EXPLORE THE MOON WITH CELESTRON®

Master lunar imager Robert Reeves captured hundreds of images of the Moon with his 8” and 11” Celestron optical tubes, then stitched them together to create this Moon mosaic.

THE MOON’S ORBIT

Perigee average: 362,600 km (varies from 356,400 to 370,400 km)
Apogee average: 405,400 km (varies from 404,000 to 406,700 km)
Orbital period: 27 days, 7 hours, 43 minutes, 11 seconds
Synodic period: 29 days, 12 hours, 44 minutes, 3 seconds
Average velocity: 1.022 km/second
Equatorial rotation: 4.627 m/second
Inclination: 5.145 degrees

THE MOON’S GRAVITY

Mass: 0.012x that of Earth
Surface gravity: 1.62 m/second per second
Escape velocity: 2.38 m/second
Atmospheric pressure by day: 1 picobar
Atmospheric pressure by night: 1 femtobar

THE MOON’S NORTH CELESTIAL POLE
as seen from Earth’s sky

Right ascension: 17 hours, 47 minutes, 26 seconds
Declination: 65.64 degrees

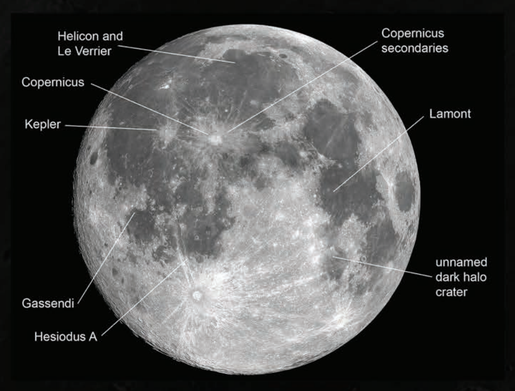
THE MOON’S SIZE

Average diameter: 3,474.8 km
Equatorial diameter: 3,476.2 km
Polar diameter: 3,472.0 km
Circumference: 10,921.0 km
Surface area: 37,930,000 sq km
Volume: 0.20x that of Earth
Mass: 0.012x that of Earth
Angular diameter: 29.3-34.1 arc/min

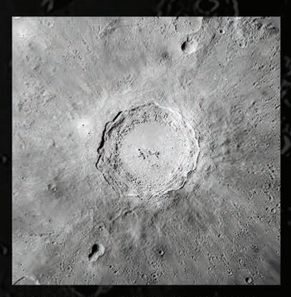
THE MOON’S BRIGHTNESS

Varies from magnitude -2.5 at crescent phase to -12.9 at full phase

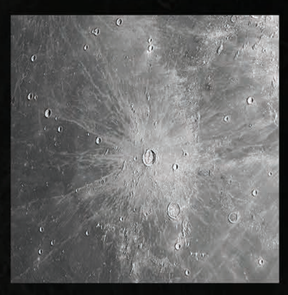
CRATER VARIATIONS ON THE MOON



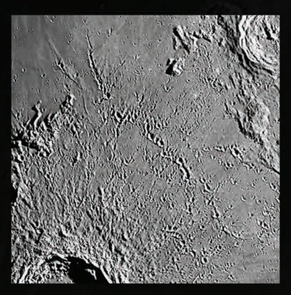
Craters less than 16 kilometers wide, like Helicon and Le Verrier, present a bowl shape and are classified as simple craters.



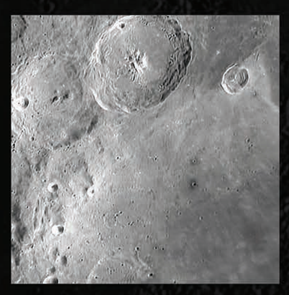
Craters greater than 16 kilometers wide, like Copernicus, are classified as complex craters and feature central peaks and terraced walls.



Floor-fractured craters have been modified by volcanic uplift, which raised and fractured their interior.



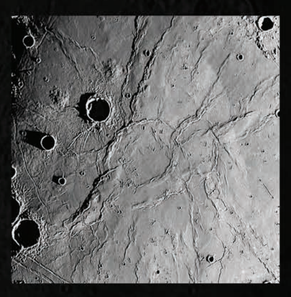
Secondary craters like the chains and strings of small craters north of Copernicus were created by blocks of material thrown by the impact that formed a larger crater.



Impacts that penetrate light-colored deposits on a mare surface excavate dark subsurface mare material and scatter it in the form of a dark halo.

Floor-fractured craters have been modified by volcanic uplift, which raised and fractured their interior.

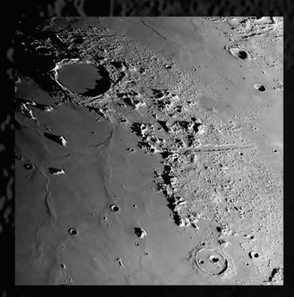
The strange double-walled concentric crater Hesiodus A lies east of Pitatus crater.



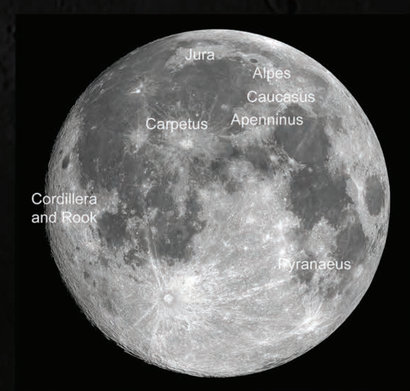
Ghost craters are the outline of ancient craters buried under fields of mare basalt.

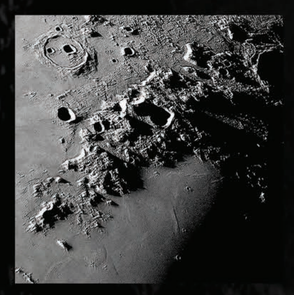
Craters on the Moon are predominately formed by the impact of meteoroids, asteroids, or comets. A small fraction of lunar craters are volcanic collapse pits. Craters smaller than 16 kilometers across are bowl-shaped excavations called simple craters. Excavations larger than 16 kilometers generally form a complex crater. The dynamics of a complex crater impact force subsurface rock to rebound upward in a fluid fashion to create a central peak on the crater floor. A complex crater's steep walls collapse inward to form a series of terraced benches. Pulverized ejecta thrown by a crater's explosive creation spreads a fan of bright rays around a crater. Rays fade after about a billion years. Large blocks of ejecta thrown by an impact crash back to the surface and create small secondary craters. Subsequent small impacts on a mare surface can penetrate a thin layer of bright ejecta and scatter subsurface dark mare material to form a dark halo crater. Craters within the maria are often volcanically modified or completely buried by subsequent lava flows, creating floor-fractured and ghost craters. Volcanic flows within small craters near a mare can form an inner wall, creating what is known as a concentric crater.

LUNAR MOUNTAIN RANGES



Montes Alpes on the northeastern shore of Mare Imbrium are divided by Vallis Alpes or the "Alpine Valley."





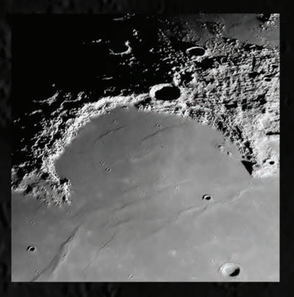
Shadow-casting Montes Cordillera and Montes Rook closer to the western limb are the two outer Orienale Basin impact rings.

Montes Caucasus form part of the barrier separating Maret Imbrium from Mare Serenitatis.

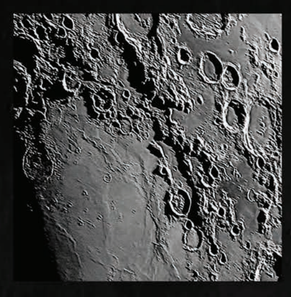
Montes Apenninus are formed by the southeastern rim of the Imbrium Basin.

Montes Caucasus form part of the barrier separating Mare Imbrium from Mare Serenitatis.

There are 18 officially recognized mountain chains on the Moon. These chains bear the Latin designation of "Montes" and each is named after a terrestrial mountain chain. The evolution of lunar mountains differs from those formed by terrestrial geology. Earth has ongoing tectonic activity that is constantly deforming the surface as our planet's moving crustal plates slowly collide and push up new mountain chains. Lunar mountain ranges are the rims of basins created by massive asteroid impacts nearly four billion years ago. Earth's mountains erode and change radically due to weathering; lunar mountains have remained static since their creation. Volcanic mountain-building that creates some of Earth's spectacular peaks is absent on the Moon. Volcanic flows on the Moon created shallow shield volcano structures referred to as lunar domes.

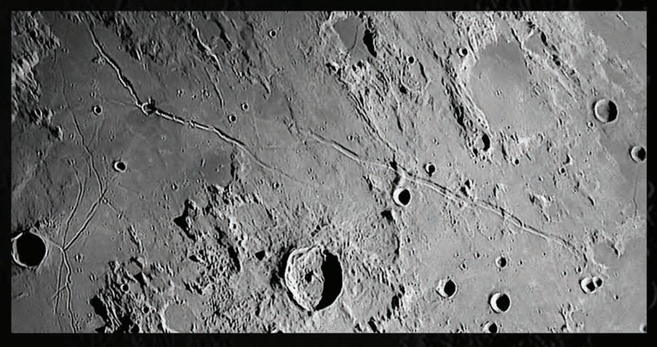


The rim of the basin cradling Sinus Iridum (Bay of Rainbows) forms Montes Jura.

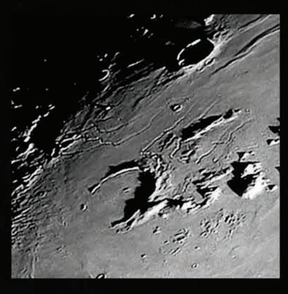


Montes Carpatus complete the eastern arc of the outer Imbrium Basin impact ring.

LUNAR RILLES



Gull wing-shaped Rima Hyginus is dotted with volcanic collapse pits, which include Hyginus at the center. The straight rille Rima Ariadaeus presents the classic form–a geologic feature known as a graben.

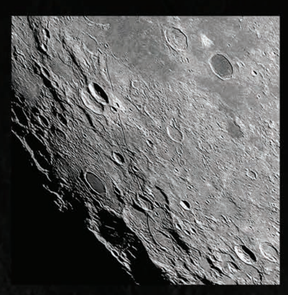


The pitchfork-shaped sinuous rilles of Rimae Prinz parallel the branches of Rimae Aristarchus.

Rimae Triesnecker is so unusual that is has the unique designation of "irregular branching rilles."

The multiple S-shape of Rima Hadley meanders through a valley west of Montes Apenninus.

Rima Hesiodus slices across lower Mare Nubium and crosses into Palus Epidemiarum.

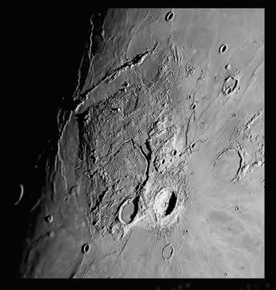


Rimae Sirsalis spans more than 400 kilometers and is the longestrille on the Moon.

The arcuate rilles of Rimae Hippalus arc around the eastern shore of Mare Humorum.

Rilles are linear features of which 121 are officially recognized and dozens are within reach of amateur telescopes. The term rille is derived from the German word for "groove" and on the Moon refers to a fissure or channel that is appreciably longer than it is wide. These features are also known by the scientific Latin name of "Rima", or "Rimae" in the plural. Different processes create rilles on the Moon. Sinuous rilles were created by flowing lava that carved a channel similar to those formed on Earth by the erosive force of flowing water. Arcuate (sometimes called concentric rilles) are created by the stretching of the surface as mare basalts slump toward the middle of a basin. Most straight rilles are a feature called a graben, or the slumping of land between two faults formed when the crust is split by the uplift of a volcanic dyke, or a sheet of magma that has pushed up from the Moon's molten core but failed to breach the surface as an eruption.

PAST VOLCANIC ACTIVITY ON THE MOON



The volcanically uplifted Aristarchus plateau features Schroter's Valley, the largest volcanic rille on the Moon.

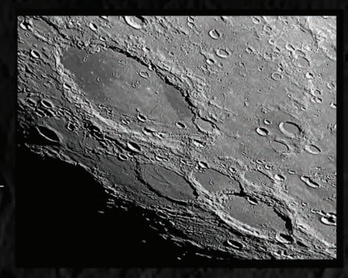
The ash-covered hilly territory north of Rima Hyginus is unofficially known as the "Heart of the Moon."

Mons Rumker is an isolated plateau on northern Oceanus Procellarum that hosts half a dozen volcanic domes.

Half a dozen fields of dark volcanic ash are seen near the inner rim of Alphonsus crater.

The Marius Hills on Oceanus Procellarum are the largest group of volcanic domes on the Moon.

Today, there is no ongoing volcanic activity on the Moon. There are also no tall steep-sided volcanic mountains on the Moon. Past lunar volcanic activity is primarily visible in the form of the broad, dark basalt fields that fill the circular impact basins and form the lunar maria, seen with the naked eye as the "Man-in-the-Moon." Other volcanic features include sinuous rilles and cinder cone craters surrounded by fields of dark volcanic ash. Both straight and curved arcuate rilles are indirectly created by past volcanism on the Moon. Other past eruptive activity is seen in the form of lunar domes, or dozens of small shield volcanoes and volcanic blisters that dot the maria.



The lava-flooded craters Schickard, Wargentin, and Phoclydes record past volcanic eruptions away from the traditional mare regions.

The dark maria forming the face of the Man-in-the-Moon are the most visible evidence of past lunar volcanism.

EXPLORE THE MOON BY

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