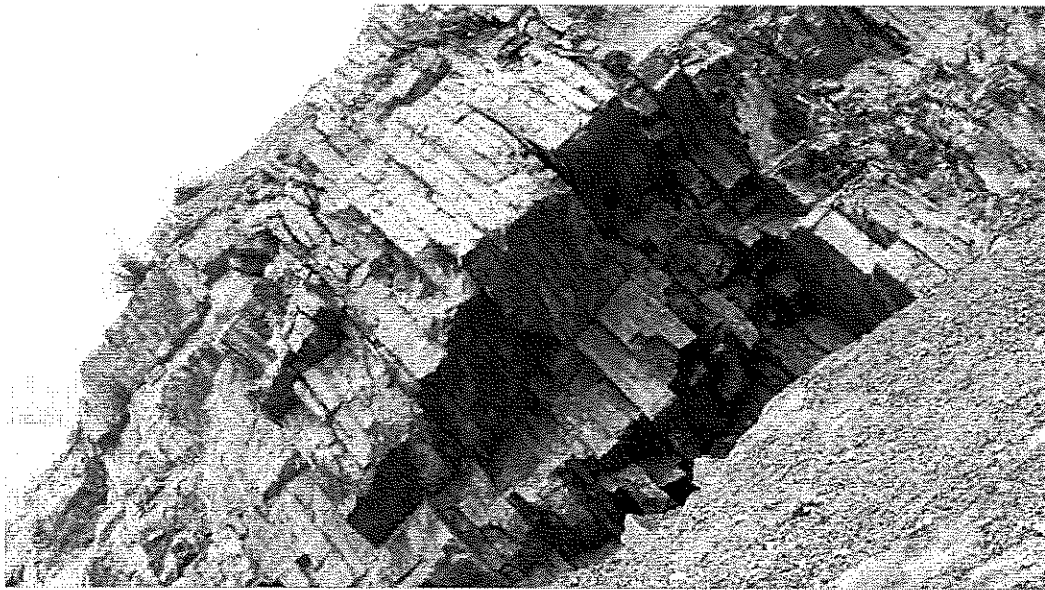


## NEWSELA

# Earth's worst extinction may have been caused by a tiny microbe

By Los Angeles Times, adapted by Newsela staff on 04.07.14

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A photo of the Permian-Triassic boundary at Meishan, China. This photo shows the limestone beds in between the volcanic ash beds that the researchers were able to date. Photo: Shuzhong Shen/ MIT

LOS ANGELES — About 252 million years ago, long before there were even dinosaurs, most of the living things on Earth died. Scientists call this event the end-Permian extinction.

It has long been a mystery over what happened that killed off nearly all life. Now they have a new idea of how it may have happened. A new study suggests that tiny microbes on the bottom of the ocean may have been to blame.

Microbes are very small living things that can only be seen through a microscope. They are usually bacteria. These particular microbes were so small, that 1 billion of them could fit in a thimble-full of ocean dirt.

The end-Permian extinction lasted for 20,000 years. Scientists say that nearly nine-tenths of all life on Earth was destroyed during that time.

Gregory Fournier is a scientist at the Massachusetts Institute of Technology (MIT). He said the end-Permian extinction was worse than what killed the dinosaurs. "Things were very close to being over for good," he said.

## **CO2's Rapid Rise**

Scientists have struggled to understand exactly what caused the long extinction. There was a quick increase of CO2 levels at the time. That would have caused the oceans to turn to acid. The Earth would have become hotter. Most forms of life would not have been able to survive in such conditions. But what actually caused the CO2 levels to rise has remained a mystery.

Some scientists have suggested an asteroid could be to blame. Others say it was volcanoes or coal fires.

Now, researchers from MIT and the Chinese Academy of Sciences have named a new and unlikely suspect. They blame a tiny microbe called Methanosarcina that puts out methane gas.

MIT scientist Dan Rothman was looking at how carbon levels grew during this time and found the first clue that microbes could have been involved. What he saw was not a straight line. It was a rapid upward curve.

A sudden fire in a coal field in Siberia would not have created CO2 that way, he said. What he saw was in line with the work of microbes.

It was the first time anyone had suggested microbes might be involved with the end-Permian extinction. But microbes have been accused of changing the chemistry of our planet at other times. For example, microbes are responsible for creating the first oxygen in the Earth's atmosphere.

"What they do" is very important, Rothman said. "And if they do better or worse, things change."

## **Increase In Nickel**

Fournier put it this way: "Microbiologists like to say, 'Microbes rule the Earth, and we just live on it.'"

To figure out which microbe might have been responsible, Rothman took his research to Fournier. Fournier had written a paper about Methanosarcina in 2008. The paper showed that sometime in the last 400 million years, Methanosarcina got a new gene. The new gene allowed it to produce methane more easily than ever before.

Fournier worked to figure out more precisely when the gene change happened. He found it most likely occurred about 250 million years ago.

The researchers cannot say for certain that the microbe and the huge amount of methane it produced were responsible for the end-Permian extinction. Still, they do have one more line of evidence to support their idea. In order to make methane, Methanosarcina needs nickel.

Much of the volcanic activity at the time occurred in Siberia. It has some of the world's largest supplies of nickel. Furthermore, the researchers found an increase in nickel in dirt from that time.

"Our proposal is unusual, but it does bring together many observations, and ties a lot of stuff together," Rothman said. "That doesn't make it right." But it is enough to do more tests to see if that's what really happened, he said.

## Quiz

- 1 Which of the following is a possible reason for the end-Permian extinction?
  - (A) volcanic activity in Siberia that led to an increase in Earth's temperature
  - (B) microbial activity that led to an increase in carbon dioxide levels
  - (C) an increase in oxygen levels that led to the growth of microbes
  - (D) an increase in CO<sub>2</sub> levels that caused oceans to turn to acid
  
- 2 Which of the following about Methanosarcina is NOT TRUE?
  - (A) Rothman found out that Methanosarcina got a new gene 250 million years ago.
  - (B) Fournier wrote a paper about Methanosarcina in 2008.
  - (C) It was confirmed by scientists that it led to the end-Permian extinction around 252 million years ago.
  - (D) It cannot produce methane in the absence of nickel.
  
- 3 Select the paragraph from the first section of the article that provides evidence to show how bad the end-Permian extinction was.
  
- 4 Which of the following is NOT one of the reasons for an increase in CO<sub>2</sub> levels?
  - (A) volcanoes
  - (B) coal fires
  - (C) asteroids
  - (D) the end-Permian extinction

Name: \_\_\_\_\_ Date: \_\_\_\_\_

**NTI - 6TH GRADE MATH - DAY #10****Question 1 of 10**

Item	TICKET	SODA	POPCORN	CANDY
	\$7.50	\$2.50	\$2.95	\$1.25

You and your cousin have \$25.00 to spend at the movies. After the movie there is \$2.05 left in change. Use the chart above to determine what you and your cousin spent your money on at the movies.

- A. 2 tickets, 2 sodas, and 2 popcorn
- B. 2 tickets, 1 soda, and 1 candy
- C. 2 tickets, 1 soda, and 2 popcorn
- D. 2 tickets, 2 sodas, and 1 popcorn

**Question 2 of 10**

Mrs. Smith is selling yearbooks. Each book is sold for \$30.00. The books cost \$12.00 to produce. How much profit would be made if Mrs. Smith sold 390 yearbooks?

- A. \$11,700
- B. \$5,850
- C. \$7,020
- D. \$4,680

**Question 3 of 10**

$$3x = 27$$

What should be done to each side of the above equation to isolate x?

- A. add 3 to each side of the equation
- B. subtract 3 from each side of the equation
- C. multiply each side of the equation by 3
- D. divide each side of the equation by 3

**Question 4 of 10**





What should be done to solve the equation below?

$$\frac{x}{5} = 20$$

- A. multiply both sides of the equation by 5
- B. divide both sides of the equation by 5
- C. subtract 5 from both sides of the equation
- D. add 5 to both sides of the equation

**Question 5 of 10**

What is the solution for  $x - 2 < 7$ ?

- A. 
- B. 
- C. 
- D. 

**Question 6 of 10**

The formula,  $\$ = 3x + 3$ , is used when purchasing cement at the local cement store. The bags of cement are represented by  $x$  and the price is represented by the dollar sign.

If Jeff purchases 4 bags of cement, how much will he pay?

- A. \$3.00
- B. \$12.00
- C. \$15.00
- D. \$18.00

**Question 7 of 10**

Orville and Wilbur Wright flew their airplane called Flyer I in Kitty Hawk, North Carolina, on December 17, 1903. Wilbur's flight was 364 feet. This was 120 feet longer than Orville's flight. The equation  $364 = 120 + n$  models this situation.

What does the variable "n" stand for in the equation above?

- A. The difference between Wilbur and Orville's flights.
- B. The length of Wilbur's flight.
- C. The total length of both brothers' flights.
- D. The length of Orville's flight.

**Question 8 of 10**

Determine the appropriate operation to solve this equation.

$$13x = 26$$

- A. Multiplication
- B. Division
- C. Subtraction
- D. Addition

**Question 9 of 10**

Solve the following equation.

$$n + 29 = 64$$

- A. 29
- B. 35
- C. 64
- D. 93

**Question 10 of 10**

Freddy's Flowers charges \$3 for each flower in an arrangement. There is also a \$9 fee for making the arrangement.

If a person has \$30 to spend, how many flowers would he/she receive?

- A. 3 flowers
- B. 7 flowers
- C. 14 flowers
- D. 63 flowers

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