

Dear Educator,

September 2004

As the exciting events of NASA's exploration of the solar system are unfolding – twin robotic geologists roving on the surface of Mars, an orbiting explorer studying Saturn and its magnificent moons and rings, and more – compelling new discoveries are being made that are changing our understanding of our planetary neighbors. Where do we come from? Where are we going? Are we alone? Clues to help solve these mysteries are scattered among the planets, moons, comets, and asteroids that make up our solar system. Evidence of the earliest days of the solar system may exist in rocks on the cratered surfaces of Mercury, Mars, and Earth's moon. Chemical clues to our origins may linger in the icy hearts of comets or in the hazy atmosphere of Saturn's giant moon, Titan.

In the next few years, an unprecedented fleet of robotic spacecraft will continue to explore other these distant worlds. These current events offer unique “teachable” moments that can draw student interest. We have put together a collection of educational materials for use in your classroom to draw attention to the worlds we are studying and the challenges of getting there. We've packaged these materials with an “Extreme Exploration” theme – intended to highlight the harsh environments of the planets and bodies in our solar system, and the technological challenges of building and sending robotic missions to explore them.

For example, when comets are far from the Sun, they are only about 6 miles across – but when they travel closer in, the cloud of gases they emit can swell larger than the size of Jupiter! Imagine flying through so much dust, as the Stardust spacecraft has done in order to capture cometary dust particles to bring back to Earth. Traveling to Mercury, the closest planet to the Sun, also poses hazards that the MESSENGER spacecraft has been built to withstand, requiring adaptation to both the extreme cold of space and the extreme heat of being so close to the sun. The Mars Exploration Rovers had to slow from 12,000 mph to 12 mph in just six minutes in order to survive a landing on the planet Mars. Titan, the mysterious moon of Saturn, is the only moon in the solar system with an atmosphere thicker than earth's, and is being studied by the Cassini-Huygens spacecraft.

In this education package, the Solar System Exploration Timeline mini-poster contains a summary of the major mission events in the next few years, many of which are likely to draw the attention of the public and of your students. We've included a selection of posters, lithographs, and materials related to NASA's current exploration of the solar system.

We've also prepared a collection of science, technology, engineering, and mathematics standards-based activities for use in K-4, 5-8, and 9-12 classrooms that you can use to support your teaching about the solar system, and also tie in to current mission events. These have been selected by a diverse group of K-12 educators experienced in delivering solar system concepts using NASA materials. They considered criteria such as: addressing of the national content standards for the grade range, conceptual appropriateness for the age group, need in the classroom, engaging for students, practicality for teaching, taking full advantage of the mission timeline to help add incentive to use of the lesson, and balance in the whole set of activities. These can be found on this CDROM, and are also available on the web at <http://solarsystem.nasa.gov/educ/lessons.cfm>.

We hope this information can make learning science more interesting and engaging to your students. If you would like other copies of the Extreme Exploration education packets, please contact NASA CORE (<http://core.nasa.gov>). You can follow the full NASA story as we explore Earth, Moon, Mars, and Beyond at <http://www.nasa.gov>.

Sincerely,

Dr. Ellis Miner and Ms. Leslie Lowes
NASA Solar System Exploration Education and Public Outreach Forum Co-Directors