Mars Rocks!

use with *Mars-Year One :Marooned!*

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The Mission: to examine a Martian surface core sample

Back in the 21st Century, the Mars rovers, Spirit and Opportunity, examined the regolith (top layer of rocks) on the surface of Mars with a variety of tools. One way they looked below the surface was by spinning their wheels and seeing what kind of soil they dug up. This worked fine with soft soil, but what if scientists wanted look at the layers of hard rocks so they could study how Mars formed over the course of millions of years?

Sean, Jenny and the colonists on Mars need to study the regolith to find out if there is water, oxygen and the minerals necessary to grow plants in order for them to have a self-sustaining colony. They are using a coring instrument which drills down approximately ½ meter into the Martian surface for a sample. Then scientists will look at how the different layers of rock and soil look and try to determine what the history of Mars' surface was.

You are going to use a coring instrument and drill into your Martian rock sample to record what you observe.

Procedure:

You have just received a Martian surface sample. It is your job to observe and determine all the scientific information you can from this sample. You will be taking a core sample from this Martian surface sample and answering the following questions. You will then receive a second core sample to compare to the first. List anything that is similar or different between the two samples.

1. Describe the color of your Mars sample

2. Describe the surface features of your Mars sample: Is it smooth, wavy, lined, bumpy, speckled, etc.? Describe them as though they are rocks or minerals, not candy.

3. Draw a picture of any surface features you see on your Mars sample: label some of the features

4. What is your hypothesis (science guess) about the cause of any texture you see on your Mars sample? If this was a Martian sample, what physical processes could have caused the textures or features you are seeing? (e.g. water erosion (fluvial), wind erosion (aeolian), impacts, etc.)

5. Using your straw, gently drill into your sample by twisting down into your sample to the bottom and pull out a core sample. Examine the layers through the straw.

6. How many layers does your Martian core sample contain?

7.Draw a picture showing the layers of your Martian core sample.

8. Which layers were made first, and why? The chocolate covering would be the surface - the youngest area of deposit. The stratigraphy (the order of the layers) would grow older as they go down the straw, towards the bottom.

9. Take another core sample with your drill and examine it. You might want to try another area of your sample to see if there are differences.

10. Draw a picture of the second core sample showing any layers and surface features.

11. Compare the two core samples and list any similarities or differences from your first Martian core sample. There will probably be some change. Compare the thickness of the top layers, colors, textures, smells, number of layers, sizes of layers, softness, hardness, etc.

12. What would account for the samples being different if they were both from Mars?

Would a core sample from Mars be important to the study of Mars? Why? A core sample would be very important to the study of Mars! Most of our science observations have been of surface features. To have a better understanding of the processes that formed the Martian features, seeing the subsurface would be very important. There are also many unanswered questions the scientists are trying to find answers for: Is there water in the subsurface (perhaps that a human mission to Mars could access)? How many layers are there and how thick are the layers in the subsurface? Are there different rocks underground than there are on the surface of Mars? What can we tell about the climatic history of Mars from these layers?

Why is it important to find out about what another planet's rocks are like? Does it have anything to do with us here on Earth? How could this help us understand our own planet?

Congratulations! You are now an Areologist (Mars geologist)! You can eat your Mars rocks. That's something Mars scientists almost never really get to do.