# Dark Side Of The Moon

## Moon to enter last eclipse until 2000

MIAMI (AP) — Sky watchers throughout North America will get a triple treat Thursday night: a total eclipse of a harvest moon, with a bright Saturn in tow.

Most of North America won't see another total eclipse of the moon until the year 2000, and astronomers say these kinds of very public displays help reconnect a generation of children who have "lost contact with the sky."

"With the amount of electric lighting we're using, we're washing out the sky," said Bob Stencil, head of the physics department at the University of Denver. "When we illuminate the sky, we're depriving children of a chance to tap into the cosmic wellspring of creativity and imagination."

A total lunar eclipse occurs whenever the Earth moves directly between the sun and the full moon, casting its shadow across the moon. Even when the moon is completely in the Earth's shadow, it doesn't get entirely dark; it is often a faint reddish, illuminated by sunlight filtering around the Earth's edge.

This time, Earth's curved shadow will fall across the moon starting at 9:12 p.m. EDT, with the darkest part of the eclipse coming at 10:54 p.m.

This lunar eclipse comes at the same time as the harvest moon, which is the full moon closest to the first day of autumn. A harvest moon is not necessarily different from other full moons, but crisp, dry fall weather can make it seem brighter and more distinct.

Making things even more interesting this time, Saturn is positioned in the sky very close to the eclipsed moon. As the moonlight dims, stars will come out and Saturn will seem to shine more brightly.

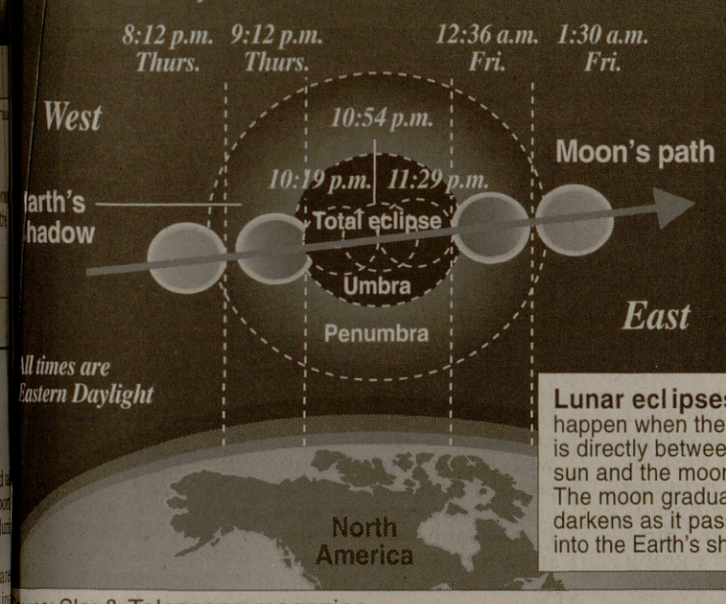
"This is a wonderful dance between the Earth and the moon, sort of a cosmic ballet," said Jack Horkheimer, director of the Miami Planetarium and host of the PBS show "Star Hustler."

Dust from volcanic eruptions or smoke from forest fires can affect the color of the eclipsed moon, which can vary from a dull gray to a coppery or muddy red color. A lunar eclipse can give scientists a reading of how much dust is in the atmosphere.

"Anybody can see the eclipse with their own eyes," said Paul Knappenburger, president of the Adler Planetarium and Astronomy Museum in Chicago. "Just find a comfortable place and watch the moon perform."

### Lunar eclipse

Almost anyone in North America will be able to see the moon turn a dim shade of orange-red or red-brown during Thursday's lunar eclipse. The next total lunar eclipse won't occur until January 2000.




**What to look for:**

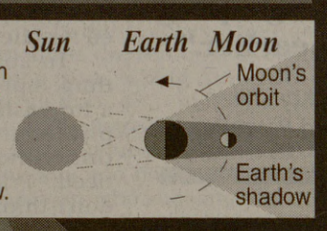
**8:45 p.m.:** The moon enters the penumbra, developing a faint shading.

**9:12 p.m.:** The moon enters the darker portion of the Earth's shadow, the umbra. For an hour, it slips deeper into the shadow, glowing orange, red or brown. This is considered a partial eclipse.

**10:19 p.m.:** Total eclipse begins. Look for changing colors and shadings.

Also, watch for Saturn just below or to the right of the moon.

**Lunar eclipses** happen when the Earth is directly between the sun and the moon. The moon gradually darkens as it passes into the Earth's shadow.




Source: Sky & Telescope magazine

AP

Discovery

## Galaxy's high-energy gamma rays pose questions

NEW YORK (AP) — A distant galaxy has showered Earth with two record-setting bursts of very high-energy gamma rays and dumped a puzzle into scientists' laps.

"It's very difficult to explain how this happened," said physicist Jim Gaidos of Purdue University.

Very high energy gamma rays have been reported to come from two distant galaxies, and two more are under study. The rays are absorbed by the upper atmosphere and don't pose any risk to health.

Scientists think a spinning black hole in these galaxies somehow sends out jets of matter and radiation.

These jets bump into energy packets called photons, changing them to the gamma rays, scientists theorize.

It will take some doing to explain two gamma ray bursts detected last spring, Gaidos and other researchers said in Thursday's issue of the journal Nature.

The bursts came from a galaxy called Markarian 421, which lies about 400 million light-years away.

The first burst, on May 7, send 15 to 16 gamma rays per minute crashing into the Earth's atmosphere, nearly three times the old record.

The second flare, eight days later, set a record for being so brief: half an hour. Previously observed flares have lasted for days.

This brevity suggests that the gamma rays must have been generated within a very small space.

Scientists will now have to rethink their theories to come up with a way that a galaxy could produce the high intensity seen in the first burst, through some process that can turn on and off in only half an hour and act within a very small space, Gaidos said.

"It's going to be tough," he said.

But Gaidos said he's not ready to declare current theories dead.

Jules Halpern, an associate professor of astronomy at Columbia University in New York, said there's probably a "clever explanation" for the new observations that won't overturn current theories.