



Mars Rover Celebration

Curriculum Module

Week 2: Investigating Mars

Lesson 5: Selecting Team's Rover Mission



Educational Product	
Educators & Students	Grades 3-5

Week 2: Investigating Mars

LESSON 5: SELECTING TEAM ROVER MISSIONS

GRADE LEVEL: 3-5

LENGTH: 2 DAYS

VOCABULARY: geology
hypothesis
mission
valid

MATERIALS:

- 1- pad of Sticky notes (3x3 size or larger)
- 9- Pieces of Chart paper, labeled accordingly:
 - Craters on Mars
 - Polar ice caps of Mars
 - Valleys of Mars
 - Weather/Climate on Mars
 - Rocks and Soil of Mars
 - Water on Mars?
 - Riverbeds and Canyons of Mars
 - Present life on Mars?
 - Other
- Science Notebooks

ESSENTIAL QUESTION:

Why is it important to ask valid (good) scientific questions?

LESSON OBJECTIVE(S):

Students will be able to:

- Determine the nature of a valid scientific question that can be answered by data and/or modeling
- Construct a valid scientific question that can be answered by data and/or modeling
- Choose an appropriate mission for their rover that will answer their scientific question

ENGAGEMENT

1. At the beginning of this lesson, and using the attached documents, present the Essential Question and Key Vocabulary for students to consider during the lesson.
2. Now that students have researched Mars, they will work to decide what mission they will undertake.
3. To help students focus on a scientific or technological question that can be answered through data, students will begin reviewing the most compelling things they learned about Mars. Direct students to the chart paper hung around the room and ask them to write the one thing that most excites their curiosity about Mars on a sticky note. Sticky notes should be placed in a separate area for the teacher to review.

4. One at a time, the teacher will share and discuss the ideas and thoughts on the sticky notes, modeling for students how to turn each idea into a potential scientific or technological question (one that can be answered through data or modeling). Ask students questions such as:
 - What makes a good scientific or technological question?
 - How can we make this idea into an interesting question to answer?
 - How can we narrow the scope of our question or make it more specific?
5. Once students understand the process, students should take an active part in turning each of the remaining ideas into scientific or technological questions.
6. Once a good scientific or technological question is generated for each sticky note, the teacher will work with the students to determine which category the question falls under and stick the note on the appropriate piece of chart paper.
7. As the teacher and students are discussing the sticky notes and placing them appropriately, students should select three of the scientific or technological questions and write them in their Science Notebooks.
8. Once all ideas have been shared, turned into scientific or technological questions, and placed, students will have time to visit each of the chart paper posters to finalize their three ideas to be considered.

EXPLORATION

1. After students have each chosen their three questions, students will meet with their teams to narrow down to one scientific or technological question that the team will research.
2. In order to narrow down the ideas, students should strike questions that do not make sense, questions that do not have a scientific or technological basis, and questions that do not interest the entire team.
3. Students should be sure that the question chosen is one that:
 - Has an answer that can be found through modeling or data
 - Can be researched by students
 - Focuses on a specific problem
 - Builds on what they already know
4. Open the “Writing and Scientific Question” mini-lesson. Walk through the slides using the example of Saturn. Then have student follow the same process further refine their question and make sure that it is clear, specific and can be answered using data. The teacher may wish to display the last slide as students work to provide a visual guide.
5. Once students determine the question they will answer, they will need to make sure it is clear, specific and can be answered through data.

EXPLANATION

1. Throughout the lesson, the teacher will circulate to each team assisting when needed and approving appropriate scientific or technological questions that each team will answer. When teams are finished, they should write their team name and scientific or technological question on the top of a piece of chart paper (to be used in Lesson 6).
2. Towards the end of the lesson, students should revisit their Science Notebooks to answer the Essential Question.
3. At this point, the teacher may wish to hand out and have the students begin answering the questions in the presentation guide used as part of Lessons 14 and 15.

ELABORATION

1. If time permits, teams should work to further polish their scientific or technological questions.
2. Teams may also brainstorm a list of possible solutions to their scientific or technological questions. Student teams should work to assess their solutions by trying to determine which ones are most likely to meet some or all of the criteria and constraints of the problem.

EVALUATION

1. During this lesson, the teacher is encouraged to use formative assessments to determine and deepen student understanding. Teachers may wish to review teams' scientific or technological questions and/or grade students' science notebooks to establish student understanding.
2. Teachers are encouraged to create their own grade-level and ability-level assessments so as to best meet the needs of their students.

SUPPLEMENTAL RESOURCES

Planetary Information:

National Geographic: Mars

<http://science.nationalgeographic.com/science/space/solar-system/mars-article/>

Mars: Overview

<http://solarsystem.nasa.gov/planets/profile.cfm?Object=Mars>

Fact Monster: Mars

<http://www.factmonster.com/dk/science/encyclopedia/mars.html>

Kids Astronomy: Mars

<http://www.kidsastronomy.com/mars.htm>

Mars on Earth

<http://www.marsonearth.org>

Nine Planets: Mars

<http://www.nineplanets.org/mars.html>

Nine Planets: Mars Facts

<http://www.planetfacts.net/Mars-Facts.html>

Planet Facts

<http://www.sciencekids.co.nz/sciencefacts/planets/mars.html>

Article: 3D View of Mars

<http://www.solarviews.com/eng/mars3d.htm>

Mars Missions:

Mars Exploration Program

<http://mars.jpl.nasa.gov/>

Mars Science Laboratory

<http://mars.jpl.nasa.gov/msl/>

Mars Programs and Missions

<http://mars.jpl.nasa.gov/programmissions/>

Mars Exploration Rovers

<http://marsrovers.jpl.nasa.gov/home/index.html>

Mission to Mars

<http://www.planetary.org/explore/space-topics/space-missions/missions-to-mars.html>

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