

Solar SPRK+

Lesson 3: Mars Exploration Debate

AUTHOR

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DESCRIPTION

Students will research and then debate about the value of Mars exploration through robotic and/or human missions using a debate structure.

GRADE LEVEL(S)

6, 7, 8

SUBJECT AREA(S)

Research, Debate,

ACTIVITY LENGTH

2 class periods (100 minutes)

LEARNING GOAL(S)

1. Students will identify high quality scientific information through research that represents multiple sides of an argument.
2. Students will communicate a pre-determined side of an argument verbally, using evidence to support their claims.

STANDARDS REMINDERS

- While students are conducting research, make sure that they are pinpointing scientific connections to the information they hope to communicate and present, whether it relates explicitly to the engineering design cycle or science content.
- Students could use this opportunity to discuss how “criteria for success” could be impacted depending on the different approaches for exploring Mars.

REQUIRED MATERIALS



HANDOUTS/PAPER MATERIALS

- Role Cards (1 per student)

LESSON PROGRESSION

PLANNING AND PREP

This debate is adapted from draft “Mars Exploration Debate” available through American Geosciences Institute NASA Triad Activities. The lesson plan is cited as being NASA-generated, but with a source link leading to an (outdated) URL through the Lunar and Planetary Laboratory at the University of Arizona.

LESSON SEQUENCE

INTRO

- Students will be formulating arguments that take sides on the following major questions regarding mars exploration:
 - Should we continue to explore Mars?
 - Should we use robotic exploration?
 - Should we pursue human exploration?
- Students will use a debate format and resources from NASA to research the various sides on the issue. The overview of this method with “role cards” can be found here:
http://www.agiweb.org/education/NASA/tr/invest/activities/Mars_Exploration_Debate.pdf

STUDENT PREP

- For this debate, use the attached worksheet “Solar SPRK+ Mars Debate” for students to track their research with corresponding roles. You can have students choose as many opinions to research as time allows, using one worksheet per opinion. The NASA guide suggests one opinion per student group.
- For each opinion, students will write the position of the opinion on the right side of the worksheet, which they copy from the “role cards.” They will then research six facts to write on the left hand side of the chart. Make sure students cite their research!
- The following resources can be viewed as a class or given as a list for students to use individually:

Terraforming Mars (“How Could We Create A Second Earth?” by Life Noggin)	https://youtu.be/peVJ2BrtuY
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Bill Nye and Mars - Video ("Bill Nye's Open Letter to the President" by The Planetary Society)	https://youtu.be/lA5KjplowF8
Mission to Mars: Future Megaprojects Video ("Mission to Mars: Future MEGAPROJECTS" by The Daily Planet)	https://youtu.be/21GLi9RJQKc
Curiosity: Mars' Next Visitor ("Curiosity: Mars' Next Visitor" by SciShow)	https://youtu.be/SnklvCDpJOM?list=PLsNB4peY6C6KgGVbYmTp0N5zPIXYE3ebY
Life on Mars - SciShow	https://youtu.be/rOztrDmFFWM?list=PLsNB4peY6C6KgGVbYmTp0N5zPIXYE3ebY
Let's Go to Mars - SciShow	https://youtu.be/NiCDQ_91Pks?list=PLsNB4peY6C6KgGVbYmTp0N5zPIXYE3ebY
The Curiosity Rover Landing - SciShow	https://youtu.be/a4YqNoLkxmE?list=PLsNB4peY6C6KgGVbYmTp0N5zPIXYE3ebY
The Top 5 Coolest Things About Curiosity - SciShow	https://youtu.be/bB2eB2qH2-A?list=PLsNB4peY6C6KgGVbYmTp0N5zPIXYE3ebY
The Latest from Mars: Day 2 - SciShow	https://youtu.be/U76y7_jO_Ao?list=PLsNB4peY6C6KgGVbYmTp0N5zPIXYE3ebY
Mars Colony Plans? - SciShow	https://youtu.be/N1aggLqdbd0?list=PLsNB4peY6C6KgGVbYmTp0N5zPIXYE3ebY
Seven Minutes of Terror ("7 Minutes of Terror: Curiosity Rover's Risky Mars Landing Video" by VideoFromSpace)	https://youtu.be/h2I8AoB1xgU

LESSON PLAN

- Students will present their Opinions to the “World Leaders.” This is essentially a group of student judges, with different roles as leaders in society. They can be politicians, industrial figures, or scientists. Have these students research the background of their position as well to provide context to their opinions.
- These World Leaders will also be given a rubric that aligns with classroom grading methodologies to ensure that they are scoring each group based on set standards. Potential categories to score using the rubric could include:
 - Quality of evidence
 - Coherence of argument
 - Group teamwork
 - Rebuttal
- World Leaders will work together as a team to choose a winning Opinion once all Opinions have been heard.

ASSESSMENT AND EXTENSIONS

FORMATIVE ASSESSMENT

Teacher should be making observations and notes throughout the debate. No comprehensive assessment for this activity has been developed. Students should be encouraged to record notes throughout debate to prepare for rebuttal. After the winning team is chosen, students should de-brief by sharing new information learned from other teams, additional questions, and any conclusions.