

Lunar Colonization Design Challenge

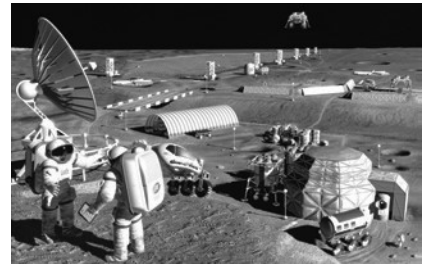


By 2020, the United States is hoping to have established a lunar colony. This colony would be used to conduct research, gather information about lunar soil, and be a stepping stone for travel to Mars and beyond. This challenge was presented to the public by President Bush on January 14, 2004. For a complete transcript of his speech, you can read the document entitled “President Bush Announces New Vision for Space Exploration Program” or view it online at:

Office of the Press Secretary (January 14, 2004). *President Bush announces new vision for space exploration program*. The White House. Retrieved May 14, 2007, from <<http://www.whitehouse.gov/news/releases/2004/01/print/20040114-1.html>>.

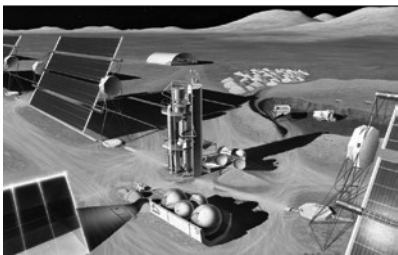
The greatest challenges to this venture are not just technological, but also sociological. Many people have very strong opinions, both positively and negatively, about lunar colonization and space travel in general. Traveling to the Moon requires that the general public is kept well aware of the challenges and risks. As a team, it is your challenge to find out what people in your locality think about colonizing the Moon. This will require that you complete the following tasks:

- Design and construct a model of a sustainable lunar colony.
- Develop a plan of action to transport people and goods to and from the Moon.
- Survey people in your community regarding your lunar colonization and transportation plans.
- Create a print or electronic media informational piece that helps the public better understand lunar colonization.
- Deliver a group presentation about your findings.



Model Lunar Colony Criteria

1. Each member of the group must create at least two rough sketches of a lunar colony in his or her Engineering Design Journal. This journal may be created on paper or electronically. A final sketch by the group must be approved by the teacher before construction of the model can begin.
2. Your model must fit in on 18”×18” base and not exceed 9” in height.
3. Materials to build the lunar colony model can be brought in from home and/or provided by your teacher.
4. All key components of your colony must be clearly labeled on the model.
5. A one-page written description of your colony and how it would function must accompany your model.
6. The model parts must be securely attached so that no parts can fall off.



Moon and Earth Comparison Worksheet

(Student Version)

Name: _____

Date: _____

Hour/Period: _____

| | Earth | Moon | Comparison Factor* |
|---------------------------------------|-----------------------------------|-------------------------------------|--------------------|
| Orbit Distance (km) | km (average distance from Sun) | km (average distance from Earth) | =0.2724 * Earth |
| Radius at Equator (km) | | 1,737.4 km | =0.2724 * Earth |
| Equator Circumference (km) | km | km | |
| Maximum Surface Temperature (°C & °F) | °C °F | °C °F | |
| Minimum Surface Temperature (°C & °F) | °C °F | °C °F | |
| Angle of Tilt (degrees) | ° | ° | |
| Length of a Day (Earth Days) | Earth Hours | Earth Hours | |
| Length of a Year (Earth Days) | Earth Days | Earth Days | |
| Equatorial Gravity | m/sec ² | m/sec ² | |
| Atmosphere | | | N/A |
| Water | | | N/A |

* The comparison factor is used to compare the Moon to Earth.

The following web sites may be used to locate data about the Moon and the Earth:

Artemis Society International (June 27, 1999). *Comparison of Earth and Moon*. The Artemis Project. Retrieved May 14, 2007, from <<http://www.asi.org/adb/m/03/01/Earth-moon.html>>.

Bray, Becky & Meyer, Patrick (Authors/Editors). & Koczor, Ron (NASA Official). (n.d.). *Water on the Space Station*. NASA. Retrieved January 31, 2009, from <http://science.nasa.gov/headlines/y2000/ast02nov_1.htm>.

Levy, David H. (Author), Phillips, Tony (Author/Editor), Horack, John M. (NASA Official), & Walls, Bryan (Curator). (n.d.). *Moon Water. Science at NASA*. Retrieved May 14, 2007, <from http://science.nasa.gov/headlines/y2005/14apr_moonwater.htm>.

Munsell, Kirk (Editor), Martin, David (Webmaster) & Lindstrom, Marilyn (NASA Official). (July 24, 2006). *Solar System Exploration*. National Aeronautics and Space Administration. Retrieved May 14, 2007, from <<http://solarsystem.nasa.gov/planets/profile.cfm?Object=Moon>>.

Wilson, Jim (Editor) & Dunbar, Brian (NASA Official). (March 1, 2007). Moon, Mars, and Beyond. *National Aeronautics and Space Administration*. Retrieved May 14, 2007, from <http://www.nasa.gov/mission_pages/exploration/mmb/index.html>.