

# astronomical calendar

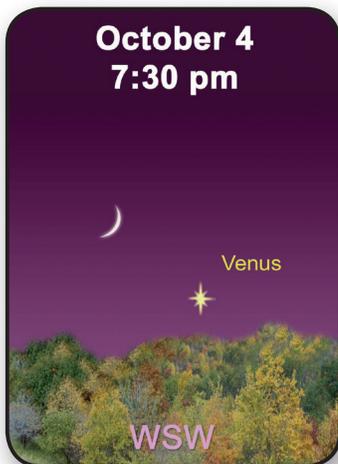
BUHL PLANETARIUM & OBSERVATORY

autumn  
2016



## SEPTEMBER

1	Thu	●	New Moon – 5:03 am
3	Sat		Venus 4 degrees below thin Crescent Moon (Look west at dusk)
8	Thu		Saturn 2 degrees below Moon (Look southwest in pm)
9	Fri	◐	First Quarter Moon – 7:48 am Mars 7 degrees below Moon (Look southwest in pm)
16	Fri	○	Full “Harvest” Moon – 3:05 pm
22	Thu		Autumnal Equinox – 10:21 am
23	Fri	◑	Last Quarter Moon – 5:56 am
28	Wed		Mercury 8 degrees below Crescent Moon (Look east at dawn) Mercury at greatest elongation (Look east at dawn)
30	Fri	●	New Moon – 8:11 pm



## OCTOBER

4	Tue		Venus 10 degrees below thin Crescent Moon (Look southwest at dusk)
5	Wed		Saturn 5 degrees to left of Crescent Moon (Look southwest at dusk)
8	Sat		Draconid Meteor Shower peak (Evening until dawn on Oct. 9) Mars 5 degrees below Moon (Look southwest in pm)
9	Sun	◐	First Quarter Moon – 12:32 am
16	Sun	○	Full “Hunters” Moon – 12:23 am
19	Wed		Jupiter 10 degrees above eastern horizon (Look east at dawn)
20	Thu		Orionid meteor shower peaks (Overnight until dawn on Oct. 21)
22	Sat	◑	Last Quarter Moon – 3:13 pm
27	Thu		Venus 4 degrees below Saturn (Look southwest at dusk)
30	Sun	●	New Moon – 1:38 pm



## NOVEMBER

2	Wed		Venus 6 degrees to right of Saturn and Crescent Moon (Look southwest dusk)
3	Thu		Venus 7 degrees below Crescent Moon (Look southwest at dusk)
6	Sun		Mars 6 degrees below Moon (Look south-southwest in pm) <b>Daylight Saving Time ends 2 am (Turn clocks back one hour)</b>
7	Mon	◐	First Quarter Moon – 2:51 pm
14	Mon	○	Full “Beaver” Moon – 8:52 pm (Closest supermoon of 2016)
16	Wed		Leonid meteor shower peaks – (Late evening until dawn on Nov. 17)
21	Mon	◑	Last Quarter Moon – 3:33 am
24	Thu		Jupiter 6 degrees below Crescent Moon (Look southeast in am)
29	Tue	●	New Moon – 7:18 am

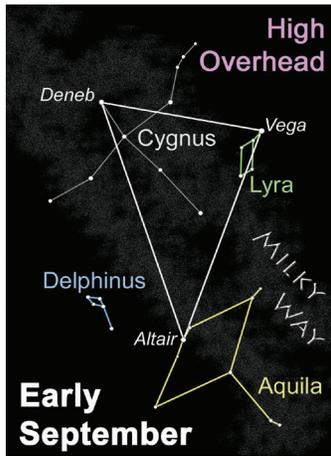


Join stargazers rain or shine on select evenings September – November.

\$4 for non-members / \$2 for members and as an add-on to general admission or Omnimax show  
For dates and details visit [CarnegieScienceCenter.org/planetarium](http://CarnegieScienceCenter.org/planetarium)

## Autumn Planet Visibilities

September	<b>Morning:</b>	Mercury (E) late month
	<b>Evening:</b>	Mars & Saturn (S-SW), Venus (W) and Jupiter (W) early month
October	<b>Morning:</b>	Mercury (E) early month, Jupiter (E) mid-month
	<b>Evening:</b>	Venus and Saturn (SW), Mars (S-SW)
November	<b>Morning:</b>	Jupiter (E-SE)
	<b>Evening:</b>	Mars (S-SW), Venus (SW), and Saturn (SW) early month



## Delphinus and the Summer Triangle

The brilliant star shining directly overhead at 9 pm in early September is Vega, brightest star in Lyra the Harp. Vega is one of three bright stars that outline a large triangle that rides high in the southern sky throughout the summer and into the autumn. The other stars in the triangle include Deneb and Altair. Deneb, the brightest star in Cygnus the

Swan, is also overhead and about 25 degrees to the east or left of Vega. About 40 degrees below Deneb sits Altair, the brightest star in Aquila, the Eagle. These three stars outline the asterism known as the Summer Triangle.

While observing the summer triangle away from bright city lights, look 12 degrees to the upper left of Altair, and you should be able to make out a tight group of five stars that form the constellation of Delphinus. The dolphin appears to be leaping out of the river of stars known as the Milky Way.

### astronomical fact:

The Sun and Moon appear to be about the same size in our sky because the Sun is 400 times larger than the Moon and the Sun is 400 times as far away from the Earth as the Moon. This ratio allows the full disk of the Sun to be fully obscured by the Moon creating a total solar eclipse. On Aug. 21, 2017, there will be a total solar eclipse when the Moon's shadow is cast on a 68-mile-wide path from Oregon to South Carolina. It will only be a partial eclipse in Western Pennsylvania with over 85 percent of the Sun obscured.

## Moon Phase Guide

As the Moon circles once around the Earth, it completes a full cycle of phases every 29.5 days. What it looks like to us at any particular time depends on the angle at which the Sun's light is hitting the Moon.



**New Moon** – Each lunar cycle begins with a New Moon. At this time, the Moon cannot be seen because it is lined up between the Earth and the Sun, and sunlight is only hitting the side of the Moon facing away from the Earth.



**Waxing Crescent** – As the Moon moves east, away from the Sun, we see a thin, right-sided crescent in the early evening western sky.



**First Quarter** – This phase occurs when the right half of the lunar disc is illuminated. Its name comes from the fact that the Moon is now a quarter of the way through the lunar month. It appears due south at sunset.



**Waxing Gibbous** – When more than half of the lunar disc is illuminated, it has a shape we call “gibbous.” This moon rises before sunset in the east and sets before sunrise.



**Full Moon** – The Moon is now lined up on the opposite side of the Earth from the Sun, and receives sunlight across the entire lunar surface facing Earth. The full Moon rises near sunset and sets near sunrise.



**Waning Gibbous** – The Moon is now growing smaller from right to left. It rises before midnight and is visible in the southern sky after sunrise.



**Last Quarter** – The left half of the lunar disk is now illuminated. This Moon rises around midnight, is seen high in the south at dawn, and sets in the early afternoon.



**Waning Crescent** – The left sided crescent is seen in the morning sky before sunrise and is high in the south around noon. It sets before sunset. A day or two after this phase, the Moon will be a New Moon, and the cycle begins again.