

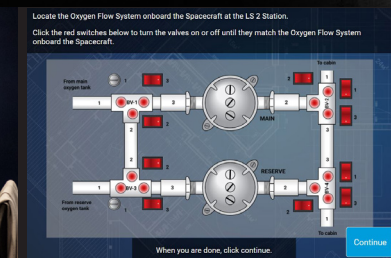
# LUNAR QUEST

NASA recently launched a Rover (ROV) to the Moon to explore new areas and collect critical scientific data. However, the ROV lost power before any of the findings were sent back to Earth. A faster and more reliable process to gather this type of information is needed. The result is a new directive from NASA - human astronauts will return to the Moon!



A team of astronauts must board a Spacecraft and launch to the Moon in search of a long-term habitat on the Moon. A team of scientists and engineers are stationed in Mission Control on Earth to command and assist the astronauts. Once the Spacecraft crew successfully lands on the Moon, they must deploy a Lunar Exploration ROV to identify a suitable location for a sustainable long-term human habitat.

However, when the crew receives troubling readings from below the Moon's surface, the two teams must work together and make critical decisions to turn a potential catastrophe into NASA's finest hour!



## Major STEM Concepts

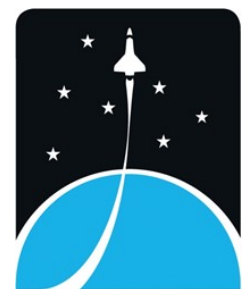
- Study lung tissue samples to analyze the impact of radiation exposure during space flight.
- Explore lunar surface features and properties that could protect astronauts.
- Conduct experiments to test the efficiency of solar panels used as an energy source during the mission.

## Hands-on Labs

- Use a digital microscope to explore and analyze lung tissue samples.
- Design electrical circuits to troubleshoot and determine functional and non-functional solar panels.
- Assemble and troubleshoot the parts of the Rover required for the mission.
- Conduct experiments to measure the mass of rock samples and calculate the density.

## Suggested Grades

7-9



**Challenger**  
LEARNING  
CENTER  
ESC LAKE  
ERIE WEST, OH

Matching funding of 50% per district is available thanks to a generous donation from Cenovus Energy.





# Teams

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



## Communications

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

**Branches of Study:** Communications, Physical Sciences/Sound Waves

**Career Connections:** Communications Engineer, Satellite Engineer, Systems Technician



## Navigation

**Objectives:** Calculate and plot the Spacecraft's course to the Moon and back to Earth.

**Branches of Study:** Aviation, Aerospace Studies and Operations

**Career Connections:** Pilot, Aerospace Engineer, Air Traffic Controller



## Rover

**Objectives:** Design and assemble the ROV that is launched to the Moon to search for lava tubes.

**Branches of Study:** Engineering, Network Support, Information Technology, Communications Technician

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



## Weather

**Objectives:** Conduct experiments and collect data to analyze the efficiency of the solar panels on the Spacecraft.

**Branches of Study:** Meteorology, Astronomy, Environmental Engineering

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



## Medical

**Objectives:** Conduct health assessments to ensure the safety of the crew in the Spacecraft.

**Branches of Study:** Anatomy and Physiology, Biology, Nutrition, Health Sciences, Counseling/Mental Health Awareness

**Career Connections:** Nutritionist, Counselor, Emergency Medical Technician, Nurse, Doctor, Medical Assistant



## Biology

**Objectives:** Conduct experiments and investigate lung conditions that can occur due to radiation exposure.

**Branches of Study:** Laboratory Sciences, Respiratory Diseases, Infectious Diseases

**Career Connections:** Biologist, Respiratory Therapist, Epidemiologist, Lab Technician



## Robotics

**Objectives:** Conduct experiments to determine if solar panels are functioning and then create a coding program for the robotic arm to replace the appropriate panels.

**Branches of Study:** Coding, Electrical Engineering, Computer and Informational Technology

**Career Connections:** Electrical Engineer, Computer Scientist, Computer Programmer, Systems Technician



## Life Support

**Objectives:** Conduct experiments and troubleshoot the systems on the Spacecraft to ensure the environment is safe for the crew during the flight.

**Branches of Study:** Engineering, Environmental Health and Safety

**Career Connections:** Environmental Engineer, Chemist, Systems Technician



## Geology

**Objectives:** Collect data and analyze the physical features of the landing sites on the Moon.

**Branches of Study:** Physical Sciences, Geology, Environmental Sciences

**Career Connections:** Geologist, Chemical Engineer, Seismologist, Land Surveyor

