



Lunar CRater Observation and Sensing Satellite

Phases of the Moon

The Moon always presents the same face to Earth because the length of time it takes to orbit the Earth is the same as it takes to rotate once on its axis. This length of time is about 29.5 days and is the origin of our time period known as a month. Although we only see one side of the Moon from Earth, the far side of the Moon from Earth is not in permanent darkness. No one side of the Moon receives more sunlight than another.

Why is there no dark side of the Moon? You can prove this to yourself. Stand beside a chair in front of a sunny window. Walk completely around the chair, but keep your face and front of your body facing the chair as you walk around it. This is the correct analogy to the Moon's orbit around the Earth. Note that because you are keeping the front of your body toward the chair as you move around it, your body will make one complete turn every time you walk around the chair. All sides of your body will get direct sunlight from the sunny window as you move around the chair, just as all sides of the Moon are sunlit during some portion of its orbit.

As the Moon goes through its monthly orbit around Earth, we view its different phases. Moons and planets shine only from reflected light from the Sun. The illuminated part of the Moon changes throughout the month. For example, it can be fully lit or a Full Moon, a crescent moon or a gibbous moon as seen from Earth.

The direction to the Moon in its orbit produces the phase of the Moon that we see. If the Moon in its orbit is close to the direction to the Sun, then the bright side of the Moon will face away from the Earth. The hemisphere of the Moon facing Earth will receive no sunlight, and will be dark. We will not see the Moon in this phase. This is known as a New Moon.

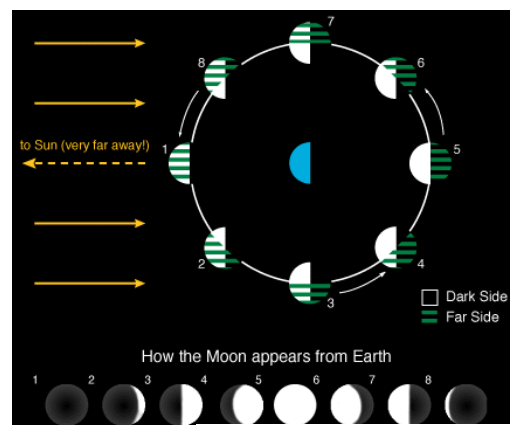
About a week later in its orbit, the hemisphere of the Moon being illuminated by the Sun will only be half visible from Earth. We will see a First Quarter Moon at this time, when the Moon is one quarter of the way through its orbit. The Moon will appear to be half illuminated.

About a week later the direction to the Moon in its orbit will be opposite the direction to the Sun. The side of the Moon that faces Earth will also face the Sun and we will see the fully illuminated Moon or a Full Moon.

After approximately another week, we will see the Moon half illuminated, as it is three quarters of the way through its orbit. This is the Third Quarter Moon. In approximately one more week, the cycle will repeat with the New Moon phase again.

As the illuminated portion of the Moon grows toward the Full Moon phase, we refer to the crescent or gibbous phase as Waxing. As the Moon progresses toward a New Moon phase, we refer to the crescent or gibbous phase as Waning.

Regardless of phase, the bright portion of the Moon that we are seeing is experiencing daytime, just as we have daytime on Earth. The dark portion of the Moon that is not illuminated is experiencing nighttime. The boundary between darkness and brightness on the Moon that we see is known as the terminator. Locations on the Moon at the terminator are experiencing either a sunrise or sunset.



Phases of the Moon as numbered above:

1. New Moon
 2. Waxing Crescent Moon
 3. First Quarter Moon
 4. Waxing Gibbous Moon
 5. Full Moon
 6. Waning Gibbous Moon
 7. Third Quarter Moon
 8. Waning Crescent Moon
- Photo courtesy NASA

1: Crescent moon - the figure of the moon in it's first or last quarter, resembling a segment of a ring tapering to points at the end. 2: Gibbous moon - more than half but less than fully illuminated. 3: Hemisphere - one half of a celestial sphere. 4: Waxing - waxing is a word meaning "growing". A waxing moon occurs between a new moon and a full moon. The amount of the lit surface we can see is growing. 5: Waning - waning a word meaning "shrinking". A waning moon occurs between a full moon and a new moon. The amount of the lit surface we can see is shrinking. 6: Terminator- the dividing line between the bright and shaded regions of the disk of the moon or a planet.



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