



A Viking's Search for Life

Hands-On Activity

Background Information

In 1976, the United States sent spacecraft Viking 1 and Viking 2 to Mars. The landers on the spacecrafts had instruments that could detect any sign of life in the Red Planet's soil.

What were the instruments looking for? When living things metabolize food into energy, they produce waste, some of which is gas. The Viking landers tested Mars' soil by mixing it with nutrients and measuring the subsequent release of gas.

- ◆ If there were life in the soil, scientists would have expected a continuous production of gas.
- ◆ If there were no life, either no gas would be produced or a just a small amount would be produced initially. (This initial chemical reaction would not last because the chemicals in the soil would be used up, while a living organism would continue to metabolize the food as long the supply lasted.)

In this experiment, you'll duplicate the tests the Viking landers conducted in their search for life on Mars with this experiment.

What You Need

- ◆ 3 glass jars
- ◆ enough sand to fill each jar one-third full
- ◆ masking tape (for labeling the jars)
- ◆ 2 teaspoons of salt
- ◆ 2 teaspoons of yeast
- ◆ 2 teaspoons of baking powder
- ◆ A large pitcher
- ◆ 1/2 cup of sugar
- ◆ 2 cups warm water

What To Do

1. Fill each glass jar one-third full of sand, and attach a masking tape label to each jar. Mark each label with a different color — red, blue, and green.
2. Add the salt to the red jar, the baking powder to the green jar, and the yeast to the blue jar.
3. Refrigerate the jars overnight to simulate the cold Martian surface.

4. The next day, mix the sugar and warm water in the large pitcher until the sugar is completely dissolved.
5. Pour equal amounts of the sugar water into each of the labeled jars. Then place the jars in a shallow tray and set them aside.
6. Watch the jars carefully for any signs of organic or chemical reactions, noting your observations on the attached worksheet.

Worksheet
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Name _____

1. What happens to the sheet of paper in each jar when you add the sugar water?

Jar Color	Contents	Observations
Red	Sand + Salt	
Green	Sand + Baking Powder	
Blue	Sand + Yeast	

2. Based on your observations, in which jar or jars does life exist?

3. Explain how you came to your conclusion using what you know about the Viking landers experiments.
