A SUCCESSFUL PLANETARY SCIENCE "SPACE" EDUCATION PROGRAM FOR STUDENTS IN GRADES 3-8; Jo Ann Merrell, Dick Kenealy, Doug Nash, San Juan Institute, 31872 Camino Capistrano, San Juan Capistrano, CA 92675

San Juan Institute (SJI) has developed and is successfully carrying out a new space education program for elementary school children that emphasizes planetary science. Since inception (late 1991), SJI's "SPACE" (Satellites, Planets, Asteroids, Comets, Earth) Education Program has given over 6,000 kids their first taste of planetary science and how scientists study the planets and solar system. The approach used at SJI centers around providing elementary teachers with a support program of class field trips and teacher workshops in space science that excites students to learn more about planets and the solar system.

PROGRAM OBJECTIVES:
• To train and support elementary school teachers in their role as science teachers by using planetary science as the principal topic.
• To provide a means by which students can experience planetary science in a manner that will excite them, and motivate them and their teacher to expand their experience.
• To be a continuing resource for elementary and middle schools in the area of planetary space science.

HOW SJI'S PROGRAM WORKS:
• Class field trips in a non-traditional format, using the 150-seat auditorium at SJI. Occasionally, we make presentations at schools.
• Teacher workshops at SJI associated with SJI science conferences.
• Utilizing up-to-date NASA research and public information material.
• Staffed by experienced science teachers and research scientists.

RECORD OF SUCCESS:
• In two years, a total of 6300 kids (from ~50 schools throughout southern California) have been introduced to planetary science through the SJI Field Trip Program.
• 120 teachers have participated in SJI Educators' Workshops.
• Current field trip schedule is booked solid through June '94, involving another 800 children.

PROBLEM AREAS THAT NEED TO BE ADDRESSED:
• Insufficient operating funds, limiting SJI's ability to achieve its capacity to reach more kids with planetary science field trips, hold more teacher workshops, and distribute more classroom materials.
• Diversity in cultural background of students, presenting challenges in overcoming a broad range of preconceived ideas and notions that are hurdles to learning science.
• Special needs of ESL (English as a Second Language) and Special Education children.
• Lack of planetary and general space science education on the part of most elementary school teachers.

METHODS WE HAVE FOUND SUCCESSFUL: When children become excited about learning a particular subject, good teachers will follow their lead by searching out resources and opportunities that help students to learn. San Juan Institute has found that, with modest funding (~20 K/yr.) and a
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lot of volunteerism), planetary science can involve the teacher and students in several ways that have proven to be very successful.

A "Planetary Journey Through the Solar System", is SJÍ's first interactive program that has brought 2700 students to the Institute in the '92-'93 school year alone. We are now adding a second program, "Exploring Planets With the Electromagnetic Spectrum", and have reservations for field trip visits to our Institute from teachers that will bring over 3000 children to SJÍ during the '93-'94 school year.

These two field-trip programs provide an interactive visit to SJÍ for class groups of up to 80 children. A typical field trip involves an interactive demonstration, audio-visual-aided lecture, question-and-answer period, and a walk-through of laboratory facilities. SJÍ has taken its lead from the Nation Science Teachers Association and their recommendations for science inquiry at the elementary level. In attempting to be as much hands-on as possible in a laboratory/office setting, SJÍ has developed an interactive approach. For the demonstration and interactive parts of the field trip, the approach combines the requirement created by the institution's environment to have the children in a seated, assembly configuration; yet, maintain an atmosphere of "What If?", which young curious minds demand. This has worked quite well.

The prime elements that maintain this balance are: having demonstrators who are knowledgeable and experienced enough to handle the wide-ranging direction of children's questions; using interesting materials (such as rocks and meteorites) that are passed around to be handled for the children to make comparisons; clipboards with worksheets (which they can take home); and simple equipment (colored filters and rainbow glasses) that allow the kids to participate in the experiments being demonstrated. The assembled class talks with and ask questions of a working planetary research scientist, giving the kids an opportunity to better understand what a "scientist" actually does.

SJÍ provides a learning experience that is affordable. We serve a busload of children (70-80) at each presentation, which takes two hours. We have so far offered these field-trip experiences at no cost to the school. However, beginning July 94, a fee of $50 will be charged for each field trip. We have worked with the teachers to make the experience one that the children will remember, through follow-up materials given to the teacher. We have also worked with ESL and Special Ed. teachers to adjust the program to fit their needs. All this has been done with emphasis on planetary science and the solar system.

Through Educator Workshops, held in association with the many research science conferences taking place at SJÍ, we work to educate teachers on current findings in space and planetary science, and inform them about new technologies (such as computer visualization) that can be applied to teaching. At these workshops, teachers are given classroom materials and hands-on lessons ready to be presented to the children.

The response from teachers for both of these programs has been very positive. An ongoing evaluation program is in place: We get regular written feedback from the teachers after a field trip using a mailback questionnaire. And, we are working with the University of California Irvine Social Ecology Department on a formal evaluation program. We use the feedback to adjust the program content, pace, or other needs where indicated. Based on our experience, we think SJÍ's SPACE program is a success, and could be a model for others to follow.