



# MARS Rover Celebration

## Planning for Martian Mania

A time line for participation in the Mars Rover Model Celebration

Preparation for this exhibition can be accomplished in as little as 24 clock hours. However, many teams spend much more time on it because they are having so much fun!

6 weeks out

Enter the celebration!

Research the characteristics of Mars.

5 weeks out

Investigate the features of NASA's probes and the power sources available for probes.

4 weeks out

Decide on design teams, mission, rover features and create initial draft with the criteria in mind.

3 weeks out

Build rovers using kits or craft materials.

2 weeks out

Plan your mission, and presentation. Practice sharing with other Mars Rover teams.

1 week out

Polish your presentation for the exhibition

## Six Weeks Out Plan

### 1. Enter the celebration.

This can be easily accomplished by going to the online site to register.

<http://marsrover.phys.uh.edu/>

This will bring up a picture of the Spirit / Opportunity style rover. Just move your mouse over the photo and sites will pop up. Click on the “enter the contest” site.

Keep a record of the id number that you are issued. Remember that you have to send the \$25 deposit by mail.

This is an amazing site and virtually everything you will need is here. Happy hunting!

### Hints for success

Download copies of:

- \*The Mars Rover Model Celebration Contest Rules
- \*The Mars Rover Model Celebration Judge’s Evaluation
- \*The Mars Rover Model Celebration Judge’s Detailed Instructions
- \*The Mars Rover Model Celebration Mars Free Form Judges Rubric
- \*The Mars Rover Model Celebration “Where to get Kits” information sheet
- \*The Mars Rover Model Celebration Mission Choices
- \*The Mars Rover Model Celebration Criteria for Mars Rover Presentations pages
- \*Mars Resources pages (these pages will become attached to your left hip) and “Research for Smarties” page.
- \*Sample student book. Please feel free to have your students design their own book for data collection and presentation.
- \*Mars Rover Self-Evaluation sheet

## 2. Research the characteristics of Mars

Use various sources—Internet, NASA materials, videos, CD's, DVD's and the resource list to

\*Research the features and conditions of Mars

\*Basic facts, size, gravity, temperature, length of day and year, seasons, etc

\*Atmosphere, Weather

\*Current Land Features, volcanoes, valleys, etc

\*Previous Land Features (erosional evidence of rivers, seas, wind, etc.

\*Signs of previous life, fossil evidence

\*Moons of Mars, Phobos and Deimos compare with our Moon

\*Comparison with Earth, size, mass, water percentage, atmospheric composition, etc

\*Other cool kid stuff, number of alien movies made about either planet, etc

\*Take a trip to a NASA Center

\*Invite a guest speaker to your class

\*Go online with the experts from NASA

\*Gather information critical for a Mars space probe

\*Learn how space probes communicate and conduct experiments

\*Learn why language will play such an important role in communication as we travel farther away from home

\*See how space probes are designed to survive in harsh/hostile conditions

\*Learn how rovers are designed and tested

\*Share everything you learn with someone else in a fun way

\*Research Martian missions and find similarities to your mission choices

\*Download Mars Pathfinder and Sojourner Rover pages, (MER) 2003 Mars Exploration Rover page, and Mars Polar Lander page

- \*Design a Spirit and Opportunity Rover page (The Little Rovers That Could)
- \*Find a fun way to share the information in your class
  - \*Have students teach a lesson
  - \*Read The Little Engine That Could then write a kids book called “The Little Rovers That Could” using I think I can, I think I can...
  - \*Design a PowerPoint
- \*Keep track of all your resources; you will be creating a bibliography from these sources

## Five Weeks Out Plan

### 1. Investigate the features of NASA’s probes and the power sources available for probes.

- \*Find out everything you can about these sources and others:
  - \*Solar Energy Systems— kits are great for learning about solar power and experimenting with various kinds of propulsion. Cost about \$10. Fun for races, analyzing design and propulsion strategies. Try [www.kelvin.com](http://www.kelvin.com) Detailed part numbers on the Web site.
  - \*VASIMR project NASA JSC ASPL (Variable Specific Impulse Magnetoplasma Rocket)
  - \*Ion Propulsion systems
  - \*Nuclear Power systems
- \*Find a fun way to share the information with others
- \*Develop a junk depository for tools, supplies, knives, balsa wood, sandpaper, Styrofoam, soldering iron, markers, fabric, glue, glue guns, paper rolls, buttons, spools, gadgets and gismos galore, etc.
- \*Save all receipts for budget. If you choose to purchase a kit from Kelvin or Radio Shack, the cost is not included in the budget allowance of \$25.00. If you are choosing a free design

(junk rover) there is no kit and no cost, but your expenditure maximum is still \$25.00

## Four Weeks Out Plan

### 1. Decide on design teams, mission, rover features and create initial draft with the criteria in mind.

\*Design teams work best with teams of 3 or 4 members. However if you would like to involve your class as one team, you can use the team formation sheets to assist you. Just remember during the Celebration there can only be 3 or 4 persons that present each model. The Celebration rules allow a minimum of three models per school, more if space permits. For example this might be your presentation team, with other class members functioning behind the scenes. Remember, this can be tailored to fit your needs, so be creative, and stay within the criteria guidelines. Most of all remember to have fun!

\*Use team description sheets to form teams, pay attention to learning and working styles. You don't want all the same kind of thinkers on one team.

\*Use mission choices download to decide on your team mission, or choose a mission of your own. Think outside the box like a kid! Adult thought can be redundant and boring to students.

\*Brainstorm technology and features needed in the rover to accomplish the mission.

\*Brainstorm features of the rover to handle the harsh conditions of Mars—cold, dusty, rough terrain etc.

\*Obtain consensus on 2-3 objectives for the mission.

\*Use mission choice to decide on rover's features. BE CREATIVE! Just because rovers have always looked like that doesn't mean yours has to. Customize!

- \*Scoop
- \*Camera
- \*How many wheels, tracks, etc.
- \*Satellite feed
- \*Lights for working in the dark
- \*Heaters and A/C
- \*Batteries
- \*etc.

\*Begin completing the leading questions in the Mars Rover Guide. Examine a map of Mars to locate a landing site to accomplish mission goals.

\*Create initial design or draft. Sketch initial design incorporating team's ideas. Sketch may be messy, and might have fix marks. The design will most likely be done in pencil and should have details written to the side. Components should be labeled and detailed. Students will change this design as they progress. Designs must have teacher / mentor approval before being built.

## Three Weeks Out Plan

### 1. Build rovers using kits or craft materials.

\*Remember that depository of junk your students were working on? This is where students get to use it. Introduce safety rules to students, but don't limit imagination. (Avoid sword fights with soldering irons; a spool to you might be a wrench to them.)

\*Emphasize teamwork and group decision making

\*Use various arts and craft supplies along with materials available from the store.

\*If your class is using a kit, read and follow all safety directions carefully. Supervise closely with lots of parent helpers.

\*Give formal instruction on pieces in the kit, the assembly options and steps and pitfalls. It is helpful to build one yourself first.

\*Emphasize safety using the tools—Hot glue guns, knives, blades, needles, pins, and even scissors.

\*Show a finished sample of each type of propulsion system

## 2. Review Martian conditions

\*Make sure your rovers can function in the area of Mars where they will be working. Review these conditions to see if you have the right equipment for working and translating over the surface

## 3. Review highlights of NASA's probes to Mars

\*We learn from the past. Is there something that was done, that you think you can improve, or is there something untried you would like to experience? Do the research and go do it!

## 4. Review the criteria for the Mars Rover Celebration

\* It won't do you much good to spend your time designing a really cool rover if it doesn't match the criteria. Make sure to review these as your class progresses through their design.

# Two Weeks Out Plan

## 1. Plan your mission, and presentation.

\*Begin by checking for completeness of answers to these questions from the Mars Rover Guide:

\*Name of Rover

- \*Rover Design Team Members
- \* Log in to <http://marsrover.phys.uh.edu/mocr.php> and list your model names and team members
- \*Mars Landing Coordinates
- \*Purpose (Goals) of Rover Mission
- \*Describe how the rover will overcome or handle the conditions of Mars (be specific)
- \*Explain how is the rover powered, how will it be controlled
- \*Describe how will the rover communicate with Earth and/or send back data (a good link for your language arts teachers)
- \*Begin Bibliography and documentation of resources used. Don't forget to include people you have contacted for assistance.
  
- \*Begin formation of your budget. Remember the maximum of \$25.00 (plus the cost of Kelvin kits). Attach all receipts.
  
- \*Create explanation of the jobs done by each member of the Rover Project team. Use the team design sheets to help you with this.

## 2. Practice sharing with other Mars Rover teams.

- \*Use the Criteria for Mars Rover Presentations download to explain the criteria for the presentations, consult the rubric for more details.
  
- \*Get creative with skits, props and costumes.
  
- \*Explain the rover's key features and the rover's capabilities in the extreme conditions of Mars.
  
- \*Write a script, practice the script and rewrite as necessary. Watch the time limits, the judge will. Speak slowly and clearly, including less information instead of being rushed. Videotape the presentation and watch it to find areas where the group can

improve. Use the judges' rubric to help find areas and specific ideas for improvement. Practice, practice, practice! Solicit probing and clarifying questions from others, or audience members

## The Last Week, One Week Out Plan

\*Polish your presentation for the Exhibition.

\*Evaluate rovers and presentations based on established criteria. Get an outside opinion using the rubric.