NASA/Jet Propulsion Laboratory
Pluto Express Preproject
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Pluto Express Preproject Educational Outreach Bulletin

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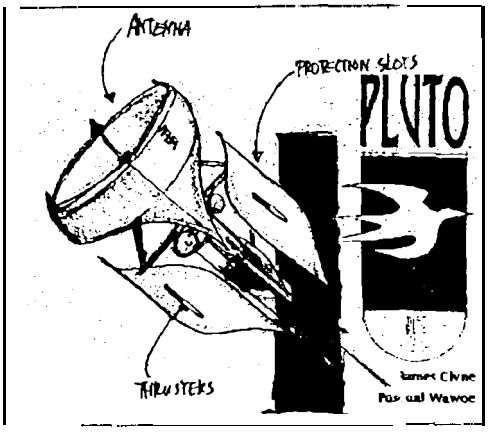
Partnership with the Art Center College of Design - Students Design Pluto Spacecraft

ıe science rationales for a mission to Pluto are evident. The urgency for such a mission exists :cause as Pluto cent inues on its journey away from the Sun, is believed that its atmosphere ill collapse or decay, eliminating the possibility of studying its composition and vertical temperature and pressure structure. But the real justification for this mission exists in the phenomenal opportunity it affords for rethinking the way wc explore. space, the way we educate our youth, and the way we perceive our place in the universe The development of the Pluto Express program has aheady resulted in technological advancements in many areas including composite materials, computer chip design, and communications



One of the student designs for the Pluto Express spacecraft

Pluto Express has also made significant and unexpected strides toward making the concept of how we explore space more accessible to everyone. The Pluto Express educational outreach efforts have involved over 100 students from universities all over ıe country in hands-on roles working on designing the mission. Many hundreds more have anticipated in Pluto Express educational programs and hundreds of teachers have attended :acher training workshops sponsored by the roject. But the most unique example of student ıvolvement has been with the Art Center :ollege of Design in Southern California. Art :enter, one of the nat ion's premier schools for esigners and artisans in all fields, is known ıroughout the world for their innovative and evolutionary designs of automobiles, ·ansportation systems, and many other roducts. For thirteen weeks ending April 20,

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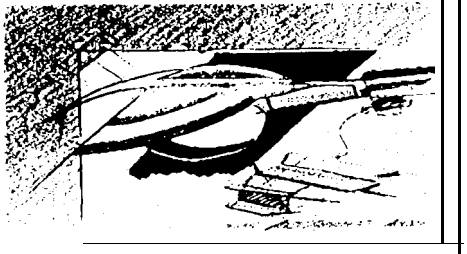
Educational Objectives

1To UNDERSTAND why we want to explore Pluto.
2 T'o understand HOW spacecraft are designed.
3 To IDENTIFY the challenges of spacecraft design
4 To SEE how students can make substantial contributions to the space program.
5 To DESIGN a spacecraft of your own.

Kcy Questions For

I Why is it difficult to design a spacecraft to go to Pluto?
2 What are the conditions at Pluto? Is it hot or cold?
3 Why is it important we get to Pluto soon?
4 Why is it important to consider what the spacecraft looks like?
5 Which of our own human senses are represented on spacecraft?
6 What name would you give the Pluto Express spacecraft?



1995, sixteen design students from the Department of Transportation Design at Art Center worked in tandem with the Pluto Express Spacecraft Design Team to develop options for a revolutionary new design for the spacecraft. Eight teams of two students each produced their own visions of what the spacecraft should look like. Each team had to follow some strict design criteria, but once those constraints were satisfied, they were free to explore their imaginations,

The end results were remarkable! The students produced half-scale models and beautiful artwork to accompany their designs and presented their visions at JPL. A video has been produced based on those presentations to help teachers share the excitement generated by the project with their own students The designs all had themes which helped to capture the imagination. One team had an aquatic theme and designed their spacecraft to look like a horseshoe crab. Another team thought a spacecraft was much like a beetle, with its hard outer shell and delicate insides, designed to last for many years thorough many challenging environments. Other teams chose a botanical theme, likening the spacecraft and its unfolding journey to that of a flower blooming. In his preliminary assessment of the student designs, Hoppy Price. leader of the Pluto Express Spacecraft Design Team, found many innovative and viable design features that had not been considered before. It is wonderful that these new ideas that challenged the thinking of spacecraft engineers came from art and design students! It is hoped that the actual spacecraft will incorporate many of the feat urcs developed by the students. The models will be on display in the JPL museum.

Video Available

A **video** has been produced showing the Art Center College of Design student designs for the Pluto Express Spacecraft. The video includes interviews with the students and project personnel and contains views of the students' models. It is available in a 10 and 26 minute version. It would be a good exercise to show your class the video and follow it with an activity for students to design their own version of the spacecraft. Contact the Pluto Express Educational Outreach office for copies of this

The Pluto Mystique

Pluto has captured the imaginations of many since its discovery by Clyde Tombaugh on February 18, 1930, sixty-five years ago. People throughout the world sent letters to Lowell Observatory suggesting a name for the newly discovered Planet X. The name for Pluto is credited to a Miss Venetia Burney of Oxford, England who, 11 years old at the time, cabled the **Observatory with her suggestion shortly after the initial** news of the discovery reached the world.

Since that time, Pluto has represented the unexplored, the last world in a vast solar system brought closer to us by the Surveyor, Pioneer, Voyager; and Galileo spacecraft. And with the discovery of Phrto's moon Charon in **1978** and an atmosphere around Pluto in 1988, the mystery deepened as we became aware of the only double planet in our solar system In fact, Pluto now seems more closely related to the newly discovered worlds of the distant Kuiper comet disk than to the other planets. In onc of the design options for the Pluto Express mission, we could send back to Earth the first close-up views of Kuiper Belt objects.

There are so many benefits to student-centered programs such as these. With direct involvement of students with our spacecraft design teams, they have unparalleled opportunities to practice their skills in the context of a cutting edge, high technology, real-world, out-of-this-world program. The results of this project have provided interesting and innovative designs for robotic, interplanetary space travel that are constrained by real-world technology limitations and financial constraints, yet are aesthetic, beautiful extensions of our own senses into space. But one of the most important benefits of projects like these is the excitement and enthusiasm they bring into the engineering workplace, which has been so depressed in recent times by workforce and budget reductions.

Pluto Express represents a dynamic and challenging scientific mission, but it also represents a means to motivate the human spirit to achieve the best it can offer and to gain perspectives that can help us better appreciate the sacred place on which we live - Earth

PLUTO EXPRESS

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