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Astronomy

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**Lunar Eclipse**

In this short essay I will summarize the astronomical event know as a Lunar Eclipse.

Before you can fully understand why a lunar eclipse happens, and why it looks the way it does it is important that we understand the moons natural phases as it rotates around the earth, and how its position in its rotation creates the different phases.

The moons phases, occur over the period of a month, and are as follows:

A fully dark moon is the New Moon, A mostly visible moon is called a Waxing Crescent, when the moon is half visible and half dark it is called the First Quarter, When it is slightly more than half visible it is called a Waxing Gibbous, when the moon is fully visible it is called the famous full moon, as it starts waning again it will pass through the Waning Gibbous, then the Third Quarter, and finally a Waning Crescent as there is only a sliver left visible before the next months cycle begins with the fully dark new moon.

These different phases of the moon are due to the moons relative position to the sun, with respect to the earth. This monthly cycle is the same every month, with little to no change, however it is important for an eclipse, because a Lunar Eclipse can only occur when the moon is in its full phase. When the moon is fully illuminated and opposite the earth, there is the chance that the moon will pass straight behind the earth on its orbit. To achieve a full lunar eclipse, the moon must line up exactly with the ecliptic plane around the earth, creating a straight line between the sun, earth, and moon respectively.

We see a lunar eclipse as the normally bright moon falling into shadow, and sometimes on the rare occasion of a total eclipse, falling all the way into darkness.

During an eclipse there are two areas of shadow that the earth creates. The dark area, directly behind the earth that is shaped like an ice cream cone holding the earth is the Umbra, and is in full shadow. The Penumbra is a larger area expending outward behind the earth that creates a light shadow on the moon because in that area, only part of the suns light is blocked.

In general, scientists recognize three main kinds of eclipses: Penumbral, Partial, and Total. As the name suggests, a Penumbral eclipse is when the moon passes through an area of light that is behind the earth, but it still reflects some light from the outer parts of the sun. A Partial eclipse, where the moon passes partially into the Umbral region of shadow, where we might see only half of the moon. The other half of the moon would be covered by the earths shadow. The full eclipse is most famous because of its total visible eclipse as the moon passes through the Umbra region of shadow cast by the earth. The moon can be visibly seen passing into and out of this umbra region of shadow and is famously dimmed to a faint outline during this period. Even in the total lunar eclipse, the moon is still faintly visible, and famously tinted red from light reflecting from it after being refracted through the earth’s atmosphere.

It is worth noting that because of the earth’s rotation around the sun, and the moons orbit around the earth partial eclipses occur around two times a month, while full lunar eclipses are far less common!