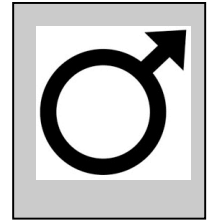


## Station # 4 Mars

Number of steps from the Earth sign to the Mars sign: \_\_\_\_\_



Was your mathematical prediction for the number of steps it takes to travel from the Earth sign to the Mars sign correct? If not, why might the number of steps counted be different than the number you predicted?

*Mars is the farthest of the inner or terrestrial planets from the Sun. Many people believe that humans could make their home on Mars.*



**Working in a group of four**, consider the following scenario: *imagine* that sometime in the distant future, the Earth's natural resources are almost depleted. Humans have decided to move to Mars as a way to keep their species alive.

Working together, use the information from the Mars sign to identify which obstacles will need to be overcome as humans progress toward colonizing Mars. Then propose possible solutions to those obstacles. Be prepared to share your answers.

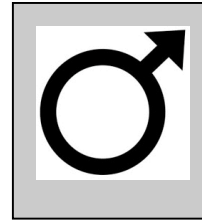
**Numbered Heads Together:** The group leader will ask group members to number off 1-4. The leader will then randomly call forward the group members with a certain number to answer one of the following questions. Basing responses on their own group discussion, every person on the team should be prepared to answer.

(The leader may use a spinner, a die, cards or other methods to randomly select numbers.)

*(Cont'd on next page)*



## Station # 4 Mars



### Questions:

- What are some Martian fresh water source options?
- What are the challenges to food production on Mars? What are some feasible solutions?
- In what ways could humans obtain oxygen on Mars?
- In what ways could humans compensate for gravity on Mars that is less than Earth's?
- How might the Martian dry air and dust be problematic? In what ways could humans cope with these conditions?
- How might the lesser amount of solar energy received on Mars be an issue? What are some possible solutions?

*Note: It is a long journey (550 million km) from Mars to the first outer planet Jupiter. Although it is not part of this model, if you were truly traveling through space toward Jupiter, you would pass through the Asteroid Belt. You would come across this area of rocky debris located 330 to 495 million km from the sun, or 102 to 267 million km from Mars. These asteroids are believed to be small chunks of material left over from the formation of our solar system. Asteroids, like planets and comets, are in heliocentric orbits, meaning they travel around the sun.*



## Mars Station #4

### Mars - Close But No Cigar

**Close** to an Earth day: Mars rotates on its axis in 24½ hrs, **but** its year is twice as long as Earth's – 687 days.

**Close** to Earth's land area: Mars is half the size of Earth, **but** its land surface area is about the same. Why? No oceans!

**Close** to Earth: The next planet from the Sun, Mars is the only planet on which humans could possibly land, **but** no human has set foot on its surface.

**Close** to Earth's atmosphere: Mars has one, **but** it is mainly carbon dioxide. Although not poisonous, it lacks the oxygen necessary to sustain human life.

**Close** to Earth: Both have polar ice caps, but ours is frozen water, while Mars' is frozen carbon dioxide (dry ice).

**Close** to Earth's daytime temperature at Mars' equator, **but** the average temperature is -63°F.

**Close** to Earth's gravitational force, **but** too weak to hold oxygen and the lighter gases in its atmosphere.

**Close** to Earth: Mars' axis tilts the same as Earth's, but its seasons are twice as long.

**Close** to Earth: Mars has two moons, Phobos and Deimos, but they are tiny, and are, most likely, captured asteroids.

(Mars information continued on next page)



**Less than Ideal** - Mars is the only other planet on which humans can live, but it is a harsh environment.

- ✓ **Water supply** – Mars has no liquid water, however it can be extracted from ice in the soil.
- ✓ **Atmosphere** – Mars' thin atmosphere is mainly carbon dioxide. Humans would need to extract oxygen from compounds in the ground to survive.
- ✓ **Gravity** – Less than 1/3 of Earth's, it is not strong enough to hold oxygen in its atmosphere.
- ✓ **Temperature** – Similar to Antarctica's, the average Martian temperature is -67° F, with a range of -225° to 60° F. Mars receives only half as much solar heat as Earth does.
- ✓ **Land Area** – Mars is half the size of Earth, but its land surface area is about the same. Why? No oceans!
- ✓ **Weather** – The air on Mars is dry with occasional wispy clouds. Seasonal winds blow great volumes of powdery red dust sometimes covering the entire planet in the storm.
- ✓ **Moons** – Phobos and Deimos, named after Mars' mythical dogs, are tiny and most likely captured asteroids.

### **Standing on Mars**

Viewing the images from Mars Rover, it is easy to imagine hiking across the Mars landscape. Yet, although Mars has an atmosphere, it is mostly carbon dioxide and almost no oxygen. You would need an expedition parka and an oxygen tank for your trek. Despite its problems, Mars is the only other planet where humans could live, drawing water and oxygen from the frozen ice in the soil. Temperatures are a frigid -70° F. and there is no oxygen to breathe. You would need an expedition parka and an oxygen tank for your trek

### **THEN...**

Was Mars once covered in water? In this artist's conception we see how Mars may have looked millions to billions of years ago. The large white volcano is Olympus Mons, at three times the height of Mt. Everest, it is the highest peak in the solar system. A body of water fills the terrain in the foreground.

### **NOW...**

Over billions of years, Mars' atmosphere probably thinned, causing its water to evaporate. Dry riverbeds, dry basins and even shorelines remain as a testament to the rivers, lakes and oceans that may have once existed.

