Unit 8

Planetary Exploration Tips

Difficulty: Challenging

Content: Fairly Important

Preparations: None

Materials: None

Time: 1 Period or more. Can be finished for homework.

Suggestions for the Teacher: Illustrate a "new form of life" by squeezing a drop of model airplane (Duco) cement into a petri dish nearly full of water on an overhead projector.

Discuss the question, "Is this alive?"

Student Intro:

1. Read the directions carefully.
2. I need one drawing per group.
3. Maximum group size: 4 students

Post-Lab: None

Extensions: None

Planetary Exploration Key

Maximum Group Size: 4 Students. Students may submit one lab for the whole group Each member will receive the same lab grade.

+1 for each experiment that yields information
+2 for instruments that are specified
+3 for experiments that are especially creative and particularly well explained

Examples:

1. Panning camcorder produces panoramic photos of landscape. (The camcorder is also used to digitize these images to be sent back to the Earth, as well as monitoring other instruments.)
2. Thermometer registers the temperature.
3. Barometer records the atmospheric pressure.
4. Wind vane measures the wind direction.
5. Anemometer (many hardware stores) measures wind speed.
6. Rock is thrown up to calculate gravity. (Also used to calculate mass)
7. Televised impact shows how solid the surface is.
8. Light a match to test for oxygen.
9. Camcorder pans up to stars to determine period of rotation.
10. A solar powered toy caterpillar with an odometer travels around the circumference to determine the size of Mars. It carries a miniature TV-camera, in case it doesn't make it all the way, which allows the use of a proportion (Eratosthenes method) to calculate the circumference. (This example would be worth 3 points)

+0	D-
+1	D
+2	D+
+3	C-
+4	C
+5	C+
+6	B-
+7	B
+8	B+
+ 9	A-
+10	A

Date _____ Per. _____

Your task is to design a research module that will be landed on the planet Mars to send information about Mars back to the Earth.

Maximum Group Size: 3 Students. You may submit one lab for the whole group. Each member will receive the same lab grade.

Please do this activity in two concurrent parts:

(Hint: Plan ahead *before* you start drawing your planetary landing device.)

I. Design and draw, on a blank sheet of paper, a landing module that will sit on Mars and perform observations or experiments that you will specify. On your drawing, please number each observation/experiment 1, 2, 3... Drawings must be neat and clear.

II. On a separate sheet of notebook paper, write a brief explanation of how each device on the module operates. Your explanations must include what the device will "observe", how it works, and what it is made of. Number them 1, 2, 3, etc to correspond to the numbers in your drawing.

You should not include devices that you, yourself, could not construct or purchase. (Be prepared to justify your judgements!) NASA will supply an interplanetary radio transmitter.

Please note the following rules:

A. You do not need to consider how to land the module safely. (NASA will take care of that part for you.)

B. Your research station will not be leaving the surface of Mars, once it has landed. Nothing will be carried back to Earth. All equipment must be expendable.

C. No persons or animals will be allowed. (Sorry, animals are not considered "expendable".)

D. Include only experiments or devices that you can design and explain. For example, if you perform a test for the presence of life on Mars, it must be clear what tools or instruments you use, how the test is done, and how you will interpret your results.

Tip: Several simple experiments are better than one complicated procedure. (K.I.S.S.)

Good luck!