

20A/ENGLISH



Wndsn XPD

Universal Moon Clock

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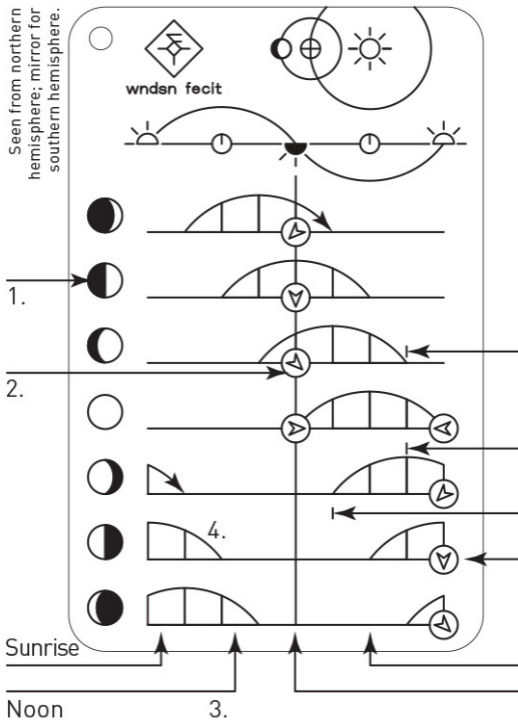
THE PHASES OF THE MOON

- Waxing Crescent
- 7 days First Quarter
- Waxing Gibbous
- 14 days Full Moon
- Waning Gibbous
- 21 days Third Quarter
- Waning Crescent
- 28 days New Moon

OPERATION

1. Observe and **determine shape** by reading from the right edge.
2. **Observe altitude** and determine direction.
3. **Infer time** by comparing altitude and direction with verticals in diagram.
4. **Determine time of moonrise** and predict time and direction of moonset from arc of respective phase.

Seen from northern hemisphere; mirror for southern hemisphere.



DEDUCTION

5. From here, it's deducing from the appearance of the Moon what a particular night will look like. The Moon's relative position between east and west allows us to determine the approximate time of night.

Moonset: west(wards)

Zenith: in the south

Moonrise: east(wards)

Azimuth at sunrise

Midnight

Compass direction at sunset

APPROXIMATING TIME OF NIGHT

[All times are given in **unequal hours**.] For the Sun, we know that sunrise is at 6 AM, noon is at 12 PM, and sunset is at 6 PM. Halfway (+3 hours) between rising in the east and its zenith, the Sun marks 9 AM. At noon, the Sun is at its zenith, and at 180° azimuth, due south (as seen from the northern hemisphere). Halfway (+3 hours) on its way from zenith to sunset, the Sun marks 3 PM.

That same holds true for the full Moon. Thus, for the full Moon, at its zenith, this means that it is midnight.

For **high-precision calculations**, use: tycho.wndsn.com

GENERAL NOTES

The underlying times are based on unequal hours (day = 1/12 + night = 1/12) (and sunrise at 6 AM) and are **valid as is on the equator and on the equinoxes**. For all other times and locations, the unequal hours are to be understood as **average times** and have to be converted to, or estimated in 1/24 (equal) hours.

Please see telemeter.wndsn.com for **in-depth tutorials**.

DUE SOUTH

A line through the points of the waxing or waning Moon indicates due south and, the further south we go in the northern hemisphere, the more tilted the shape of the Moon appears.

The symbols depict the Moon as viewed from the northern hemisphere. For observations from the **southern hemisphere, the directions and positions are mirrored** and the Moon clock works by turning it over and looking at the scales from the reverse side.