

Mars Pathfinder

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From *Muse* magazine

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READING TIP

Find the main ideas

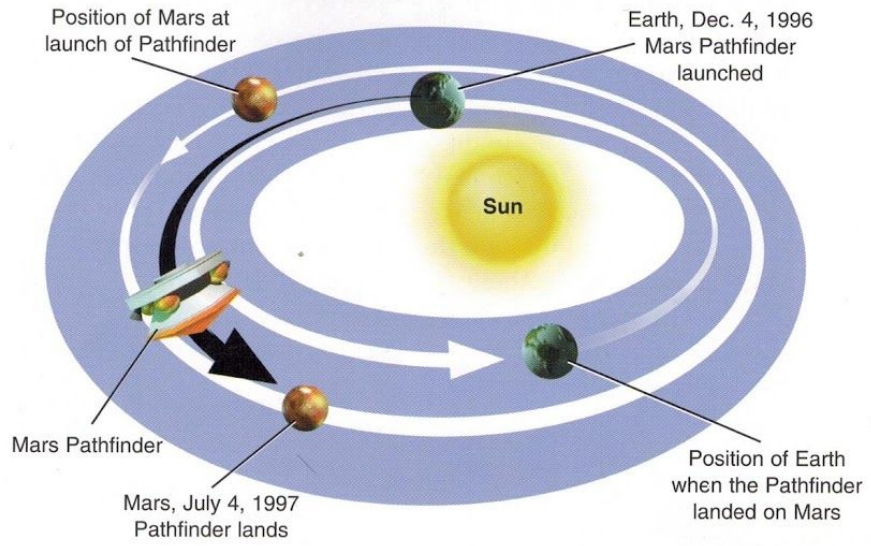
When reading for information, it is a good idea to jot down notes about the main ideas. Each paragraph has one main idea that will give you information about the topic. As you read each paragraph, stop and write down a few words—in point form—to remind you of the main idea.

In July 1997, Mars had a special visitor from Earth. It was a spacecraft called *Mars Pathfinder* and it was launched by NASA on December 4, 1996.

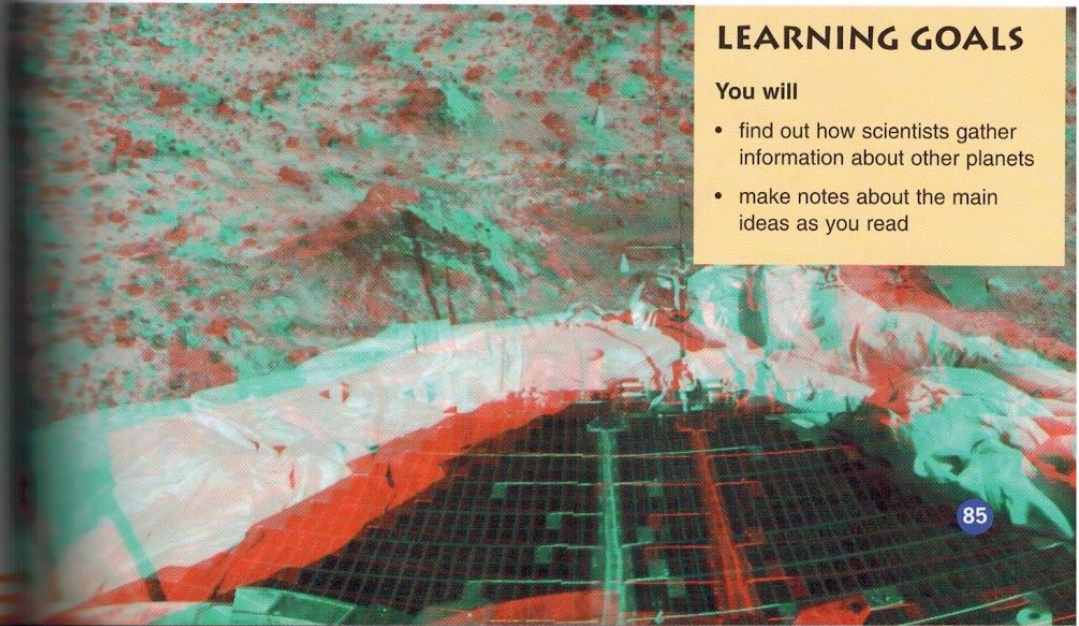
Pathfinder took seven months to reach Mars and landed on July 4, 1997.

Pathfinder was the first spacecraft to arrive at Mars since the twin *Vikings* landed there 21 years earlier. Its destination was a rocky plain on Mars called *Ares Vallis*. Scientists believe that water may have flowed there over a billion years ago.

The Pathfinder's Journey to Mars



Before NASA scientists launched the Pathfinder they had to plan how far and how fast it would have to travel in order to reach Mars as the planet moved along its orbit.



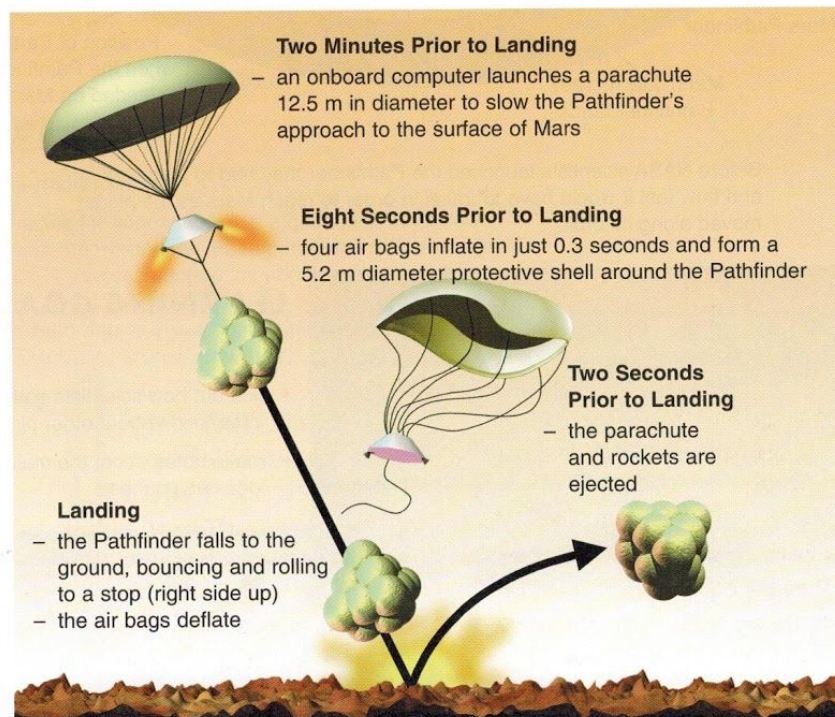
LEARNING GOALS

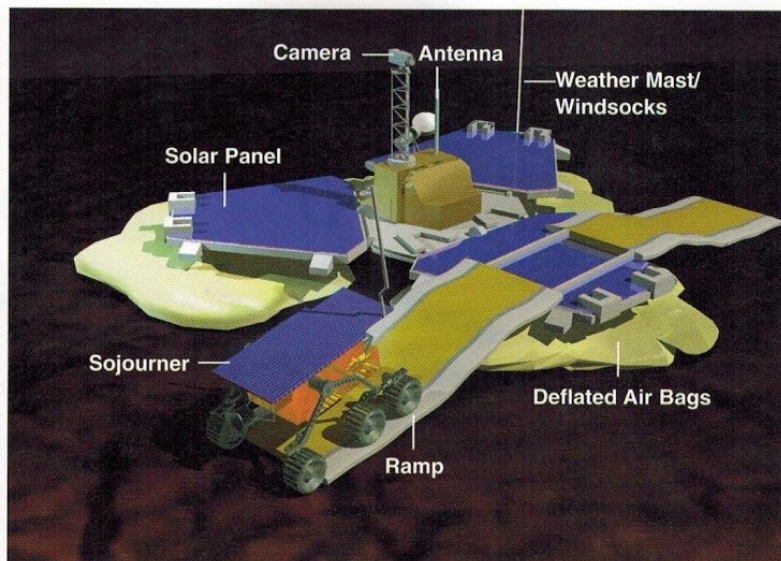
You will

- find out how scientists gather information about other planets
- make notes about the main ideas as you read

There has never been a landing quite like *Pathfinder's*. It headed straight to the planet's surface, instead of circling it first, as the *Vikings* and the *Apollo* missions to the Moon did. Then a parachute opened and slowed *Pathfinder* down as it plunged through the Martian atmosphere. About 20 m before it hit the surface, the parachute dropped away and large air bags inflated to

cushion the impact. The spacecraft bounced three times until it came to rest. *Pathfinder's* computers then deflated the bags. Two ramps popped out, and a remote-controlled six-wheeled buggy, no bigger than a microwave oven, rolled down to take a look around. This rover, called *Sojourner*, inspected Martian rocks and sent live pictures of the planet's surface to Earth.





The Mars Pathfinder lander.

To make sure they could guide *Sojourner* around Mars's rocky surface, NASA scientists in California had been practising with a remote-controlled rover. After all, a wrong turn into a boulder could wreck it. The scientists practised in a sandbox (complete with lots of rocks) about the size of a living room. But guiding *Sojourner* on Mars wasn't quite as easy as moving a remote-controlled rover on Earth. Instructions to

Sojourner—travelling at the speed of light, about 300 000 km/s— took over 10 minutes to get from Earth to Mars. That meant that when scientists watched what *Sojourner's* cameras saw on a video screen here on Earth, they were actually watching what the rover saw 10 minutes ago! So, if they saw the rover heading toward a rock, it would take another 10 minutes before they could signal it to change its path or stop.

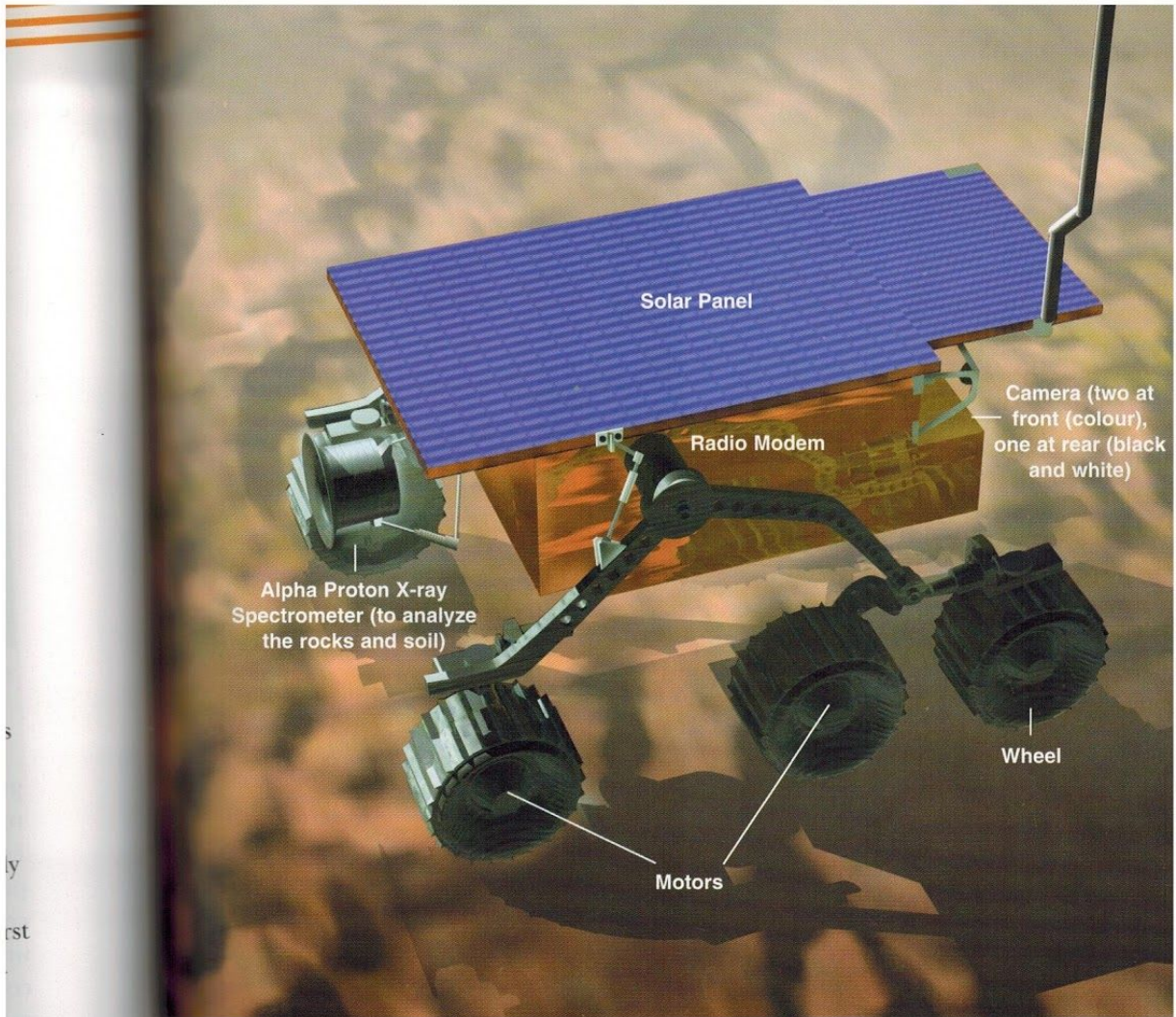
Scientists tested the rover on Earth before sending it to Mars.



So, more important than studying rocks or soil, the *Pathfinder* mission was really a test of a big idea—could engineers build a machine that could make some decisions on its own? *Sojourner* had been equipped with a special laser navigation system that tells it when to avoid deep holes and big rocks.

Sojourner transmitted data and images to Earth until October 7, although NASA engineers expected that it might only have enough power to transmit for a week. While it was there, NASA scientists transmitted its panoramic views of Mars over the World Wide Web, which gave many of us a chance to share in the excitement. This included daily Martian weather reports, too.

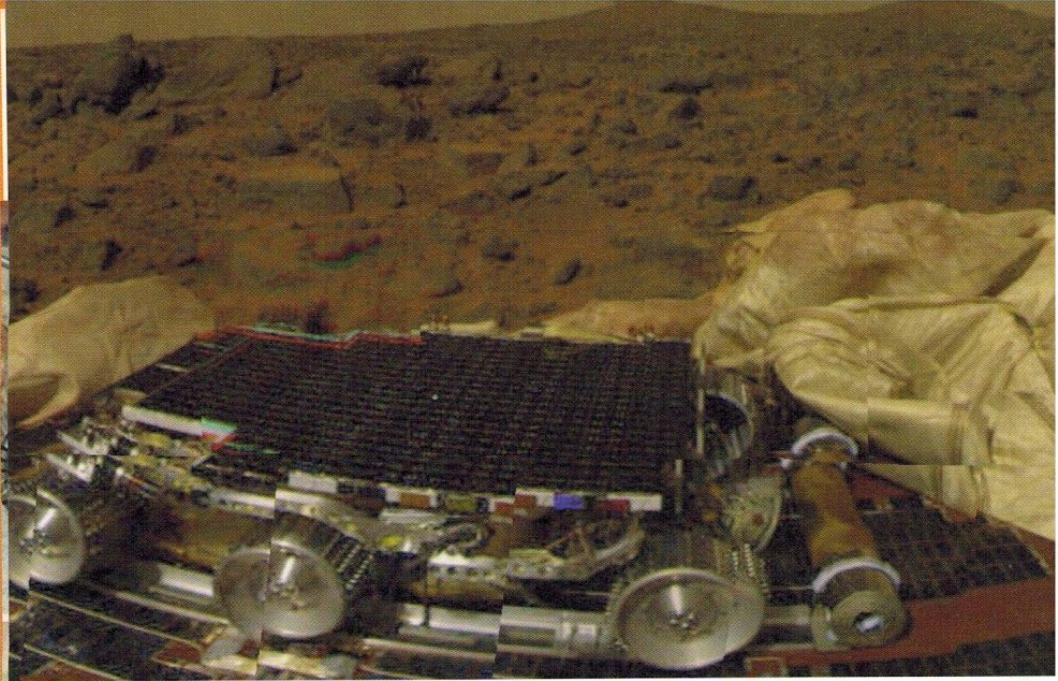
Pathfinder was only the first of many spacecraft that NASA hopes to send to Mars in the next decade. Another probe, *Global Surveyor*, was launched in November 1996 and began orbiting Mars in September 1997. *Global Surveyor* will make detailed maps of Mars so that scientists can choose good



A close-up look at the Pathfinder rover, the Sojourner.

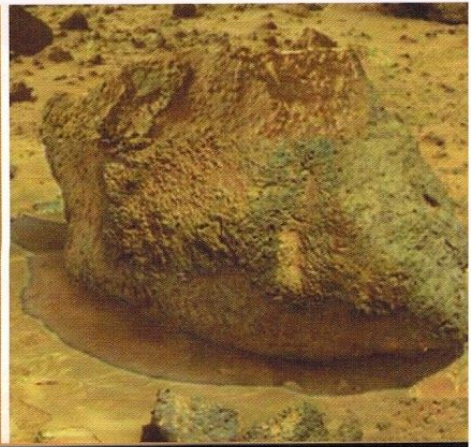
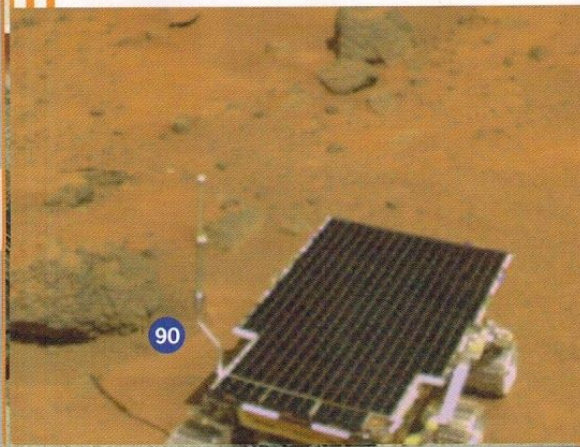
landing sites for future missions. Eventually, NASA plans to send a spacecraft that will bring back samples of

Martian soil. That could help them find out for sure whether any kind of life ever existed on Mars.



Above: One of the first pictures taken by a camera on the Pathfinder when it landed on Mars on July 4, 1997. **Below:** (left) The Sojourner on the surface of Mars. (right) A close-up view of a boulder on Mars.

The *Pathfinder* mission cost \$US 280 million, about the same as making a big Hollywood movie. (OK, maybe *two* big Hollywood movies.) But the real-life mission proved to be more exciting than any made-up blockbuster. So with Mars on the web, sit back, relax, and enjoy the show!





AND NOW
FOR THE
Weather...

The climate on Mars, a planet long favoured by both scientists and science-fiction writers as a home for life, probably started out rather warm, but now it's in a deep freeze. Liquid water may have flowed on Mars long ago, but now its surface is dry and barren. The two *Viking* spacecraft which landed on Mars in 1976 didn't find any sign of life on its surface. If

there were primitive life on Mars, it would only survive where the water is—underground and in the polar caps. In 1996, scientists discovered what may be fossils of ancient bacteria in a meteorite that is believed to have come from Mars. All the evidence isn't in yet, but it's quite possible that life existed on Mars in the remote past.

AFTER YOU READ

Summarize content

Make a web or chart that shows the topic—the Mars Pathfinder—and all of the main ideas you wrote down as you read. Each paragraph gives details to tell the reader more information about the main idea. Reread the selection and add important details to your web or chart.