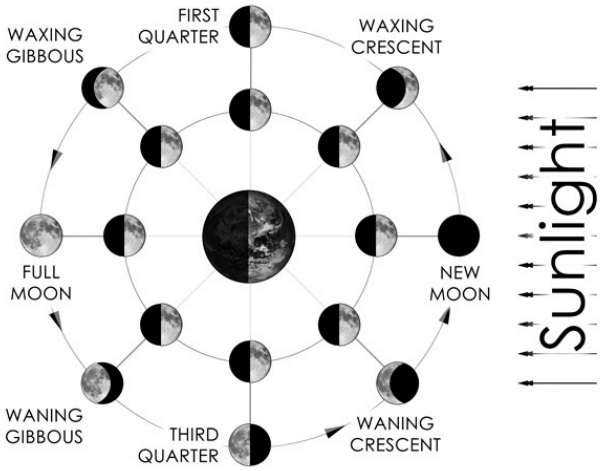
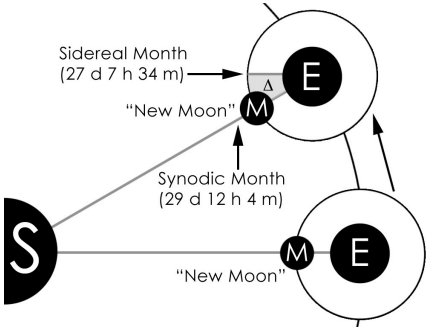
* Phases Of The Moon

The inner ring shows the view from above Earth



The outer ring shows the view from the ground



From Earth (E), we only see the part of the Moon (M) that is illuminated by the Sun (S). With respect to a fixed spot over the Earth's surface, the Moon completes one orbit in a **sidereal month** - 27 days, 7 hours, and 43 minutes. But the Earth orbits the Sun as the Moon orbits the Earth, so the time it takes for the Moon to return to the same position with respect to the Sun takes longer. This is known as a **synodic month**, which is 29.5 days. The difference is the grey region above.

* The Blue Moon (Not Really Blue)

Blue Moon - The 2nd Full Moon (FM) in a month (or 3rd FM of a season containing 4 FMs). Since the synodic cycle of the Moon (FM to FM) is 29.5 days, a FM at the very beginning of a month will result in a FM at the end of same month.

* Interesting Facts About the Moon

Collected from: lro.gsfc.nasa.gov/moonfacts.html

Our Moon is the 5th largest satellite in the Solar System (Io, Ganymede, Callisto (Jupiter), and Titan (Saturn) being larger), with a radius of 1,738 km (1080 miles).

The average Earth-Moon distance is 363,301 km (225,745 miles) - a 135 day drive at 70 mph or, in an Apollo capsule, a little over 3 days.

The moon weighs in at 74 sextillion (10^{21}) kilograms (81 quintillion (10^{18}) tons), with a gravity only 1/6 that of Earth. A 120 lb. person would weight in at only 20 lbs. on its surface (but still be as massive, of course).

When sunlight hits the Moon's surface, the temperature can reach 253 °F (123 °C). The "Dark Side" of the Moon can have temperatures dipping to -243 °F (-153 °C).

To complete its 29.5-day orbit, the Moon orbits the Earth at 3,680 kph (2,287 mph).

The Moon is going away! The Moon moves away from the Earth at 1.5 inches per year. As it slides away, it steals angular momentum from Earth, causing Earth to spin more slowly. 620 millions years ago, the day was 21.9 hours long and one year was 400 days!

The Apollo missions brought back 382 kg (842 lbs.) of Moon rocks, with the oldest clocking in at 4.5 billion years old. The rock compositions were identical to Earth rocks, indicating we had a common origin.

The current theory of Moon formation was that a Mars-sized protoplanet (called *Thea*) hit the early Earth, causing part of Earth's early surface to fly into space. This material eventually condensed into TWO moons that ultimately collided to form our ONE Moon.

Features on the Moon are massive - many visible with low-power binoculars - with some craters 225 km (140 miles) wide and 4,500 meters (15,000 ft.) deep. The Moon's highest mountains are 5,000 meters (16,000 ft) tall and are visible beyond the terminator (the edge between the lit and dark surfaces of the Moon) with binoculars.

Some Full Moon Names: Wolf (Jan.), **Snow** (Feb.), **Crow** (Mar.), **Seed** (Apr.), **Milk** (May), **Mead** (Jun.), **Thunder** (Jul.), **Corn** (Aug.), **Harvest** (Sep.), **Hunter's** (Oct.), **Frosty** (Nov.), **Cold** (Dec.).

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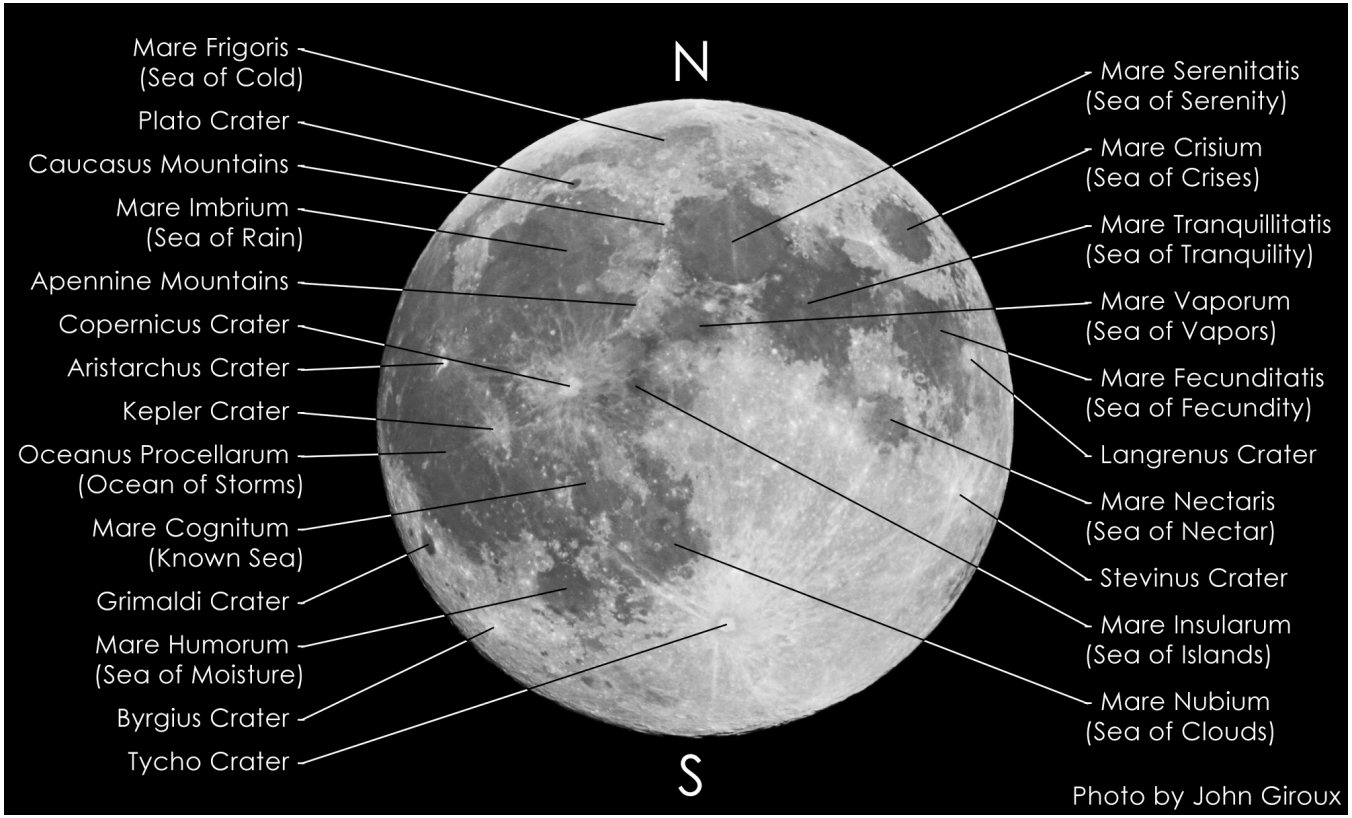
A Guide For Lunar Observing (v4)

"Don't stare at the Moon. You'll go crazy!"

Some people *still* believe that moonlight causes insanity. The word *lunatic* comes from a time when doctors thought that the insane had been "moonstruck." Maybe it's true, maybe (most likely!) not, but our nearest celestial neighbor is definitely a source of true fascination - so go ahead, take a chance, and look up!



* The Man In The Moon & Other Features

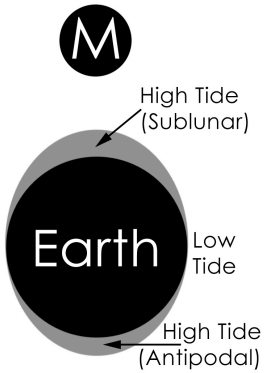
The surface of the Moon shows evidence of the violent nature of the early Solar System. Its surface is pock-marked with craters from flying debris (comets and meteors) in the early Solar System. The large dark areas on its surface, called **mare** (from the Latin for "seas," as Galileo believed them to be filled with water), are vast solidified lava flows.

Craters are named after deceased scientists, scholars, artists and explorers who have made outstanding or fundamental contributions to their field. Craters in or around **Mare Moscoviense** are named after deceased Russian cosmonauts. Craters in and around **Apollo Crater** are named after deceased American astronauts.

When some people look up at the Moon, they see the face of a man or a rabbit formed by the shapes and placement of the mare. What do you see?

* The Moon - Not Just A Pretty Face!

The Moon **CAUSES** the tides as the oceans respond to the Moon's gravity. On the side of Earth nearest the Moon, lunar gravity is strongest, pulling the water up slightly ("**sublunar" high tide**). Some rather... complicated physics explains the bulge of the oceans on the opposite side of the Earth as well ("**antipodal" high tide**). Low tides are also experienced due to the Moon's gravity. The Earth spins about this water bulge to produce daily tides. During high tide, the ground closest to the Moon also rises by an inch or two. This deformation occurs over a huge part of Earth, so we do not notice it.



* Can I See The American Flag?

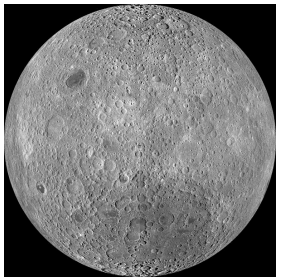
In 1959, the former Soviet Union launched **Luna 1**, the first to pass near the Moon. **Luna 2** was the first to "land" on the Moon (although "crash" is more like it). **Luna 3** was the first to image the Far Side of the Moon (so most of the features on the Far Side have Russian names). In 1966, **Luna 9** was the first spacecraft to perform a soft landing on the Moon.

On 20 July 1969, U.S. **Apollo 11** astronauts Neil Armstrong and Buzz Aldrin became the first humans to set foot on the Moon (with Michael Collins left "driving the bus"). To this day, only 12 people have walked on the Moon.

There is lots of equipment left on the Moon from manned and unmanned missions, but Earth-based and many space-based telescopes do not have the resolving power to see any of it. In 2011, the **Lunar Reconnaissance Orbiter** took amazing high-res images of the Moon that revealed the landing sites of many of the Apollo missions, complete with hints at the equipment and tracks on the surface.

* The "Dark Side" Of The Moon...

... is, actually, the "Far Side." The Moon's orbital period and rotation period are the same - as it makes one trip around the Earth, it completes one spin on its axis - this is called "Tidal Lock," and is why we only ever see one side from Earth. This means that one Lunar day (the time from "Earthrise" to "Earthrise") is 708 hours, or 29.5 Earth days.



But that doesn't mean we only ever see 50% of the lunar surface. The Moon's orbit is tilted 5 degrees with respect to the *ecliptic* (the apparent path the Sun travels across the sky). At some points each cycle we see a little past the Moon's North and the South Poles.