

## Living on Mars: Exploring the Surface



**Student Level:**  
Middle School (6-8)

**Objectives:**

- Students will learn, in an introductory way, about the Martian surface environment.

**Resources:**

- n/a

**Outcomes:**

- Students will write an essay describing the challenges of exploring the surface and how those challenges might be overcome.

**Assessment:**

- Were the students able to generate ideas for addressing the needs of explorers on Mars?
- Were the students, in their essays, able to describe the difficulties and propose reasonable solutions?

**Time:**

About 70 minutes.

**Procedure:**

~5 minutes:

Explain that while the surface of the Earth is mostly shaped by the forces of plate tectonics and water movement, and the surface of the Moon is mostly shaped by meteorite impacts, the surface of Mars is somewhat in between. The southern hemisphere is heavily cratered, but Mars also has massive volcanoes, deep canyons, wide plains, polar caps, and many features shaped by water. Explorers on the surface of Mars would face a near vacuum, low temperatures, rough terrain, long distances, and fierce dust storms. Explorers would likely have a number of goals, such as searching for life, studying the geology, and discovering resources that would support an expanded human presence.

~15 minutes:

Facilitate a brainstorming session, writing ideas on the board, about how humans might explore the Martian surface, despite the difficulties there. What sort of vehicles and equipment might be used? How might manned and unmanned (robotic) exploration be combined? What strategies might be employed by the explorers?

~50 minutes:

Have the students write a descriptive essay in which they describe the challenges faced by explorers on the surface of Mars and propose a plan for how the explorers could meet those challenges. Perhaps have some of the students share their essays aloud after they are done.

**Standards Addressed:**

**California:**

*Science, Grade 8*

4.e. Students know the appearance, general composition, relative position and size, and motion of objects in the solar system, including planets, planetary satellites, comets, and asteroids.

**Florida:**

*Science, Grades 6-8, Earth and Space*

1.2 The student knows that available data from various satellite probes show the similarities and differences among planets and their moons in the Solar System.

**New York:**

*Science, Physical Setting*

1. The Earth and celestial phenomena can be described by principles of relative motion and perspective.

**Texas:**

*Science, Grade 6*

13. The student knows components of our solar system; the student is expected to: A) identify characteristics of objects in our solar system.