

Voyage to Mars Lessons and Activities
8th Grade

Timing	Mission and Description	Supported Standards
Pre-Mission	Mission Patch: All on-site missions ask students to collaboratively create a mission patch symbolizing the class, school, and mission. Teachers are encouraged to emphasize "consensus" with the students to instill the concept of give-and-take when making group decisions.	Science:-- Math:-- English:1.1, 1.2 Social Studies:-- Visual Arts:2.1, 3.1, 3.2, 3.3, 4.1, 4.2
	Mapping out a trip to Mars: This icebreaker activity encourages students to consider what they would take with them if they were planning a trip to Mars. Then it challenges them to consider how to best support their decisions.	Science:3.3 Math:-- English:1.1, 1.2, 4.2, 4.3 Social Studies:2.1
	Navigating a Spacecraft: This activity asks students to use graphical data to plot a course from the Earth to Mars. But the challenge for students is to consider that Earth and Mars are always rotating and orbiting the sun.	Science:3.3 Math: 1.1, 2.1, 2.2, 3.1, 4.2 English:1.2, 2.2, 4.3 Social Studies:2.1
	Mars Geological Mapping: Students use photo geology to examine the surface of Mars and determine geological history of several areas. Students are then asked to use that knowledge and apply it to maps of the surface of the Earth.	Science:3.3 Math:3.1, 4.2 English:1.2, 4.2, 4.3 Social Studies:2.1
	Searching for Signs of Life: Students will discuss the criteria for "life," and use this idea to experiment with soil samples, looking for signs of life. Then the students will record their results in data logs about their findings.	Science:3.3 Math:4.2 English:1.2, 4.3 Social Studies:--
	Hydroponics: Students will design and construct a controlled environment to grow plants without the use of soil. This form of plant growth conserves space and energy for space travelers of the future.	Science:3.3 Math:3.1, 4.2 English:-- Social Studies:--
	Spacesuit Design: This activity explains to students why astronauts need a spacesuit to survive in space. But as we change environments, the spacesuit needs to change as well. Students are asked to analyze the conditions of Mars and to make modifications to spacesuits to adapt to that environment.	Science:1.1, 3.3 Math:4.2 English:1.2, 2.2 Social Studies:2.1
	Mission Meals: This 2-part lesson asks students to create a meal plan for a trip to Mars. However, there are weight restrictions, health, shelf life, and dehydration issues that must be accounted for in creating their meal plan. Students must create a balanced diet on limited resources.	Science:-- Math:4.2 English:4.3 Social Studies:2.1
	Satellite Toolkit® (STK) Lessons: These lessons review the concepts of two-dimensional graphing and continue to three-dimensional graphing. Students learn about how to incorporate altitude and azimuth angles into finding objects in the third dimension.	Science:1.1, 3.3 Math:1.1, 2.1, 2.2, 3.1, 4.2 English:1.2 Social Studies:2.1
Mission Day	Tracking Rover/Dust Storm: Students utilize latitude and longitude to track a rover team and a dust storm on the surface of Mars, playing an intricate role in the mission.	Science:1.1, 3.1, 3.3 Math:1.1, 2.1, 2.2, 3.1 English:1.1, 1.2 Social Studies:2.1
	Testing Chemicals: Using robotic arms, students will find mass and volume of chemical bottles. Then using this data, they will draw conclusions about safety of those chemicals.	Science:1.1, 1.3 Math:1.1, 3.1, 4.2 English:1.1, 1.2, 4.2, 4.3 Social Studies:--
	Plotting the Course of the Mars Transfer Vehicle: Students are asked to triangulate the position of the Mars Transport Vehicle during the mission; as well as, determine angle of entry into Martian orbit, formulate a landing path, and utilize telescopes to calculate trajectory.	Science:1.1, 3.4 Math:1.1, 2.1, 2.2, 3.1, 4.2 English:1.1, 1.2 Social Studies:2.1
	Comparing Earth/Mars Soil/Mineral Samples: A cornerstone of the <i>Voyage to Mars</i> mission is studying the natural resources of Mars. Students study mineral and soil samples and determine color, luster, magnetism, and coarseness of geological samples.	Science:3.3 Math:4.2 English:-- Social Studies:--
	Identifying Gas Leak/Spectrum Analysis: Due to complications with landing on the surface of Mars, students are asked to identify an unknown gas through the use of spectrum analysis. Students will diffract white light into its various wavelengths (colors) and use those wavelengths to determine what type of gas is being leaked.	Science:1.4 Math:4.2 English:-- Social Studies:--
Post-Mission	Press Conference: Students are asked to prepare for a press conference to answer questions surrounding their mission. Then parents, teachers, and administrators ask students to reflect on their experience and explain what they learned as a result of their mission.	Science:-- Math:-- English:1.2, 2.2, 3.3 Social Studies:--

