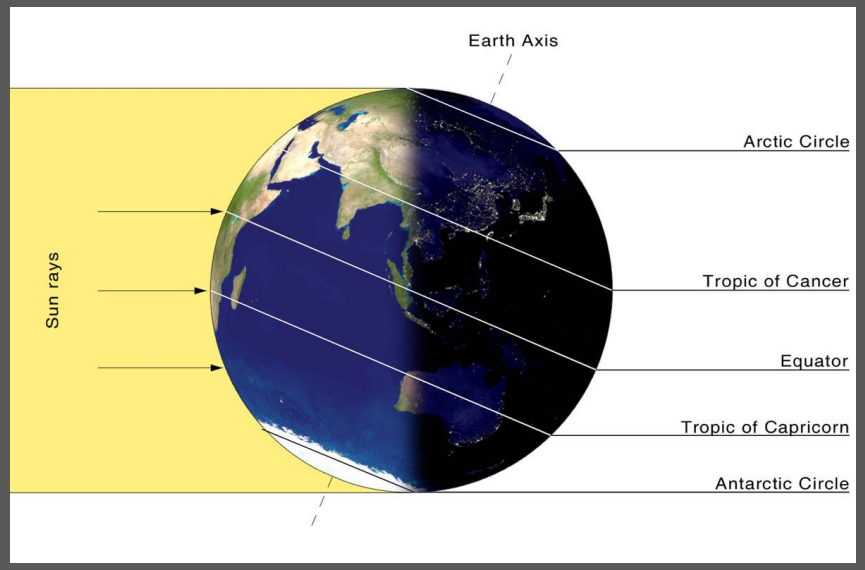
Winter Solstice

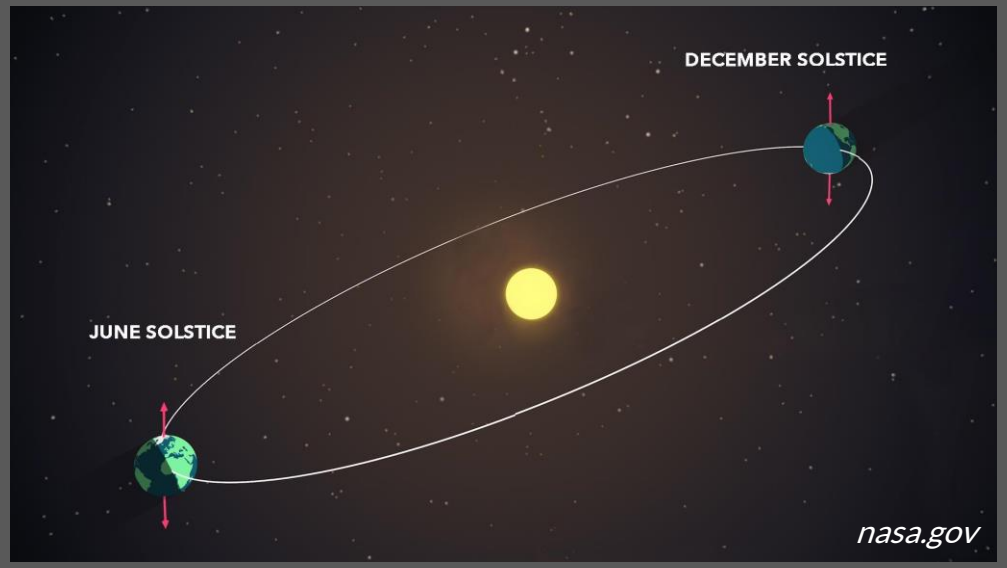
2020

Weather Forecast Office
Albuquerque, NM
Updated: December 19, 2020 5:39 PM MDT

December 21, 2020
3:02 AM MST

The winter solstice occurs at the moment the earth's tilt away from the sun is at a maximum. Therefore, on the day of the winter solstice, the sun appears at its lowest elevation with a noontime position that changes very little for several days before and after the solstice. In fact, the word solstice comes from Latin *solstitium* or *sol* (the sun) + *-stit-, -stes* (standing). The winter solstice marks the shortest day and longest night of the year. In the Northern Hemisphere, it occurs when the sun is directly over the Tropic of Capricorn, which is located at 23.5° south of the equator and runs through Australia, Chile, southern Brazil, and northern South Africa. The Northern Hemisphere winter solstice will occur at **3:02 am MST on December 21, 2020**.





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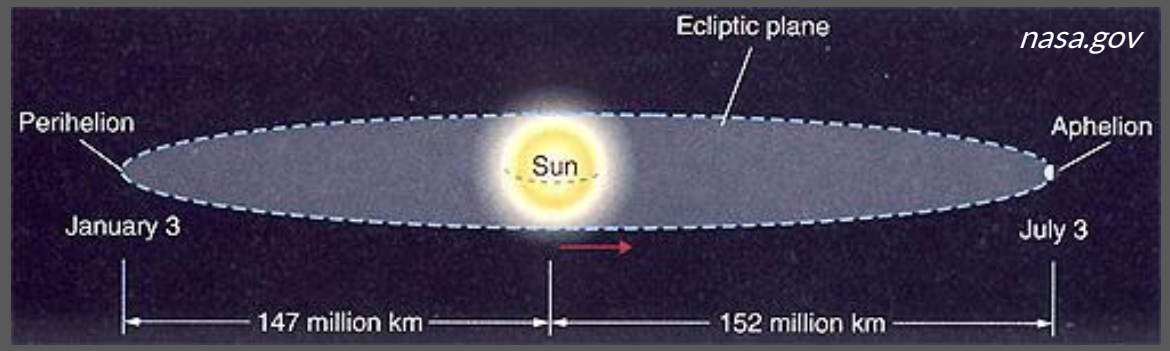
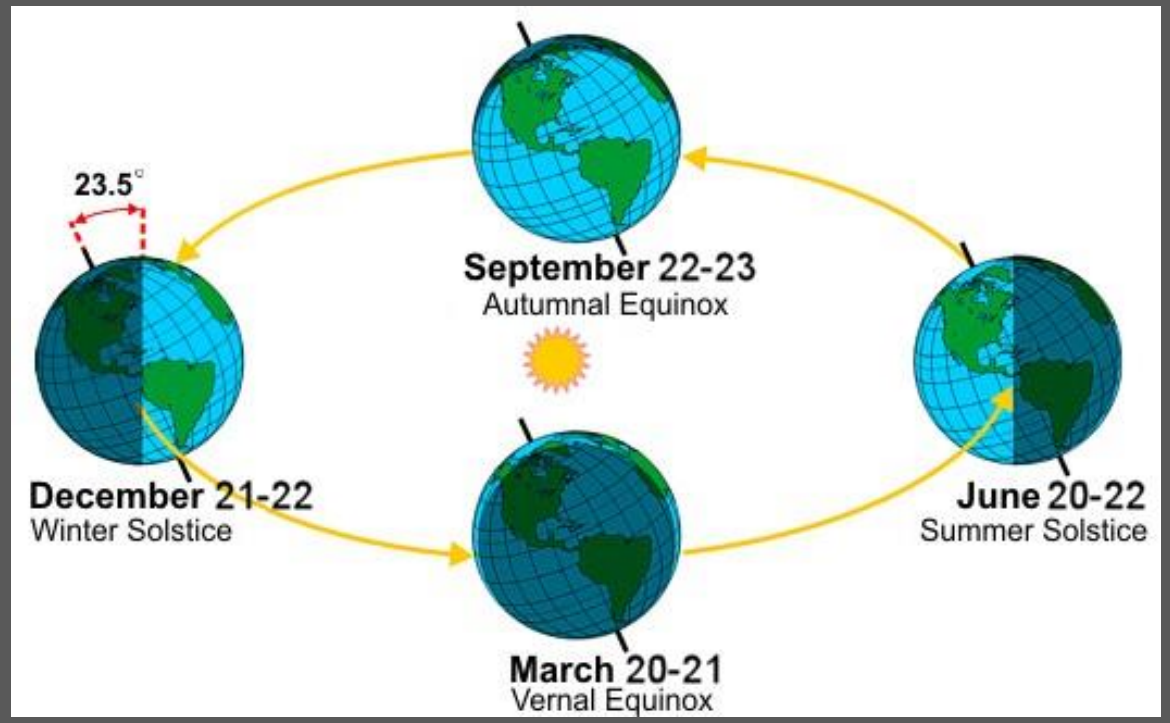
The Seasons

We all know that the Earth makes a complete revolution around the sun once every 365 days, following an orbit that is elliptical in shape. This means that the distance between the Earth and Sun, which is 93 million miles on average, varies throughout the year. The top of figure on the right illustrates that during the first week in January, the Earth is about 1.6 million miles closer to the sun. This is referred to as the perihelion. The aphelion, or the point at which the Earth is about 1.6 million miles farther away from the sun, occurs during the first week in July. This fact may sound counter to what we know about seasons in the Northern Hemisphere, but actually the difference is not significant in terms of climate and is NOT the reason why we have seasons. **Seasons are caused by the fact that the Earth is tilted on its axis by 23.5°.** The tilt's orientation with respect to space does not change during the year; thus, the Northern Hemisphere is tilted toward the sun in June and away from the sun in December, as illustrated in the bottom graphic on the right. The combination of the earth's elliptical orbit and it's axial tilt contribute to the uneven changes in the times of sunrise and sunset throughout the year.





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A pinhole camera (no lens and a single small aperature) can be effectively used to document the change in elevation of the sun during the year. The image below is a solargraph made with a pinhole camera, in which the path of the sun as it crosses the sky is captured for an extended period. It was made in Tijeras, and depicts the period from the summer solstice (highest streaks) to the winter solstice (lowest streaks) in 2009.

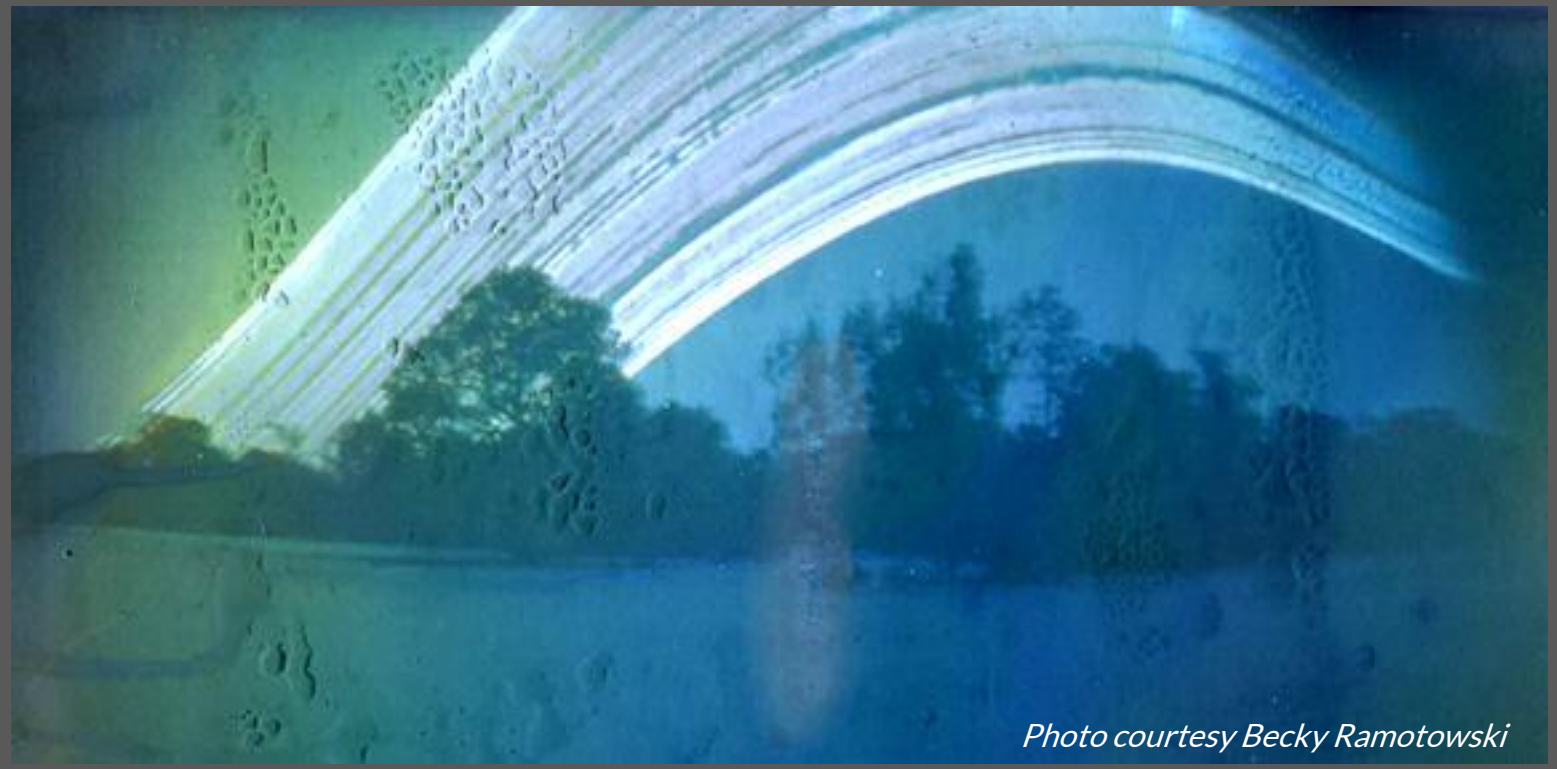

Photo courtesy Becky Ramotowski