Ask an Astronomer

Question: "What causes an eclipse of the Moon?"
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DORIS DAOU:

An eclipse is actually nothing more than a shadow. In the case of a lunar eclipse, it's the shadow that the Earth casts on the Moon.

As the Earth orbits around the Sun, the Sun shines on it and on the Moon. But the Earth casts a shadow, just like you do when you stand outside on a sunny day.

So a "lunar eclipse" is what we see when the full Moon moves into the Earth's shadow. Since the Earth's shadow is so large, it can blot out the entire Moon for as much as half an hour. A lunar eclipse can be seen by anyone on Earth who has a clear view of the Moon during the period of darkness.

So why don't we get a lunar eclipse every time the Moon is full?

Well, here we see the plane of the Earth's orbit around the Sun, which is called the "ecliptic." Notice that it doesn't line up exactly with the Moon's orbit around the Earth.

The only time the Moon will pass directly through the Earth's shadow is when it crosses the ecliptic plane *and it is full*. At other times the Earth's shadow will pass to one side or the other of the Moon and there will be no eclipse at all. This special alignment is only possible during the so-called "eclipse seasons," which happen about every 6 months.

So the next time you hear about an upcoming lunar eclipse, try to find a clear sky to watch it. And remember that what you're actually seeing is the shadow of our home planet falling on the Moon.

For "Ask an Astronomer," I'm Doris Daou of the SIRTF Science Center.