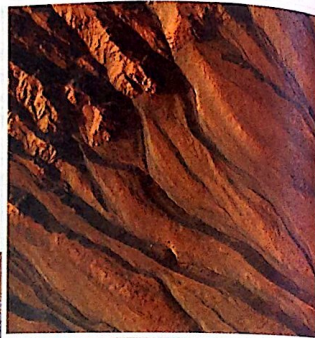


### Liquid Water Once Flowed on Mars

A number of features on Mars provide evidence that liquid water once flowed on the planet's surface. Many of these features have been struck by asteroids. These asteroid impacts have left behind craters that scientists can use to find the approximate dates of these features. Scientists estimate that many of these features, such as empty river basins, existed on Mars more than 3 billion years ago. Since then, little erosion has taken place that would cause these features to disappear.

In 2000, the *Mars Global Surveyor* took before-and-after images of a valley wall on Mars. Scientists observed the unmistakable trace of a liquid substance that had flowed out of the valley wall and into the valley. Since 2000, many similar features have been seen. The best explanation of these observations is that water is found beneath Mars's surface. At times, this water leaks out onto the Martian surface like spring water on Earth.

*This image shows gullies on the wall of a Martian crater. Water that may be stored close to the Martian surface has run downhill into the crater.*



### Visualize It!

**16 Describe** How do the features in the image at the right indicate that liquid water once flowed on Mars?

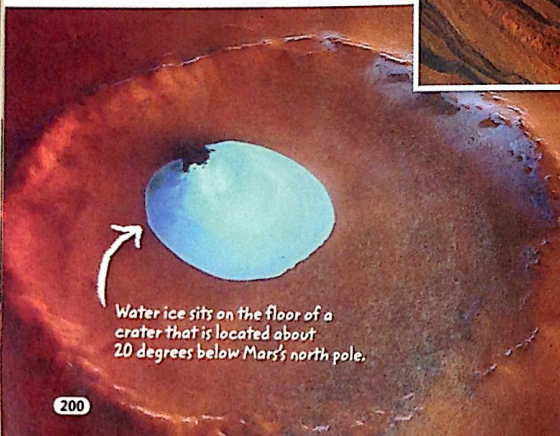
---



---



---



*Water ice sits on the floor of a crater that is located about 20 degrees below Mars's north pole.*

### Why It Matters

# Roving Mars



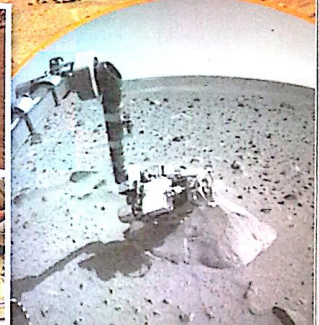
The Mars Exploration Rovers *Spirit* and *Opportunity* landed safely on Mars in January 2004. The 185-kg rovers were designed to explore Mars for 90 days. However, in 2009, both rovers were still exploring Mars. They are searching for rocks and soils that indicate that water once flowed on the Martian surface. The rovers are also looking for environments in which life may have existed.

### The Martian Surface

Mars's surface is made up mostly of the volcanic rock basalt, which is also found on Earth. Boulders of basalt cover the Martian landscape.

### Testing the Rovers on Earth

Before leaving Earth, the rovers were tested under conditions that were similar to those that they would encounter on the Martian surface.



### Collecting Data on Mars

The Mars rover *Spirit* took this picture of itself collecting data from the Martian surface.

### Extend

**17 Infer** What advantages would a robotic explorer, such as *Spirit* or *Opportunity*, have over a manned mission to Mars?

**18 Hypothesize** What kind of evidence would the Mars Exploration Rovers be looking for that indicated that water once flowed on Mars?

### Inquiry