



International OBSERVE
THE **MOON** NIGHT 2021

SATURDAY 16TH
OCTOBER

NORTHERN HEMISPHERE MOON MAP FOR TELESCOPE VIEWING

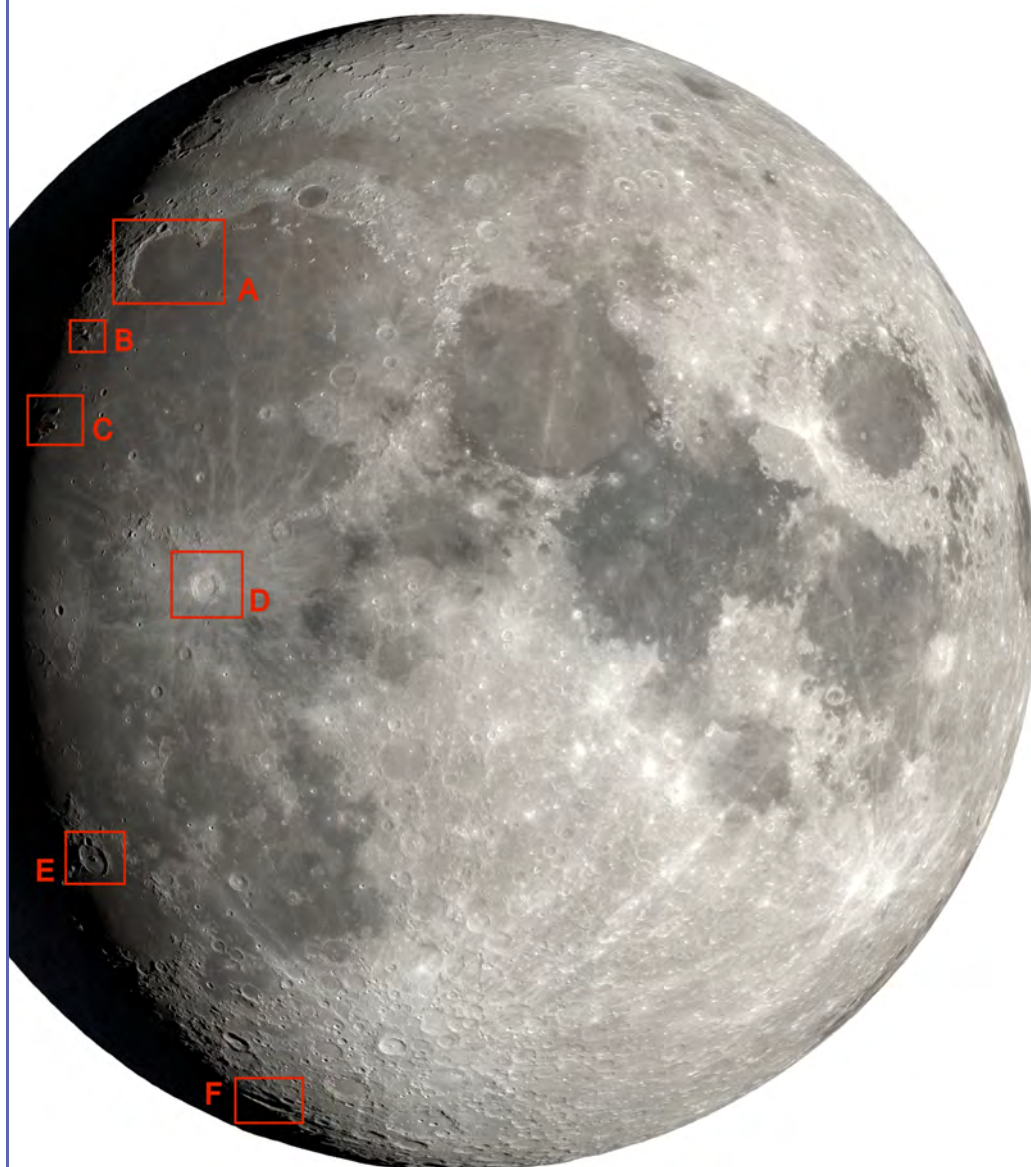
Moon Map

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). Many of the best views will occur along the terminator (the line between the day and night side of the Moon).

Selected Features

Some of the more interesting lunar landforms that have favorable lighting for viewing tonight are identified here. Details for each are on the reverse side of this map.

- A. Sinus Iridum
- B. Gruithuisen Domes
- C. Harbinger Mountains
- D. Copernicus Crater
- E. Gassendi Crater
- F. Schiller Crater



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



Selected Features for Telescope Viewing



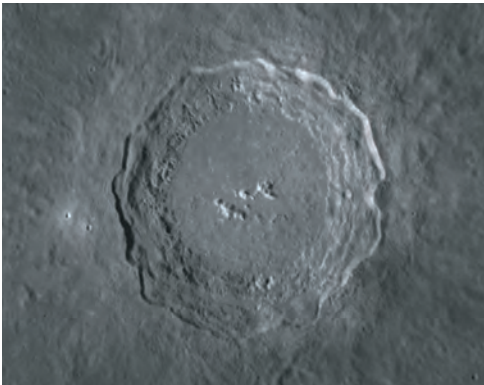
A. Sinus Iridum, the “Bay of Rainbows,” is a bay along the northwest edge of Mare Imbrium. This 161-mile-wide (260 km) crater’s floor was once flooded with lava. Its north and west rim forms the Jura Mountains.



B. Gruithuisen Domes: These lunar volcanoes, reaching about a mile (1,600 m) high, are unusually tall and steep for volcanoes on the Moon. They seemed to be formed by lava that was particularly thick and pasty.



C. Tonight we see the Harbinger Mountains just after they have experienced sunrise. This small range measures about 59 miles (95 km) long and reaches heights of about 1.2 miles (2 km). Larger telescopes show volcanic vents and channels on the range’s western edge.



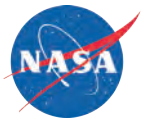
D. Copernicus is a magnificent 57-mile-diameter (93 km) crater with terraced walls, a flat floor, and a group of central peaks towering almost a mile (1,200 m) above the floor. The crater is over 2.2 miles (3,700 m) deep.



E. Gassendi: This 68-mile-diameter (110 km) floor-fractured crater lies on the northern rim of Mare Humorum. It had its floor pushed up by magma rising from below. Larger telescopes will reveal a network of fractures across the crater floor.



F. Near the Moon’s edge, all craters appear oval and foreshortened. However, Schiller is actually very elongated, measuring 111 x 43 miles (180 x 70 km). It was likely formed by the impact of an asteroid striking the ground nearly horizontally.



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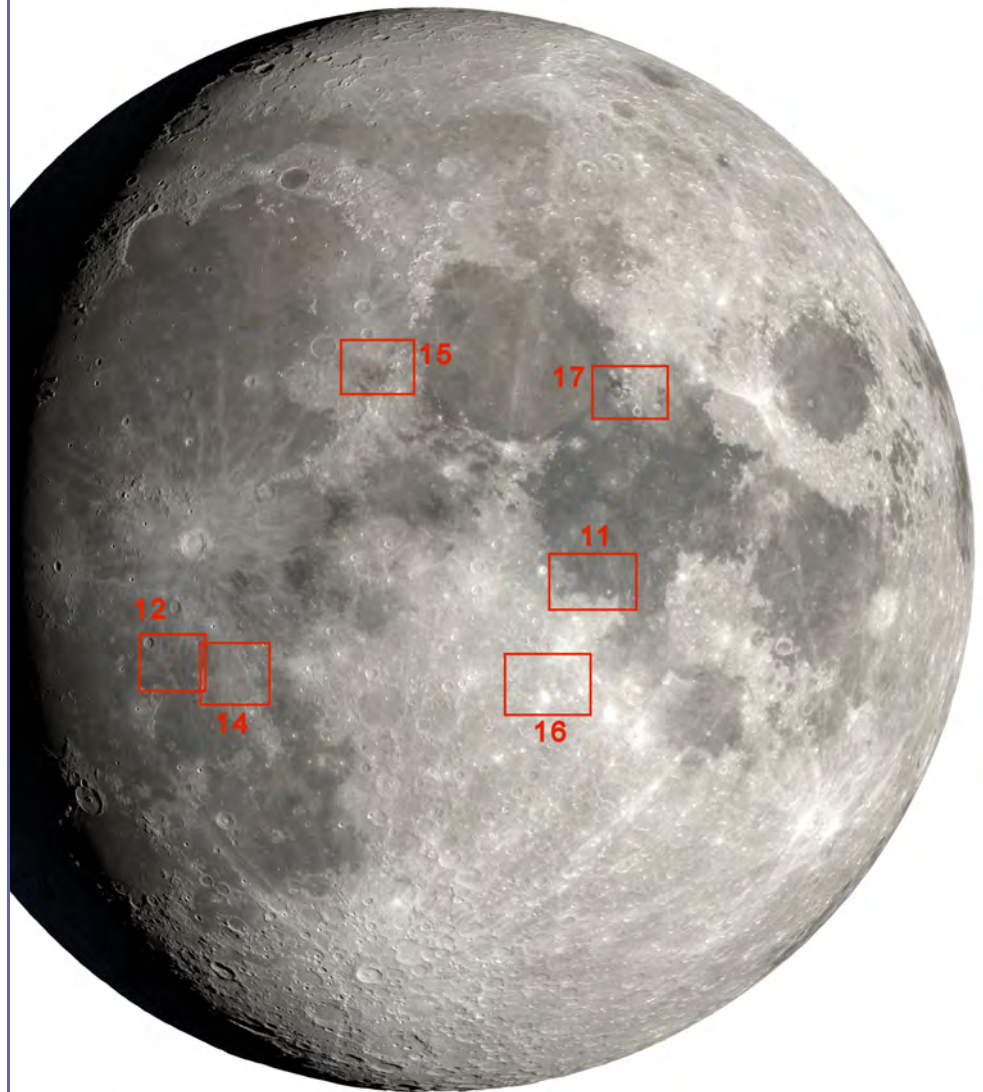
**NORTHERN HEMISPHERE MOON MAP
with HUMAN LANDING SITES**

Moon Map

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Human Lunar Landing Sites

Between July 1969 and December 1972, a total of 12 astronauts landed on the surface of the Moon as part of six of the Apollo missions. Apollo missions 11, 12, 14, 15, 16, and 17 each landed in different locations on the lunar surface. These locations, each fascinating for their own particular reasons, sampled a wide range of lunar geology and terrain, from smooth mare plains to rugged ancient highlands. All six landing sites are visible tonight. Use this map and the magnified charts on the other side of this sheet to find and observe all six historic sites.



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



Selected Objects for Telescopic Viewing



Apollo 11: The first human landing site on the Moon was on the smooth, flat plains of the Sea of Tranquility. Despite how flat the area looks from Earth and from lunar orbit, astronauts Armstrong and Aldrin had to maneuver their lander in the last minutes of their descent in order to avoid a field of giant boulders.



Apollo 12: In November 1969, a pinpoint landing brought astronauts Conrad and Bean down right next to the robotic Surveyor 3 spacecraft, which had landed there in April 1967. The astronauts collected samples of material blasted from the formation of Copernicus Crater over 217 miles (350 km) away and 800 million years ago.



Apollo 14: Astronauts Shepard and Mitchell landed in a broad expanse of low, rolling hills in February 1971. The rock samples collected by Apollo 14 revealed that the topography within Mare Imbrium was formed nearly four billion years ago by debris blasts from the basin's formation.



Apollo 15: In July 1971, astronauts Scott and Irwin landed at the edge of Mare Imbrium at the base of the towering Apennine Mountains. Driving their rover across the mare and up the lower mountain slope, they gathered samples from the dark mare plains and the surrounding, light lunar highlands.



Apollo 16: This was the first and only mission to land in the rugged lunar highlands. In April 1972, astronauts Young and Duke collected rock samples more than four billion years old. These showed that the ancient lunar crust formed from rock that crystallized and floated to the top of a global lunar magma ocean.

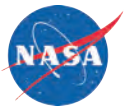


Apollo 17: The final Apollo mission to land on the Moon visited the spectacular Taurus-Littrow Valley, deeper than Earth's Grand Canyon. In December 1972, astronauts Cernan and Schmitt (the first professional geologist on the Moon) explored an active fault, a gigantic landslide deposit, and brought back samples that included beads of volcanic glass from an ancient lunar fire fountain.



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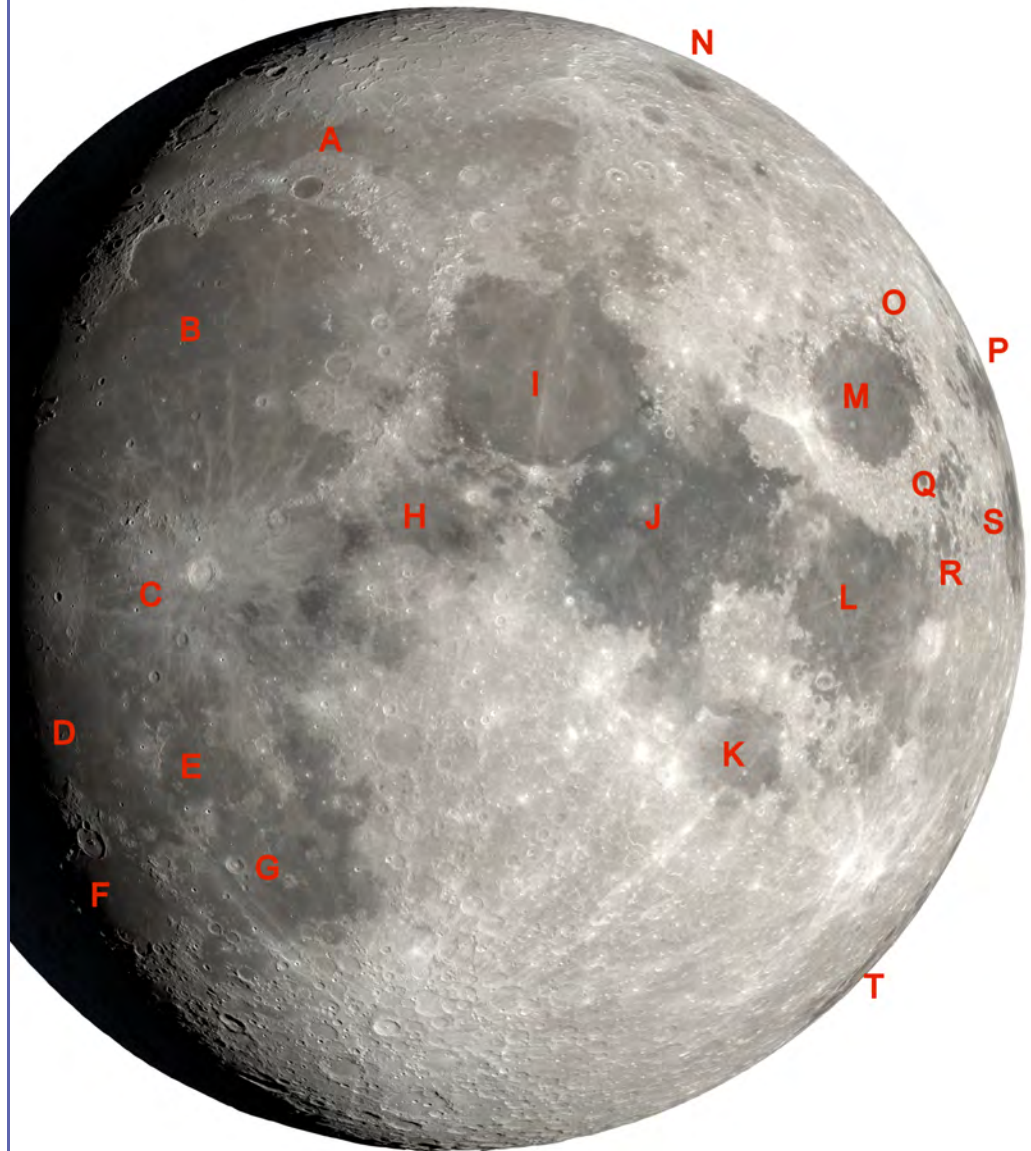
NORTHERN HEMISPHERE MOON MAP WITH LUNAR MARIA (SEAS OF BASALT)

Moon Map

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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.

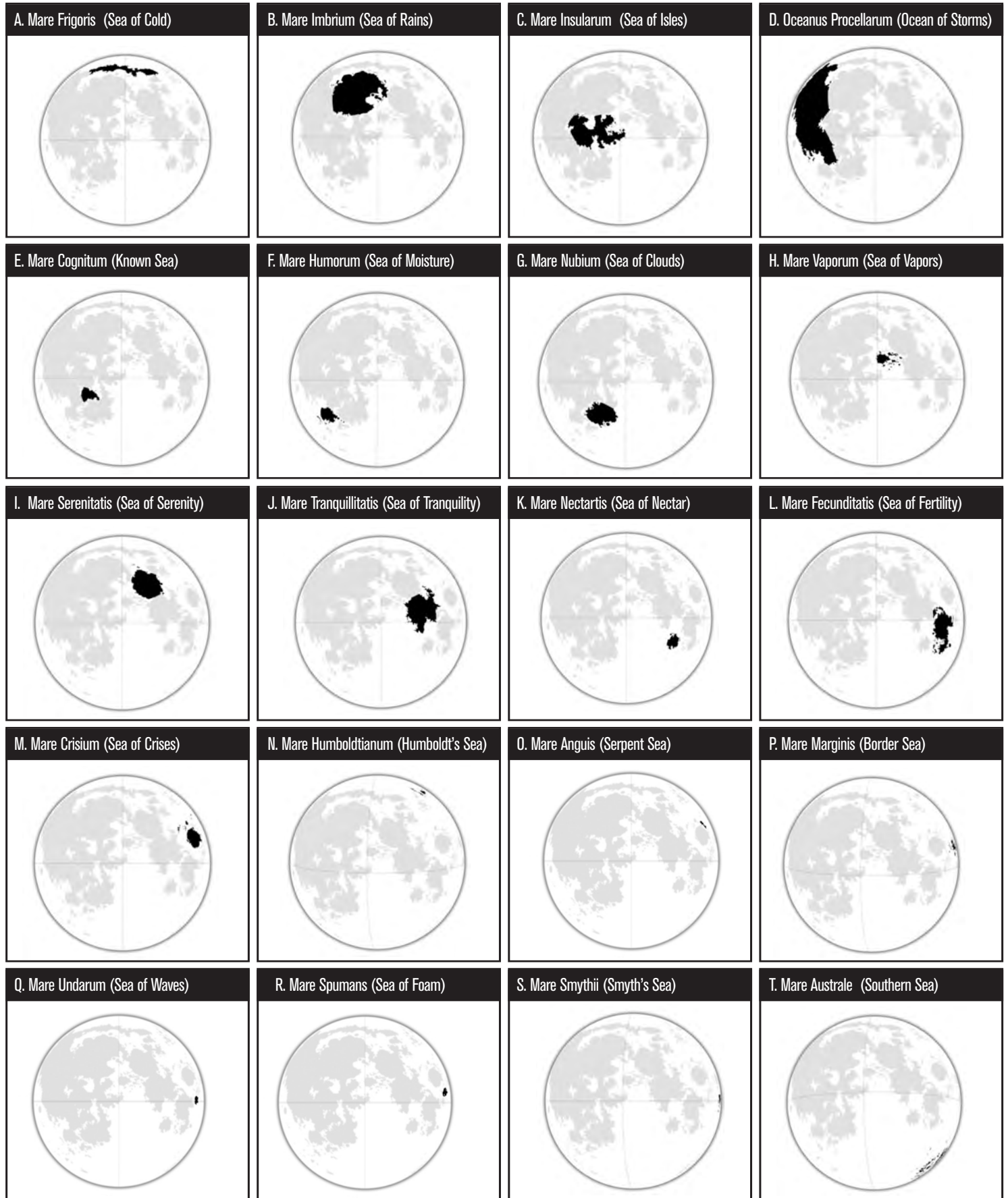


Map generated with NASA's Dial-A-Moon
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- | | | |
|--|--|---------------------------------|
| A. Mare Frigoris (Sea of Cold) | H. Mare Vaporum (Sea of Vapors) | O. Mare Anguis (Serpent Sea) |
| B. Mare Imbrium (Sea of Rains) | I. Mare Serenitatis (Sea 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) | |



INTERNATIONAL OBSERVE THE MOON NIGHT 2021–The Lunar Maria (Seas of Basalt)



These are the 20 lunar seas visible tonight, with north up and lunar west to the left. You may be able to see some of the larger seas with your unaided eyes. Smaller seas may provide challenges even through binoculars. Combine these charts with the accompanying map (on the front page) and see how many of the Moon's maria you can track down tonight!

Note: Mare Orientale is not included here, because it is obscured in the dark western portion of the Moon as seen tonight.