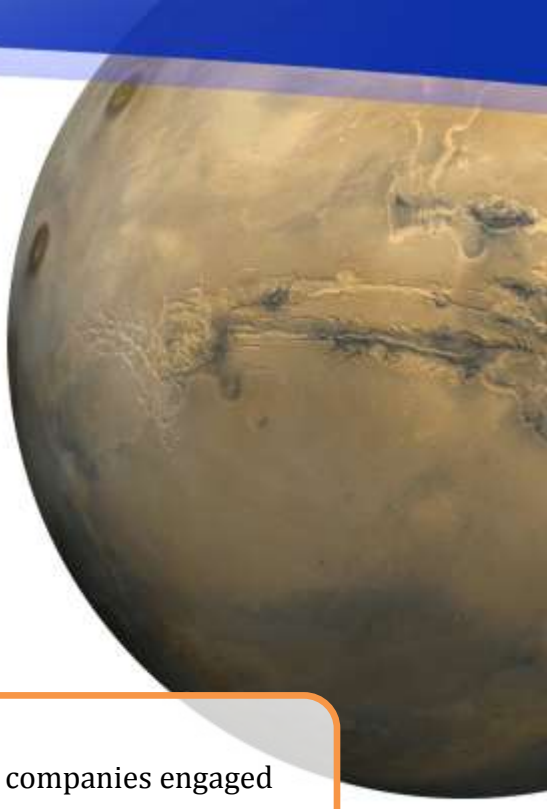

Lesson 22: The Issues and Future of Space Exploration

Summary
This learning module and related exercises will expose students the issues of space exploration and the other NASA-partnering agencies and institutions as well as private companies engaged in space-related technology. Students address socio-scientific issues and apply the nature of science to real-world decisions regarding human space flight.

Learning Goals

Students will be able to:

- Become aware of NASA partnering agencies and private companies engaged in space-related technology
- Design a mission and experience the panel review/decision process.

Context for Use
This particular module does not apply to any Earth analog approaches, but rather exposes students to the philosophy and ethics of privatized vs. government-funded research programs. Students practice with the realities of a cutting a budget in preparation for the Mission to Mars project.

Description and Teaching Materials
In-Class Activity

In-Class Activity 1: Manned-Space Flight: Is it needed?
In-Class Activity 2: Space flight going private

Homework/Lab

Homework 1: Cut A Budget: An Ethical Debate

Teaching Notes and Tips

1. *Homework 1* should be given prior to the Mission to Mars project due date to give students experience.
2. Become aware of the issues yourself before engaging in a discussion with students regarding privatization.

Assessment
Each *In-Class Activity* and *Homework* has its own measure of Assessment.

THE UNIVERSITY OF UTAH®

Sponsored by:
National Aeronautics
and Space Administration
NASA Award (NNX11AH29G)

NASA

Mars for Earthlings

References and Resources

- Mission to Mars Rubric
- Space X Press Release

Mars for Earthlings

In-Class Activity 1
Space Issues_MFE
Manned Space-Flight: Is it needed?

Purpose: Discuss the issues surrounding manned-space flight and the future of space flight.

Preparation:

- Disseminate copies of news articles and/or NASA goals for students to discuss in groups or…
- Summarize points of each article in a PowerPoint presentation for discussion.

Resources:

- News Article (find a recent article such as): http://www.science20.com/brinstorming/near_future_manned_spaceflight-93648
- NASA Human Space Flight Goals: http://www.nasa.gov/pdf/626738main_HEOMD2012Goals.pdf
- NASA roadmap for Astrobiology: https://astrobiology.nasa.gov/roadmap/
- Space-X CEO Interview: *http://www.youtube.com/watch?v=IiPJsI8pl8Q&feature=related*

Engage

Engage students by asking what they think about space flight. Should the U.S. be involved in space exploration? What is the benefit? Should we do more than we are doing? What are the ethical questions? What is their knowledge about NASA missions?

Then Poll students on whether or not manned-space flight is a good idea

1. What is the reason for their choice?
2. What is the history of space flight? (utilize NASA interactive timelines on the history of spaceflight such as those below):
   http://nssdc.gsfc.nasa.gov/planetary/chronology.html
   http://history.nasa.gov/timeline.html
   http://www.nasa.gov/missions/timeline/

Explore

Manned-Space Flight Discussion in the News

1. "The Near Future of Manned Space Flight"
   http://www.science20.com/brinstorming/near_future_manned_spaceflight-93648
2. Discuss the article and what the future might or should be.

Mars for Earthlings

Explain

1. Review NASA Human Space Flight Goals: http://www.nasa.gov/pdf/626738main_HEOMD2012Goals.pdf
2. Review NASA roadmap for Astrobiology: https://astrobiology.nasa.gov/roadmap/
    a. What points do students believe are important?
    b. What aspects did they not expect?

Elaborate

Space X Plans to put man on Mars in 10 years

- Interview with the CEO of Space-X (start interview at Time- 13:00-15:30) *http://www.youtube.com/watch?v=IiPJsI8pl8Q&feature=related*
- Discuss what students think of this venture.

Evaluate

Statement to a Congressman/woman

Ask students to prepare a 2-page statement to a Congressman/woman recommending or declining space flight using NASA published goals and/or other publicly announced space flight goals.

a. Have students identify a real and acting member of Congress and write a letter/statement accordingly.
b. Students must cite publications that support their recommendation.
c. Review student recommendations to Congress for understanding of current NASA goals.