

Ask an Astronomer

Question: "Why does the Moon look like it changes?"

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DORIS DAOU:

Well, here on Earth it turns out that we always see exactly the same features on the Moon's surface. That's because the Moon spins once around its axis in the same amount of time it takes to go all the way around the Earth: about four weeks. So the same side of the Moon is always facing us.

What we see as changes, or "phases" of the Moon, are actually changes in the Moon's illumination as seen from Earth.

This "lunar cycle" starts with the new moon, when the Moon is in the same direction as the Sun. The side of the Moon facing the Earth is dark and is lost in the Sun's glare.

At first quarter the Moon has moved one quarter of the way around its orbit. At this point, it is at right angles to the sun and we see it half-lit.

About a week later, when the Moon is "full," it's opposite the Sun in the sky. Rising just as the Sun sets, its face is now fully illuminated.

The Moon reaches the third quarter of its orbit in yet another week.

From here the Moon wanes to a crescent and will become new again, starting the cycle all over.

Since the Moon is so far away, it always looks the same to everyone on Earth who can see it. It's located in different places in the sky, depending on where you happen to be, but its appearance is constant.

Interestingly, if you're in the Southern hemisphere, the Moon looks to be upside-down compared to its appearance from the Northern hemisphere.

So even though the Moon seems to be changing all the time, it really is just a trick of the light.

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