Strange New Planet
Student Version

Adapted from NASA's "Mars Activities: Teacher Resources and Classroom Activities – Strange New Planet" located at mars.jpl.nasa.gov/classroom/pdfs/MSIP-MarsActivities.pdf

Why should your team do this activity?

Your team should now be somewhat familiar with Mars, the planet your Rover will be designed to navigate and explore. Why do we send rovers to planets in the first place? Well, different kinds of spacecraft are able to make different kinds of observations. Think about how different the information gathered by looking at a planet from Earth is from the information that a rover might collect. The information that a rover can gather about rock materials on the surface of Mars is much more specific than what an astronomer can collect simply by looking through a telescope. Yet the astronomer's information is necessary to successfully land and operate a rover on the surface of another planet, right?. As you will see, each kind of mission has its advantages and drawbacks.

During this activity, your team will explore a strange new planet, one that your teacher has made especially for you. You will explore this planet just like NASA explores Mars. As you make observations, you will make decisions about what your team would like to explore further. Your observations will continually refine the goals of your exploration. During the last phase of exploration, you will land on the surface and carry out your investigations. Happy exploring!

The Necessities:

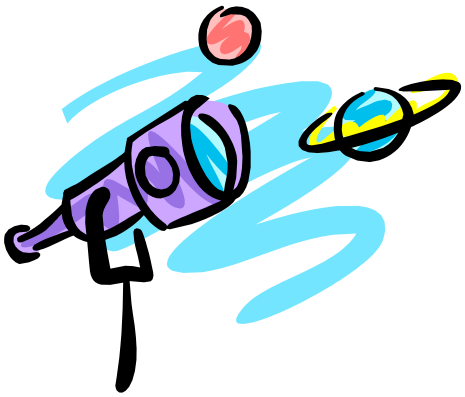
- ★ A planet (your teacher will provide this)
- ★ Planetary viewers, one for each team member (your teacher will help you with this)
- ★ One 5 inch by 5 inch blue piece of cellophane paper and rubber band per member
- ★ Pen or pencil
- ★ Idaho TECH Lab Notebook

Directions

Your teacher will guide your team through this activity. Be sure you read through each mission *before* you perform it. Respond to the questions in your Lab Notebook.

<u>Pre-Launch Reconnaissance – Earth-bound observations</u>

1. Estimate your distance from the planet in meters.
2. Using your viewers (with blue cellophane attached to simulate Earth's atmosphere), observe the planet for one minute. What types of things does your team observe? Record any observations (shape of planet, color, size, etc.) in your Notebook.
3. As a team, write questions to be explored in future missions to the planet. What else do you wish to know and how will you find out that information (special features of the planet, life of any kind, etc.)?



Mission 1: The Fly-By *(Mariner 4 in 1965, Mariner 6 & 7 in 1969)*

Using your viewers with the cellophane removed, your team will quickly walk past one side of the planet. A distance of five feet needs to be maintained from the planet. Your team will then meet back at Mission Control.

1. Record your observations of the planet. What did you see that was the same as your Earth observations? What did you see that was different? Can you hypothesize (make a science guess) as to why there were any differences?
2. List the team ideas of what you want to observe on your orbiting mission.

Mission 2: The Orbiter *(Mariner 9 in 1971-72, Viking 1 & 2 Orbiters in 1976-80, Mars Global Surveyor in 1996-present, 2001 Mars Odyssey in 2001-present, Mars Express in 2003-present)*

Using your viewers, your team will take a total of two minutes to orbit (circle) the planet at a distance of two feet. Divide the two minutes by the number of team members to get the time each person has to orbit the planet. After your orbit, return to Mission Control.

1. Record your observations of the planet. What did you see that was the same as in your reconnaissance or fly-by missions? What did you see that was different? Can you hypothesize as to why there were any differences?
2. As a team, develop a plan for your landing expedition onto the planet's surface.
    - ★ Where will you go and why? How did your team decide where to land?
    - ★ What are the risks or benefits of landing there?
    - ★ What specifically do you want to explore at this site?
    - ★ What type of special equipment or instruments would you need in order to accomplish your exploration goals? (Remember, anything you bring has to be small and light enough to bring on a spacecraft!)

Mission 3: The Lander *(Viking 1 & 2 Landers in 1976-82, Mars Pathfinder Rover ["Sojourner"] in 1997, 2003 Mars Exploration Rovers ["Spirit" & "Opportunity"] in 2003-present)*

Your team will approach your landing site and mark it with a pin, tack or masking tape. Each team member will take a turn observing the landing site through the viewer. Field of view (the area that you can see through your viewer) is kept constant by aligning the viewer so the pin is located inside and at the top of the viewer. Your team has a total of five minutes to view the landing site, so make sure everyone has time to view the site. After each member views the landing site, return to Mission Control.

1. Now that you have landed, what do you think you can accomplish at this site?
2. How long (in days) will it take you to get the job accomplished?
3. Was your mission successful? Why or why not?
4. What were the greatest challenges of this mission (personally and as a team)? What would you change for the next mission?