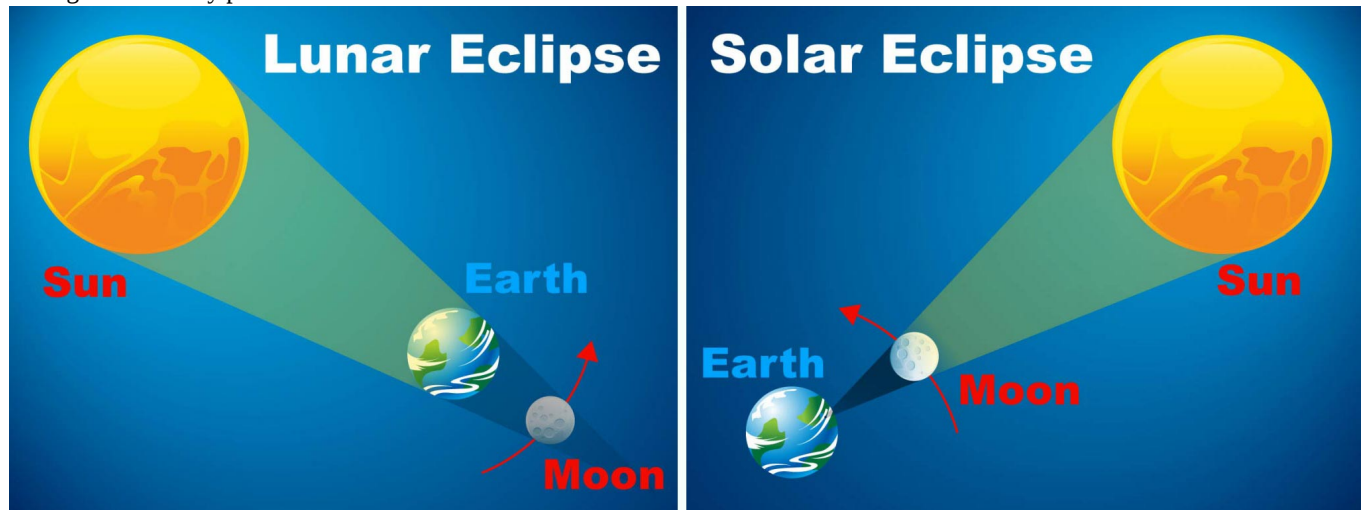


3.7: Eclipses

An eclipse is an event that happens when one body is temporarily hidden, either by passing into the shadow of another body or by having another body pass between it and the observer.



Lunar Eclipses

A lunar eclipse occurs when Earth lies directly between the Sun and the Moon, so that Earth's shadow falls on the Moon. A lunar eclipse can only occur at full Moon. There are three types of lunar eclipses: Penumbral, Partial, and Total. The type of lunar eclipse depends on how far the Moon travels into Earth's shadow. The entire night side of Earth can see the lunar eclipse. Total lunar eclipses can vary in color and brightness due to Earth's atmosphere and how deep the Moon passes into Earth's shadow; Red to Copper to Orange to Black. The colors can be quite varied and spectacular.

A Solar Eclipse occurs when the Moon comes between the Earth and the Sun, partially or totally blocking off the Sun from view on Earth. A solar eclipse can only occur at new Moon (whereas a lunar eclipse can only occur at full moon). There are four types of solar eclipses:

1. You must be within the eclipse "zone" to see even a partial solar eclipse.

Total Solar Eclipses

During a total solar eclipse, the Moon totally blocks all harmful solar light and radiation at totality but not during partial. Totality is the phase of the eclipse at which the Sun is completely covered by the Moon. Right before totality, you might be able to see several stars and planets as the sky begins to darken due to decreasing sunlight. At totality, daytime becomes nighttime; the Moon's shadow passes over your site and you will see colors around the horizon, called the sunrise/sunset effect. Occasionally you might see bands of black and white running across the ground right before and after totality; these are called shadow bands and are due to Earth's atmosphere. Animals often react as if it has become nighttime.



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Right at totality and during totality, you will be able to see several things associated with totality.

The **Diamond ring** looks just like its name. It is the last bright sliver of the Sun visible as the Moon covers the Sun, or right after the end of totality as the Sun is being uncovered by the Moon.

Baily's Beads are spots of light that appear as the Moon is covering the Sun. The edge of the Moon is not smooth with mountains and valleys and sunlight goes through these valleys for a few seconds until they too are covered.

At totality, a couple of features become prominent at the now-totally eclipsed Sun. You will see pink-red spots along the edge of the Sun. These are solar prominences and surround the eclipse Sun you will see a whitish extension, the corona or Sun's outer atmosphere.

Eclipse: Lore and Legend

There are some interesting eclipse stories over the passage of civilization. For example, was Stonehenge a system to predict lunar eclipses or something else? In China, the term for an eclipse is *chih*, which also means to eat; something was eating the Sun. The ancient Chaldeans believed that an eclipse was a display of the Moon's anger. The Babylonians determined the eclipse's "quadrant" – geographical indicator of who would suffer the worst disasters as a result of the eclipse. The Peloponnesian War (5th century BC) was won on the heels of a lunar eclipse; the Athenians failed to retreat and the Syracusians routed them.

Maybe the most interesting and distressing was the story of Columbus and a total lunar eclipse. Columbus used a total lunar eclipse in 1504 to convince the Jamaican natives to supply him and his crew food – he threatened to keep the Moon dark unless the natives met his demands.

Today's World...

In much of the world, it is still common practice to make noise to frighten away whatever is attacking the Sun or Moon. Some peoples are also concerned that diseases are caused by eclipses. Some wells are covered in Japan to prevent celestial poisoning. Some Eskimos turn over utensils to avoid contamination. In India some people lock themselves in their homes to avoid evil rays. And in many parts of the world pregnant women are not allowed outside during an eclipse.

A Total Eclipse of the Sun

People have described total solar eclipses as magical, life-changing, and almost religious in nature...even in today's scientific and high-technology world.



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