

7 LITTLE GREEN MARTIANS

Many People thought the first probes to land on the surface of Mars- Viking I and Viking II- would discover little green Martian men or some other form of extraterrestrial, so there was much disappointment when no signs of life were spotted. Below is an experiment similar to the tests the Viking probes performed on the Martian soil in search of life on the Red Planet.

WHAT YOU NEED

- 3 canning jars
- Clean sand (boiled)
- Salt
- Yeast
- Baking Powder
- Sugar

WHAT YOU DO.....

- Fill each glass one-third full of sand.
- Number each jar.
- Measure two spoonfuls of yeast into # 1, two spoonfuls of baking powder into # 2, and two spoonfuls of yeast into # 3.
- Refrigerate the jars overnight, so that they are cold like Mars.
- The next day, mix a half cup of sugar into a pitcher of warm tap water. Pour equal amounts of sugar water into each of the jars.
- Look for signs of life! What happens in each of the jars?

WHAT DID YOU FIND?

The Viking experiments added nutrients to Martian soil samples and monitored the reactions- a brief, quick reaction indicated the presence of non-living chemicals, while a slow and continuous reaction would suggest that a life-form was multiplying. In your experiment, which jar contained something living? The question of life on Mars is still being pursued. Instead of looking for huge plants or animals, scientists have now turned their search toward the possibility that microscopic bacteria may live-or may have once lived- on the Red Planet.

4 RED PAN-IT

Everyone always calls Mars the "Red Planet" because the Martian surface is covered with a reddish-brown sand. You can do this experiment to find-out what Martian sand is made of, and why it is red.

WHAT YOU NEED:

- Shallow cake pan
- Sand
- Gloves
- Steel wool

WHAT YOU DO:

- Pour a layer of sand into the cake pan.
- With the gloves on, use scissors to cut the steel wool into small chunks. Be careful to keep all the places in the pan—they can be sharp!
- Mix the steel wool and sand together with your hands, again, keep those gloves on.
- Fill the pan with enough water to just cover the mixture.
- Leave the pan in a level, safe place.
- Each day, check the pan, and add water to it so that it always stays wet.
- Watch what happens to the color of the mixture over the course of several days.

WHAT DID YOU FIND?

Martian sand contains iron and oxygen. The same ingredients you added to your sand mixture. When iron comes into contact with water and oxygen, it rusts and turns a reddish-brown-just like your bike will rust if left in the rain. Scientists think there was once enough water on Mars that the whole planet rusted and turned red- a color we can see all the way from Earth.

2 MARS IN REVERSE

Early astronomers believed that, as Mars moved through its orbit, it would stop, go in reverse, and then go toward again. Today that sounds like a crazy way for a planet to move, but that's still the way it looks from Earth, despite the fact that we now know Mars travels in an elliptical orbit around the Sun without backing up. Why does Mars appear to go backwards?

WHAT YOU NEED:

- A friend
- A bike or inline skates

WHAT YOU DO.....

- Go to a park and find a long, clear straightway with few pedestrians.
- Put on the inline skates, or get your bike ready.
- Pick a starting point and end point for your experiment, and then find a stationary object around the middle to focus on.
- Both begin at your starting point, with your friend walking at a steady pace the whole way to the finish. When you start moving, begin by moving slightly slower than your friend, watching the focus point.
- Keep your eyes on the focus point as you speed up and pass your friend.
- What did you see?

WHAT DID YOU FIND?

Your friend never stopped moving forward, but from your point of view, she appeared to back up! The same thing happens when Earth moves faster and passes Mars on its way around the Sun-Mars only appears to go in reverse. This type of apparent motion is called retrograde motion. The odd retrograde motion of Mars helped to clue some astronomers onto the flaws inherent in early models of the Solar System- Why would this one planet go backwards for such a short period when the others move steadily in one direction? Mars going in reverse may have put astronomy in fast-forward!

FUN FACTS; THE MARS ROVER AND YOU

You may not know it, but you have a lot in common with the Mars Exploration Rovers.

Stand in the middle of driveway of gray, crushed stone and your eyes are drawn to the rocks that look different. A few of them are pink or even white. You move toward a white rock, reach out with your arm to pick it up and examine it. Sometimes you get a magnifying glass to look closer. Or you may want to get a hammer to break it open and see what's inside. When you find a rock that looks really cool, you usually want to tell someone about it.

The rovers were built to look for interesting martian rocks. They scan the ground, move forward a selected rock, collect information, and send that information back to scientists here on Earth. Just like you, the rovers have eyes, an arm, mobility, and the ability to communicate.

How does your body compare to the Mars Exploration Rovers?

ROVER EYES

The "eyes" of the rover belong to Pancam. Pancam is a camera that will give scientists a binocular view of the martian surface. Instead of seeing everything flat, like a photograph, the Pancam can see its surroundings in stereo. This gives the rover depth perception which is very important when you're moving across a surface as rocky as Mars. Depth perception helps the rover judge distances and avoid obstacles. Your eyes do the same for you.

ROVER ARM

Hold your arm up in the air. Move it around. You can move it from your shoulder, bend it at the elbow and you can twist your wrist. The rover arm was designed to do the same thing. But where you have a joint, the rover has a motor. The rover "shoulder" has two motors. One rotates the arm parallel to the ground. This is a similar motion to you holding your arm straight out from your side and moving it in a circle. The other shoulder motor on the rover lifts the arm up and down. The "elbow" of the rover has a motor that bends the arm. The motor that moves the rover's "wrist" can also move it up

and down. The "hand" of the rover is a turret that holds four science instruments. It has a motor that rotates the different instruments into place so they can take turns looking at an interesting grind into martian rock and then rotate the microscopic imager into place to get a closer look at the newly exposed surface.

ROVER FEET AND LEGS

Each rover moves on six wheels- Three on one side of its body and three on the other. You don't have six wheels, but you do have two feet and two legs that provide mobility. Your legs also do something very special. Think about what happens when you walk along the narrow curb of the street and then lose your balance. One foot lands on the street and the other stays up on the curb, but you don't fall over. Your body stays level because one leg bends while the other is straight. The rover has a differential that makes one set of wheels go down if the other goes up. This keeps the rover from tipping over because its top stays level to the ground.

ROVER MOUTH AND EAR

The rover uses its antennas to "listen" for commands from Earth and to "tell" scientists what it has learned. One of its antennas is called the high gain antenna. The HGA provides "direct to Earth" or DTE communication. It sits on top of the rover, sometimes acting like your ear and sometimes like your mouth. In the beginning of a martian day, the rover listens for instructions from scientists. Then it carries out the tasks it is given and uses HGA to relay the data it has gathered. Transmission of information is at a rapid rate of speed, but this "conversation" can only occur once per day because of the very long distance between Earth and Mars.