Why is the harvest moon so big and orange?

1 October 2010, By Jennifer Hsu

Picture of a harvest moon. Source: Wikimedia Commons/Roadcrusher

Ever wonder why the moon sometimes looks so big and orange? Professor Emeritus John Percy of the Department of Astronomy and Astrophysics explains the mystery behind the harvest moon:

First off, why is it called the harvest moon?

Before I get into answering the question, I'd like to give a bit of background first.

In approximately a one month time frame, the moon revolves around the earth. At the same time the earth is revolving around the sun. What we see during the month is a series of moon phases, as the moon goes around its orbit. These phases include the new moon - when the sun and moon are in the same direction - and the full moon, which takes place about two weeks after the new moon. During the full moon, the sun is in one direction, the moon is in the other and the sun is fully illuminating the moon.

As a result of the moon going around the earth, the moon rises on average 50 minutes later every night. So if the moon rises at 8pm tonight, it will rise an hour later tomorrow night. This is one thing to note. The other thing to note is that the earth's rotation axis is not upright relative to its orbit. Because of this, the sun and the moon actually move northward and southward during their respective paths around the earth.

During the year, the sun is furthest north of the equator on the first day of northern summer and its furthest south of the equator on the first day of northern winter. Right now we're in the beginning of fall in the northern hemisphere. The moon, opposite the sun, is moving northward as the sun is moving southward. The season of fall is somewhat of a midway point for the sun and the moon. Because the moon is moving northward, it is rising about 25 minutes earlier than it normally would, or only about 25 minutes later each night. Therefore, for about a week, it's rising at about the same time that the sun is setting.

To answer your question on why the moon is called the harvest moon we need to go back to the time when everybody lived off of a rural environment. At this time of the year after sunset when people were bringing in the harvest, the earlier rising full moon provided additional light during the evening so people could extend their harvest collection. This is why the full moon at this time of the year is referred to as the harvest moon.

Why does the harvest moon look so big?

The full moon will always look bigger when it's near the horizon, but it's not actually bigger. It's totally an optical illusion. You can test this by just holding an Aspirin at arm's length. The Aspirin will exactly cover the moon when it's by the horizon and it'll do the same when you hold it up to the sky when the moon is higher up but appears smaller.

Why is it orange?

That has nothing to do with the harvest moon. The moon and the sun both look redder when they're by the horizon. The reason for this is because we're seeing them through the maximum thickness of atmosphere, which absorbs blue light and transmits red light.

Provided by University of Toronto