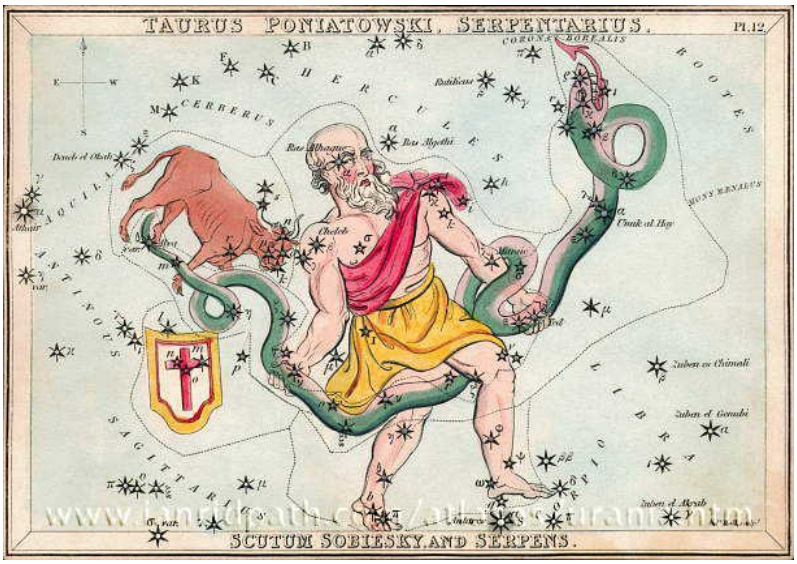
The Sun in Zodiac Constellations, 2019

Here are the Sun-entry dates to zodiac constellations in 2019, using boundaries for constellations set by the International Astronomical Union in the 1930s.

You might know that the real Sun in the real sky does not appear in front of a constellation of the zodiac within the same range of dates you'll see listed in astrological horoscopes. That's because astrology and astronomy are different systems. Astrologers typically indicate the Sun's position with signs while astronomers use constellations.

Below, you'll find the dates for the Sun's entry into each zodiacal constellation during the year 2019, plus the Sun's ecliptic longitude – its position east of the March equinox point on the ecliptic – for each given date.

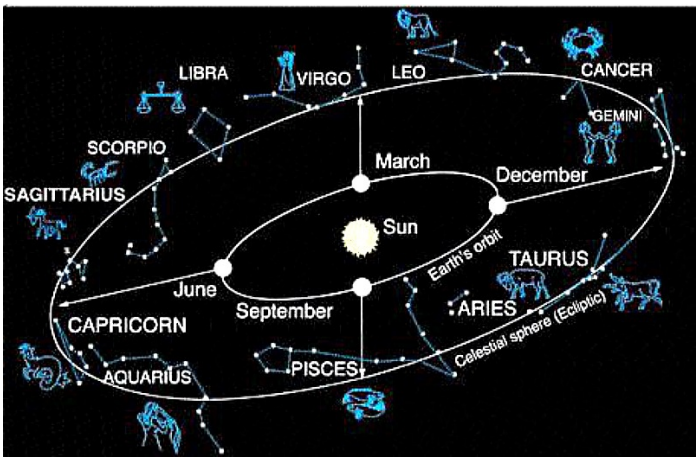


Ophiuchus, the Serpent Bearer, isn't an astrological sign, but it is one of the constellations of the zodiac. In other words, many people are born when the Sun appears in front of this constellation. In 2019, the Sun will cross into Ophiuchus on November 30.

The Sun resides at a longitude of 0° on the ecliptic at the March equinox. The Sun is at 90° ecliptic longitude at the June solstice, 180° ecliptic longitude at the September equinox and 270° ecliptic longitude on the December solstice.

DATE OF SUN'S ENTRY INTO EACH ZODIACAL CONSTELLATION (and ecliptic longitude):

Dec 18, 2018: Sun enters Sagittarius, 266.60°
Jan 20, 2019: Sun enters Capricornus, 299.71°
Feb 16, 2019: Sun enters Aquarius, 327.89°
Mar 12, 2019: Sun enters Pisces, 351.57°
Apr 19, 2019: Sun enters Aries, 29.09°
May 14, 2018: Sun enters Taurus, 53.47°
Jun 22, 2019: Sun enters Gemini, 90.43°
Jul 21, 2019: Sun enters Cancer, 118.26°
Aug 11, 2019: Sun enters Leo, 138.18°
Sep 17, 2019: Sun enters Virgo, 174.16°
Oct 31, 2019: Sun enters Libra, 217.80°
Nov 23, 2019: Sun enters Scorpius, 241.14°
Nov 30, 2019: Sun enters Ophiuchus, 248.04°
Dec 18, 2019: Sun enters Sagittarius, 266.61°

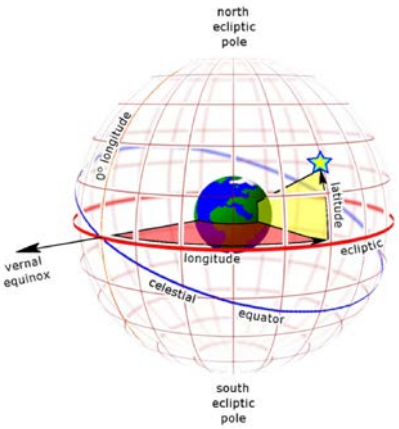


WHAT IS THE ZODIAC?

Maybe you associate the word 'zodiac' with astrology, but it has an honoured place in astronomy, too. It's defined by the annual path of the Sun across our sky.

We're surrounded by stars, but some are more special to us than others. Because Earth orbits in a flat plane around the Sun, we see the Sun against the same stars – the constellations of the zodiac – again and again at regular intervals.

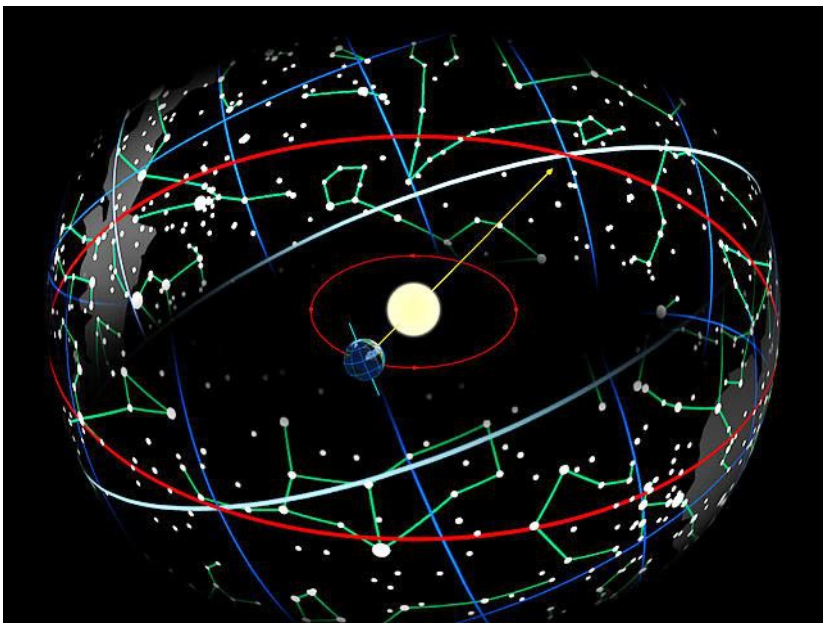
The zodiac, the 12 signs listed in a horoscope, is closely tied to how the Earth moves through the heavens. The signs are derived from the constellations that mark out the path on which the Sun appears to travel over the course of a year. You might think that dates in a horoscope correspond to when the sun passes through each constellation. But they don't, much of the time, because astrology and astronomy are different systems. Plus, a closer examination of the motion of the Earth, the Sun, and the stars shows the zodiac to be more intricate than you might imagine!



Earth-centred ecliptic coordinates as seen from outside the celestial sphere. Ecliptic longitude (red) is measured along the ecliptic from the vernal equinox at 0o longitude. Ecliptic latitude (yellow) is measured perpendicular to the ecliptic.

As Earth orbits the Sun, the Sun appears to pass in front of different constellations. Much like the moon appears in a slightly different place in the sky each night, the location of the Sun relative to distant background stars drifts in an easterly direction from day to day. It's not that the Sun is actually moving. Its motion is entirely an illusion, caused by Earth's own motion around our parent star.

Over the course of a year, the Sun appears to be in front of, or "in", different constellations. One month, the Sun appears in Gemini; the next month, in Cancer. The dates listed in the newspaper's horoscope identify when the Sun appears in a particular astrological sign. For example, March 21 through April 19 are set aside for the sign Aries. But your astrological sign doesn't necessarily tell you what constellation the Sun was in on the day you were born.



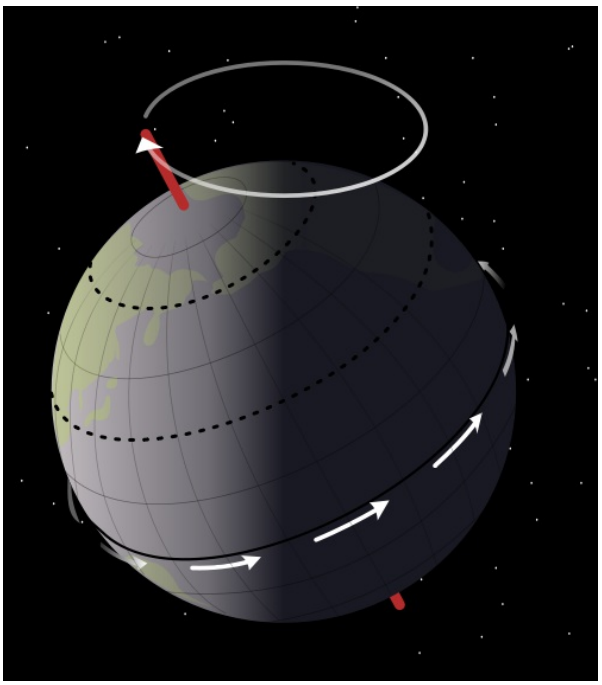
As the Earth orbits the Sun, the Sun appears to move against the background stars (red line). The constellations (green) through which the Sun passes define the zodiac

If only it were that simple!

To understand why constellations no longer align with their corresponding signs, we need to know a little bit more about how the Earth moves. And something about how we measure time. Time is a fiendishly difficult thing to define, especially if we insist on using the Sun and stars as a reference. Our calendar is, for better or worse, tied to the seasons. June 21 – the approximate date of summer solstice above the equator and the winter solstice below – marks the day the Sun appears at its most northerly point in the sky. At the June solstice, the North Pole is most tilted towards the sun.

What makes this complicated is that the North Pole is not always pointing in the same direction relative to the backdrop stars. Our planet spins like a top. And like a top, the Earth also wobbles! A wobbling Earth makes the North Pole trace out a circle on the celestial sphere. The wobble is quite slow, requiring 26,000 years to go around once. But, as the years go by, the effect accumulates.

Over the course of one orbit around the Sun, the direction of the Earth's axis drifts ever so slightly. This means that where along our orbit the solstice occurs also changes by a very small amount. The solstice actually occurs about 20 minutes earlier than one full trip in front of the backdrop stars!



Tidal forces from the sun cause Earth's axis to wobble over a 26,000-year period. The wobble changes where in Earth's orbit the solstices and equinoxes occur.

Since we tie our calendar (and astrologers tie the signs) to the solstices and equinoxes, the Earth does not actually complete an entire orbit in one year. The seasonal or tropical year is actually a hair less time than one full orbit (sidereal year). This means that, each year, where the Sun is relative to the stars on any given day – June 21, for example – drifts a very tiny amount.

But wait about 2,000 years, and the Sun will be sitting in an entirely different constellation!

On the June solstice 2,000 years ago, the Sun was sitting almost halfway between Gemini and Cancer. On this year's June solstice, the Sun will be sitting between Gemini and Taurus. In the year 4609, the June solstice point will pass out of the constellation Taurus and into the constellation Aries. The slow wobble of the Earth's axis has caused the solstice and equinox points to be about one calendar month off. In another two thousand years they'll be about two months off.

AK, with EarthSky and Wikipedia Notes