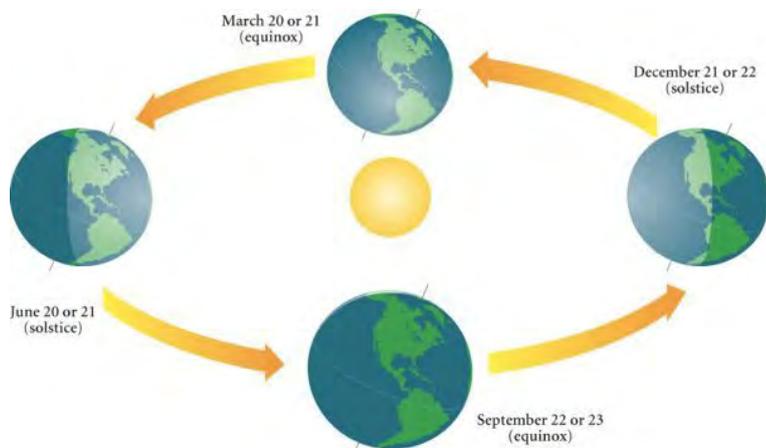
At the equinox, Earth's two hemispheres are receiving the Sun's rays equally. Night and day are often said to be equal in length. In fact, the word equinox comes from the Latin *aequus* (equal) and *nox* (night). For our ancestors, whose timekeeping was less precise than ours, they likely did seem equal. But we today know it's not exactly so.

Here's another equinox truism. You might hear that the Sun rises due east and sets due west at the equinox. True? In fact, this is true. And that's true no matter where you live on Earth. At the equinoxes, the Sun appears overhead at noon as seen from Earth's equator, as the illustration above shows. This illustration shows the sun's location on the celestial equator, every hour, on the day of the equinox.

No matter where you are on Earth, you have a due east and due west point on your horizon. That point marks the intersection of your horizon with the celestial equator – the imaginary line above the true equator of the Earth.

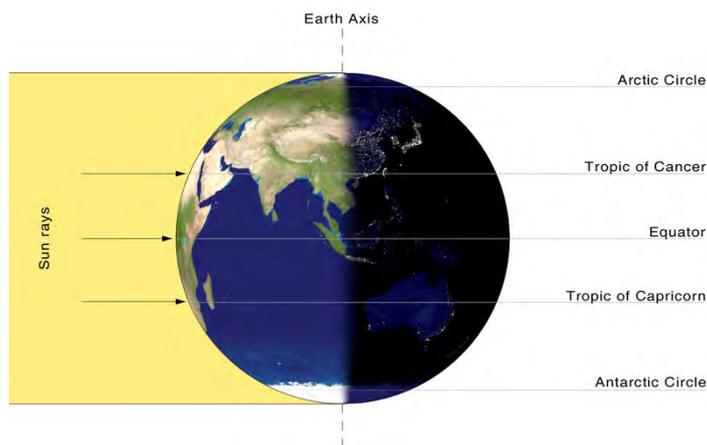
That's why the Sun rises due east and sets due west for all of us. The Sun is on the celestial equator, and the celestial equator intersects all of our horizons at points due east and due west.

Read more: Sun rises due east and sets due west
Since Earth never stops moving around the Sun, the position of the sunrise and sunset – and the days of approximately equal sunlight and night – will change quickly. At an equinox, the Earth's terminator – the dividing line between day and night – becomes vertical and connects the poles.



The day arc of the sun, every hour, during the equinox as seen on the celestial dome, from the pole.

Robin Storebrand



Where can you look to see signs of the equinox in nature? Everywhere! Forget about the weather for a moment, and think only about the daylight. In terms of daylight, the knowledge that spring is here – and summer is coming – permeates the northern half of Earth's globe.

Notice the arc of the Sun across the sky each day. You'll find that it's shifting toward the north.

Meanwhile, in the Southern Hemisphere, the days are getting shorter and nights longer. A chill is in the air. Fall is here, and winter is coming!

Full supermoon at March 2019 equinox

The March 20-21, 2019, full Moon ushers in the first full moon of spring for the Northern Hemisphere, and the first full Moon of autumn for the Southern Hemisphere. This full Moon is also a supermoon, particularly close to Earth. It comes less than four hours after the arrival of the March 20 equinox.

This is the closest coincidence of a full Moon with the March equinox since March 2000 – 19 years ago. The full Moon and March equinox won't happen again for another 11 years, until March 2030.



Full moon rising over Santiago Peak, Alamos Bay, Long Beach, California.

This month's full Moon also presents the third and final supermoon of 2019. Will it appear bigger in your sky? No, not unless you happen to catch the Moon just after it has risen in the east, around sunset. Then its larger-than-usual size has less to do with the supermoon, but more from a psychological effect known as the Moon illusion.

Supermoons don't look bigger to the eye to most people, but they do look significantly brighter. If you're in the suburbs or a rural area, notice the bright moonlight cast on the landscape at this full Moon.

Also, supermoons have a stronger-than-usual effect on Earth's oceans. Watch for higher-than-usual tides to follow the supermoon by a day or so, especially if a coastal storm is happening in your part of the world. This March supermoon isn't 2019's closest supermoon, that happened last month.

At the equinox, the Sun is at zenith (straight overhead) at the Earth's equator. Because the Earth's atmosphere refracts (bends) sunlight, a tiny bit more than half of the globe is covered over in daylight.

Generally, the first full moon of a Northern Hemisphere spring heralds the imminent coming of the Christian celebration of Easter. Since Easter Sunday – by proclamation – occurs on the first Sunday after the first full Moon in spring, we might expect the upcoming Sunday on March 24 to be Easter Sunday. However, by ecclesiastical rules, the equinox is fixed on March 21, so that places this year's Easter Sunday on April 21, 2019.

The last time that an ecclesiastical Easter and an astronomical Easter didn't occur on the same date was 38 years ago, in 1981. The next time won't be until 19 years from now, in 2038.

For Eastern or Orthodox Christendom Easter Sunday actually falls on April 28, 2019. That's because the Eastern Church bases Easter on the old style Julian calendar, instead of the revised Gregorian calendar used by Western Christianity and most of the world.

For our friends in the Southern Hemisphere, this March full Moon counts as your Harvest Moon. The Harvest Moon is the full moon occurring closest to the autumnal equinox. On average, the Moon rises about 50 minutes later with each passing day. But for several days around the time of the Harvest Moon, the lag time between successive moonrises is reduced to a yearly minimum. For instance, at 40 degrees south latitude, the moon now rises some 30 to 35 minutes later (instead of the average 50 minutes later) each day for the next several days.

In the Northern Hemisphere, where it's the closest full moon to the spring equinox, the lag time between successive moonrises is at a yearly maximum. At 40 degrees north latitude, the moon now rises around 70 to 75 minutes later daily.

AK, with EarthSky and Wikipedia Notes