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## **Weird Ways to Observe the Moon**

David Prosper

International Observe the Moon Night is on October 16 this year– but you can observe the Moon whenever it's up, day or night! While binoculars and telescopes certainly reveal incredible details of our neighbor's surface, bringing out dark seas, bright craters, and numerous odd fissures and cracks, these tools are not the only way to observe details about our Moon. There are more ways to observe the Moon than you might expect, just using common household materials.

Put on a pair of sunglasses, especially **polarized sunglasses**! You may think this is a joke, but the point of polarized sunglasses is to dramatically reduce glare, and so they allow your eyes to pick out some lunar details! Surprisingly, wearing sunglasses even helps during daytime observations of the Moon.

One unlikely tool is the humble **plastic bottle cap**! John Goss from the Roanoke Valley Astronomical Society shared these directions on how to make your own bottle cap lunar viewer, which was also suggested to him by Fred Schaaf many years ago as a way to also view the thin crescent of Venus when close to the Sun:

“The full Moon is very bright, so much that details are overwhelmed by the glare. Here is an easy way to see more! Start by drilling a 1/16-inch (1.5 mm) diameter hole in a plastic soft drink bottle cap. Make sure it is an unobstructed, round hole. Now look through the hole at the bright Moon. The image brightness will be much dimmer than normal – over 90% dimmer – reducing or eliminating any lunar glare. The image should also be much sharper because the bottle cap blocks light from entering the outer portion of your pupil, where imperfections of the eye's curving optical path likely lie.” Many report seeing a startling amount of lunar detail!

You can **project the Moon**! Have you heard of a “Sun Funnel”? It's a way to safely view the Sun by projecting the image from an eyepiece to fabric stretched across a funnel mounted on top. It's easy to make at home, too – directions are here: [bit.ly/sunfunnel](https://bit.ly/sunfunnel). Depending on your equipment, a Sun Funnel can view the Moon as well as the Sun– a full Moon gives off more than enough light to project from even relatively small telescopes. Large telescopes will project the full Moon and its phases, with varying levels of detail; while not as crisp as direct eyepiece viewing, it's still an impressive sight! You can also mount your smartphone or tablet to your eyepiece for a similar Moon-viewing experience, but the funnel doesn't need batteries.

Of course, you can join folks in person or online for a celebration of our Moon on October 16, with International Observe the Moon Night – find details at [moon.nasa.gov/observe](https://moon.nasa.gov/observe). NASA has big plans for a return to the Moon with the Artemis program, and you can find the latest news on their upcoming lunar explorations at [nasa.gov](https://nasa.gov).



Sun Funnels in action! Starting clockwise from the bottom left, a standalone Sun Funnel; attached to a small refractor to observe the transit of Mercury in 2019; attached to a large telescope in preparation for evening lunar observing; projection of the Moon onto a funnel from a medium-size scope (5 inches).

**Safety tip:** NEVER use a large telescope with a Sun Funnel to observe the Sun, as they are designed to project the Sun using small telescopes only. Some eager astronomers have melted their Sun Funnels, and parts of their own telescopes, by pointing them at the Sun - large telescopes create far too much heat, sometimes within seconds! However, large instruments are safe and ideal for projecting the much dimmer Moon. Small telescopes can't gather enough light to decently project the Moon, but larger scopes will work.



*International* OBSERVE  
THE **MOON NIGHT 2021** SATURDAY **OCTOBER 16<sup>TH</sup>**



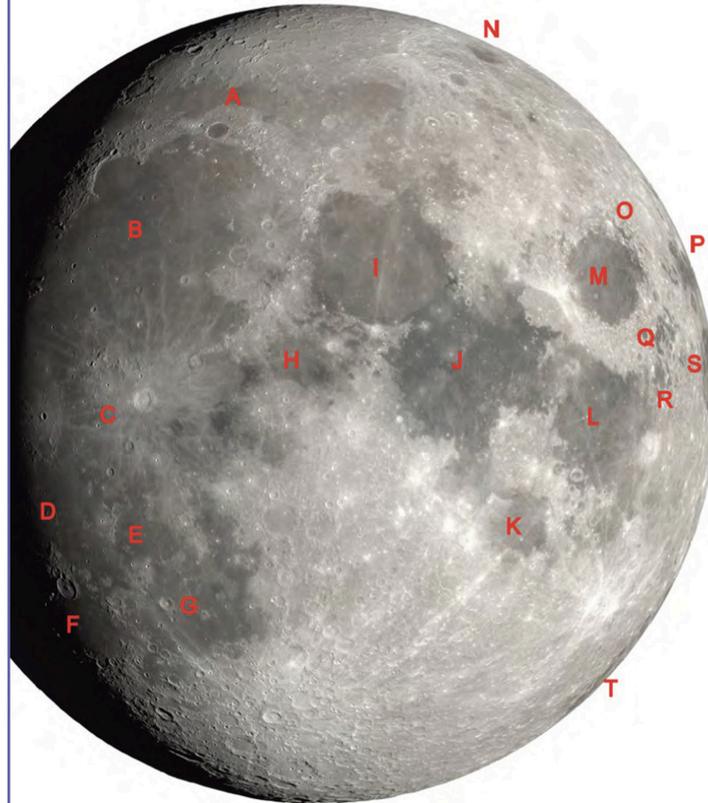
**NORTHERN HEMISPHERE MOON MAP WITH LUNAR MARIA (SEAS OF BASALT)**

**Moon Map**

This map was created for International Observe the Moon Night 2021. It depicts the Moon as it will appear from the northern hemisphere at approximately 11:00 PM EDT on October 16, 2021 (3:00 AM UTC on October 17).

**Lunar Maria (Seas of Basalt)**

You can see a number of maria tonight. Once thought to be seas of water, these are actually large, flat plains of solidified basaltic lava. They can be viewed in binoculars or even with the unaided eye. Tonight, you may be able to identify 18 maria on the Moon. This includes four seas along the eastern edge that are often hard to see. Because of libration, a slight apparent wobble by the Moon in its orbit around Earth, tonight we get to peek slightly around the northeast edge of the Moon, glimpsing a sliver of terrain normally on the Moon's far side.



Map generated with NASA's Dial-A-Moon (<https://svs.gsfc.nasa.gov/4874>)

- |  |  |                                 |
|--|--|---------------------------------|
| A. Mare Frigoris (Sea of Cold)           | H. Mare Vaporum (Sea of Vapors)              | O. Mare Anguis (Serpent Sea)    |
| B. Mare Imbrium (Sea of Rains)           | I. Mare Serenitatis (Sea of Serenity)        | P. Mare Marginis (Border Sea)   |
| C. Mare Insularum (Sea of Isles)         | J. Mare Tranquillitatis (Sea of Tranquility) | Q. Mare Undarum (Sea of Waves)  |
| D. Oceanus Procellarum (Ocean of Storms) | K. Mare Nectaris (Sea of Nectar)             | R. Mare Spumans (Sea of Foam)   |
| E. Mare Cognitum (Known Sea)             | L. Mare Fecunditatis (Sea of Fertility)      | S. Mare Smythii (Smyth's Sea)   |
| F. Mare Humorum (Sea of Moisture)        | M. Mare Crisium (Sea of Crises)              | T. Mare Australe (Southern Sea) |
| G. Mare Nubium (Sea of Clouds)           | N. Mare Humboldtianum (Humboldt's Sea)       |                                 |



[MOON.NASA.GOV/OBSERVE](https://moon.nasa.gov/observe)

**#ObserveTheMoon**

You can download and print NASA's observer's map of the Moon for International Observe the Moon Night! This map shows the view from the Northern Hemisphere on October 16 with the seas labeled, but you can download both this map and one of for Southern Hemisphere observers, at: [bit.ly/moonmap2021](https://bit.ly/moonmap2021) The maps contain multiple pages of observing tips, not just this one.