

CLASSROOM ACTIVITY

Geologists on Mars

In March 2004, two NASA explorers discovered firm evidence that water once flowed on Mars—perhaps enough water to harbor life.

CLASS DISCUSSION

Establish Prior Knowledge

Ask students to think about how geologists study rocks on Earth. How do they determine where to look? What tools do they use? How do they analyze the rock samples they collect? (You may want to direct them to the Earth Bulletin feature, “The Rise of Oxygen” at <http://sciencebulletins.amnh.org/?sid=e.f.rise02.20040301&src=b>, to see scientists collecting and analyzing rocks.) Tell students that in the video they are about to see, scientists on Earth analyze rocks on Mars.

Exploration

Have students watch the video. Use the following questions to guide a class discussion.

- Why is the study of rocks on Mars important?
(Answers may include: Scientists want to know if life ever existed on Mars. The rocks on Mars contain the geological history of that planet. If water is found in the rocks, the chances are that life would have been possible on the planet.)
- How do scientists on Earth analyze rocks on distant planets?
(Answers may include: They use satellites and the robotic rovers, MERs or Mars Exploration Rovers.)
- Why are the rovers such “supergeologists”?
(Answers will include: The rovers have super vision and can see in the infrared. They are equipped with microcameras that can transmit images at very high resolutions. They can “sniff” the rocks with spectrometers. They have drills and grinders that can scrape or drill into rock surfaces to see what’s inside.)
- What data are they looking for and why? What will the data reveal?
(Answers will include: They are looking for evidence that water once existed on Mars. If water existed on Mars, scientists believe that life could have existed there as well.)
- What factors were important in choosing landing sites for the rovers?
(Answers will include: The Spirit landing site in Gusev Crater was chosen because it is flat surface, which makes for a safer landing. A large canyon goes into Gusev Crater that may have fed water into the crater. There’s also a nearby volcano that would have provided heat. Heat and water are two ingredients that are important for life. The Opportunity landing site was chosen because of a mineral identified from space—iron oxide gray hematite that frequently forms in the presence of water.)
- What evidence do scientists have that water once existed on Mars?
(Answers will include: Little spherical objects called concretions are present. The concretions form when there is liquid water inside the rock. Unusual holes have been found in rocks that scientists think are the molds of crystals that once precipitated from water. Jarosite, a sulfite hydrate mineral, has been discovered. Water is needed in order for Jarosite to form.)

Wrap-Up

Use the following questions to wrap-up your discussion:

- Do you think the evidence that supports the hypothesis that water once flowed on Mars is conclusive?
(Students responses will vary. Have students support their answers.)