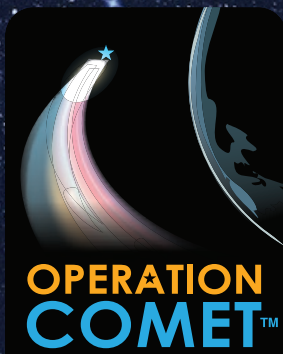


OPERATION COMET



After several previous failed attempts, the crew is tasked with a mission to observe, research, and analyze long-period comets that have entered our solar system. Astronauts in both Mission Control and Spacecraft conduct experiments to study comets to help scientists better understand how they are formed and how they could potentially impact Earth. During the mission, however, a shocking discovery is made, and the crew must brainstorm together to solve the emergency, ensuring the safety of the crew and the success of the mission.



Major STEM Concepts

- Geologic materials property tests
- Analyzing the carrying capacity of the robotic arm
- Completing the engineering design process to design and launch an ROV

Hands-on Labs

- Conduct scratch tests to determine the physical properties of rocks and minerals
- Use the robotic arm to conduct a capacity test
- Use a digital microscope to analyze microorganism samples potentially found on the Spacecraft

Suggested Grade

5



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

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 the communications leader of the mission, and track the path of the Spacecraft to ensure a safe mission.

Branches of Study: Communications, Systems Engineering, Space Security and Safety

Career Connections: Communications Engineer, Satellite Engineer, Systems Technician, Space Weather and Debris Analyst



Navigation

Objectives: Analyze the Spacecraft's trajectory, perform mathematical calculations needed during the flight, and make adjustments to the orbital path during the mission.

Branches of Study: Aviation, Aerospace Studies and Operations

Career Connections: Pilot, Aerospace Engineer, Air Traffic Controller



Rover

Objectives: Design, build, and assemble an ROV investigate long-period comets.

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

Career Connections: Computer Scientist, Mechanical Engineer, Structural Engineer



Weather

Objectives: Use specialized telescopes to identify and analyze long-period comets, and track potential space weather events.

Branches of Study: Environmental Sciences, Astronomy, Meteorology, Space Weather, Space Security and Safety

Career Connections: Meteorologist, Astronomer, Space Weather Analyst, Astrophysicist



Medical

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

Branches of Study: Biology, Anatomy and Physiology, Mental Health

Career Connections: Emergency Medical Technician, Nurse/Doctor, Mental Health Counselor, Physical Therapist, Space Medical Practitioner



Biology

Objectives: Conduct experiments to investigate microorganisms in space, and analyze the impact of space radiation and bone density loss on the crew.

Branches of Study: Environmental Sciences, Biology, Microbiology, Anatomy and Physiology

Career Connections: Biologist, Environmental Scientist, Microbiologist, Lab Technician



Robotics

Objectives: Conduct experiments to determine the carrying capacity of the robotic arm and use the engineering design process to prototype a new robotic arm for future missions.

Branches of Study: Engineering, Robotics, Computer Science, Computer Programming

Career Connections: Robotics Engineer, Civil Engineer, Mechanical Engineer, Computational Engineer, Computer Programmer



Life Systems

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, Mechanical Engineering

Career Connections: Environmental Engineer, Chemist, Systems Technician, Mechanical Engineering



Geology

Objectives: Conduct experiments to determine the physical features of comet materials found during the flight.

Branches of Study: Physical Sciences, Geology, Environmental Sciences

Career Connections: Geologist, Engineer, Mineralogist, Environmental Geologist

