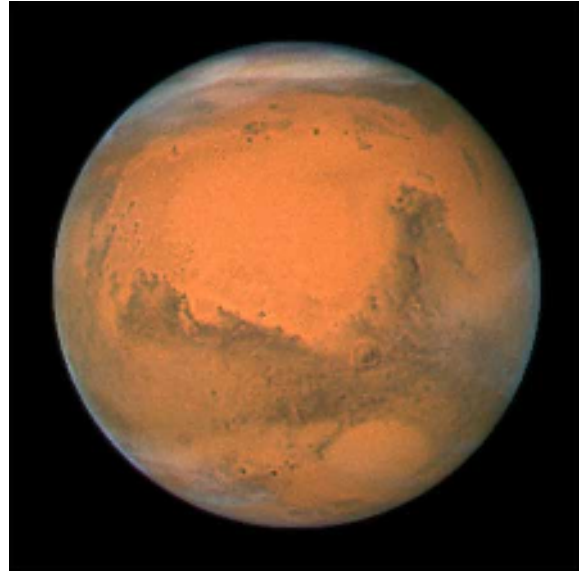


## Astronomy

### Either Martians or Mars has gas

*The Red Planet has been spewing clouds of methane, scientists recently discovered. There's a possibility that tiny living organisms on Mars are the source of the gas. Or it could be coming from freezing and thawing processes on the planet.*



Cows and Mars have at least one thing in common — methane. Like flatulent (or farting) cows that produce the gas, the Red Planet releases clouds of methane, according to a recent study. Researchers wonder whether colonies of bacteria hidden beneath Mars' red surface could be the cause.

The gas comes from three different areas of the planet, reports Mike Mumma, a NASA scientist at the Goddard Space Flight Center in Greenbelt, Md. At each location, the amount of methane fluctuated throughout the year. The biggest plumes were in the Martian summer and the smallest during the planet's winter.

Other research teams have claimed to find Martian methane, but this was the first time that anyone could say so for sure.

Detecting the methane clouds was no easy task. The scientists measured Mars' methane levels for three Martian years (equivalent to seven Earth years) using three special telescopes on Earth. These instruments can detect an invisible kind of light called infrared light. Scientists use these infrared telescopes to measure gases in space. But since the telescopes were on Earth, they also measured gases in our atmosphere. So the scientists had to use some tricks to figure out which gases came from Earth and which came from Mars.

"Mumma and his team have been painstakingly careful," says Christopher Chyba, an astrobiologist (someone who studies extraterrestrial life) at Princeton University. "The reward is that we have observations of methane that show variations over season and by location. It's fantastic."

Methane is an unstable compound. Unless there is a constant source of the gas, the methane on Mars would eventually disappear. Spotting the methane over several years means that it is replenished regularly, Mumma said.

The scientists don't know for sure what is causing methane to spew from Mars' rocky floor. But they have a couple ideas. It could be that the gas is trapped in ice-covered rocks. In the summer, the planet warms, and the ice melts. Then the gas could slip out of cracks in the rock. When winter rolls around again, the ice reforms and plugs up the leaks. That could explain why there is more methane in the summer than in the winter.

In the other scenario, the methane is still trapped, but this time it's locked inside little molecular cages called clathrates. These are basically chunks of ice with lots of methane inside. The summer sun unlocks the cages and frees the methane.

Neither of these hypotheses explains what creates the methane in the first place. That is still a bit of a mystery. About 90 percent of the methane in Earth's atmosphere comes from livestock and rotting plants, but bacteria also create the gas. It's possible that Mars' methane could be coming from bacteria too. But it's too soon to say. There is not enough evidence yet to say one way or another, Chyba says. That will be the next challenge for Mumma and his team — finding out if living organisms on Mars produce all that methane.

But one thing is for sure: It's not coming from cows.

### Science Promotion Team:

**Chairperson:** Wong Tai Wa 黃棟華 6S

**Vice-chairperson:** So Ying Kin 蘇英健 6S

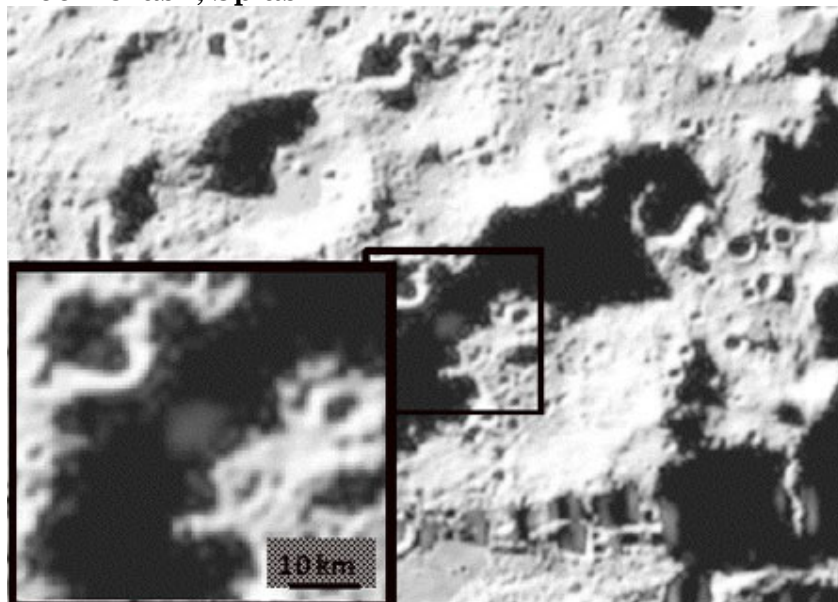
**Committee Member:**

Chan Wai Sum Anita 陳蔚心 6S, Lam Kit Yan 林潔欣 6S, Lam Yin Kwai 林賢桂 6S,

Leung Chun Tung 梁鎮通 6S, Tang Chi Chung 鄧志聰 6S & Tang Tsz Ching 鄧芷晴 6S

**Website:** <http://210.3.43.253/~lck/science/spt0910/spt0910.htm>

### Moon Crash, Splash



*The plume of debris (closeup, lower left) made by a Centaur rocket crashing into a crater at the moon's south pole is seen about 20 seconds after impact in this image taken by LCROSS, the rocket's mother craft. New research reveals that the plume contained vapor and ice.*

There are many ways to study the moon: Look through a telescope, measure its movement across the sky, or watch for mountains (with special sunglasses) as it passes across the sun during an eclipse, for example. But here's one way that's a little unusual: crash a rocket into it and see what happens.

That's exactly what NASA did in October, when scientists steered a rocket and a small spacecraft, called LCROSS, right into a dark crater on the moon's surface. Just as a rock falling into a pond will cause a splash, the rocket's crash on the solid moon sent up a cloud of dust and debris (also called a "plume"). This plume was large enough to be seen with telescopes on Earth — but just barely. Scientists had hoped to study the plume to find out whether or not this dark crater held water.

Now, the scientists have finished their first study of the plume — and found water. In a recent press conference, scientist Anthony Colaprete announced that the plume contained at least 25 gallons of water vapor and ice. Colaprete, a scientist at the NASA Ames Research Center in Mountain View, Calif., works on the LCROSS project. (LCROSS stands for Lunar CRater Observation and Sensing Satellite.)

The LCROSS spacecraft flew to the moon on the back of a Centaur rocket. Just as the pair approached the moon, they separated. The Centaur rocket plunged into the moon and sent up a plume, and LCROSS flew through it — just before crashing and, as a result, sending up a second plume. As LCROSS passed through the Centaur’s plume, it used nine different devices — including five cameras — to take measurements of the dust and debris.

But the cameras didn’t deliver evidence of water. Instead, the scientists used an instrument called a spectrometer. A spectrometer is a tool that uses light, or radiation, to identify the chemical makeup of a material. It gets its name from the “spectrum,” which refers to all the different kinds of electromagnetic radiation. An infrared spectrometer measures something we can’t see with our eyes: infrared radiation. (Although infrared radiation isn’t visible, it can be felt. Heat is an example of infrared radiation.)

The infrared spectrometer on board LCROSS took measurements of infrared radiation as the spacecraft passed through the plume. Scientists have long known that molecules like water absorb infrared radiation in particular patterns. So if they see a particular pattern, they know that water molecules are present.

The patterns observed by the infrared spectrometer on LCROSS showed that water molecules had absorbed infrared radiation. Another spectrometer on LCROSS that can detect a different kind of radiation, called ultraviolet radiation, was also important for finding water. That instrument found the pattern of a piece broken off a water molecule – that piece is called hydroxyl.

Both of these measurements together “made us really confident” that there’s water in the lunar crater, Colaprete told *Science News*.

Finding water on the moon meant LCROSS accomplished its mission, but now scientists have to face a new round of questions. We don’t know, for example, whether or not all lunar craters have as much water in them. Plus, scientists want to know where the water came from. Maybe it came from nearby comets flying by; maybe it came from chemical reactions.

Answering these questions may help scientists learn how the moon formed in the first place. And answering these questions will no doubt lead to more, deeper questions — but that’s the nature of science.

### Lunch Time Video Shows: 12:20 p.m. @ Chem. Lab. (Room 512)

Date	Name of Program	Phy	Chem	Bio
2/3/2010 (Tue)	Crime Scene University, Chapter 4 鑑識科學教室 (Part 1)			
5/3/2010 (Fri)*	Crime Scene University, Chapter 4 鑑識科學教室 (Part 2)			
9/3/2010 (Tue)	100 Greatest Discoverier : Astronomy 世界百大發現 天文學 (Part 1)			
12/3/2010 (Fri)	100 Greatest Discoverier : Astronomy 世界百大發現 天文學 (Part 2)			
16/3/2010 (Tue)	The Mysteries of Magic 魔術幻影 (Part 1)			
19/3/2010 (Fri)	The Mysteries of Magic 魔術幻影 (Part 2)			
23/3/2010 (Tue)	100 Greatest Discoverier : The Origin and Evolution of Life 世界百大發現 生命的起源與進化 (Part 1)			
26/3/2010 (Fri)	100 Greatest Discoverier : The Origin and Evolution of Life 世界百大發現 生命的起源與進化 (Part 2)			
30/3/2010 (Tue)	Poison dart frog 七彩斑斕箭毒蛙			

\* Special time table

## Public Seminars

Date	Time	Name	Venus
30/3/2010 (Sat)	2:30-3:10 pm	Energy management in Water Supplies Department – an energy efficient pumping system	Science Museum
	3:10-3:50 pm	Organic aquaculture	
	3:50-4:30 pm	Application of genetic algorithm in pump scheduling for water supply	
14/3/2010 (Sun)	3:00-4:30 pm	Easy Cosmology 宇宙論淺說	Space museum

FREE OF CHARGE! FIRST COME FIRST SERVE! For more details, please refer to the notice board outside Chemistry Laboratory.

### Topic of Science Quiz 你知道唔知道? in March

6<sup>th</sup>, 24/2-5/3: **Fossil Fuels**

7<sup>th</sup>, 8/3-19/3: **Animals**

8<sup>th</sup>, 22/3-1/4: **Airplane**

Questions are posted on the notice board of Science Promotion Team near the Staff Common Room. Students can find the five questions and get the answer sheets on our board. After filling in your answers, put it into the box provided. Students who can get all the answers correct will be awarded a small gift.

Science Festival was successfully held in 3<sup>rd</sup> to 5<sup>th</sup> Feb. Thank you for your participation!

**Prize Presentation**



**Book Exhibition**



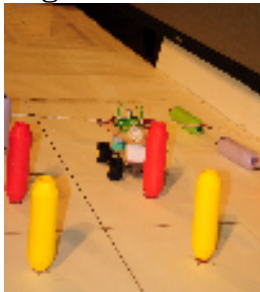
**Space Talk**



**Video Show**



**Through the channel down the generals competition**



### Winners

Champion:

Lau Tsz Him (3E)

1<sup>st</sup> runner-up:

Kwan Yu (3E), Poon Yi Tak (3E) & Tang Lok Yiu (3D)

2<sup>nd</sup> runner-up:

So Ying Kin (6S)

Best Creativity:

Lau Tsz Him (3E)

Best Appearance:

Mok Hoi Yan (3D), Wong Suet Ching Yuki (3A) & Chung Ho Man (3A)