

DECEMBER 2011 ASTRONOMY
From the Trackman Planetarium at Joliet Junior College

The winter solstice, the first day of winter, is on December 21st. On that date, the sun crosses the sky at the lowest point above the horizon (25 degrees) for the year. Because the sun is so low in the sky, we get the least amount of heat and energy from the sun on the solstice that we will receive on any other day of the year. After the winter solstice, the sun will appear to cross the sky higher every day until next June. The winter solstice is the day of the year with the least amount of daylight (9 hours). However, for those of you who dislike the dark afternoons, the earliest sunset for the year is on December 8th. After December 8th, the sun starts setting later each afternoon - setting 6 minutes later by Christmas. But the sun rises later every morning until the first week in January.

The word "solstice" means to stand still. From June until December, the sun crosses the sky lower every day until the winter solstice when it seems to stand still. After the winter solstice, the sun appears to cross the sky higher every day until the summer solstice. The sun's change in crossing altitude is a result of Earth's axis being on a 23.5 degree angle from the plane of our orbit around the sun. As we do our annual orbit of the sun, the sun goes from shining over the northern hemisphere during our summer, to shining over the southern hemisphere during our winter. For thousands of years, the winter solstice and its promise of renewed warmth and light was celebrated throughout the northern hemisphere. We continue to have these "celebrations of light" when we celebrate our current Holiday Season at the time of the winter solstice.

There are two planets visible in the evening sky during December. Venus is the very bright object in the western sky after sunset. Venus' orbit is moving it to the east and Venus will be setting later every day through the winter. Jupiter is in the southeastern sky after sunset. Jupiter is the largest of the planets and will remain very bright in the evening sky throughout the winter. By mid-December, Mars will be rising in the late evening sky and Mars will continue to rise earlier every day throughout the next year. Mercury is in the sky after sunset and is moving toward the sun. Mercury will pass between the sun and the earth on the 4th of December. Mercury will then be in the morning sky before sunrise and will reach the farthest east in its orbit (21 degrees) on December 21st. Saturn is still in the sky during the middle of the night, rising at near 2 am.

The winter constellations are above the horizon by mid-evening. Cassiopeia looks like a "W" and is high in the sky during the evening. Below, and slightly to the right of Cassiopeia is the square of Pegasus. When you find Pegasus, start with the star that marks the upper left corner of the square. From that star move two stars above and to the left. Just above that star is the Andromeda Galaxy, the closest galaxy to our Milky Way Galaxy. In a pair of binoculars, the Andromeda Galaxy will appear as an elongated fuzz ball. Continue above and to the left of Pegasus and you come to Perseus. Perseus has several star clusters that are good binocular targets. Below Perseus is the Pleiades, a tight cluster of new stars that is visible to the naked eye and another great binocular target. To the right of the Pleiades is Taurus, and then further to the east is the easily identified winter constellation of Orion. Look for the three stars in a straight line that make up Orion's belt. The red star that marks

Orion's left shoulder is Betelgeuse, a super giant star that is about to go supernova. Below Orion's belt is the Orion Nebula. The Orion Nebula can be seen with the naked eye, and this nebula is a cloud of gases that has been pulled together by gravity, and through a process called accretion, is forming new solar systems. The Orion Nebula is another good binocular target. Above Orion are two bright stars (Castor and Pollux) that mark the heads of the Gemini twins.

The Geminoids meteor shower peaks on December 13th, but the moon will be very bright in the sky and will interfere with good meteor viewing.

On November 26th, NASA launched Curiosity, the largest rover ever sent to Mars. Curiosity is the size of a monster truck, and is equipped with a jackhammer drill and a rock zapping laser, along with other tools necessary to study the Martian soil and to look for signs that the red planet could have supported microscopic life in its past. Curiosity will take 8 1/2 months to complete the 354 million mile journey to Mars. The Mars rover will be lowered onto the Martian surface via a jet pack and tether system similar to the sky cranes used to lower heavy equipment into remote areas on Earth. Curiosity is too heavy to use air bags like its much smaller predecessors, Spirit and Opportunity, did in 2004.

The full moon in December is on December 10th and it was known to the Native Americans as the Full Long Nights Moon or the Full Cold Moon.

Whatever your beliefs, we wish you the warmest wishes for a wonderful solstice and the best of everything good during 2012.

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