RESEARCH TRIANGLE SCIENCE AND MATHEMATICS PARTNERSHIP: A MODEL OF BUSINESS AND INDUSTRY COLLABORATION

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BACKGROUND

The Research Triangle Science and Mathematics Partnership is a public-private partnership that provides training, support and resources necessary to transform science and mathematics instruction into participatory, "hands-on" explorations of nature and technology.

This successful project began as a cooperative pilot effort of North Carolina State University (NCSU), the Wake County Public School system, and local industry in 1988-89. The partnership now serves 6 school systems, over 120,000 children in 109 elementary schools, 36 middle schools, and 24 high schools. We are currently reaching over 50% of the elementary schools, about 35% of the middle schools and are developing strategies for expanding into the high schools.

The Partnership brings together parents, students, business and industry, school administrators, universities and community colleges, and public officials to plan and implement relevant effective education reform.

The Partnership has three mandates:

1. To increase hands-on science and mathematics instruction.
2. To increase the pool of minorities and women preparing to enter careers in science, mathematics, and technology.
3. To promote public awareness and support of science and mathematics.

Our mission is to advance math and science education by empowering classroom teachers and students to experience success.

PARTNERSHIP PROGRAMS

One of the keys to dramatically improving science, mathematics and technology education in North Carolina is to mobilize a critical mass of educational, industrial, and community leaders, scientists and engineers, and parents to recognize that problems exist and to become involved in addressing the solutions.

Volunteer involvement is crucial to the success of this and any endeavor that includes as its mission the expansion of young minds.

SCIENTISTS IN THE CLASSROOM

The rich diversity of scientists, engineers, mathematicians, and other technically trained people in the Research Triangle has enabled the Triangle Partnership to create a database of over 850 volunteers for the *Scientist-in-the-Classroom Program*. As a result of that program, the Partnership sent 406 volunteers on 1,090 visits to 395 different teachers in the Triangle area during the 1991-1992 school year. This program was recognized as a Program of Excellence in Math and Science by the Southeastern Regional Vision for Education (SERVE) for that year.

In the Scientist-in-the-Classroom program, industry and college professionals visit classrooms to assist in the development of "hands on" instructional techniques in order to increase the student's awareness of the work of scientists and technical professionals. This classroom participation allows them to observe the problems associated with science and mathematics and offer possible solutions.

Scientific participants in our programs include any person who uses or has used mathematics, science, or technology in their work or avocation. They can be technicians, engineers, medical professionals, fire and police personnel, science hobbyists, mathematicians, scientists, agricultural professionals, educators, and many other professionals.

Volunteer training workshops are held quarterly to train volunteers in working more effectively with teachers. In these workshops, emphasis is placed on what to expect in the classrooms and assistance is given in how to develop age-appropriate lessons sensitive to the child's development and learning styles. Scientists and engineers are encouraged to use a student-centered and hands-on inquisitive approach to teaching.

SCIENTIST IN RESIDENCE

An outgrowth of the *Scientist-in-the-Classroom Program*, the *Scientist-in-Residence Program*, matches a scientist with a teacher for the entire school year. In this program, volunteers and teachers work in pairs throughout the year in implementing a variety of activities that match their skills and preferences. The original goal of matching 75 pairs for the 92/93 school year has been far surpassed, there are now 91 pairs working together to bring

science and technology into classrooms throughout the Triangle.

We are tremendously indebted to our volunteer scientists and the business, industry and university communities that support our programming efforts. The ease with which they make the transition from the work environment to the classroom underscores their willingness to serve as role models for youth and teachers.

SPECIAL PROGRAMS

The Partnership is also active in a variety of other programming areas. The Teacher in Industry program places teachers in internships with business and industries. Internships may range from a one day experience to a six week period to learn about local applications of science and technology. The teachers will use their experiences and the information gained in such a setting to develop applications-oriented, "hands-on" modules which is then transferred to the classroom for instruction.

A student "internship" program under development by the partnership could become another component of the teacher's program. This would place secondary students in technological industries for after-school and summer internships where they are paired with practicing technical professionals. The students will enroll in a Research Technician course prior to their internship. This internship experience will expose them to potential role models and to the reality of the technological workplace environment.

As part of the *Using the Outdoors to Teach Environmental Science (UTOTES) Program,* elementary schools are in the process of restructuring their school grounds to teach science. The UTOTES project provides experiences that address the various learning styles of students and foster a greater understanding and appreciation of ecology. Working cooperatively with the Science House at NC State University, four fall teacher training workshops were sponsored in 1992; *Countertop Chemistry, Physics From the Junk Drawer, Hands-On Mathematics,* and *Digging Into Earth Science.* Because of popular demand, all four workshops are being repeated this spring.

Gender/Ethnic Expectations and Student Achievement (GESA) training is designed to help both teachers and volunteer scientists make constructive changes in the way they interact with students in order to free themselves from stereotypical race and gender roles and expectations. A *Gender/Ethnic Expectations and Student Achievement (GESA)* Facilitator training workshop was held in January, 1993. Forty participants from all over North Carolina were prepared in order to train classroom teachers in their local area. *GESA* will not only raise teacher and student

expectations, but it will also help teachers recognize how they're shortchanging minorities and young girls.

An Expanding Your Horizons conference is scheduled annually for 250 7th grade underrepresented, underserved girls. The goals of the conference include increasing young women's interest in science and mathematics, fostering awareness of career opportunities in math and science related fields, and providing students with opportunities to meet and form personal contacts with women working in traditionally male occupations. This program is modeled after the EQUAL's Expanding Your Horizons program.

A brochure and promotional videotape are being developed to build community awareness of our Partnership and programs. In addition, a quarterly newsletter is distributed to update Partnership database members and to gain support of more teachers in our service area.

Tomorrow's work force is in today's classrooms. The technical skills that these students develop and the attitudes toward work that they acquire will help determine the performance of our businesses and the course of our society in the twenty-first century. The partnership is constantly exploring new programs to assist reaching our goal of empowering classroom teachers and students to experience success in science, math, and technology. We invite all businesses and community leaders to volunteer and let us help determine what their role could be in helping us to reach our goal of turning young minds toward the vast, wonderful world of science, mathematics, and technology.

EVALUATION

Qualitative and quantitative feedback of our programs reflects that we are having significant impact on teachers and students. Both are introduced to new teaching strategies and methods of using hands-on science in the classroom. Children are exposed to scientists and engineers as real people and come to realize that they too can become employed in a technology field.

As a result of our programming efforts, teachers are using more hands-on science and math manipulatives in their classrooms. Over time, we hope to be able to indicate that enrollment in advancing science and math courses has increased. Taking advanced courses will allow students to keep open doors for many career options.

PARTNERSHIP ORGANIZATION

The Partnership operates through the North Carolina Science and Math Alliance, North Carolina Board of Science and Technology in the North Carolina Department of Administration and is partially supported by the North

Carolina Legislature, private foundations and the National Science Foundation Statewide Systemic Initiative (SSI), the major effort by NSF to encourage improvement in math, science and technology education.

The Research Triangle Science and Mathematics Partnership, administered out of Raleigh, is in its fourth year. Our organization is supported by two "anchor" offices. The Durham office, located in the North Carolina Museum of Life and Science, schedules training for in-service and pre-service teachers. The Chapel Hill anchor office, located in the Center for Math and Science Education on the University of North Carolina campus, schedules scientists with teachers in the Chapel Hill-Carrboro, Chatham and Orange County area. The Partnership serves Chatham, Durham, Granville, Orange, and Wake counties.