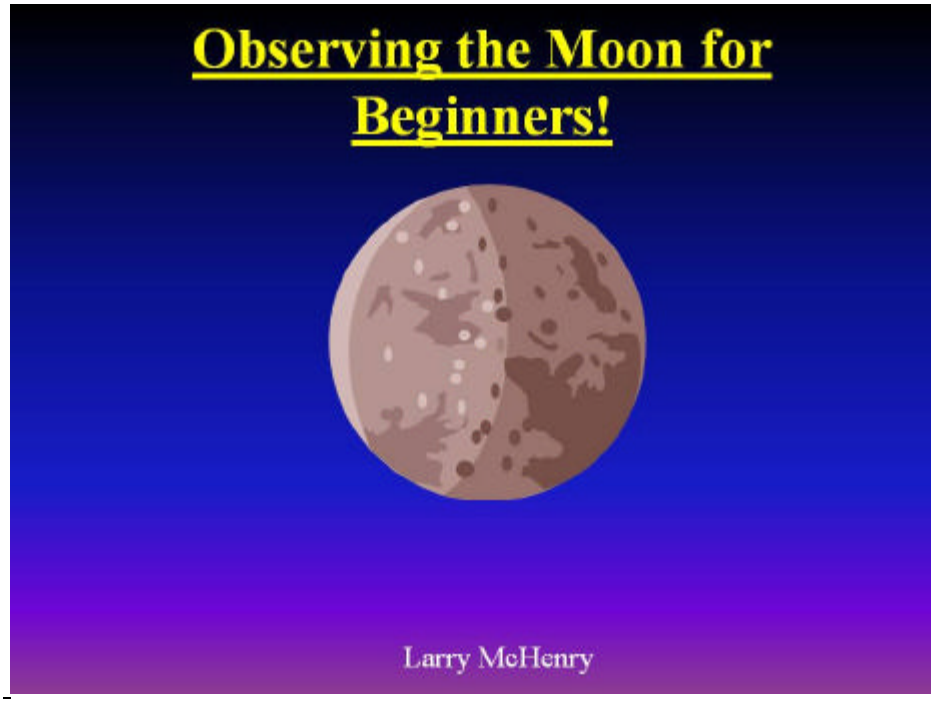
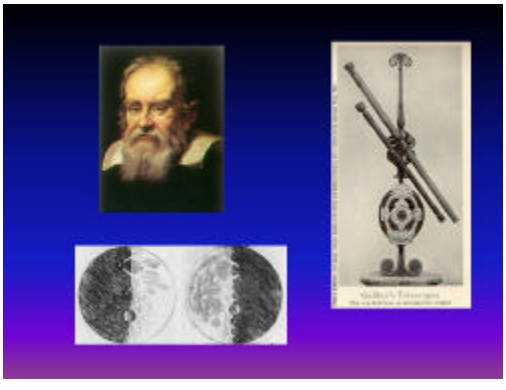


Good Evening, Today I'm going to spend a few minutes introducing you to our nearest neighbor in the Solar System, the Moon. The Moon is one of the favorite objects of stargazers.
It is the brightest and easiest night-time object to find. It's also the closets at about 250,000 miles.

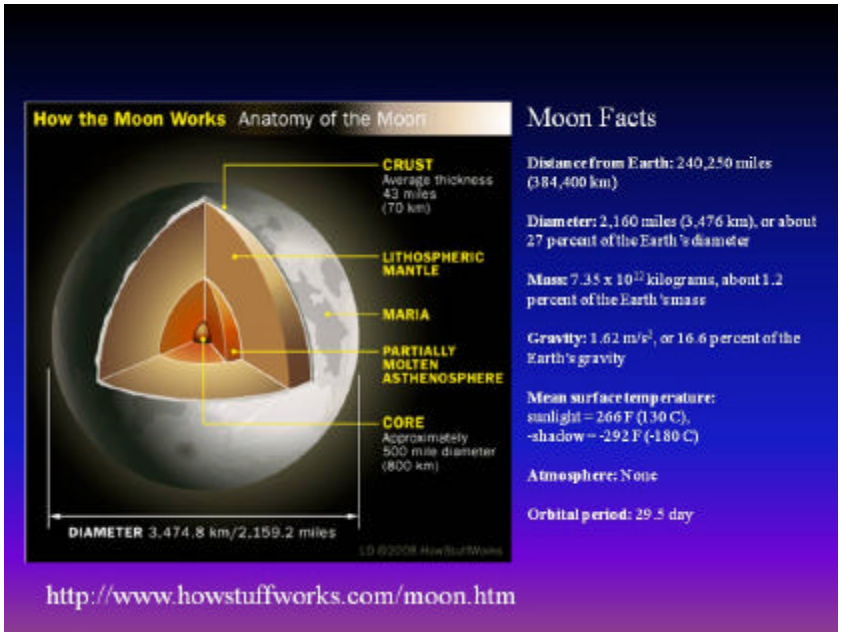
Viewed with the unaided eye, the Moon appears to be a bright sunlit world, made up of light and dark patches. In reality, the Moon is actually a very dark gray in color.
It appears white to the eye because of the great difference in seeing a sunlit object against a dark night sky.

Ancient peoples saw various shapes in these patches, from oceans to resemblances of animals or human faces. After Galileo turned his telescope on the Moon, astronomers began to realize the true nature of the Moon. The Moon is an airless, barren, geologically dead, rocky world.

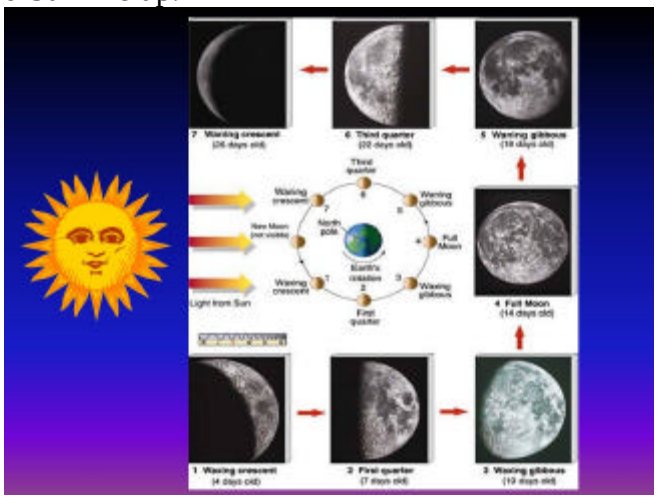


Where did the Moon come from? Here are some of the earlier theories: Double-Planet, Capture, and Fission.
Current Theory: Impact!!!!

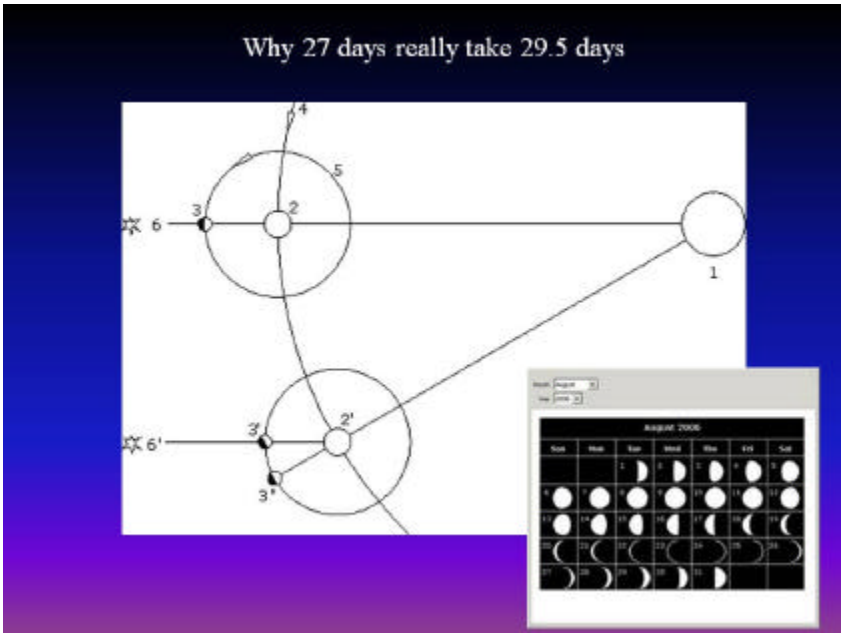
Moon Facts:



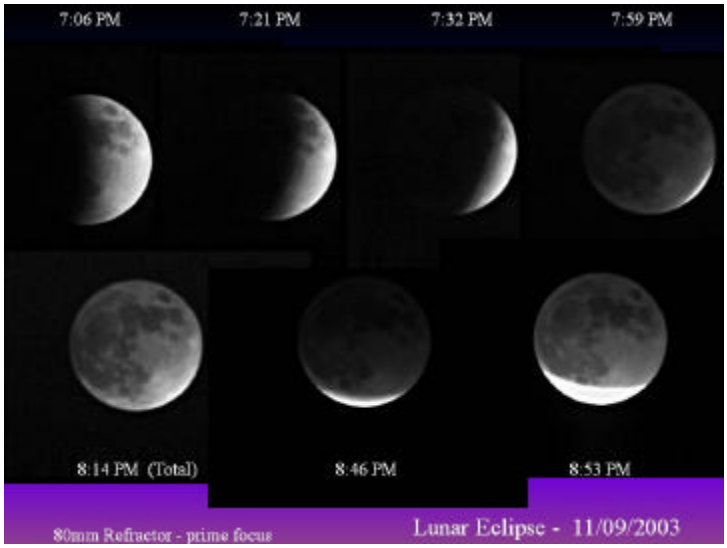
The first thing you notice when looking at the Moon is its phases.
The phases are caused by the way the Earth, Moon, and Sun line up.

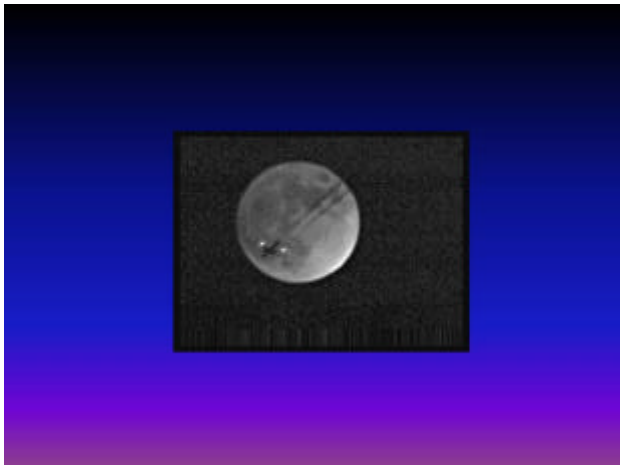


It takes the Moon about 27 days to complete one orbit of the Earth. But because the Earth is also moving, it really takes 29.5 days for the Moon to catch up to the same point that it started from in its orbit around the Earth. This is where our calendar comes from. You may also have noticed that we always see the same side of the Moon. This is because it takes the Moon the same amount of time to make one rotation on its axis (or spin around), as the same amount of time it takes the Moon to revolve around the Earth.
This is due to the Earth's gravity having slowed down and locked the Moon's rotation to its orbital period. Thus we always see the same side of the Moon.

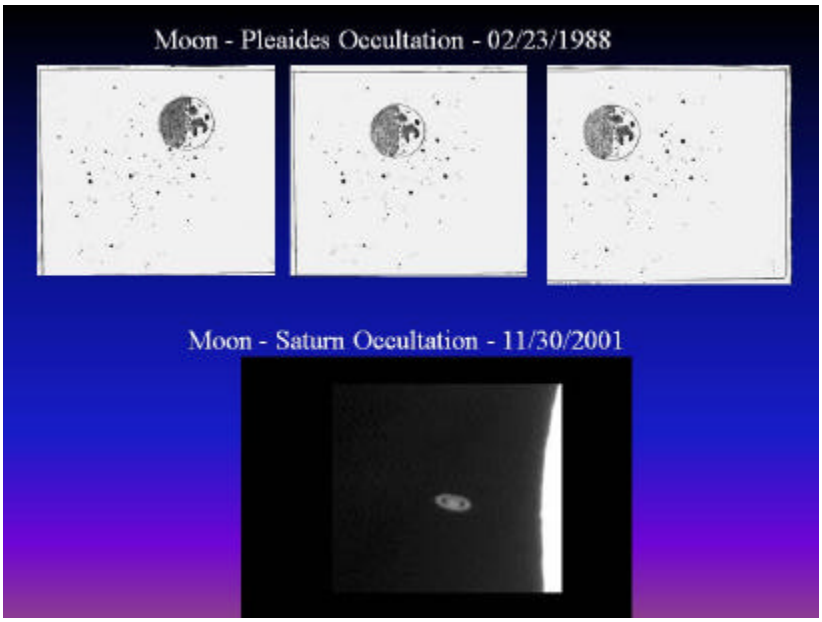


Occasionally, when the geometry is just right, the Sun, Earth, and Moon align so that the Earth's shadow falls on the Moon. This is what causes Lunar Eclipses.
Here's an example of a local Lunar Eclipse back in 2003.
If you're real lucky, a jet might fly over while you are observing!

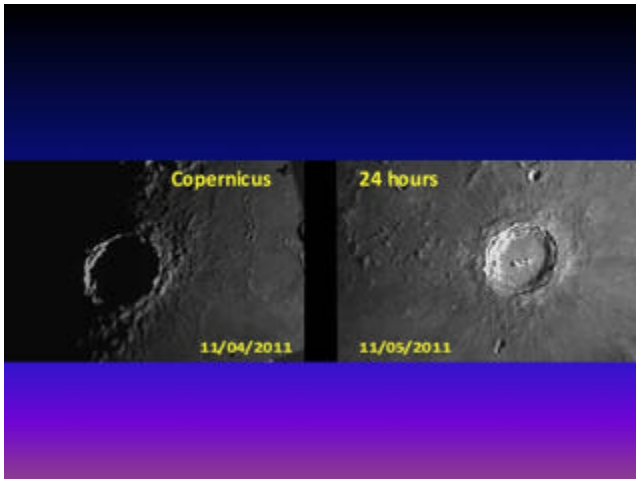




Even rarer is when the Moon passes in front of another object. This is called an ‘Occultation’.

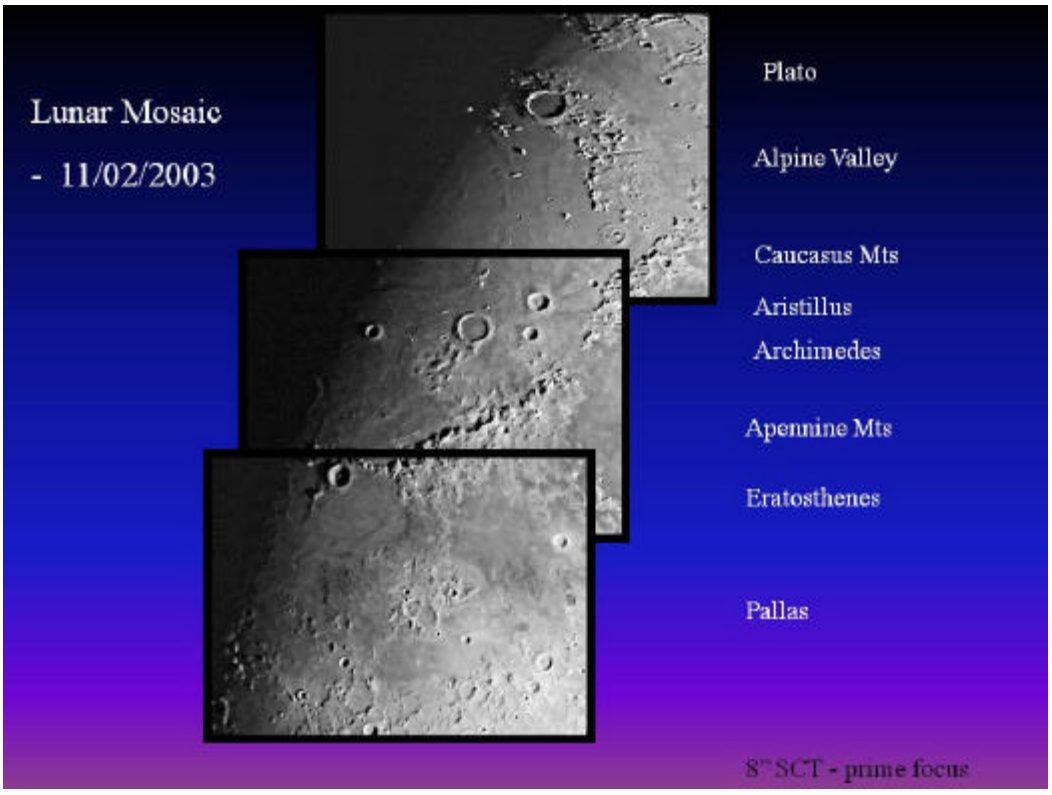


As you observe the Moon going thru its phases, you may notice what looks like a line that divides the moon, and separates the light portion from the dark portion. This line is called the ‘Terminator’. It marks where sunrise or sunset is occurring on the Moon, (depending on what phase you are observing).
The terminator slowly advances or recedes, keeping with the Moon’s orbital motion.
It can be very interesting watching the tops of mountains appear, or the walls of a crater slowly covered over by darkness.

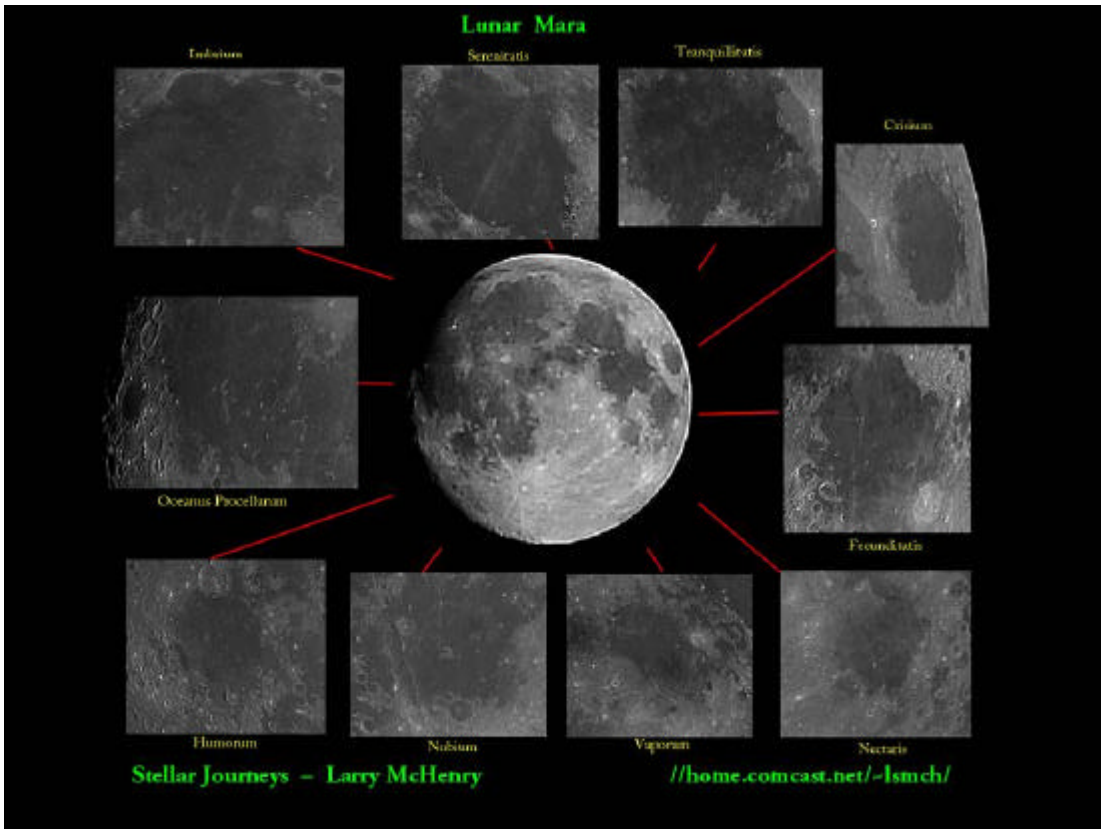


Sometimes, a few days after New moon, when it is a thin crescent, you might notice that the dark portion of the Moon is not very dark. You can faintly see details on the dark area of the Moon.
This is called 'Earthshine'. It is caused by sunlight reflecting off the Earth's oceans, clouds, and atmosphere and faintly illuminating the entire Moon, including the portion not lit by direct sunlight.

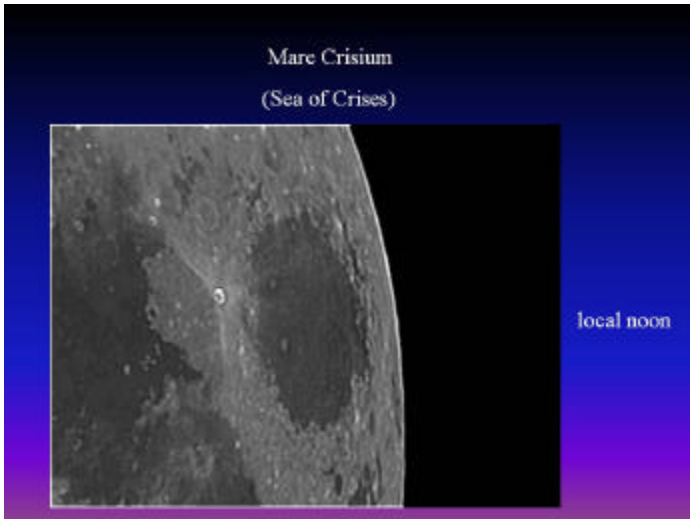
As the closet object to us, the Moon shows thousands of times more detail than anything else in the night sky. Being so close, the lunar surface shows a feature filled landscape.
When you observe the Moon using Binoculars or a Telescope, you will notice that there are three basic types of lunar terrain, or surface features: Lowlands, Highlands, and Crater!!!!

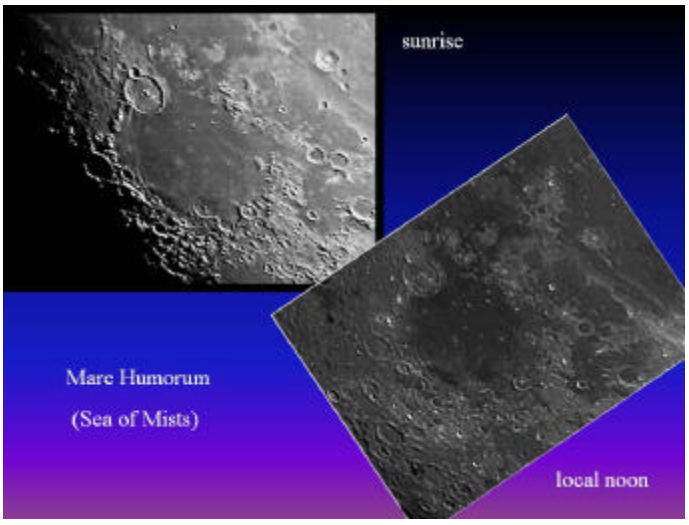


Lowlands: are made up of the 'Maria' or 'seas' are large flat dark gray plains. Before the invention of the telescope, people actually thought that the Moon had seas, plants and animals, just like the Earth. Maria are actually huge impact basins that were filled in after the initial asteroid strikes by molten lava erupting from the lunar interior through fissures in the crust created by stress of the impact.



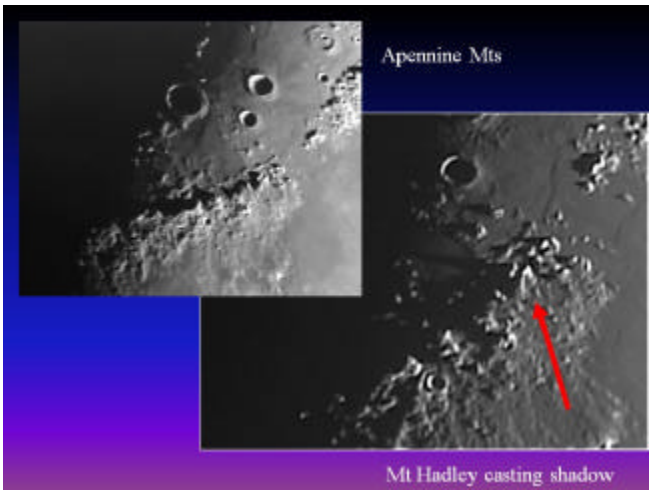
One of my favorite maria is Mare Crisium: (Sea of Crises)._It's about 345 miles in diameter, 3.85 to 4.55 billion years old. It has a very flat floor, with a ring of wrinkle ridges toward its outer boundaries. Has several Ghost craters that have largely been buried. The crater Picard can be seen, to the east of the Mare. Another favorite is Mare Humorum: (Sea of Mists), It's a large lava plain. 265 miles across. age of about 3.9 billion years. Its Basin is filled with a thick layer of basalt lava believed to exceed 1 mile in thickness at the center. You can observe low curved wrinkle ridges formed by the cooling lava, and many small craters formed by younger impacts dot the surface. On the north edge of the mare is the large crater Gassendi.

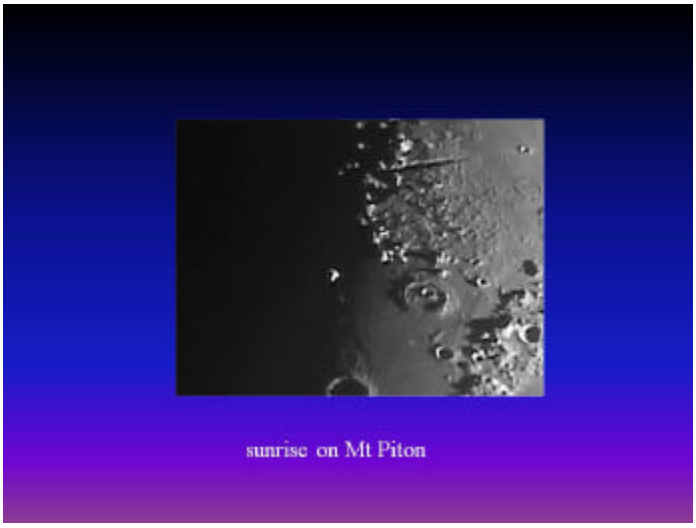




If you use just your eyes, and a little imagination, you can come up with various shapes made by the dark Mar-ray

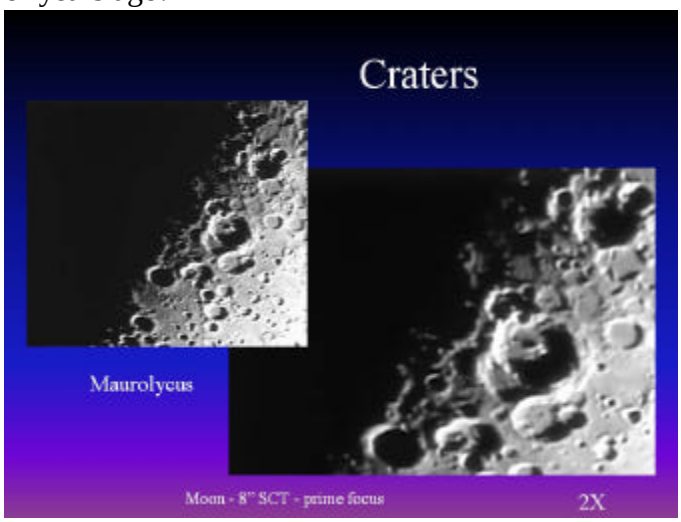
Highlands: the second type of Lunar Terrain are bright areas made up of mountains, and ridges. And along with Craters, highlands cover about two-thirds of the surface of the Moon.

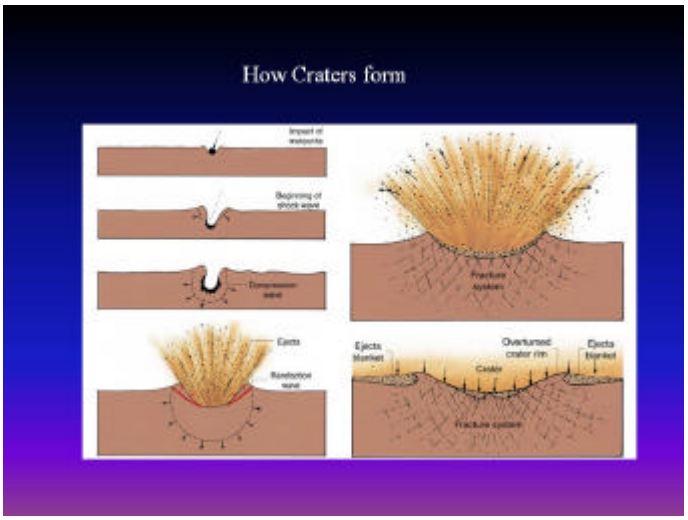




When you look at the Moon, you see written on its surface the history of our corner of the solar system. That history is full of violent collisions and impacts. The Moon has been an ancient target for wandering space debris and its surface is pockmarked with the most common type of landform of the solar system - impact craters!

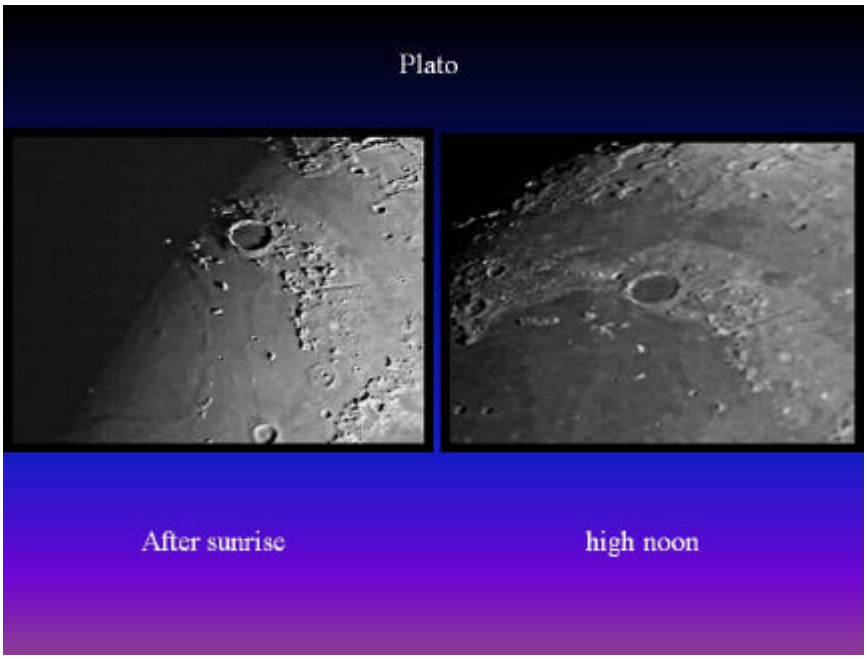
Craters are the third type of Lunar Terrain!! A few of the craters that you can see are from old volcanoes, but the vast majority of craters were made by large asteroids or comets that crashed into the Moon millions of years ago.



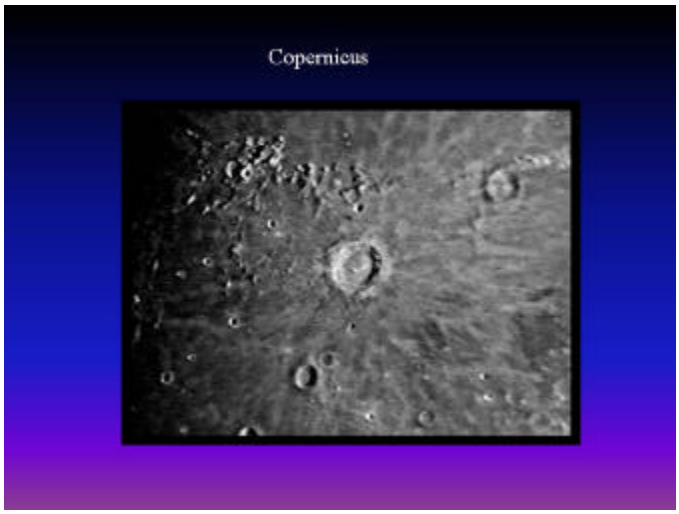


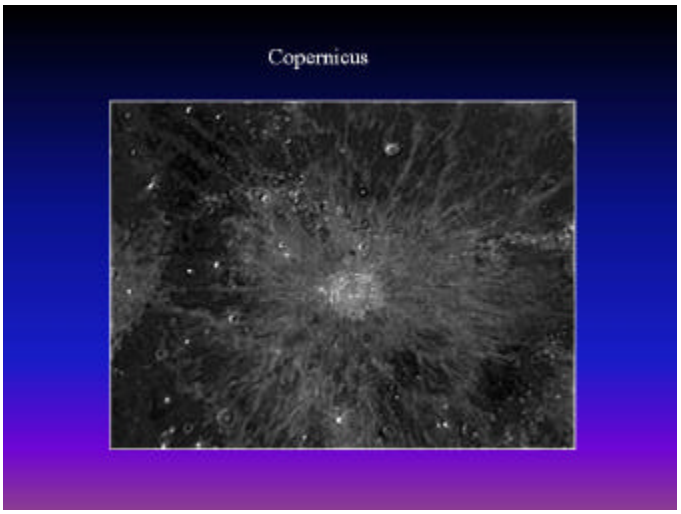
Because the Moon has no atmosphere or weather, most craters have changed very little from the day they formed. Craters come in all sizes, some are as small as a car, others as big as a large city or small state, and 1000's of feet deep, They can have tall central peaks or walls formed by the impact, and extensive bright 'ray' systems formed by ejected material.
Even a small telescope will allow an observer to see dozens of craters.

One of my favorite craters is Plato - approximately 61 miles in diameter with walls rising to 6000 ft.
The age of Plato is about 3.84 billion years. Sections of the inner wall display signs of past slides.
The floor is free of significant impact craters and lacks a central peak.
Nearby is the Alpine Valley, a wedge-shaped depression, cutting through the mountains to the east of Plato (80 miles in length, and varies between 4 - 6 miles wide)



Another favorite of mine is the crater Copernicus. It is a 60 mile wide crater created about 900 million years ago from an impact of a small asteroid. Through even a small telescope, many of the crater's features can be observed: Several central peaks and walls formed from the lunar crust rebounding after the impact.
A blanket of ejecta material and surrounding ray system from material blasted from the surface.
Small pits and craterlets formed by larger ejected fragments falling back down nearby.





Conclusion:

This concludes my introduction to the Moon.
Now that you've learned a little about the Moon's phases and features, perhaps the next time you look at the Moon, you will see it as another world, in some ways similar to our own,
but in many important ways completely different.

Books:

The Moon Observers Handbook
The Atlas of the Moon
Internet: just 'google' 'the Moon'