Lunar Calendar

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Lunar Calendar

The moon on the breadcrumb bar of every page is not a decoration. It is a clock face reading one number: how far today has travelled through the current lunation. Hover it and you get the phase name, the lunar day, and the percentage of the disc lit. This is the page behind it.

Almost every calendar humanity has kept started here. The Moon is the only celestial body whose cycle is legible to an unaided eye from a doorway, on any clear night, without instruments, records, or a horizon marker — and it repeats often enough that one person can learn it in a season. The Sun gives you the year but demands a solstice observation to fix it. The Moon hands you the month for free. The English word *month* is the word *moon* with a suffix, and the same is true in Greek (*men* / *mene*), in Latin, and across the Semitic languages.

The trouble is that the two do not divide. Everything below follows from that one fact.

What the chip counts

The breadcrumb moon runs on a **mean lunation**: a fixed 29.530588853-day cycle counted forward from the new moon of **6 January 2000, 18:14 UTC**. Divide the elapsed time by the cycle length, and the remainder is the age of the Moon in days; the fraction lit follows from the phase angle.

That model is exact about the average and approximate about tonight. Real lunations are not all the same length, so the true new moon runs ahead of or behind the mean one, by as much as **seventeen hours** in the 2015–2035 window. The chip is therefore reliable to within about half a day — right for a phase name, right for a lunar day, not right for planning an observation. The dated tables further down are computed properly and do not carry that error.

Four different months

"Lunar month" names at least four distinct intervals, depending on what you count the Moon's return *to*.

Month	Length	Counted against	What it governs
Synodic	29.530589 d	The Sun — new moon to new moon	Phases; every lunar calendar on Earth
Sidereal	27.321661 d	The fixed stars	The Moon's true orbital period
Tropical	27.321582 d	The vernal equinox	Precession bookkeeping
Anomalistic	27.554550 d	Perigee — closest approach	Supermoons; the varying speed of the Moon
Draconic	27.212221 d	The orbital nodes	Eclipse seasons; the saros

The synodic month is the long one, and the reason is that the Earth does not hold still. In the 27.3 days the Moon takes to come back around to the same star, the Earth has moved about 27° along its own orbit, so the Sun has shifted with it. The Moon needs roughly another 2.2 days to catch up to the new alignment. **Phases lag the orbit**, and that gap — the difference between what the sky does and what the eye sees — is the seam every lunisolar calendar is built over.

Nor is the synodic month constant. Both orbits are ellipses, so the interval breathes. In 2026 the shortest runs from the new moon of 15 June to the new moon of 14 July at **29.28 days**, and the longest from 9 November to 9 December at **29.74 days** — a spread of about eleven hours inside a single year.

The eight phases

The names the chip cycles through, in order. Four are instants — a specific moment when an alignment is exact — and four are the spans between them.

Phase	Age	Lit	Rises	What it is
New Moon	0 d	0%	Sunrise	Instant: Moon and Sun share ecliptic longitude. Invisible
Waxing Crescent	0–7.4 d	0–50%	Morning	Span. The first sighting after new opens the month in a sighting-based calendar
First Quarter	7.4 d	50%	Noon	Instant: 90° of elongation. Half lit, and a quarter of the way round
Waxing Gibbous	7.4–14.8 d	50–100 %	Afternoon	Span
Full Moon	14.8 d	100%	Sunset	Instant: 180° of elongation. Rises as the Sun sets
Waning Gibbous	14.8–22.1 d	100–50 %	Evening	Span
Last Quarter	22.1 d	50%	Midnight	Instant: 270° of elongation
Waning Crescent	22.1–29.5 d	50–0%	Small hours	Span. Ends at the next new moon

"Quarter" names the fraction of the *cycle* completed, not the fraction of the disc lit — which is why a quarter moon looks half full. It is the most common misreading of the whole sequence.

Two consequences worth holding onto. A **full moon rises at sunset and sets at sunrise** — it is the only phase visible all night, and the only one that can pass into the Earth's shadow. A **new moon rises and sets with the Sun** — it is never visible at all, and it is the only phase that can pass in front of the Sun. Eclipses only happen at those two instants, and only when the Moon is also near a node, which is what the draconic month tracks.

2026: the year's lunations

Twelve new moons and thirteen full moons, in **UTC**. Times are Coordinated Universal Time; Ohio runs five hours behind in winter and four in summer, so anything before 04:00 or 05:00 UTC belongs to the previous day locally.

New moons

New moon (UTC)	Opens	Note
18 January, 19:52		
17 February, 12:01	Lunar New Year — the Fire Horse, ??	Annular solar eclipse. Also the lunation that opens Ramadan 1447
19 March, 01:23		
17 April, 11:51		
16 May, 20:01		
15 June, 02:54		Start of the year's shortest lunation
14 July, 09:43		
12 August, 17:36		Total solar eclipse
11 September, 03:26		
10 October, 15:50		
9 November, 07:02		Start of the year's longest lunation
9 December, 00:51		

Full moons

Full moon (UTC)	Almanac name	Note
3 January, 10:02	Wolf Moon	
1 February, 22:09	Snow Moon	
3 March, 11:37	Worm Moon	Total lunar eclipse
2 April, 02:12	Pink Moon	
1 May, 17:23	Flower Moon	
31 May, 08:45	—	**Blue moon**: the second full moon in a single calendar month
29 June, 23:56	Strawberry Moon	
29 July, 14:35	Buck Moon	

28 August, 04:18	Sturgeon Moon	Partial lunar eclipse
26 September, 16:49	Harvest Moon	The full moon nearest the September equinox
26 October, 04:11	Hunter's Moon	
24 November, 14:53	Beaver Moon	
24 December, 01:28	Cold Moon	

The almanac names are worth a caveat. They circulate as ancient and Native American, and they are neither: the list in this form was printed by American farmers' almanacs in the twentieth century, assembled from a mixture of colonial-era English usage and second-hand attributions to Algonquian peoples. **Harvest Moon** is the exception and the only one with a real astronomical definition — the full moon nearest the September equinox, which in northern latitudes rises only a little later each night for several nights running, extending the light over the end of the harvest.

Blue moon is a modern accident. The Maine Farmers' Almanac used the term for the third full moon in a season containing four. A 1946 *Sky & Telescope* article misread that rule as "the second full moon in a calendar month," a radio programme repeated the misreading in 1980, and the mistake is now the definition. Note that it is an artefact of the Gregorian grid and of the time zone you are standing in, not an event in the sky: 31 May 2026 at 08:45 UTC is a blue moon in the Americas and Europe and not one in Australia, where it has already become 1 June.

The calendars built on it

Three strategies exist for the fact that twelve lunations make **354.37 days** and the tropical year is **365.242** — a shortfall of nearly eleven days. Each of the world's surviving lunar calendars picks one.

Ignore the Sun. The **Islamic (Hijri)** calendar keeps twelve lunar months, 354 or 355 days, and inserts nothing. Its year retrogrades through the seasons by about eleven days annually and returns to its starting point after roughly 33 years, which is why Ramadan is a summer fast in one generation and a winter one in the next. The epoch is 1 Muharram AH 1, **16 July 622 CE** in the Julian calendar. Whether a month begins on the calculated conjunction or on the first human sighting of the crescent is a live question rather than a settled one, and it is why the start of Ramadan and of Eid can differ by a day between countries — and sometimes between mosques in the same city.

Patch the Sun back in. The **Hebrew** calendar is lunisolar: months follow the Moon, and a thirteenth month, Adar I, is inserted in seven years out of every nineteen — years 3, 6, 8, 11, 14, 17 and 19 of the cycle — to keep Passover in the spring. Its mean lunation, the *molad* interval, is fixed at 29 days, 12 hours and 793 *halakim* (1080 halakim to the hour). That works out to 29.5305941 days, which is about half a second longer than the modern measured value — an error small enough that it has accumulated to only a couple of hours since Hillel II is traditionally credited with fixing the calculation in the fourth century.

The **Chinese** calendar solves the same problem differently, and more elegantly. Each month begins on the day the new moon falls, in Beijing time; the winter solstice must always land in the eleventh month; and when a year cannot satisfy that without help, the leap month is the first lunation containing no *zhongqi* — no principal solar term. The rule is astronomical rather than arithmetic, which is why the date of Lunar New Year has to be computed rather than looked up in a cycle. The same lunation drives the Vietnamese and Korean calendars, which is where they occasionally disagree with the Chinese one by a day, on the strength of the time zone the new moon is measured in.

Hindu calendars are lunisolar too, and they subdivide further than any of the others: the *tithi* is one-thirtieth of a lunation, defined as each 12° of elongation between Moon and Sun, so its length breathes with the orbit from about 19 to 26 hours. North India ends its months at the full moon (*purnimanta*), the south and west at the new moon (*amanta*) — the same festival can therefore sit in differently-named months depending on where it is observed. An intercalary *adhika masa* absorbs the drift.

Freeze the Moon into a table. Christianity's **computus** keeps the Moon in name only. Easter is the first Sunday after the ecclesiastical full moon falling on or after 21 March — but the ecclesiastical full moon is an entry in a table built on the 19-year cycle, not an observation. It can differ from the real full moon by a day or two, and does. Because the Orthodox churches run the same rule on the Julian calendar, the two Easters diverge by up to five weeks.

Finally, a lunar calendar with no history at all: the Celtic Tree Calendar's thirteen tree-months are Robert Graves's 1948 invention, laid over the medieval Irish ogham alphabet. It is on this site's breadcrumb strip and it is honest about what it is — see World Zodiacs for which of the seven systems there are ancient and which are twentieth-century constructions.

The nineteen-year problem

Every fix above is a variation on one discovery: **235 lunations run to 6939.69 days, and 19 tropical years run to 6939.60 days.** The two agree to within about two hours.

That is the **Metonic cycle**, named for Meton of Athens, who used it to reform the Athenian calendar in 432 BCE; Babylonian astronomers were already using the same 19-year intercalation scheme, and Chinese astronomers arrived at it independently as the *zhang* cycle. It is the reason the Hebrew calendar inserts seven months in nineteen years, the reason the Easter tables run on a 19-year golden number, and the reason your birthday and the phase of the Moon on it come back into alignment every nineteen years.

The eclipse counterpart is the **saros**: 223 lunations, 6585.32 days, about 18 years and 11 days. It works because that interval is also very nearly a whole number of draconic and anomalistic months, so the Sun, Moon and node return to nearly the same geometry. The leftover third of a day means each repeat lands roughly 120° of longitude further west, which is why a saros series walks around the planet before returning to where it began.

None of these are permanent. Tidal friction is pushing the Moon outward at about 3.8 cm a year and lengthening the Earth's day by roughly 1.7 milliseconds a century, so the ratios drift. Slowly — but the Metonic cycle is an accident of this era, not a law.

Sources and method

Phase times on this page are computed from the periodic-terms method in Jean Meeus, *Astronomical Algorithms* (chapter 49), stated in UTC with ?T taken as 69.5 seconds. The implementation was checked four ways before publication: it reproduces the 6 January 2000 18:14 UTC new moon the site's own chip counts from, and it independently lands the new moons of the 17 February and 12 August 2026 solar eclipses and the full moons of the 3 March and 28 August 2026 lunar eclipses. Expect the tabulated instants to be good to within a minute or two.

The site's breadcrumb chip does *not* use this method — it uses the mean lunation described at the top of the page, which is cheap enough to recompute in the browser once a second and accurate to about half a

day.

Related

- Calendar — the site's own calendar, its entry format, and the .ics feeds
- World Zodiacs — the seven systems in the breadcrumb strip beside the moon
- Chinese Zodiac — the year-animal cycle that turns at the lunar new year
- Lunar New Year 2026 — the Fire Horse year
- Seasons — the solar half of the same problem