



Mars Rover Celebration

Curriculum Module

Week 2: Investigating Mars

Lesson 5: Selecting Team Rover Missions



Educational Product	
Educators & Students	Grades 6-8

Week 2: Investigating Mars

LESSON 5: SELECTING TEAM ROVER MISSIONS

GRADE LEVEL: 6-8

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 form a valid (reasonable or sensible) and specific scientific question before conducting your research?

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 both in a structured way and by using the inquiry-based model with their teams, students will work to decide what mission they will choose to 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, making sure to guide students in turning 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 each sticky note has been shared, the teacher will ask the students which category the scientific or technological question falls under and stick the note on the appropriate piece of chart paper.
6. 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.
7. Once all scientific or technological questions have been shared, discussed, and placed, students will have time to visit each of the chart paper posters to finalize their three scientific or technological questions to be considered.

EXPLORATION

1. After students have each finalized their three questions, they will meet with their teams to narrow down to one well-written scientific or technological question.
2. In order to narrow down the list, 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. 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.
4. Once students determine the scientific or technological question they will answer, they will need to match it to one of the possible missions in their science notebooks.
5. 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.

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.
2. 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).
3. Towards the end of the lesson, students should revisit their Science Notebooks to answer the Essential Question.

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. Students should focus on evaluating their different solutions using a systematic process to determine how well each one meets the criteria and constraints of their chosen question.

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

Mars Exploration Program: Mars for Educators

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

Mars: Planet Profile

<http://pds.nasa.gov/planets/special/mars.htm>

National Geographic: Mars

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

Mars: Overview

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

Nine Planets: Mars

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

Nine Planets: Mars Facts

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

Article: 3D View of Mars

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

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>

Let's Investigate Mars

http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/Lets_Investigate_Mars_Activity.html

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