Mars for Earthlings

LESSON 22: Space Issues

In-Class Activity 1

Manned Space-Flight: Is it needed?

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

Resources:

- News Article: 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*

Manned-Space Flight Discussion in the News:

Listen to "The Near Future of Manned Space Flight."
http://www.science20.com/brinstorming/near_future_manned_spaceflight-93648

1. What is your reaction to the article?

2. What do you think should be the future of space flight?

Review NASA Human Space Flight Goals and the NASA roadmap for Astrobiology.
http://www.nasa.gov/pdf/626738main_HEOMD2012Goals.pdf
https://astrobiology.nasa.gov/roadmap/

1. What points do you believe are important?

2. What aspects did you not expect?

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Space X Plans to put man on Mars in 10 years

Watch the interview with the CEO of Space-X (start interview at Time- 13:00-15:30)
http://www.youtube.com/watch?v=IiPJsI8pl8Q&feature=related

1. What do you think of this venture?

Statement to a Congressman/woman:

Prepare a 2-page statement to a Congressman/woman recommending or not recommending funding for space flight using NASA published goals and/or other publicly announced space flight goals.

a. Identify a real and acting member of Congress and write letter/statement accordingly.
b. Cite publications that support your recommendation

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In-Class Activity 2
Space Issues_MFE
Space Flight going Private

Purpose: Become aware of private companies pursuing space flight and their role outside of NASA's Mission directorate (government vs. private funding).

Dragon docking with the ISS
Watch the following video of Space X's Dragon spacecraft docking with the ISS:
http://www.youtube.com/watch?v=QwDCWTqNceQ&feature=player_embedded

a. What is significant about this event?

b. What are your reactions to this venture?

Government vs. Privatization

1. Make a list of the pros and cons of private companies taking over the space program:

   Pros Cons

2. Space X is awarded the manned-space flight contract.
   Video: http://www.youtube.com/watch?v=MZJk4CrxctQ&feature=youtu.be
   If you had the money, would you buy a seat? Why or why not?

3. Why is the Space X craft remarkable?
   Video: http://www.youtube.com/watch?v=sSF81yjVbJE&feature=related

4. What do you think of *Space X's* Mars Business Model?
   Video: http://www.youtube.com/watch?v=4fS1FxBq64A&feature=relmfu

Final Verdict
As a class, come to a final verdict "as congress" on whether or not NASA should privatize. Compromise is likely necessary.

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Homework 1
Future Mars Missions & Societal Issues_MFE
Cut a Budget: An ethical debate?

Objective: Critique the viewpoint of a proponent of increased NASA funding and cut a theoretical mission budget to fit NASA cut backs.

A Viewpoint on NASA funding
Watch the following YouTube video, narrated by Neil deGrasse Tyson, concerning the national budget and NASA. Neil deGrasse Tyson is an astrophysicist and director of the Hayden Planetarium.
Video: http://www.youtube.com/watch?v=Fl07UfRkPas&feature=youtu.be

1. Do you agree with any of Neil deGrasse Tyson's points?

2. Similarly, do you disagree with any of his points?

3. Do you find Dr. Tyson's line of argument flawed? If so, why?

A Proposed Budget
Below is a proposed hypothetical NASA budget with all budget elements compliant with NASA documentation:
http://www.hq.nasa.gov/office/procurement/nraguidebook/proposer2013.pdf

4. Scrutinize the budget and make a 30% cut to your budget. NASA will approve this mission if you can cut your budget by 30%. For reference on what each budget item means see the above .pdf url link. (1) Show and justify all changes you make to achieve the 30% cut. (2) Attach an extra sheet of paper for justification if necessary. (3) Add items you think are necessary.

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Proposed Budget
(Sample, direct costs)
Mission: Orbit Europa
Duration: 4 years

Category	Sub-Category (#)	Cost per Unit	Cost Total (4 years)
Direct Labor	PI- Scientist (1) (1FTE)	$112,000	$448,000
	Co-I Scientist (3) (1/2 FTE))	$55,000	$660,000
	Co-I Engineer (5) (1FTE)	$95,000	$1,900,000
	Co-I Educator (1) (1/2 FTE)	$40,000	$160,000
	Post-Docs (3)	$48,000	$576,000
	Graduate Students (7)	$24,000	$672,000
	Undergraduate Students (3)	$3,000	$36,000
Other Labor	Consultant- Science (2)	$15,000	$120,000
	Consultant- Education (1)	$10,000	$40,000
Equipment	Orbiter (includes thermal, power, navigation, launch vehicle, etc)	$425,000,000	$425,000,000
	Cameras (1)	$31,000,000	$31,000,000
	Spectrometer (1)	$17,600,000	$17,600,000
	Website development	$40,000	$80,000
Supplies	Publications	$2,000	$10,000
	Software	$20,000	$20,000
	Computer Stations	$50,000	$50,000
Travel	LPSC Meeting Registration	$100	$800
	AGU Meeting Registration	$350	$2,800
	AAAS Meeting Registration	$400	$3,200
	Per Diems ($40/day /person)	$320	$10,240
	Airfare (roundtrip/person)	$600	$4,800
	Lodging (night/person)	$140	$4,480
	Transportation (trip/person)	$40	$960
Facilities/Administration	Imaging lab (yearly)	$15,000	$60,000
	Imaging rendering lab (yearly)	$15,000	$60,000
		Mission Total	$478,519,280