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MUSEUM IN A SCHOOL
(REACHING THE UNREACHABLE AUDIENCE)

Final Report

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Final Report

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I. Introduction

SciTech, an interactive science and technology center located 45 miles west of Chicago, is dedicated to providing hands-on and minds-on experiences that explore the spectrum of science and mathematics. SciTech opened at its present location during the summer of 1990 in Aurora, a changing community with a large minority population. Since then, SciTech has received over 331,000 visitors from the entire Chicago metropolitan area. There are now more than 250 exhibits housed in the museum. SciTech has grown quickly in part due to the strong volunteer support from the research and development corridor population it serves, as well as through international ties. SciTech has become known as an innovative force in the science museum community for its original exhibits and unique youth and school programs. SciTech's traveling outreach program, "Museum in a School," has served over 391 public and private schools in 111 districts in the Chicago metropolitan area, and has reached over 3,099 teachers and 98,837 students throughout its history. This program serves a wide variety of students, including bilingual, economically depressed, and learning impaired. SciTech is concerned with every American's need for increasing basic science literacy.

II. Completed Goals and Objectives

In the original grant, SciTech proposed to take the "Museum in a School" program to selected rural, urban, and suburban schools in low-income areas in order to reach the audiences that do not normally visit science museums.

The "Museum in a School" program has served over 391 schools in the Chicagoland area and has reached over 3,099 teachers and 98,837 students throughout its history. The grant from the Department of Energy has provided funding for 78 schools and over 19,000 students.

DISCLAIMER

The following objectives were stated in the grant and have been successfully met.

Through this grant, SciTech has been able to:

- Stimulate curiosity in science and mathematics.
- Allow students an opportunity to enjoy science and mathematics and give them an experience using science process skills, thus making them uninhibited by science and mathematics.
- Complement the schools' formal teaching program by providing an informal hands-on approach giving students a well-rounded experience in science and mathematics.
- Provide teachers a role model for learning in an unstructured setting and to model inquiry-based learning techniques.
- Reach across different minority groups, including those currently underrepresented in math and science-related careers.
- Bring the museum to the parents of the unreachable audience, thereby encouraging public science literacy.

III. Format of Program

SciTech's "Museum in a School" program gives students the opportunity to visualize, experiment with, and understand science and mathematics through hands-on discovery, while giving teachers an opportunity to observe and implement inquiry-based learning techniques. This program brings ten to twelve interactive exhibits to the school for an entire week during which teachers get a new perspective on science and mathematics teaching techniques and methods, and students explore new concepts through hands-on experiences. Each class spends two one-hour sessions with the exhibits, a "Discovery Session" and an "Explainer Session." The "Discovery Session" allows students to discover scientific concepts through free exploration of the exhibits. The "Explainer Session" is spent with a SciTech representative who facilitates student understanding of the concepts.

Exhibit Delivery and Set Up

On the first day of the "Museum in a School" program at a particular school, a set of 10 to 12 exhibits is delivered and set up in the school, either in a Learning Resource Center (LRC), library, or similar dedicated room. The room is selected by the school personnel to accommodate the space needs.

Teacher In-Service Training

After the exhibits are set up in the school, a training session is held for the teachers who will have students participating in the week-long program. The teachers are introduced to the exhibits and given training on the principle of science behind each exhibit. A set of program materials, including general

concepts, teacher notes, and student activity sheets, are also reviewed. Each class is scheduled for a free discovery session with the exhibits and for an hour-long Explainer session directed by a SciTech-trained Museum Educator.

Discovery Session

Individual classes begin to visit the exhibits one hour at a time. Each class comes to the LRC and is divided into cooperative learning groups of 2 or 3 students each. Each group is then assigned to one exhibit. The students are instructed to read the exhibit sign and use the student activity sheet to explore the exhibit together through cooperative learning. The activity sheets encourage the students to explore, ask questions, and form their own unique answers. After about 5 minutes, the teacher signals to the groups that they should move to the next exhibit. This continues for one hour until all of the students have experienced each exhibit. The teachers are also encouraged to participate in the free discovery session. Parent volunteers are asked to assist the classes.

Explainer Session

During the last two days of the week, each participating class returns for a second one-hour session with a Museum Educator from SciTech. During this interactive session, students make discoveries about how the principles connect to the general topic, as well as to their everyday lives. The Museum Educator brings additional activities to reinforce the concepts that were introduced by the exhibits and to stress the importance of these principles in the everyday lives of all Americans.

Through these activities, we have achieved our objective of increasing the student and teacher understanding that science and mathematics skills are useful for everyone, not just the scientific community. We have also completed the goal of involving students actively in hands-on experiences and group learning as a model for further learning at school and in their everyday lives.

Parents' Night

An important component of this program was to incorporate a "Parents' Night" at the school to generate family involvement in the students' experience and for the parents to see for themselves that the principles of science or math demonstrated by the individual exhibits are accessible to them, as well as to their children. The several schools that participated in hosting a Parents' Night tried to tie the evening in with another function at the school in order to generate better attendance. The parents that attended were extremely pleased with the program and had heard great reviews from their participating children. The interesting outcome was to see the children "teaching" their parents about the science principles they had learned during their classes and the excitement that was being generated by all who attended.

IV. Resources Utilized

Since all grant funds were depleted, additional resources were used to assist in the delivery of this effective program, including the ASK (AT&T Science for Kids) project. The goal of this project was to stimulate young people, mostly Hispanic, to take an interest in science and mathematics and to introduce them to the technological world. A group of AT&T employees who volunteered for this program was extremely beneficial to the project in many ways. They were instrumental in raising funds to match the grant dollars for several schools participating in the program. This group also proved to be a valuable asset in the evaluation of the program by giving constructive feedback on program delivery, as well as exhibit effectiveness and age-appropriateness of written materials, such as exhibit signage and student materials.

Old Second National Bank, a local bank in Aurora, also partially sponsored some schools in the community by matching DOE funding. SciTech also assisted in the funding and development of this program by offering free family passes as an incentive for family involvement.

V. Evaluation of Program

Teachers and students have been and will continue to be our chief evaluators of the effectiveness of the exhibits. We currently use and will continue to use written forms for the teachers' evaluation of each exhibit set and its components, its effectiveness in teaching, the students' enjoyment of the experience, and recommendations about the materials provided.

Through the use of the returned evaluation forms and effective communication with participating teachers and students, the "Museum in a School" exhibit sets have been modified and improved to provide the best possible experience for all involved. Classroom teachers were given an opportunity to evaluate all parts of the program, including each exhibit's appearance, clarity of purpose, understandable instructions, and age-appropriateness. Teachers also evaluated the signage and checked for simple, concise written directions at appropriate reading levels. This information was looked at periodically and revisions were made to the exhibits when they proved to be beneficial to the program.

Several Explainer sessions were videotaped for later viewing to observe the students' interaction with the exhibits and the effectiveness of the Explainer session. The tapes were reviewed to discover if the students seemed to have learned anything from the exhibits during the Discovery session. The students clearly seemed to have remembered specific exhibits which caught their interest

and many had written down questions for the Museum Educator to answer. The students had no trouble understanding what was going on during the Explainer session, although some said that they had not understood the exhibit until it was explained to them. When asked if they had read the sign or used the student activity sheets, many of these students replied, "No." It was apparent from the learning that was taking place and the students' interaction with each other that cooperative learning was effective.

VI. Dissemination and Replicability of Program

In the world-wide network of science centers, SciTech is regarded as a leader in generating new ideas and many original exhibits and exhibitions. SciTech feels that this teaching model is of great interest to educators in the community, as well as nationwide. A session regarding the "Museum in a School" program, "Think Like a Scientist" exhibit set, was presented at the Association of Science-Technology Centers (ASTC) conference and the Illinois Science Teachers' Association (ISTA) conference where all materials developed, including exhibits, activities, and instructions were made available to interested parties. This program can be easily replicated for further enhancement of science literacy in other target areas. The format of this program is currently being used as a role model for a collaboration between SciTech and the Shedd Aquarium, Chicago, in the development of an exhibit set on "The Physics of Aquatic Animals," which has been funded by the Illinois State Board of Education. The format is also being replicated in a statewide collaboration between science centers in Springfield, Peoria, Aurora, Rockford, and Carbondale, Illinois (SPARC) which is developing a set of exhibits called "Illinois' Wild Weather" and funded by the Illinois State Board of Education.