



A rocket blasts off as part of NASA's LCROSS mission from Cape Canaveral Air Force Station, Fla., in June. The LCROSS mission is seeking lunar ice. [Enlarge photo](#)
Pat Corkery/United Launch Alliance

Jimmy Westlake: A watery moon?

Water on the moon? Sounds ridiculous. How can an airless world that bakes in the hot sun at temperatures above the normal boiling point of water be expected to hold on to any of the vital substance?

If scientists are correct, prospectors on the moon might one day mine the precious stuff from the deep, dark craters near the moon's polar regions — places where the sun has never shone.

Water is essential for life as we know it. It is so plentiful on our planet that we naturally take it for granted, but water is not so common on other worlds. As we begin to take baby steps into space and eventually establish colonies on nearby worlds, water will become a very valuable commodity. Consider that the cost of carrying 1 pound of water from the Earth to the moon is about \$10,000.

Clearly, the cost of transporting large quantities of water to the moon is cost-prohibitive. If a source of water could be found on the moon itself, the prospects of establishing a large lunar colony suddenly begin to look much better. Last month, giddy scientists announced water had indeed been discovered on the moon, but not in the form of oceans, lakes or even puddles.

The interaction of solar wind particles (mostly hydrogen nuclei) and oxygen atoms in the lunar soil and rocks has synthesized water molecules that permeate the lunar dust.

We're not talking about enough water to make lunar mud, but maybe enough scattered across an area the size of a football field to fill a small glass. The trick will be extracting this water, one molecule at a time. Wouldn't it be nice if there were some natural process that collected and concentrated these water molecules into large lunar ice fields for us to use?

Such a process just might exist. Several spacecraft have detected indirect evidence of water, in the form of ice, buried in the floors of some deep craters near the moon's north and

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south poles. Near the poles, the sun's glancing rays are not able to shine into these craters, so the temperatures there hover at minus 250 degrees Fahrenheit or colder. Buried under a meter or so of lunar dust, large deposits of ice might form in these cold pockets and survive for billions of years. Mining lunar ice would be far more economical than transporting Earth water to the moon. But how can we determine whether the polar craters are hiding these mother lodes of water without sending prospectors there to find out?

One way is to bomb a suspect crater and see if a plume of steam rises from the darkness. That's exactly what NASA's LCROSS spacecraft will do Friday morning. LCROSS (the Lunar CRater Observation and Sensing Satellite) will execute a suicide plunge into the shadow-filled (and hopefully ice-filled) crater named Cabeus, near the lunar south pole.

Earth-based and space-based instruments will examine the resulting plume of debris for telltale signs of water vapor, a sure indication of buried ice.

If the results come back positive, then sit back and watch the lunar ice rush begin.

By the way, if you or a friend owns a 10-inch or larger telescope, NASA thinks you might be able to catch a glimpse of the LCROSS debris plume rising from Cabeus crater at about 5:30 a.m. Friday. Give it a try. You might just witness history in the making. Visit the LCROSS Web page at <http://lcross.arc.nasa.gov/> for the latest updates and details.

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