

### Offered Title: Solstice & Equinox...What?

We have solstices and we have equinoxes. Why? Who invented them? What's the difference and why should we care?

*Solstice* is derived from Latin: Sol is the Sun and sistere is to stand still. *Equinox* is derived from Latin too: aequinoctium (aequus) for equal and nox (noctis) for night.

The why...blame it on our Earth's tilted axis of rotation.

That's right, we're on a tilted spinning top, that is, relative to our orbit around the Sun. If our axis of rotation were perpendicular to our orbit we would still have seasons, albeit with much less change. This is because our orbit is elliptical, and our distance from the Sun varies throughout the year. But that darn tilt, it complicates things. It really pumps up seasonal changes, and oh yes, causes solstices and equinoxes.

We'll look at solstice first. Because of the tilt, as we orbit around the Sun, the Sun appears to change altitude. But, on two days of the year the Sun's altitude change seems to stop...stand still...*solstice*. After a solstice the altitude change reverses. The two days are generally June 20/21 and December 21/22. To complicate matters further, southern and northern hemispheres experience opposite effects. For example, on June 20/21 the Sun is highest in the northern hemisphere but lowest for the southern hemisphere. It is the beginning of summer in the northern hemisphere and the beginning of winter in the southern hemisphere.

Solstices have been given names and observed by many cultures, especially around Christmas, but it was the Greeks who appear to first use the phenomenon, in celestial navigation, after determining our Earth is spherical. They devised the Celestial Sphere, on which stars, Sun, Moon, and planets moved.

Equinoxes come into play for spring and fall...isn't that convenient. Because of our tilted axis, as our Earth orbits the Sun there are two dates where the plane of our rotation (equator) intersects our orbital plane with the Sun (ecliptic). This occurrence results in our entire planet having roughly equal daylight and night time hours. The dates? Usually March 20<sup>th</sup> and September 22/23. Of course, the northern and southern hemispheres experience these days differently. For example: In the southern hemisphere March 20<sup>th</sup> is the first day of fall and in the northern hemisphere it is the first day of spring.

Equinoxes have been celebrated around the world and used as signposts for culturally important events such as Passover, Easter, New Year for India and numerous western and central Asian countries, Harvest festivals, Mother's Day in Arab countries, and World Storytelling Day.

The who...solstice and equinox were not invented, just noticed, studied, named, and made noteworthy by many cultures.

The difference... is evident, and caring is optional.

### What's in the Sky?

December 13-14: Take in the Geminid Meteor Shower. Starting late night on the 13<sup>th</sup>, the Geminids will be coming into the upper eastern sky, continuing well into the early hours of the 14<sup>th</sup>. Hope it's clear.