Space School

Overview
Space School is designed to take the students through a challenging week-long exploration of their own engineering talents. Focus is on teamwork, problem solving, communication and adaptation to unexpected problems. Throughout the program, students must work within a NASA budget; knowing that funds or supplies for their projects may be decreased at any time due to budget cuts, OSHA safety regulations, or any other excuse deemed necessary by the staff to make the experience truly dynamic and representative of NASA engineering.

The students of the Space Center Houston's Space School will find themselves on an engineering mission to create the means to land a rover on the surface of Mars, analyze rock samples with a Reflectance Spectrometer, loft a rock sample into Martian orbit, and return back to Earth in a rocket of their own design.

Rocket Project
Given a price list, students must decide which rocket parts they need and/or can afford to engineer a rocket which will be launched at Johnson Space Center (weather permitting). Students may choose from a wide variety of supplies including pricey pieces such as real model rocket parts or less expensive alternatives including paper towel rolls for the body tube or plastic bags for a parachute.

Robotic Rover Project
Given a set of parameters for tasks each rover must accomplish on the surface of Mars, students must decide how to create a robotic rover. Using a price list for supplies, students are able to choose from an assortment of pieces including different sized wheels and various sizes of other connecting parts. Among a few of the parameters are: the rover must be able to shine a light on the rocks it will analyze (representing their spectrometer), be able to move a rock should it be in a hard to reach area, be able to pick up and move the rock to the home base, and be able to maneuver the rover through rocky terrain. Students will also learn how to use a spectrometer so that during the rover competition, groups can analyze Martian rocks in order to find the ones most valuable to NASA.

Rover Lander Project
Creating a successful rocket and rover are only two of the objectives students must accomplish in order for their mission to be successful at Space School. Students must also create a means for their rover to land on the surface of Mars ensuring the protection of its precious payload. Working once again with a budget from NASA,
students choose supplies and design a Lander which will protect the fragile cargo of an egg from cracking. Landers must withstand the impact from a 3-story drop and must reach a predetermined landing site.

**Lofting Project**

Students are challenged to engineer an apparatus which will be able to carry all of its rocket pieces safely upwards 2-stories at a 60 degree angel of ascent. Given a price list of supplies, students choose and design their ascent vehicles methodically and through much problem solving.

**Student Presentations**

Communication is a very important skill for any professional. Each group is given a unique team binder with information specific to the needs of that group. They must present the information they possess to the other groups so that all teams will have the necessary information to accomplish their rocket, rover, landing and lofting projects. Therefore it is important that each group sift through the mountain of information they have been given and relay it to the other groups in a timely, understandable and memorable way. Since the other teams do not have the same information, if a presentation is not well done, all groups will lack the information needed to perform their tasks for a successful mission. Students are evaluated by all teams and Space Center Houston administration for presentation style and content knowledge of the subject.

**NASA Tours**

Students are given the opportunity to see the real NASA in action. Several tours are given at Johnson Space Center highlighting both Mars and project related themes. Students will visit the historic and current Mission Control Centers and the Space Station Mock-up Facility which houses life-sized models of the International Space Station and Space Shuttle used for astronaut training. Students may also see astronauts training for Extravehicular Activities (EVA) in the Neutral Buoyancy Laboratory, a very large pool used to simulate the microgravity astronauts will encounter when spacewalking. In addition, students may see up-close the experimental vehicles designed at Johnson Space Center, known as the X-vehicles, as well as the rockets used in the early space program. The Mars Yard is also a site of great interest to the students as it is used by NASA for Mars experimental vehicle and spacesuit testing.

**NASA Experts**

Students are immersed with information about the space program, and Mars. Not only through students’ presentations of the pertinent information needed to complete each task, but also by NASA experts. Students may hear presentations on several topics, some of which include: Space Exploration, Rocket Propulsion, Flight Controllers and the Space Program, the International Space Station, Robotics and Space Physiology.