


Before You Read:

Before reading, think about what you already know about Spirit's and Opportunity's missions. What success have they both had? What challenges have they had? Record your notes below.

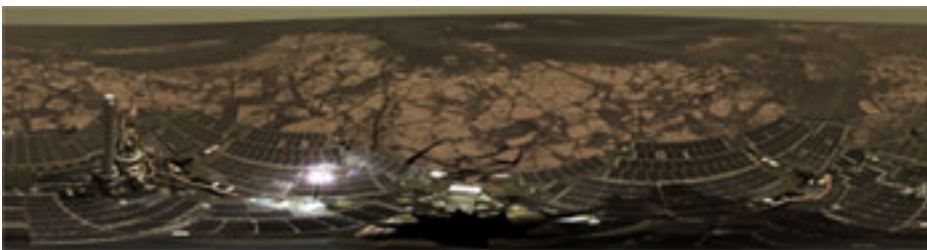
Spirit	Opportunity
Successes:	Successes:
Challenges:	Challenges:

Activating background knowledge is incredibly important for understanding this text; the teacher adds this warm-up task to give students a chance to think about what they've already learned, making it easier for them to understand the Press Release

 This text is a press release from NASA. The purpose of the text is to inform the scientific community and others who may be interested on how the rover mission is going.

January 24, 2006

Mars Rovers Advance Understanding of the Red Planet



This is the Opportunity rover's panorama of "Erebus Rim," acquired as the rover was exploring sand dunes and outcrop rocks in Meridiani Planum. Image credit: NASA/JPL/Cornell. [Click here for a larger image](#)

Students haven't seen a press release before; the teacher includes this tip to help students understand the purpose of the text


Teacher adds a heading to help readers determine what the section will be about

Purpose of the Mission

NASA's Mars rovers, Spirit and Opportunity, have been working overtime to help scientists better understand ancient environmental conditions on the red planet. The rovers are also generating excitement about the exploration of Mars outlined in NASA's Vision for Space Exploration.

The rovers continue to find new variations of bedrock in areas they are exploring on opposite sides of Mars. The geological information they have collected adds evidence about ancient Martian environments that included periods of wet, possibly habitable conditions.

Teacher includes notes on key vocabulary words

 If something is habitable, it is suitable or good enough to live in. The suffix "-able" means that something is fit for something. In this case, Mars may have been fit for living.

"The extended journeys taken by the two rovers across the surface of Mars has allowed the science community to continue to uncover discoveries that will enable new investigations of the red planet far into the future." said Mary Cleave, associate administrator for the Science Mission Directorate, NASA Headquarters.

Teacher gives a quick genre tip to help students understand a new type of evidence



The author is including a quotation from Mary Cleave because she works at NASA and knows a lot about what is happening with the mission.

STOP AND JOT: Why was the Mars mission important?

Teacher adds a Stop and Jot to encourage students to stop and synthesize what they have read so far



In late November 2005 while descending "Husband Hill," Spirit took the most detailed panorama to date of the "Inner Basin." Image credit: NASA/JPL/Cornell

[Click here for a larger image](#)

Teacher adds a heading to help students determine what the section will be about

Spirit's and Opportunity's accomplishments

NASA's third mission extension for the rovers lasts through September 2006, if they remain usable that long. During their three-month primary missions, the rovers drove farther and examined more rocks than the prescribed criteria for success.

Opportunity begins its third year on Mars today. It is examining bedrock exposures along a route between "Endurance" and "Victoria" craters. Opportunity found evidence of a long-ago habitat of standing water on Mars.

On Jan. 3, Spirit passed its second anniversary inside the Connecticut-sized Gusev Crater. Initially, Spirit did not find evidence of much water, and hills that might reveal more about Gusev's past were still mere bumps on the horizon. By operating eight times as long as planned, Spirit was able to climb up those hills, examine a wide assortment of rocks and find mineral fingerprints of ancient water.

To watch a video of Spirit's trek, click [here](#).

Teacher includes an additional video link to help students visualize tricky content

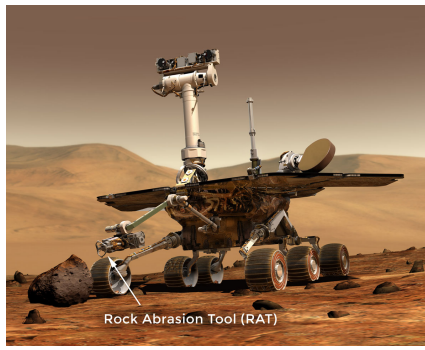
Teacher adds a Stop and Jot to encourage students to stop and synthesize what they have read so far

STOP AND JOT: What did Spirit and Opportunity accomplish?

Challenges Facing Spirit and Opportunity

Teacher adds a heading to help students determine what the section will be about

While showing signs of wear, Spirit and Opportunity are still being used to their maximum remaining capabilities. On Spirit, the teeth of the rover's rock abrasion tool are too worn to grind the surface off any more rocks, but its wire-bristle brush can still remove loose coatings. The tool was designed to uncover three rocks, but it exposed interiors of 15 rocks.



Teacher adds a picture to help students understand the rover rock abrasion tool

On Opportunity, the steering motor for the front right wheel stopped working eight months ago. A motor at the shoulder joint of the rover's robotic arm shows symptoms of a broken wire in the motor winding. Opportunity can still maneuver with its three other steerable wheels. Its shoulder motor still works when given extra current, and the arm is still useable without that motor.

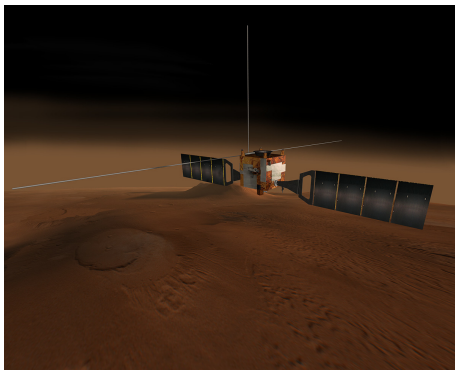
Teacher adds a Stop and Jot to encourage students to think about the key information they learned

STOP AND JOT: What challenges did Spirit and Opportunity face? Name three.

Other Missions

Teacher adds a heading to help students determine what the section will be about

The rovers are two of five active robotic missions at Mars, which include NASA's Mars Odyssey and Mars Global Surveyor and the European Space Agency's Mars Express orbiters.



Mars Express Orbiter



Mars Odyssey

Teacher adds pictures to show the other robotic missions

The orbiters and surface missions complement each other in many ways. Observations by the rovers provide ground-level understanding for interpreting global observations by the orbiters. In addition to their own science missions, the orbiters relay data from Mars.

Teacher includes notes on key vocabulary words



An orbiter is a spacecraft designed to go into orbit. It is not intended to land.
To complement means to work together and help one another.

Teacher adds a Stop and Jot to encourage students to think about the key information they learned

STOP AND JOT: How do the rovers and the orbiters work together?

NASA's Jet Propulsion Laboratory, Pasadena, Calif., a division of the California Institute of Technology, manages the Mars Exploration Rover, Odyssey and Global Surveyor projects for NASA's Science Mission Directorate.