



# FUTURE U.

## Boeing 360 Experience | Earth-Mars Physics Museum

### Objectives

Students will be able to:

- **Share** what they already know about Mars.
- **Observe** and **explain** how Earth-based phenomena compare to Mars.
- **Investigate** how using technology connects scientists, engineers, and citizens by contributing to a citizen science project.

### Overview

Our 360 experience brings students to the Earth-Mars Physics Museum to compare how Earth-based phenomena compares to Mars. Students will be invited to roam around the museum and investigate exhibits that explore gravity, magnetism, air pressure, and plate tectonics. Throughout the experience, students will be prompted with questions and asked to manipulate objects.

### Grade level

6–8

### Boot Up

Tell students that they will soon be participating in a simulation in which they navigate a museum space. Explain that after Earth, Mars is the most habitable planet in our solar system. Its day/night rhythm is very similar to Earth, it has an atmosphere that provides some protection from radiation, it has sufficient gravity, and sunlight to power solar panels to name a few. But there are several differences that make each planet very unique.

Before you begin your journey, see what students already know about Mars. Designate one corner of the room to represent each response. You might want to use small white boards or signs to label each corner. State the question and ask students to write their response on an index card or small piece of paper. Then, ask students to take their cards to the designated corner. Direct students to form groups of 2–3 and share why they selected this option. Repeat directions for each question and reveal correct answers.

1. Earth and Mars:
  - Have days of about 24 hours
  - Have seasons
  - Have both (**correct answer**)
  - None of the above
2. The surface of Mars has:
  - Smooth plains
  - Deep canyons
  - Volcanoes
  - All of the above (**correct answer**)
  - Recombinant DNA

3. Number of known moons of planet Mars are:  
Two (**correct answer**)  
Three  
Four  
Five
4. Planet Mars is also known as the:  
Blue planet  
Yellow planet  
White planet  
Red planet (**correct answer**)

## Experience

Divide students into pairs or small groups. Distribute an Experience handout to each student and review the instructions. Explain that each student will be responsible for taking notes on this sheet as they move through the 360 experience.

## Reorient

Two activity options are available for students to summarize, apply, and synthesize their learning:

### Reorient #1

Challenge students to design an additional exhibit that could open in the Earth-Mars Museum. Ask students to consider what other phenomena on Mars would be important for humans to examine as they plan to send humans for long term habitation.

### Reorient #2

Students can use NASA's Citizen Scientist [Homepage](#) to identify a project they can contribute to. Citizen science allows anyone to collect and analyze data to contribute to scientific research. NASA is just one of the many organizations that works with citizen scientists to gather more data to better understand our world.

## National Standards

### Next Generation Science Standards

MS-ESS2-2. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

MS-ESS2-5. Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.

MS-PS2-4. Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.

**Directions:** Mars is the most Earth-like known planet, but Mars also has many important differences. Scientists

want to understand these differences to help up design the first human settlement on Mars. Enter the virtual museum to visit a series of exhibits that explore characteristics of Earth and Mars. Answer the question posed at each exhibit on this worksheet and be sure to use the key vocabulary words in your response.

Exhibit	Key Vocabulary	Explanation
<p><b>Magnetism</b>                      Earth acts like a very big, weak magnet. Some rocks on Mars are magnetized but the planet itself has no overall field. <b>How did the compass respond on Mars compare to Earth? Why did it behave in that way?</b></p>	magnetic field compass poles	
<p><b>Gravity</b>                      Earth has a greater force of gravity than Mars. <b>What do you notice about how balls bounce on Mars compared to Earth?</b></p>	gravity force higher longer	
<p><b>Natural Hazards</b>                      The wind speed on Mars can reach up to 60 mph, while the wind speed on Earth has been recorded at 231 mph. This is because Mars' atmospheric pressure is a lot less than Earth's. Things can still be blown around but not at nearly the same intensity as on Earth. <b>Enter the wind tunnels to experience the difference! What observations do you have about the wind speed on Earth compared to Mars?</b></p>	windsock wind speed high pressure low pressure	
<p><b>Tectonic Forces</b>                      Earth's outer shell is divided into several plates that move apart, together, or slide past each other. Many mountains on Earth were formed when plates moved together. Mars at one time had lava that rose to the surface and would stack creating tall mountains. There is not much evidence that the surface of Mars is made up of plates. <b>What other geographical features do you see on both planets? And how were these features formed?</b></p>	energy density	