

Name _____ Date _____

Reading Complex Text

Read the article “Mission to Mars: Moving Beyond Speculation.” As you read, stop and answer each question. Use evidence from the article to support your answers.

Mission to Mars: Moving Beyond Speculation

Since the earliest written histories, people have been looking up into the skies and speculating about outer space. One of space’s most tantalizing mysteries has always been one of its closest. Mars has long been the subject of fascination, especially for scientists. But Mars has not just captured the scientific imagination. It has also been the subject of many stories and movies. Most of these popular accounts of Mars revolve not just around what the planet looks like, but what type of life it might sustain.

Until the 20th century, the discussions about Mars were mostly speculation and fancy. No person or spacecraft had ever visited the planet. Telescopes could not provide images of the planet in great detail. Then, beginning in the 1960s, NASA, the U.S. agency responsible for space exploration, began launching missions to Mars. NASA sent spacecraft to circle the planet and take pictures and soil samples. These early missions put to rest the idea that intelligent or human-like Martians were in existence there. The pictures from early missions showed that Mars was extremely desolate and unlikely to support life. There seemed to be little to no water on the planet’s surface. Mars’s atmosphere appeared to be too thin to retain liquid water.

1 Why were discussions about Mars based only on speculation until relatively recently? Cite evidence from the text to support your answer.

But the Mars missions raised more questions. Pictures confirmed that Mars’s surface contained large canyons. These features indicate that water may have once been abundant on Mars, since canyons are usually formed by water movement. If water was once abundant on Mars, then Mars may, at one time, have held life. Although scientists were intrigued by the idea that Mars may have once held water and life, they also became concerned about what this meant for Earth. Could Earth’s water and life also disappear?

Because of these new questions, scientists increased efforts to explore and understand Mars. Between 1960 and 1993, 19 space missions were sent to Mars. Unfortunately, in all that time, scientists were unable to really explore Mars’s surface.

Name _____ Date _____

Reading Complex Text

In the 1990s, scientists believed that in order to understand Mars, they needed to land a rover on the planet that could take sophisticated readings of the planet's soil and rocks.

Another concern was that missions to Mars were becoming increasingly expensive. This problem was highlighted by the 1993 failure of NASA's Mars Observer. Observer had taken eight years to build. It had cost nearly \$1 billion. Furthermore, it was lost in space just days before it was scheduled to reach and orbit Mars. A small fuel leak caused an explosion that sent the Observer out beyond the reach of NASA's communications and controls. So, NASA began looking at ways to reduce the risks and costs of its missions while also better exploring Mars's surface.

- 2 How does the author help readers understand why NASA began looking to reduce the costs of missions to Mars?

The agency turned to a team to develop an inexpensive rover to explore Mars's surface. The mission was called Pathfinder. In addition to landing a rover on Mars, the Pathfinder team was charged with finding inexpensive, creative ways of exploring Mars. Previous projects had employed hundreds of scientists to launch a Mars mission. This new team had 20 to 30 people. It was made up of scientists and engineers who embraced finding creative, cheap solutions to problems. Rather than building a bulky, powerful rover to explore Mars's surface, the team focused on building a small rover. At about 2 feet long and 1.5 feet wide, it weighed less than 25 pounds. The team also began using new technology, then being commonly used in laptops and cell phones, to develop the small rover. The rover was named "Sojourner," after civil rights heroine Sojourner Truth. In keeping costs, size, and weight low, the team eliminated many of the problems of transporting, landing, and operating a large Mars rover.

To keep costs low, the team sought out creative solutions to old problems. They had to think beyond traditional fixes and approach problems without prior ideas about how they had to be solved. For example, in the past, big, expensive rockets would have been used to slow down Sojourner as it began the drop onto Mars's surface. The Pathfinder team used a simple, far less expensive innovation: a parachute and air bags. Rather than using large batteries to power Sojourner, the rover was equipped with a small solar panel and ordinary flashlight batteries! Instead of designing all of the rover's components from scratch, the team used common antennas and motors. Then, the team modified them for use on Mars.

Name _____ Date _____

Reading Complex Text

3 What evidence does the author give to support the claim that Sojourner’s team looked for creative ways to solve old problems?

When all was said and done, the Pathfinder mission cost \$266 million. (Not a bad price for a complex mission!) Most importantly, however, the mission was a major success. On Friday, July 4, 1997, Sojourner and its landing unit, named Pathfinder, descended to Mars. After a successful landing, Sojourner and Pathfinder began exploring and analyzing the surface of Mars. The rover was guided by remote control from Earth. Sojourner and Pathfinder took photographs of the surface and analyzed the chemical make-up of the rocks on Mars’s surface. Sojourner spent nearly three months exploring. During that time, Sojourner and the lander collected 2.6 billion bits of information. This included over 16,000 images, 15 chemical analyses of rocks and soil, and millions of reports on Martian weather. The Pathfinder mission proved that Mars exploration and study could be done more cheaply, and with fewer risks, than most scientists had previously imagined. As a result of the data collected during the mission, scientists confirmed that Mars once had conditions to support life! This was a major milestone in the scientific understanding of Mars. However many questions about Mars remain. Future missions will be necessary to learn more about the possibility or history of life on this mysterious and fascinating planet.

4 State the main idea of the article. How did the information about Sojourner and the Pathfinder mission convey this main idea?

