MoonWatcher™

A publication of Celestial Products

Guide to accompany the World's Most Beautiful Moon Calendars™

MoonLight™, MoonShine™, MoonDazzle™, Moons and Blooms™, MoonDance™

Phases of the Moon 2018

All times shown in Universal Time (UT hh:mm) – Eclipses are marked with "E" and number for reference under "Eclipses"

New Moon

Month	Day	Time	
Jan	17	02:17	
Feb	15	21:05	E2
Mar	17	13:12	
Apr	16	01:57	
May	15	11:48	
Jun	13	19:43	
Jul	13	02:48	E3
Aug	11	09:58	E5
Sep	9	18:01	
Oct	9	03:47	
Nov	7	16:02	
Dec	7	07:20	

First Quarter

Month	Day	Time
Jan	24	22:20
Feb	23	08:09
Mar	24	15:35
Apr	22	21:46
May	22	03:49
Jun	20	10:51
Jul	19	19:52
Aug	18	07:49
Sep	16	23:15
Oct	16	18:02
Nov	15	14:54
Dec	15	11:49

Full Moon

Month	Day	Time	
Jan	2	02:24	
Jan	31	13:27	E1
Mar	2	00:51	
Mar	31	12:37	
Apr	30	00:58	
May	29	14:20	
Jun	28	04:53	
Jul	27	20:21	E4
Aug	26	11:56	
Sep	25	02:53	
Oct	24	16:45	
Nov	23	05:39	
Dec	22	17:49	

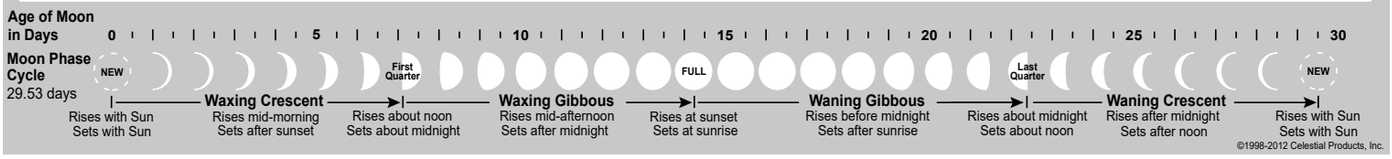
Last Quarter

Month	Day	Time
Jan	8	22:25
Feb	7	15:54
Mar	9	11:20
Apr	8	07:18
May	8	02:09
Jun	6	18:32
Jul	6	07:51
Aug	4	18:18
Sep	3	02:37
Oct	2	09:45
Oct	31	16:40
Nov	30	00:19
Dec	29	09:34

Basic data shown here and in other tables credit to Fred Espenak and Sumit Dutta, NASA Goddard Space Flight Center.

Daily Phase Changes and Rise/Set Times

The period of time in which the moon moves through one complete change of phases represents a synodic month - an average of 29.53 days. A lunation generally refers to the period between consecutive new moons - again, an average of 29.53 days. It is common to refer to the age of the moon in units of days. At about 7 days after New, the moon has passed through one fourth of its journey through a complete lunation, hence the name of First Quarter. About halfway through the cycle (14-15 days), the moon is seen in its Full illumination. At about 22 days of age, it is three-quarters through the cycle - the Last Quarter (sometimes called Third Quarter) phase. Finally, the moon comes back to New Moon after 29+ days. In the diagram below, the various phase appearances of the moon are illustrated along the days of age ruler. Names for the moon's illuminated growth/phases between the quarter phases is shown immediately below the illustrations. Just remember that the term waxing refers to the moon's increasing illumination and waning to receding illumination. Also shown are mid-latitude rules of thumb for the rise and set times of the moon. More specific times of moonrise and moonset are dependent on many variables: location, date, altitude, localized terrain, and additional sun/earth/moon geometric information. Hence, any more specific moonrise/moonset almanac information must be generated based on those variables. Refer to our mooncalendar.com website for more information on resources for moon watchers.



Eclipses 2018

Eclipse dates are marked on the Phases of the Moon table. Times shown in that table are close to "mid-eclipse" values. (See Universal Time for discussion on conversion of Universal Time to other zone times.)

E1 – January 31 – Total Eclipse of the Moon. Visible from Asia, Australia, Pacific, western North America

E2 – February 15 – Partial Eclipse of the Sun. Visible from Antarctica, south South America

E3 – July 13 – Partial Eclipse of the Sun. Visible from south Australia

E4 – July 27 – Total Eclipse of the Moon. Visible from South America, Europe, Africa, Asia, Australia

E5 – August 11 – Partial Eclipse of the Sun. Visible from Greenland, Iceland, north Europe, northeast Asia

Eclipse predictions by Fred Espenak, NASA's Goddard Space Flight Center.

See Eclipsewise.com for details and map illustrations.

Blue Moons

Should you get excited about seeing a Blue Moon? No, but this popular term has hopefully led to more interest in astronomy. Unlike other astronomical events - an eclipse, occultation, transit of Mercury, etc. - there is nothing to witness in the way of motion or change. Blue Moon definitions (yes, there is more than one!) are just human inventions to put a name on a counting fluctuation that occurs when one puts the grid of our calendar system on the natural 29.5 day moon phase cycle. To help you understand this kind of phenomenon, imagine two systems: the first a spigot that drips once every 29 seconds and the other your hand-held cup that repeatedly moves in and out under the spigot - 30 seconds under and 30 seconds out. Eventually, your cup will be under for 30 seconds and catch two drips 29 seconds apart instead of the usual one drip. So it is with our calendar system of months, season changeover dates, and the moon's phase cycle. Both of the following definitions are the result of looking for an extra count of a full moon inside one of our calendar cycles.

The widely known definition that has permeated western culture since the mid-20th century relates to the occurrence of a second full moon in a calendar month. Since the average lunation takes just over 29.5 days, it is possible to have two full moons within the 30 or 31 day calendar months as long as the first full moon occurs within the first day(s) of the month. One can find one of these Blue Moon months roughly every 2+ years, but this average is hardly a rule that can be used to predict future occurrences. This is due to the varying number of days in each calendar month, leap year, and the variance from the 29.5 day average lunation period. The next Blue Moons under this definition occur January 31, 2018 and March 31, 2018 - both in the same year which can only happen because February usually has 28 days. The next double Blue Moon like this happens in January and March of 2037.

Now, let's look at a less familiar definition of a seasonal Blue Moon that evolved many decades ago. It refers to the third full moon within a season (astronomical Winter, Spring, Summer, Fall) having four full moons. Normally a season will have only three full moons, but occasionally, the lunation cycle meshes with a season so that it is possible to get in four full moons. Thus, February, May, August, and November are the only months in which one could have one of these "extra" seasonal full moons. The full moon of May 18, 2019 is the next Blue Moon using this definition since there are four full moons in the season period between the March equinox and the June solstice. Remember, this type of Blue Moon is the full moon of the last full month in that season. Since the seasons have beginning and ending dates partially into a calendar month, the Blue Moon will always be the third full moon in the season that has four full moons.

The name Blue Moon may otherwise apply to the rare occurrence of seeing a blue colored moon filtered through atmospheric particles that scatter more of the yellow-red wavelengths leaving the green-blue wavelengths that can give it that color.

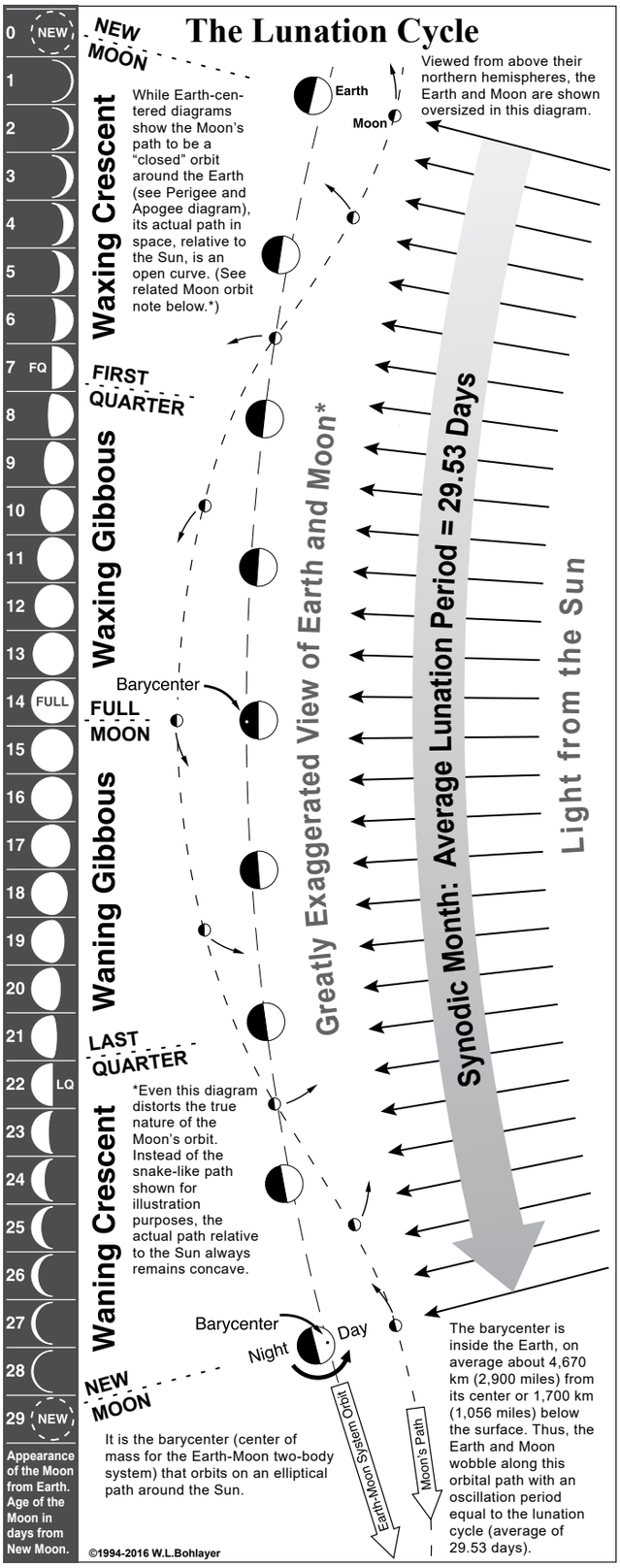
Equinoxes and Solstices 2018

(See **Universal Time** article for conversion to your time zone)

Month	Day	Time (UT)	Event
Mar	20	16:15	March (Spring/Vernal) Equinox
Jun	21	10:07	June (Summer) Solstice
Sep	23	01:54	September (Fall/Autumnal) Equinox
Dec	21	22:22	December (Winter) Solstice

Perihelion and Aphelion 2018

Month	Day	Time (UT)	Event
Jan	3	02:59	Perihelion (Earth closest to Sun)
Jul	6	15:59	Aphelion (Earth farthest from Sun)

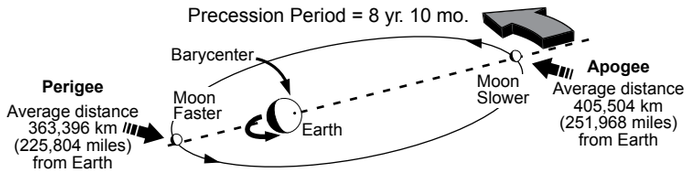


Perigee and Apogee

Like most orbits, the path of the Moon around the Earth is an ellipse with a closest approach, perigee, and farthest point called apogee. (More accurately stated, this path is an ellipse with a focus on the barycenter. See note on the barycenter in diagram at left.) It is possible to visually detect the Moon's larger apparent size at perigee to that at apogee. While perigee and apogee can occur at any phase of the moon, try to capture a full moon at or near perigee and apogee using a medium to long focal length telephoto lens.

The additional increase in lunar gravitational force on the Earth at perigee can lead to higher high tides (and lower low tides) than would normally occur. Couple this increased lunar gravitational component with the Sun's gravitational force at a time when both the Moon and Sun are aligned with the Earth (New or Full Moon) and you have the ingredients for higher than normal tides–tides that are dreaded for their potential shore damage when a storm is present.

As a further complication to the Moon's orbit, the elliptical figure itself turns (precesses) forward relative to the background stars, taking nearly 9 years to complete one circuit.



2018

These dates are also marked directly on most of our moon calendars.
Look for "P" Perigee, "A" Apogee. Data credit to Fred Espenak, NASA GSFC.

Perigee			Apogee		
Date	Time(UT)	km	Date	Time(UT)	km
Jan 01	21:54	356600*	Jan 15	02:09	406500
Jan 30	09:54	359000*	Feb 11	14:16	405700
Feb 27	14:48	363900	Mar 11	09:13	404700
Mar 26	17:17	369100	Apr 08	05:32	404100
Apr 20	14:44	368700	May 06	00:35	404500
May 17	21:06	363800	Jun 02	16:34	405300
Jun 14	23:55	359500**	Jun 30	02:43	406100
Jul 13	08:28	357400**	Jul 27	05:44	406200
Aug 10	18:05	358100**	Aug 23	11:23	405700
Sep 08	01:21	361400	Sep 20	00:54	404900
Oct 05	22:29	366400	Oct 17	19:16	404200
Oct 31	20:05	370200	Nov 14	15:57	404300
Nov 26	12:10	366600	Dec 12	12:25	405200
Dec 24	09:52	361100			

*January 1 is the shortest distance perigee (356,600 km or 221,581 miles) of 2018 and nearly coincident with the full moon of January 1-2 (the two events are just 4 hours apart). The slightly more distant perigee of January 30 is nearly coincident with the full moon of January 31. Both of these full moons are called perigee full moons, and being closer to earth, the moon is viewed slightly larger/brighter. Such events (as well as perigee new moons) were dubbed by an astrologer as "supermoons" and term is now part of popular culture. **New moons coincident with perigee are by the supermoon definition also "super." In June, July, and August, the new moon dates are coincident or nearly coincident with perigee. There is more hype than substance attached with the aspects to these events. It is more important knowing that every perigee coincident with either a full or new moon has its greatest influence in higher and lower tide height/depth values.

Full Moon Names

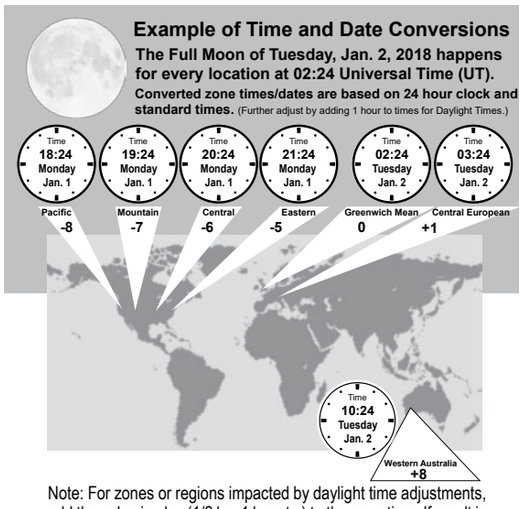
The following names for full Moons come to us from American Indian and folklore sources. Take your pick!

January..... Moon After Yule, Old Moon
February ..... Snow Moon, Hunger Moon, Wolf Moon
March..... Sap Moon, Crow Moon, Lenten Moon
April ..... Grass Moon, Egg Moon, Pink Moon
May..... Planting Moon, Milk Moon
June..... Rose Moon, Flower Moon, Strawberry Moon
July ..... Thunder Moon, Hay Moon
August ..... Green Corn Moon, Grain Moon
September.. Fruit Moon, Harvest Moon*
October..... Hunter's Moon, Harvest Moon*
November... Hunter's Moon, Frosty Moon, Beaver Moon
December... Moon Before Yule, Long Night Moon

*Usually, the full moon closest to the autumnal equinox is called the Harvest Moon, but for some, the assignment of the Harvest Moon is that which occurs only on or after the autumnal equinox. In either case, this means that there are years when the October full moon may end up being called the Harvest Moon.

Universal Time

All our publication event times are reported in Universal Time (UT). This is simply understood as the local time on the prime meridian (0 degrees longitude) which passes through Greenwich, England, hence the familiarity you may have with Greenwich Mean Time (GMT). Universal Time uses a 24 hour period with 0 hours representing midnight; 12:00 is noontime; 14:00 is 2 pm; 18:00 is 6 pm, and so forth.



Note: For zones or regions impacted by daylight time adjustments, add the value in play (1/2 hr., 1 hr., etc.) to the zone time. If result is over 24 hrs., subtract 24 and change date to the next day.

To convert Universal Time to your zone time (e.g., Eastern Standard Time), subtract an hour for each time zone west of Greenwich needed. (Add an hour for each zone east of Greenwich). Examples are shown in the Time Conversion Example diagram at left. Note that when the subtraction results in a value less than 0, the date reverts to the **previous** day and the hour value is adjusted by adding 24 hours to the negative value.

For users in the U.S., we have used a star to mark dates of Full and New Moons that may shift depending on your time zone. Thus, you should always check for a "star" and know your time zone affect on whether the event date will shift to the previous day.

CELESTIAL PRODUCTS