Moon, Mars and Beyond

In 2004, President Bush announced the "Moon, Mars and Beyond" plan for human space exploration. Humans would return to the moon setting up a sustainable moon base, and then use this base to explore Mars and other objects in our solar system. Consequently, NASA will be using a lot of its funds to send humans back to the moon by 2020, and since their money comes from you as a taxpayer, Mrs. Nowak and I want you to have an understanding of the "Moon, Mars and Beyond" project.

The project will also relate the two units of this course: Astronomy and Ecology. There are many astronomical aspects to consider and benefits to be gained from a moon base, but we must also set up an ecosystem to sustain the base. All you learned about resources, cycles, needs, environments, food webs, etc. is relevant to starting up a moon base.

This activity will be in a Problem Based Learning format. This means that instead of being taught through PowerPoint slides, lectures or worksheets, you will teach yourself! We made several questions you must answer for a grade, but the main purpose is for you to research whatever aspect of this "Moon, Mars and Beyond" project is most interesting/relevant to you. If you're interested in the Big Bang, find out how the telescopes planned for the moon will increase allow us to peer deeper into the universe. If invasive species interest you, find out how NASA plans to control the bacteria and viruses in the moon base. If you're interested in entrepreneurship, find out what new businesses can be started on the moon.

Part I: Introduction

Several posters show artists' conceptions of moon bases and other lunar activities. Teams of scientists came together in the 80's and 90's to brainstorm about lunar bases and presented these posters, along with detailed reports, at national and international conferences. Since a picture is worth a thousand words, we're having you look at the pictures instead of the reports.

You and group are assigned three posters. Study each picture for several minutes. Try to pick out exactly what each object is, what each person in the picture is doing, and what the purpose is. Discuss these ideas with your group members to come up with the most plausible (likely) scenario. Also, begin to think about how these posters are linked.

Your grade for this section will be one short story about your group's three posters. Devote at least a paragraph to each poster, but do not make them separate stories; link these posters together in one coherent story. You can use your imagination, but include as many astronomical and ecological facts as possible. Two thirds of your grade will be the scientific content in the story, and the other third will be the creativity of your story. To make sure everyone is working, each paragraph must be in a different person's handwriting.

Part II: Lunar Base

Now that you've looked at posters of a lunar base, you're going to design you own. You will work in groups of four with each person playing a different role.

Administrator: You are overseeing the whole operation of starting a moon base. You've assembled a team of an astronomer, an astronaut, and an ecologist to help you plan the specifics of the operation, but it is your job to get it done. You also have to report back the federal government so you need to make sure you maximize the money spent and keep the total low. If the other three team members want something you can't afford, you have to tell them no. Also, you need to research the commercial possibilities of the moon since making this moon base profitable will certainly guarantee federal funding for the future.

Astronaut: You are actually going to the moon. It is your responsibility to make sure you have everything you need to survive, and that you will be relatively comfortable on your adventure. The environment is much different on the moon than on Earth, so you have a lot to think about. Remember, if you forget something, it's the end of your life! Once you have taken care of your needs, think of ways to make things easier on you so you can maximize your time on the moon.

Astronomer: You have been asked by the administrator to provide all the astronomical information necessary to start a moon base. You need to know about the rockets to use, the trip to the moon, how long it takes, what the space ships can carry, and about the difference between robotic ships and human manned ships. You also realize that this is a great time for pioneering astronomical research, so you will suggest several new telescopes and experiments to carry out on the moon. You will be able to justify these experiments to the administrator for funding them and the astronaut for carrying them out.

Ecologist: You have been asked by the administrator to provide all the ecological information necessary to start a moon base. You will make the moon base safe by ensuring the conditions are right for astronauts to survive, and you will save NASA a lot of money by using all of the moon's resources to our advantage. After all, it is a big waste of time and money to send supply ships to the moon carrying resources that are already there. You are also responsible for setting up the ecosystem on the moon. This will allow the astronauts to survive on the moon.

Your grade for this section will be based on two items: a poster showing the design of your moon base and a presentation to the general public to get them on your side. Your poster can be in the format of the ones in Part I (an artist's conception to show what the base will actually look like), or you can make floor plans of the living quarters and a map of everything else in the base. Regardless, you need to show every floor of the living quarters and how everything else on the base relates to the living quarters.