

The next full moon is the buck or thunder moon

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The next full moon will be Sunday morning, July 21, 2024, appearing opposite the sun (in Earth-based longitude) at 6:17 AM EDT. For the International Date Line West and the American Samoa and Midway time

zones this will be late Saturday night. For Line Islands Time this will be early Monday morning. The moon will appear full for about three days around this time, from Friday evening through Monday morning, making this a full moon weekend.

The Maine Farmers' Almanac began publishing "Indian" names for full moons in the 1930s and these names are now widely known and used. According to this almanac, as the full [moon](#) in June the Algonquin tribes of what is now the northeastern United States called this the Buck moon. Early summer is normally when the new antlers of buck deer push out of their foreheads in coatings of velvety fur. They also called this the Thunder moon because of early Summer's frequent thunderstorms.

Europeans called this the Hay moon for the haymaking of [early summer](#), and sometimes the Mead moon (although this name was also used for the previous full moon). Mead is created by fermenting honey mixed with water, sometimes adding fruits, spices, grains, or hops.

For Hindus, Buddhists, and Jains, this is the Guru Full moon (Guru Purnima), celebrated as a time for clearing the mind and honoring the guru or spiritual master.

For Theravada Buddhists this full moon is Asalha Puja, also known as Dharma Day or Esala Poya, an important festival celebrating the Buddha's first sermon after reaching nirvana, which started Buddhism. This sermon became the core of Buddhist teachings and includes the four noble truths. In addition, with this full moon the Buddhist Monks start Vassa, the annual three-month retreat during the rainy season.

In many traditional lunisolar and lunar calendars full moons fall on or near the middle of the lunar months. This full moon is near the middle of the sixth month of the Chinese year of the Dragon, Tammuz in the Hebrew calendar, and Muharram in the Islamic calendar. Muharram is

one of the four sacred months during which warfare is forbidden.

Since this is the Thunder moon, a quick note on lightning safety. Most of the lightning that strikes the ground arcs from the negatively charged bottom of the storm to the ground underneath the storm. Much rarer is positive lightning, which arcs from the top of a thunderstorm to strike much farther away. Positive lightning can sometimes strike areas where the sky is clear (hence the term "bolt out of the blue"). NOAA's Lightning FAQ Page says that almost all lightning will occur within 10 miles of its parent thunderstorm, but that lightning detection equipment has confirmed bolts striking up to almost 50 miles away. Because positive lightning arcs across a greater distance it tends to be 5 to 10 times more powerful than regular ground strikes. It can strike dry areas outside of the storm's rainfall, so positive lightning tends to start more fires than negative lightning. Although positive lightning is rare (less than 5% of all lightning strikes), the lack of warning and its greater power make it more lethal. A good rule to follow is, if you can hear the thunder, you can be struck by lightning. As a bicycle enthusiast and daily commuter (before I retired) I am well aware that the inch or so of rubber tire between my metal bicycle and the ground will make little difference to a bolt that can arc across miles of air from the top of a thunderstorm to where I am riding.

As usual, the wearing of suitably celebratory celestial attire is encouraged in honor of the full moon. Be safe (especially during thunderstorms), avoid starting wars, and take a moment to clear your mind.

As for other celestial events between now and the full moon after next (with specific times and angles based on the location of NASA Headquarters in Washington, D.C.):

As summer continues the daily periods of sunlight continue to shorten

from their longest on the summer solstice on June 20, 2024. On Sunday, July 21, (the day of the full moon), [morning twilight](#) will begin at 4:52 AM, sunrise will be at 6:00 AM, solar noon at 1:15 PM when the sun will reach its maximum altitude of 71.4 degrees, sunset will be at 8:28 PM, and evening twilight will end at 9:37 PM. By Monday, Aug. 21, (the day of the full moon after next), morning twilight will begin at 5:24 AM, sunrise will be at 6:26 AM, solar noon at 1:11 PM when the sun will reach its maximum altitude of 63.6 degrees, sunset will be at 7:57 PM, and evening twilight will end at 8:58 PM.

Six meteor showers are predicted to peak during this lunar cycle, including one of the best meteor showers of the year for the Southern Hemisphere and one of the best meteor showers of the year for the Northern Hemisphere.

On July 31, 2024, the Southern Delta Aquariids (005 SDA) meteor shower is predicted to peak at 25 meteors per hour (under ideal conditions). This shower is one of the most active annual sources for the Southern Hemisphere, but viewing it from our more northern latitudes will be difficult. As reported by the International Meteor Organization, this shower has a broad peak, and in past years observers from Australia (in 1977) and Crete (in 2003) have reported outbursts of 40 meteors per hour several days before the predicted peak. On the morning of the predicted peak (July 31), the best time to look (from the Washington, D.C. area) will likely be from after midnight until about 2 AM. The radiant (the point from which the meteors appear to radiate out from) will rise on the east-southeastern horizon on July 30 at about 10:15 PM. Since half of the meteors are hidden by the horizon at radiant rise, waiting until the radiant is higher in the sky should make more meteors visible. But moonrise will be at 1:58 AM (when the radiant will be about 30 degrees above the south-southeastern horizon). After moonrise moonlight will interfere with seeing these meteors, making our window for seeing these meteors fairly short. The parent body for this meteor

shower is not certain, but they are caused by dust entering our atmosphere at 41 kilometers per second (92,000 miles per hour), so fast that air gets compressed and heated until it glows white-hot.

This should be a good year for the annual Perseid meteor shower. The Perseids (007 PER) meteor shower is predicted to peak on Monday, Aug. 12, 2024, between 9 AM and Noon EDT (when we can't see them). At its peak (under ideal conditions) the Perseids can produce about 100 visible meteors per hour, making it one of the three best meteor showers of the year for the Northern Hemisphere (the others being the Quadrantids in early January and the Geminids in mid December). The time closest to the predicted peak that we can see will be the early morning of Aug. 12. moonset will be a little before midnight on Aug. 11, and the radiant will rise higher in the north-northeastern sky until the sky shows the first signs of dawn (before morning twilight begins at 5:16 AM). The peak is broad, and in past years high activity has been reported well after the peak, so keep an eye on the sky between moonset and the first hints of dawn for the nights before and after the predicted peak. The Perseid meteor shower is caused by dust from the comet 109P/Swift-Tuttle entering our atmosphere at 59 kilometers per second (132,000 miles per hour)—as previously noted, so fast that air gets compressed and heated until it glows white-hot.

The best conditions for viewing these meteors would be if the weather is clear with no clouds or high hazes, you go to a place far from any light sources or urban light pollution, and you have a clear view of a wide expanse of the sky. Be sure to give your eyes plenty of time to adapt to the dark. The rod cells in your eyes are more sensitive to low light levels but play little role in color vision. Your color-sensing cone cells are concentrated near the center of your view with more of the rod cells on the edge of your view. Since some meteors are faint, you will tend to see more meteors from the "corner of your eye" (which is why you need a view of a large part of the sky). Your color vision (cone cells) will adapt

to darkness in about 10 minutes, but your more sensitive night vision will continue to improve for an hour or more (with most of the improvement in the first 35 to 45 minutes). The more sensitive your eyes are, the more chance you have of seeing meteors. Even a short exposure to light (from passing car headlights, etc.) will start the adaptation over again (so no turning on a light or your cell phone to check what time it is).

The other four [meteor showers](#), the July Gamma Draconids (184 GDR), Alpha Capricornids (001 CAP), Eta Eridanids (191 ERI), and Kappa Cygnids (012 KCG), are all expected to produce less than five meteors per hour under ideal conditions (which most of us don't have in our urban and suburban environs) but if you happen to be out with a clear sky late at night or in the early morning, your odds of spotting a meteor are a little higher than usual.

No comets are expected to be visible this lunar cycle.

Evening Sky Highlights

On the evening of Sunday, July 21, 2024 (the evening of the day of the full moon), as twilight ends (at 9:37 PM EDT), the rising moon will be 3 degrees above the east-southeastern horizon. The bright planet Mercury will be 1 degree above the west-northwestern horizon and six minutes away from setting. The planet Venus will set 22 minutes before twilight ends, but will be bright enough to see in the glow of dusk, low on the west-northwestern horizon before it sets. The bright object appearing closest to overhead will be Vega, the brightest star in the constellation Lyra the lyre, at 65 degrees above the eastern horizon. Vega is one of the three bright stars in the "Summer Triangle," along with Deneb and Altair. It is the fifth-brightest star in our night sky, about 25 light-years from Earth, has twice the mass of our Sun, and shines 40 times brighter than our Sun.

As this lunar cycle progresses the background of stars will appear to shift westward each evening (as the Earth moves around the Sun), while the planet Mercury will initially dwell low on the west-northwestern horizon, shifting towards the left. On July 24 Mercury will be 2 degrees below the bright star Regulus, and this will be the last evening Mercury will be above the horizon as twilight ends (although it may remain visible in the glow of dusk before twilight ends into early August). The bright planet Venus will also be visible in the glow of dusk, gradually shifting away from the Sun, but will not be above the horizon as twilight ends until late August. The bright star Regulus will appear about 1 degree to the lower right of Venus on Aug. 4, low on the west-northwestern horizon, with Regulus setting 17 minutes before evening twilight ends. The waxing moon will pass by Venus and Regulus on Aug. 5 (setting before evening twilight ends), Spica on Aug. 9 and 10, and Antares on Aug. 13. Aug. 16 will be the first evening that the planet Saturn will be above the eastern horizon as evening twilight ends.

By the evening of Monday, Aug. 19 (the evening of the day of the full moon after next), as twilight ends (at 8:58 PM), the rising moon will be 7 degrees above the east-southeastern horizon. The only visible planet in the sky will be Saturn at 1.5 degrees above the eastern horizon. The planet Venus will set four minutes before twilight ends but will be bright enough to see in the glow of dusk, low on the western horizon before it sets. The bright object appearing closest to overhead will still be Vega at 80 degrees above the eastern horizon.

Morning Sky Highlights

On the morning of Sunday, July 21, 2024 (the morning of the day of the full moon), as twilight begins (at 4:52 AM EDT), the setting moon will be 7 degrees above the southwestern horizon. The brightest planet in the sky will be Jupiter at 25 degrees above the eastern horizon. Mars will be 33 degrees above the eastern horizon and Saturn 45 degrees above the

southern horizon. The bright object appearing closest to overhead will be the star Deneb at 56 degrees above the west-northwestern horizon. Deneb is the 19th brightest star in our night sky and is the brightest star in the constellation Cygnus the swan. Deneb is one of the three bright stars of the Summer Triangle (along with Vega and Altair). It is about 20 times more massive than our sun but has used up its hydrogen, becoming a blue-white supergiant about 200 times the diameter of the Sun. If Deneb were where our sun is, it would extend to about the orbit of Earth. Deneb is about 2,600 light-years from us.

As this lunar cycle progresses, Jupiter, Saturn, and the background of stars will appear to shift westward each evening, with Mars shifting more slowly and to the left toward Jupiter. The waning moon will pass by Saturn on July 25, Mars on July 30, Jupiter on July 31, and Pollux on Aug. 2 and 3. Jupiter and Mars will appear at their closest on Aug. 14, after which they will separate again.

By the morning of Monday, Aug. 19 (the morning of the day of the full moon after next), as twilight begins (at 5:24 AM), the setting full moon will be 5 degrees above the southwestern horizon. The brightest planet in the sky will be Jupiter at 49 degrees above the eastern horizon. Near Jupiter will be Mars at 47 degrees above the eastern horizon. Saturn will be 29 degrees above the southwestern horizon. The bright object appearing closest to overhead will be the star Capella, the brightest star in the constellation Auriga the charioteer, at 55 degrees above the east-northeastern horizon. Although we see Capella as a single star (the sixth-brightest in our night sky), it is actually four stars (two pairs of stars orbiting each other). Capella is about 43 light-years from us.

Detailed Daily Guide

Here for your reference is a day-by-day listing of celestial events between now and the full moon after next. The times and angles are

based on the location of NASA Headquarters in Washington, D.C., and some of these details may differ for where you are (I use parentheses to indicate times specific to the D.C. area).

Wednesday night into early Thursday morning, July 17 to 18, 2024, the bright star Antares will appear near the waxing gibbous moon. As evening twilight ends (at 9:40 PM EDT) Antares will be 3 degrees to the upper right of the moon. The moon will reach its highest in the sky 27 minutes later (at 10:07 PM). As Antares sets (at 2:21 AM) it will be 5 degrees to the lower right of the moon. For much of the southern part of Africa the moon will pass in front of Antares earlier on Wednesday. See lunar-occultations.com/iota/bstar/0717zc2366.htm (external link) for a map and information on the locations that will see this occultation.

As mentioned above, the full moon will be Sunday morning, July 21, 2024, appearing opposite the sun (in Earth-based longitude) at 6:17 AM EDT. This will be late Saturday night in the International Date Line West and the American Samoa and Midway time zones, and early Monday morning in the Line Islands Time zone. The moon will appear full for about three days around this time, from Friday evening through Monday morning, making this a full moon weekend.

Early Monday morning, July 22, 2024, will be when the planet Mercury reaches its greatest angular separation from the sun as seen from Earth for this apparition (called greatest elongation). Because the angle between the line from the sun to Mercury and the line of the horizon changes with the seasons, the date when Mercury and the sun appear farthest apart as seen from Earth is not always the same as when Mercury appears highest above the horizon as evening twilight ends (which occurred on July 13).

Early Wednesday morning, July 24, 2024, at 1:43 AM EDT, the moon will be at perigee, its closest to Earth for this orbit.

Wednesday evening, July 24, 2024, will be the last evening that the planet Mercury will be above the west-northwestern horizon as evening twilight ends (at 9:34 PM EDT), setting one minute later. This will also be the evening when Mercury will appear closest to the bright star Regulus, which will be 2 degrees above Mercury on the horizon.

Wednesday night into Thursday morning, July 24 to 25, 2024, the planet Saturn will appear near the waning gibbous moon. At moonrise on the eastern horizon (at 10:45 PM EDT) Saturn will be 4 degrees to the upper right of the moon. By the time the moon reaches its highest (at 4:42 AM) Saturn will be 7 degrees to the lower right, with morning twilight beginning 14 minutes later. See lunar-occultations.com/iota/planets/0724saturn.htm (external link) for a map and information on where the moon will block Saturn from view.

Saturday evening July 27, 2024, the waning moon will appear half-full as it reaches its last quarter at 10:52 PM EDT (when we can't see it).

Tuesday, July 30, 2024, the planet Mars will appear 4 degrees to the lower right of the waning crescent moon with the Pleiades star cluster to the upper right of the moon. Mars will rise on the east-northeastern horizon (at 1:39 AM EDT) with the Pleiades star cluster 5 degrees to the upper right of the moon. Morning twilight will begin more than three hours later (at 5:01 AM) with the Pleiades 7 degrees to the upper right.

As described earlier in this posting, early Wednesday morning, July 31, 2024, from about midnight until moonrise (at 1:58 AM EDT) will likely be the best time to look toward the southeast for the Southern Delta Aquariids (005 SDA) meteor shower. Although viewing from our more northern latitudes will be limited, this shower is one of the most active annual sources for the Southern Hemisphere (with a predicted peak of 25 meteors per hour under ideal conditions). This shower has a broad peak, and rare outbursts of up to 40 meteors per hour have been reported

days before the predicted peak (in 1977 and 2003). You might have an increased chance of seeing meteors in the early mornings from after midnight to before moonrise around this date.

Friday morning, Aug. 2, 2024, the bright star Pollux (the brighter of the twin stars in the constellation Gemini) will appear 8 degrees to the lower left of the waning crescent moon. Pollux will rise after the moon on the northeastern horizon (at 4:24 AM EDT) and morning twilight will begin 41 minutes later (at 5:05 AM).

The next morning, Saturday, Aug. 3, 2024, the thin, waning crescent moon will have shifted to 7 degrees below Pollux. The moon will rise (at 4:59 AM EDT) on the east-northeastern horizon just six minutes before morning twilight begins.

Throughout this lunar cycle the planet Mars will be passing above the bright star Aldebaran as it moves towards the bright planet Jupiter. Sunday morning, Aug. 4, 2024, will be when Mars and Aldebaran will be at their closest, about 5 degrees apart. Jupiter, Mars, and Aldebaran will form a triangle, with Mars above, Aldebaran to the lower right (matching Mars in brightness), and bright Jupiter to the lower left. Aldebaran will rise last (at 1:53 AM EDT) on the east-northeastern horizon and will be 37 degrees above the eastern horizon as morning twilight begins (at 5:07 AM). The constellation Orion will appear on the horizon below this triangle.

Sunday morning, Aug. 4, 2024, at 7:13 AM EDT, will be the new moon, when the moon passes between the Earth and the sun and will not be visible from the Earth. The day of, or the day after the New moon marks the start of the new month for most lunisolar calendars. Aug. 4 is the start of the seventh month of the Chinese Year of the Dragon. Sundown on Aug. 4 is the start of Av in the Hebrew calendar. In the Islamic calendar the months traditionally start with the first sighting of the

waxing crescent moon. Many Muslim communities now follow the Umm al-Qura Calendar of Saudi Arabia, which uses astronomical calculations to start months in a more predictable way. Using this calendar, sundown on Sunday, Aug. 4, will probably mark the start of Safar, the second month of the Islamic calendar.

Monday evening, Aug. 5, 2024, if you have a very clear view of the western to west-northwestern horizon (particularly with binoculars), you might be able to see the thin, waxing crescent moon less than a degree above the bright planet Venus, with the bright star Regulus 1.5 degrees below Venus. The planet Mercury (less bright than Regulus) will be 6 degrees to the lower left of Venus. There may only be a short window between when dusk will have faded enough to see Mercury and when Mercury sets 36 minutes after sunset (at 8:50 PM EDT). Regulus will set next nine minutes after Mercury (45 minutes after sunset), followed by Venus eight minutes later (53 minutes after sunset), and the moon six minutes after that (59 minutes after sunset), six minutes before evening twilight ends (at 9:19 PM). Venus and Regulus will have been at their closest (1 degree apart) the evening before and Mercury and Venus will be at their closest (6 degrees apart) two evenings later, but these will be hard to spot, low on the horizon in the glow of dusk.

Thursday, Aug. 8, 2024, at 9:32 PM EDT, the moon will be at apogee, its farthest from the Earth for this orbit.

Friday evening, Aug. 9, 2024, the bright star Spica will appear 5 degrees to the upper left of the waxing crescent moon. The moon will be 14 degrees above the west-southwestern horizon as evening twilight ends (at 9:13 PM EDT). The moon will set first a little more than an hour later (at 10:35 PM). Saturday morning, for part of the western Pacific north of Australia and Indonesia, the moon will block Spica from view. See lunar-occultations.com/iota/bstar/0810zc1925.htm (external link) for a map and information on locations that can see this occultation.

By Saturday evening, Aug. 10, 2024, the waxing crescent moon will have shifted to 7 degrees to the left of the star Spica as evening twilight ends and the pair will separate as the night progresses.

Saturday night, Aug. 10, 2024, will be the night of the seventh day of the seventh month of the Chinese calendar, known as the double seventh festival, Qixi in China, Chilseok in Korea, and Thất Tịch in Vietnam. The double seventh festival is sometimes called the Chinese Valentine's Day. There are many variations on the legend, but basically they involve the Milky Way and the three bright stars we know as the Summer Triangle. The star Vega represents the weaver girl and the star Altair represents the cowherd. They fall in love and neglect their duties, so the Goddess of Heaven puts a wide river in the sky, the Milky Way, to keep them apart. They are allowed to meet only one night a year, on the seventh night of the seventh month, when the star Deneb forms a bridge across the Milky Way. In some versions of the legend, the bridge is formed by magpies, so another name is the Magpie Festival. The Japanese Tanabata or Star Festival is related, but is no longer tied to the lunisolar date (it is now celebrated on July 7, the double seventh of the Gregorian Calendar). On average there are a little more than seven days between each quarter of the moon, so the first quarter moon tends to occur a day or two after the seventh day of the lunisolar month.

As described earlier in this post, this should be a good year for the annual Perseids (007 PER) meteor shower, which can peak at more than 100 meteors per hour (under ideal conditions). The time closest to the predicted peak that we can see (from the Washington, D.C. area) will be the early morning of Monday, Aug. 12, 2024. moonset will be a little before midnight on Aug. 11 and the radiant will rise higher in the north-northeastern sky until the sky shows the first signs of dawn (before morning twilight begins at 5:16 AM). The peak is broad, and in past years high activity has been reported well after the peak, so keep an eye on the sky from moonset to the first hints of dawn on the nights before

and after as well. See the meteor shower summary near the beginning of this post for more information on viewing these meteors.

Monday morning, Aug. 12, 2024, the moon will appear half-full as it reaches its first quarter at 11:19 AM EDT (when we can't see it).

Tuesday night, Aug. 13, 2024, the bright star Antares will appear near the waxing gibbous moon. Antares will be 2.5 degrees to the upper left as evening twilight ends (at 9:08 PM EDT). By the time of moonset on the southwestern horizon (Wednesday morning at 12:30 AM) Antares will be 1 degree above the moon. Viewers in the southern part of South America and the Antarctic Peninsula will see the moon pass in front of Antares. See lunar-occultations.com/iota/bstar/0814zc2349.htm (external link) for a map and information on areas that can see this occultation.

Throughout this lunar cycle the planet Mars will drift toward the bright planet Jupiter. They will be at their closest on Wednesday morning, Aug. 14, 2024, just a third of a degree apart, which should be a good show! Bright Jupiter will rise early in the morning (at 1:18 AM EDT) on the east-northeastern horizon below Mars. They will be 45 degrees above the eastern horizon as morning twilight begins four hours later (at 5:18 AM).

Friday evening, Aug. 16, 2024, will be the first evening that the planet Saturn will be above the eastern horizon as evening twilight ends (at 9:03 PM EDT).

Sunday evening, Aug. 18, 2024, the planet Mercury will be passing between Earth and the sun as seen from Earth, called inferior conjunction. Planets that orbit inside of the orbit of Earth can have two types of conjunctions with the Sun, inferior (when passing between the Earth and the Sun) and superior (when passing on the far side of the sun as seen from the Earth). Mercury will be shifting from the evening sky

to the morning sky and will begin emerging from the glow of dawn on the east-northeastern horizon at the end of August.

The full moon after next will be Monday afternoon, Aug. 19, 2024, at 2:26 PM EDT. This will be Tuesday morning from Nepal Standard Time eastward across the rest of Asia and Australia to the International Date Line. The moon will appear full for about three days around this time, from Sunday morning through early Wednesday morning. As the third full moon in a season with four full moons, this will be a Blue moon (by the older, more traditional definition).

Provided by NASA

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