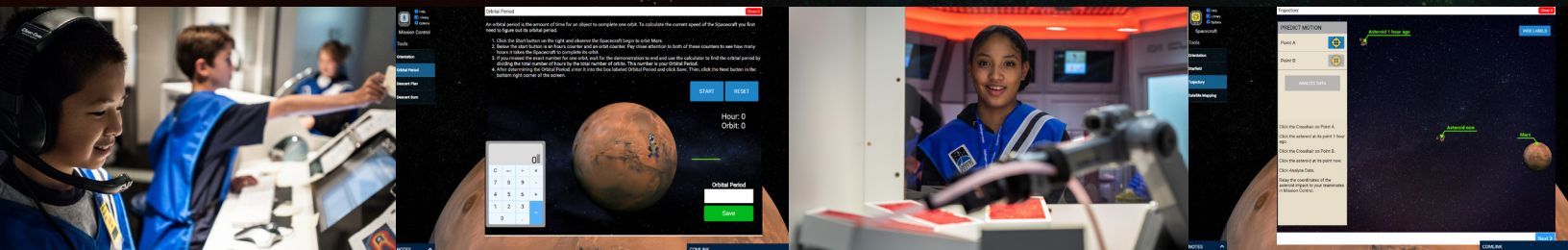


# EXPEDITION MARS



The year is 2076. A handful of facilities have been established on Mars: a greenhouse, a mobile geological survey base, and a centralized research habitat. The primary human habitat is not on Mars, but on one of its moons, Phobos. A Spacecraft regularly ferries astronauts and scientists between the base on Phobos and the surface of Mars. The Spacecraft also carries parts to build a remotely operated vehicle (ROV) to continue the search for evidence of life and water. However, when crew members discover an imminent threat to their Spacecraft and the Martian surface facilities, they must act quickly to save their stations, their research, and their lives.



## Major STEM Concepts

- Finding water is a precursor for finding life.
- Collision of objects in space can cause geological changes.
- Without the Earth's protective atmosphere, radiation levels are higher.
- Advanced programming of robots aid in science exploration.

## Hands-on Labs

- Investigate the characteristics of minerals to discover if any were formed in water.
- Build and program the ROV.
- Check vital signs and radiation levels of crew members.
- Test oxygen levels in Martian soil.

Suggested Grade

6



Our software program includes numerous accessibility features for students, including text read aloud and font resizing.

[challenger.org](http://challenger.org)



# Teams

One member of each team will be in Mission Control for the first half of the mission while the other is assigned to the Spacecraft. At the midpoint of the experience, the group in Mission Control launches to the Spacecraft and the Spacecraft group returns to work in Mission Control.



## Communications

**Objectives:** Serve as a communications leader between Spacecraft and Mission Control.

**Branches of Study:** Aerospace Engineering, Computer Engineering, Public Relations

**Career Connections:** Communication Engineer, Information Technologist



## Navigation

**Objectives:** Calculate and plot the course for the Spacecraft to navigate from Phobos to Mars.

**Branches of Study:** Physics, Avionics Technology

**Career Connections:** Pilot, Navigator, Mathematician, Aerospace Engineer, Electrical Engineer



## Rover

**Objectives:** Assemble and test a ROV to search for signs of water.

**Branches of Study:** Aerospace Engineering, Computer Engineering

**Career Connections:** Computer Scientist, Mechanical Engineer, Electrical Engineer, Structural Engineer



## Weather

**Objectives:** Monitor the Martian atmosphere for dangerous objects such as satellites and track weather patterns throughout the mission.

**Branches of Study:** Computer Engineering, Electronic Engineering, Mechanical Engineering

**Career Connections:** Electrical Engineer, Meteorologist, Solar Astronomer, Physicist



## Medical

**Objectives:** Conduct various examinations on the crew to assess their health and safety for the duration of the mission.

**Branches of Study:** Psychology, Biology, Doctor of Medicine, Physics, Chemistry

**Career Connections:** Physician, Nurse, Lab Technician, Physician Assistant



## Biology

**Objectives:** Conduct tests and analyze soil samples to determine if microbes are present.

**Branches of Study:** Biology, Chemistry, Botany, Astrobiology

**Career Connections:** Astrobiologist, Botanist, Ecologist



## Robotics

**Objectives:** Program the ROV to navigate the Martian terrain so it can collect the required data.

**Branches of Study:** Computer Engineering, Electronic Engineering, Mechanical Engineering

**Career Connections:** Computer Scientist, Mechanical Engineer, Electrical Engineer, Aerospace Engineer



## Life Systems

**Objectives:** Monitor and troubleshoot the life support systems on the spacecraft, including air pressure, temperature, and humidity.

**Branches of Study:** Aerospace Engineering Technology, Biology, Structural Engineering, Aerospace Engineering

**Career Connections:** Environmental Engineer, Chemist, Industrial Engineer



## Geology

**Objectives:** Classify and examine Martian minerals to determine if minerals were formed in water.

**Branches of Study:** Geology, Astrogeology

**Career Connections:** Planetary Geologist, Seismologist, Land Surveyor

