
Teacher Success



A Report of the State Higher Education Executive Officers
Eisenhower Coordinators Network

February 1997

Increasing The Success Of Minority Students In Mathematics And Science Through Teacher Professional Development

INTRODUCTION:

ADDRESSING THE PROBLEM OF MINORITY STUDENT UNDERREPRESENTATION IN MATHEMATICS AND SCIENCE

Student achievement in mathematics and science in elementary and secondary schools is positively related to success in postsecondary education and to successful careers as adults. The 1996 report *Science and Engineering Indicators*, published by the National Science Foundation, reveals that students who completed higher levels of high school mathematics and science courses, and went to college after high school, were more likely to continue in college or complete a degree four years after high school. There also is evidence that more rigorous academic programs of study in high school lead to higher rates of employment, higher wages, or higher status jobs.¹ The importance of knowing mathematics, science, and technology are consistently emphasized as critical to competitive advantage in the current global economy. This point is underscored within the federal Goals 2000 Act where two goals specifically relate to these areas:

Goal 3: By the year 2000, American students will leave grades four, eight, and twelve having demonstrated competency in challenging subject matter including English, mathematics, science, history, and geography; and every school in America will ensure that all students learn to use their minds well, so they may be prepared for responsible citizenship, further learning, and productive employment in our modern economy.

Goal 5: By the year 2000, U.S. students will be first in the world in science and mathematics achievement.

According to a recent report by the U.S. Department of Education, to reach these national goals, *all U.S. students will require substantial improvement* in their understanding of science and mathematics. Three racial-ethnic groups in particular -- African American, Latino, and American Indian -- will require greater support because they have a greater distance to travel to meet high performance standards.² Students from these minority groups are underrepresented in mathematics and science-related fields, and they have lower achievement in mathematics and science than other students.

Considerable research has been conducted to understand why students in these minority groups are less successful than white and Asian American students in science and mathematics. A recent report by the U.S. Department of Education called *Understanding Racial-Ethnic Differences in Secondary School Science and Mathematics Achievement* addresses these questions by synthesizing national data provided

by the National Center on Educational Statistics, U.S. Department of Education and other research.³ The report found that:

- Interest and learning in mathematics and science at early ages is equal among all students, but for minority students this interest is generally not sustained through secondary school programs.
- Minority students are less likely to be exposed to adequate educational resources and activities at home.
- Overall, the school environments of minority students are less conducive to learning and students receive fewer positive learning opportunities.
- Minority students tend to spend less time on learning tasks (for example, persistent effort and active involvement in school, homework completion).
- Minority students tend to take less rigorous academic coursework in mathematics and science.
- Minority students are less likely to have strong peer group and community support to encourage them to work hard in school.

To reach these national goals, *all U.S. students will require substantial improvement* in their understanding of science and mathematics. Three racial-ethnic groups in particular -- black, Hispanic, and American Indian -- will require greater support because they have a greater distance to travel to meet high performance standards.

Source: *Understanding Racial-Ethnic Differences in Secondary School Science and Mathematics Achievement*, U.S. Department of Education, Office of Educational Research and Improvement, February 1995

USING THE EISENHOWER PROFESSIONAL DEVELOPMENT PROGRAM TO IMPROVE THE ACHIEVEMENT LEVELS OF MINORITY STUDENTS

The federally-funded Dwight D. Eisenhower Professional Development Program is designed to support professional development for elementary and secondary school teachers in core academic fields, with primary emphasis in subject areas related to mathematics and science.⁴ Recognizing the tremendous need to enhance the preparation of African American, Latino and American Indian students, a principal aim of the program is to provide "financial assistance to help teachers and other staff gain access to professional development in core academic subjects that incorporates activities and effective strategies for serving the historically underserved and underrepresented populations to promote learning and career advancement."⁵

Under Part B of the Eisenhower Program, competitive grants are made available to colleges and universities, in partnership with K-12 school districts, to improve teaching and learning through sustained, high-quality professional development for teachers. These grants are administered through the state agency for higher education. Based on current annual performance reports to the U.S. Department of Education, most states report that programs that address the needs of underserved and underrepresented

groups are a priority and given significant weight in funding determination. The table on page 3 shows the percentage of states assigning high priority to these issues.

This issue of *Teacher Success* profiles selected examples of teacher professional development programs that demonstrate how colleges and universities, in collaboration with elementary and secondary schools, are attempting to address issues of minority student underrepresentation in mathematics and science programs, and to increase the success of minority students in these academic areas.

ADDRESSING THE NEEDS OF UNDERREPRESENTED STUDENTS BY HIGHER EDUCATION UNDER THE EISENHOWER PROFESSIONAL DEVELOPMENT PROGRAM

Priorities of State Higher Education Grant Dollars	% of States Reporting
Sensitivity to the needs of underrepresented and underserved groups underlies the priorities of the state agency for higher education.	90%
Encouraging more participation in mathematics and science of underserved and underrepresented groups are among the priorities of the state agency for higher education.	93%
The needs of underserved and underrepresented groups are a direct focus of one or more of the priorities of the state agency for higher education.	70%
Services provided are specifically targeted toward teachers from underrepresented groups.	50%
Services provided are specifically geared toward teachers of students from underrepresented groups.	70%
Recruiting minority teachers in mathematics and science teaching positions are among the priorities of the state agency for higher education.	50%

Source: Thirty responses from higher education state agencies to the *Dwight D. Eisenhower Mathematics and Science Education Program, Annual Performance Report, State Agency for Higher Education*, U.S. Department of Education, Program Year 1994-95.

STRATEGY: STRENGTHEN THE MATHEMATICS AND SCIENCE SKILLS OF TEACHERS OF MINORITY STUDENTS

Many teachers who are teaching mathematics and science in elementary and secondary schools in this country are not sufficiently trained in these areas. This is particularly true among elementary and middle grade teachers, who generally do not have undergraduate majors in mathematics and science and take few inservice training courses in these academic areas.⁶ The U.S. Department of Education reports that the majority of elementary school teachers major in general education for their bachelor's degree rather than academic subjects, such as mathematics or science.⁷ While educators voice concern about the importance of knowing mathematics and science, elementary teachers devote little classroom time to these areas. For

example, results of the 1987-88 Schools and Staffing Survey show that teachers who taught at kindergarten to fourth-grade levels reported spending less than three hours per week teaching science, less than five hours per week teaching arithmetic and mathematics compared to almost 11 hours per week teaching reading and language arts.⁸ The report concluded that the amount of time elementary teachers reported spending on science education, for example, may reflect their lack of confidence in their qualifications and ability to teach science.⁹

In 1993, less than four percent of elementary teachers who were teaching mathematics and science had undergraduate majors in mathematics or mathematics education or science or science education. Only 11 percent of middle school mathematics teachers and 21 percent of science teachers majored in their fields of teaching specialization. Sixty-three percent of high school mathematics teachers and 72 percent of high school science teachers had in-field majors in 1993.¹⁰

Inadequate teacher preparation in mathematics and science is particularly troublesome for minority students. A recent report published by the Council of Chief State School Officers documents that mathematics and science courses enrolling a high proportion of minority students tend to be taught by teachers who are less prepared than those courses with low-minority enrollments.¹¹

Moreover, many teachers (particularly those at the lower levels) are not aware of the recommendations to improve the teaching and learning of mathematics and science advanced by their professional associations. For example, in 1993, 56 percent of grade 9-12 mathematics teachers were aware of the National Council of Teachers of Mathematics (NCTM) curriculum and evaluation standards, compared with 28 percent of the grade 5-8 teachers, and only 18 percent of the grade 1-4 teachers.¹² And, among those teachers who were aware of the reform recommendations, few are implementing them. This also was one of the findings coming out of the Third International Mathematics and Science Study (TIMSS) which reported that U.S. teachers were less likely to practice U.S. reform recommendations than their teacher peers in other industrialized nations. In addition, although U.S. mathematics teachers report familiarity with reform recommendations, few apply the key points in their classrooms.¹³

Teachers often cite the lack of instructional resources in mathematics and science as a principal hinderance to improving student achievement. While evidence supports the scarcity of resources to implement some of the reform recommendations, a few states are leveraging resources and at the same time exposing teachers to best practices that support minority achievement in mathematics and science. For example, in Georgia, Clark Atlanta University has used Eisenhower higher education funds to sponsor a **Statewide Conference for Teachers of Minorities in Mathematics and Science**. The need for the annual event is obvious: Georgia's minority students make up approximately 40 percent of the public elementary and secondary school enrollment, and many of the urban and rural communities -- especially those with predominately minority student enrollments -- report standardized test scores in mathematics and science below the national norm.¹⁴ Now in its fifth year, the conference goal is to give the state's educators opportunities to learn new and innovative teaching strategies and multimedia technologies as well as approaches that will help retain and increase the number of minorities in the K-16 mathematics and science pipeline.

At the 1996 conference, the nearly 500 participants (mathematicians, mathematics educators, scientists, science educators, researchers, practitioners, pre-service and inservice teachers and administrators) had access to information and materials on local exemplary programs for minorities. The agenda focused on reform strategies such as inquiry-based instruction, connecting knowledge to everyday experiences, and examining multiple assessment techniques, as well as issues that participants indicated were important to ensuring the success of minority students in mathematics and science (for example, improving parental and community involvement, strengthening teacher competencies, and building students' self-esteem).

Conference planners suggest that at future conferences, session topics may target strategies related to educating urban children and youth, using the historical contributions of minorities in mathematics and science lessons and activities, and connecting music and literature in mathematics and science instruction.

There are so many teachers who have given up on teaching math to African Americans because they would like to think that it is impossible. I think that this conference, and others like it, should be required of every teacher of minority [students].

Georgia Teacher

Participant in the *Statewide Conference for Teachers of Minorities in Mathematics and Science*, 1996

STRATEGY: MOTIVATE STUDENTS TO LEARN SCIENCE AND MATHEMATICS

Minority and other underrepresented students are not well represented in advanced coursework in mathematics and science (such as algebra II, geometry, calculus, chemistry and physics). While national longitudinal studies do indicate that minority students are increasingly enrolling in more mathematics and science courses at the secondary level, the differences between course-taking among white and minority students is still substantial. For example, in 1994 about 62 percent of recent white high school graduates completed algebra II, while 44 percent of African American students, approximately 51 percent of Latino students, and 39 percent of American Indian students did so. In chemistry, almost 59 percent of white high school graduates completed the course, and about 44 percent of African American, Latino, and American Indian students completed it.¹⁵ Furthermore, data reported by the National Science Board indicate that African American and Latino students tend to show lower achievement gains in mathematics and science than white and Asian American students even though they are taking more courses in these disciplines. Possible reasons cited were their lower enrollments in more advanced mathematics and science courses and their concentration in schools with fewer instructional resources.¹⁶

Minority students do not begin their educational experience with a lack of interest in these areas. In fact, national studies suggest that minority students' interest and achievement in mathematics and science is equal to that of other students at early ages, but this interest is generally not sustained through secondary school programs.¹⁷ The mathematics and science reform recommendations may offer solutions to motivating and encouraging minority students to learn math and science in the elementary grades and to continue taking more rigorous courses in middle and high school. Both recommendations advocate challenging academic standards; a hands-on approach to instruction; active learning by students; the use of curricula and materials relevant to students' lives; an emphasis on thinking, problem-solving, and the application of knowledge; the integration of mathematics, science and the use of technology in the classroom; and the use of assessment that is consistent with the more rigorous content and reinforces these instructional practices.¹⁸

Teacher professional development programs that apply these strategies and are aimed at minority students are offered under the higher education component of the Eisenhower Program in almost every state. Many are reporting successful outcomes. In the last issue of *Teacher Success*, we profiled an exemplary program in Texas called the **Minority Mathematics and Science Education Cooperative (MMSEC)**, which offers a statewide network of professional development programs to help teachers integrate parental involvement, cultural understanding, and contextual teaching and learning (combining theory and practice) in their mathematics and sciences courses.

To increase the number of underrepresented minorities entering professions related to mathematics, science, and engineering, educators must develop student-centered activities that encourage interest in science, and develop in elementary and secondary education students the skills and attitudes necessary for success in higher education. This is the goal of the **Science and Math Investigative Learning Experiences (SMILE) Program** developed by Oregon State University. Currently serving about 500 students each year, the program offers rural minority students in grades four through twelve academic enrichment in mathematics and science through after-school activities, weekend and summer science challenge camps, summer "bridge" programs, and field trips to local sites of scientific interest. In addition, annual visits to Oregon State University or other colleges allow students opportunities for science-related activities, tours of campus facilities, and interaction with professors and college students. And, the program has shown impressive results. In operation since 1988, 98% of SMILE seniors have graduated from high school (compared to the average graduation rate of 63% for the eight districts targeted by the SMILE program); over 80% of students who graduate as SMILE seniors have continued on to college.¹⁹

A principal aim of this school-college collaborative also is focused on preparing pre-service mathematics and science teachers to teach and support minority students, as well as strengthening the skills of veteran teachers. For example, the Teacher Advice Discussion Group, an electronic "list-serve," allows pre-service and first-year teachers from across the state to seek and receive needed mentoring and advice from veteran educators on strategies for helping minority students to succeed. Graduate pre-service teachers also work with SMILE teachers and students during weekend science camps. There, SMILE middle and high school students solve an engineering challenge designed by faculty at Oregon State University, and participate in hands-on sessions in OSU labs. Pre-service teachers are assigned groups of students and guide them through their "challenge."

A SMILE Summer Science Camp Middle Schoolers Learn About Sound and Light

Perhaps you are wondering what the math, physics, and physics research are all about and if you will be able to do them? In previous summers, many SMILE students have studied math and physics and completed the research projects, and you can do it, too. Your studies and research will help you to answer questions in two areas of physics -- light and sound. How does the eye function? What causes the particular sounds that come from musical instruments? How fast does sound travel? What is a laser and how does it work? You will be guided in your discoveries by OSU professors and college students.

In addition to experiencing the academic side of college life, you will have the chance to find out what it is like to live in a college residence -- and eat college food, of course! You will take a raft trip on the McKenzie River and visit other places of interest. You will have the time of your life!

Excerpted from *SMILE Update*, Oregon State University,
March 1996

STRATEGY: BUILD THE ACADEMIC CONFIDENCE OF STUDENTS

The expectations of teachers and parents affect student self-esteem and academic confidence. A program developed by the State University of New York at Binghamton focuses on helping teachers recognize that

their expectations of student achievement play a key role in whether students retain an interest and commitment to learning mathematics and science. **More Math for More Females** targets minority girls and their fourth- and fifth-grade teachers. During summer and fall semesters, teachers examine both cognitive and affective dimensions to mathematics learning. Using role playing and other techniques, the course helps teachers understand that the way they respond to girls and minorities may either encourage these students or cause them to question their abilities or future opportunities in mathematics. The program ends with a career day that allows students to meet successful women who are using mathematics in their jobs. It also invites parents and instructs them in ways they can support their children's learning.

Similarly in Minnesota, the **Minority Math-Science-Computer Camps** offered by St. Cloud State University provides minority and female elementary and junior high students with intensive positive mathematics and science experiences through a university-based residential summer experience. Begun in 1987, the program has involved over 1,400 students in activities that apply mathematics, science, technology and computers, and the environment to their culture and everyday lives. Summer camps are followed up with field trips during the school year to museums, businesses, zoos, and other local institutions. To enhance and supplement what they have learned, students and their families are provided information about existing programs in their areas and encouraged to participate in them. To help continue their interest in math and science, teachers are taught pedagogical strategies that have been successful with minority students and provided applicable teaching materials. Parents learn about the critical roles they play in supporting their children's study and interest in career goals in scientific and technical fields, including the requisite educational backgrounds needed to pursue these careers.

What do these programs mean to the children who have participated? According to teacher, student, and parent surveys conducted by program directors, students are demonstrating increased confidence in their abilities by taking more rigorous mathematics and science courses. Greater motivation and responsibility is evidenced in improved grades. Students' interest in attending and participating in science fairs is increasing, and they are helping their peers with homework.

STRATEGY: CREATE A COMMUNITY OF SUPPORT FOR STUDENTS

To ensure that minority students know about and have access to the full range of educational resources, community partnership is critical. In Northern California, College of the Redwoods and Humboldt State University are working with local school districts, the County Office of Education, and parental and community support groups to strengthen the academic confidence and success for American Indian students in mathematics and science. The goal of **PARITY II (Promoting Academic Retention for Indian Tribal Youth)** is to provide teachers with knowledge and teaching strategies in mathematics and science that are relevant to American Indian students and will result in retaining these students in the formal K-16 educational pipeline. The program is based on four principles: (1) learn about and respect the student population; (2) incorporate its values and interests into a relevant curriculum; (3) combine resources to enhance learning; and (4) maintain high expectations.

PARITY partners believe that multiple types of expertise are necessary to meet the needs of students. The project builds on the strengths of the diverse participants to create an inclusive, holistic curricular approach that is relevant to American Indian students. The curriculum complements the communities' social, historical and cultural contributions as well as including college preparatory level materials.

PARITY II
A SCIENCE AND MATHEMATICS ACTIVITY INVOLVING CLAMS
HUMBOLDT COUNTY, CALIFORNIA
ORLEANS ELEMENTARY SCHOOL
GRADES 2 AND 3

Marine clams are common in the bays along the coast of Humboldt County, California and freshwater clams inhabit the Klamath River and ponds in the vicinity of Orleans Elementary School. If one learns about general attributes of clams by using local species, one can learn about attributes pertaining worldwide about clams. Students will be involved in the following:

1. What do we eat when we eat clam chowder?
2. What are local examples of clam relatives?
3. What does the structure of a clam shell tell us about where a clam may live?
4. What do we observe about the length and height of the shell of a given type of clam?

In addition, the children learn about the uses of clams by Northwestern California Native Americans. For example, using hands-on activities, they learn that local tribes used clam shells to make buttons and necklaces.

Ecosystem Lesson Plan, Teacher Preparation and Credentialing, Humboldt State University, 1996

Minority students often turn to minority teachers for critical guidance and support. But these teachers rarely have targeted assistance to help them encourage and direct students to academic programs and career paths in mathematics and science. They may not have access to information about professional development programs aimed at strengthening their own instructional competence. These are the challenges recognized by an Oregon initiative called **Preparing Minority Teachers in Math and Science (TMS)** administered by the Portland Teachers Program, a partnership of Portland Public Schools, Portland Community College and Portland State University. The effort creates a statewide network among pre-service and veteran teachers of color who are interested in mathematics and science instruction. The activities target the following goals:

- Develop teacher understanding of and commitment to interdisciplinary, culturally sensitive, concept-process based curriculum, focused on real world application to science and mathematics.
- Promote the use and development of models and strategies of instruction appropriate to successful implementation of a concept-process based curriculum (including NCTM and National Science Education standards).
- Enhance the delivery model for increasing the number of minority teachers -- and all teachers -- with strengthened background or endorsement in mathematics and/or science.
- Promote awareness and integration of TMS goals, understandings and "best practices" into the Portland State University Graduate Teacher Education Program (GTEP).

"TMS provides an opportunity to enhance minority teacher enthusiasm for and confidence in mathematics and science, while building skills and offering teaching techniques. The summer training emphasizes collaborative and team-teaching, as well as parental involvement and participation in promoting interest, confidence and academic success in student math and science achievement," comments Deborah Cochrane, Director, Portland Teachers Program. Operating over the past three summers, the project staff capitalizes on lessons learned to improve and strengthen the program. For example, the following key elements have proved to be particularly effective in strengthening the instructional skills of minority pre-service and veteran teachers in math and science:

- a participation structure, workshop environment and instructional style that promote cooperative learning and teamwork rather than competition
- curriculum that integrates multicultural/multiethnic perspectives, and emphasizes access for *all* students
- careful selection of instructors (teachers with cross-cultural communication skills, or at the least, a high level of respect for cultural diversity, a willingness to learn from students, high expectations, and enthusiasm for math/science), a strong commitment to hire instructors and presenters of color whenever possible
- cooperative planning among the instructional components to envision common goals, and to build continuity so that components complement one another; frequent communication between instructors and project staff during the planning and implementation of the project
- provision of stipends to help pay for childcare and/or to offset the loss of income for the duration of the training

One great thing about these classes is that you build a network of people who are there to support you.

TMS Teacher Participant
Portland, Oregon, 1996

CONCLUSION: LEVERAGE THE RESOURCES FOCUSED ON STUDENT SUCCESS

How is a commitment to strengthen the mathematics and science skills of *all* students demonstrated? The programs supported by state higher education agencies under the Eisenhower Professional Development Program, and profiled in this issue of *Teacher Success*, include the following critical characteristics:

- The programs recognize that teachers provide many minority students with their first formal exposure to mathematics and science concepts. If teachers do not feel confident in their own competencies, these insecurities are passed on to their students. They need opportunities to work with their peers within education and with professionals outside of education to strengthen skills, and gain new ideas and strategies for motivating students in these fields. Testimonials from teachers who have participated in Georgia's Statewide Conference for Teachers of Minorities in Mathematics and Science and the Texas Minority Mathematics and Science Education Cooperative (MMSEC) relate enthusiasm and firm beliefs that the information acquired help them

to better prepare their students. Their comments provide compelling evidence to support the advancement of these types of efforts across the states.

- The programs support teachers by creating networks through which veteran and pre-service teachers can exchange good practices and learn innovative teaching strategies that encourage student interest and strengthen understanding and achievement. Participant responses from Oregon State University's Science and Math Investigative Learning Experiences (SMILE) Program and Portland's Preparing Minority Teachers in Math and Science (TMS) demonstrate that teachers are eager for opportunities to learn from each other about what works in their classrooms.
- They build community support through collaboration between colleges and universities, area school districts, museums, zoos, businesses and industries, and other community and local resources. These partnerships create opportunities for students to learn beyond the traditional classroom. For example, California's Promoting Academic Retention for Indian Tribal Youth (PARITY II) and New York's More Math for More Females build on the environment and experiences of the participating students to help them understand and appreciate the importance of mathematics and science in their lives.
- The programs seek a variety of sources to leverage scarce funding. For example, Minnesota's Math-Science-Computer Camps expanded their Eisenhower dollars with supplemental funds from St. Cloud State University and the 3M Company. In addition, families contributed what they could afford to offset some of the costs. Oregon's *SMILE* program also includes considerable corporate sponsorship (namely, American Honda, Apple Computer, Inc., Chevron, Hewlett-Packard, IBM, Nike) and support from the National Science Foundation.

The commitment of these projects is clear: garner the support of the educational community, set a funding priority and use a combination of federal, state, and local resources to ensure the academic achievement and success of minority students.

Teacher Success is a policy report published periodically by the SHEEO/Eisenhower Higher Education Coordinators Network. Your comments and suggestions for future issues are welcome and greatly appreciated.

For more information, or to obtain additional copies of *Teacher Success*, please contact Esther Rodriguez, SHEEO, 707 Seventeenth Street, Suite 2700, Denver, CO 80202-3427, Phone: 303-299-3657, Fax: 303-296-8332, e-mail: erodriguez@ecs.org.

NOTES

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2. *Understanding Racial-Ethnic Differences in Secondary School Science and Mathematics Achievement*. Washington, D.C.: U.S. Department of Education, Office of Educational Research and Improvement, February 1995. See also, Fitzsimmons, Stephen J. and Larry C. Kerpelman, Eds., *Teacher Enhancement for Elementary and Secondary Science and Mathematics: Status, Issues, and Problems*, Abt Associates,

Inc., Center for Science and Technology Policy Studies, Cambridge, MA. Washington, D.C.: National Science Foundation, February 1994.

3. *Understanding Racial-Ethnic Differences in Secondary School Science and Mathematics Achievement*. Washington, D.C.: U.S. Department of Education, Office of Educational Research and Improvement, February 1995.

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19. *SMILE Program -- High School Graduation and College Entrance Rates, 1992-1996*, Pre-College/SMILE Programs. Corvallis, Oregon: Oregon State University, 1996.

SELECTED STATE EISENHOWER PROGRAMS

SUCCESS IN MATHEMATICS AND SCIENCE OF UNDERREPRESENTED STUDENTS

ARKANSAS

State Higher Education Coordinator:

Suzanne Mitchell, Arkansas Department of Higher Education, 501-324-9300

EQUALS

Contact: Bonnie Moody, Henderson State University, 501-230-5000

CALIFORNIA

State Higher Education Coordinator:

Linda Barton-White, California Postsecondary Education Commission, 916-322-7984

FIRST -- Four Institutionalized Reforms in Science Training

Contact: S.B. Oppenheimer, California State University at Northridge, 818-885-3336

Math TASKS (Math Teachers' Assessment Strategies for Knowing Students)

Contact: Carol Langbort, San Francisco State University, 415-338-2292

The Los Angeles Mathematics Initiative

Contact: Ruth Johnson, California State University at Los Angeles, 213-343-4427

PARITY II, Promoting Academic Retention in Tribal Youth

Contact: Joyce Ksicinski, College of the Redwoods, 707-445-6742 and Sheila Webb, Humboldt State University, 707-826-5872

Mission Science Workshop Teacher Enrichment Project

Contact: Paul J. Fonteyn, San Francisco State University, 415-338-2231

South Coast Mathematics Teacher Partnership Program

Contact: Myriam Steinback, 805-0581, ext. 2423

Improving Mathematics and Science Instruction in Grades K-6 Project

Contact: Sue Parsons, Cerritos College, 310-860-2451

Oakland Unified School District/UC Partnership for Math

Contact: Pedro Noquera, University of California at Berkeley, 510-642-1493

MELT-Mathematics Educational Leadership Training

Contact: Leslie Garrison, San Diego State University, 619-357-5541

Teachers + Occidental=Bridges in Science

Contact: Chris L. Craney, Occidental College, 213-259-2767

Teaching Opportunities for Partners in Science

Contact: Dave Willson, Columbia College, 209-533-5159

Eisenhower Cooperative Applied Mathematics and Science Project of Siskiyou County

Contact: Jim Hatton, College of the Siskiyous, 916-938-5252

Mathematics Education Master's for K-8 Teachers

Contact: Carol Langbort and Jose Gutierrez, San Francisco State University, 415-338-1562

Math/Science Based Video Project

Contact: John Wagstaff, Laney Community College, 510-466-7268

Matemáticas Y Ciencias Sin Limites (MCSL)

Contact: Nancy Lee, Mira Costa Community College, 619-757-2121

GEORGIA

State Higher Education Coordinator:

Edward J. Davis, University of Georgia, 706-542-4043

Recognizing the Contributions to Mathematics by Diverse Cultures

Contact: Patricia Wilson, University of Georgia, 706-542-4547

Explorations in Geometry and Measurement

Contact: Jane Barnard, Armstrong State College, 912-921-2057

Annual Statewide Conference for Teachers of Minorities in Mathematics and Science

Contact: Bettye M. Clark, Clark Atlanta University, 404-880-8188

Teaching Mathematics and Science in Multicultural Settings

Contact: Patricia Daniel, Oglethorpe University, 404-261-1441

Internet's World Wide Web as an Alternative Teaching Media for At-Risk Students

Contact: Kwaichow B. Chan, Albany State College, 912-430-4374

Science and Math Explorations for Young Women in the Middle Grades and their Teachers

Contact: Del Preseley, Georgia Southern University, 912-681-5444

ILLINOIS

State Higher Education Coordinator:

James C. Forstall, Illinois Board of Higher Education, 217-782-7184

Preparing Teachers for the 21st Century: Integrating Computer Technology into the Teaching of Science and Mathematics in Chicago Schools

Contact: Noreen Moran, Northeastern Illinois University, 312-733-7330

Developing Teacher Leaders for Latino and Other Non-Mainstream Student Mathematics Success

Contact: Karen Fuson, Northwestern University, 847-491-3794

Growing Up in the Middle with Science and Mathematics

Contact: Sister Colleen McNicholas, Rosary College, 708-524-6830

Rural, Urban, and Inner City Computer Literacy Network

Contact: David A. Winnett, Southern Illinois University at Edwardsville, 618-692-3082

Chicago Secondary Mathematics Improvement Project

Contact: Philip Wagreich, University of Illinois at Chicago, 312-996-2448

K-12 Students as Researchers in Discrete Mathematics and Computer Science: The MATHmaniaCS Experience

Contact: Leonard Pitt, University of Illinois at Urbana-Champaign, 217-244-6027

Hands-On Physical Science Demonstrations for Teachers

Contact: Toby Ward, College of Lake County, 708-223-6601

Science and Mathematics Initiative for Learning Enhancement

Contact: Kenneth Schug, Illinois Institute of Technology, 312-567-3438

Project MATH: Good Beginnings (1997)

Contact: Carol A. Thornton, Illinois State University, 309-438-7503

Expanding and Sustaining Project-Enhanced Science Learning for Urban Teachers and Students Using Collaborative Technology

Contact: Louis Gomez, Northwestern University, 847-467-2821

KENTUCKY

State Higher Education Coordinator:

Wendell Cage, Kentucky Council on Higher Education, 502-342-4253

Strengthening Underrepresented Minority Math/Science Achievement

Contact: Robert E. Cinnamon, Brescia College, 502-686-4279

Math/Science Institute

Contact: Valina Hurt and Dianne Adams, Hazard Community College, 606-436-5721

MINNESOTA

State Higher Education Coordinator:

Nancy Walters, Minnesota Higher Education Services Office, 612-296-9777

FAST Camp

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Addressing Minority Student Underrepresentation

Contact: Robert C. Johnson, St. Cloud State University, 612-255-4928

STREAMS: Summer Teen Research Encouraging Attitudes in Mathematics and Science

Contact: Julie Larson, Bemidji State University, 218-755-2791

Increasing Science Expertise on the Grand Portage Indian Reservation

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CONNECTIONS: Encouraging Hispanic Student Involvement in Math and Science through Algebra Enrichment

Contact: Richard Fuller, Gustavus Adolphus College, 507-933-7311

Morris Minority Mathematics Educational Encouragement

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Minority Math-Science Computer Camps

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Using Environmental Investigations to Interest 9-12 Year Old Girls in Science

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Urban Network Cultivation Project

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More Math for More Females

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Seneca Nation Science Education Initiative

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Inservice Program for Underrepresented Students in the Middle Schools and High Schools of Cleveland County

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School Science Leadership Teams\$Teachers Educating and Managing Science

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Elementary Science Leadership Program

Contact: Vallie Guthrie, North Carolina A&T State University, 910-334-7500

Communicating in Mathematics and Science to Improve Student Performance Using a Teacher Leadership Model

Contact: Sarah B. Berenson, North Carolina State University, 919-515-2011

EQUALS Training for Anson, Richmond, and Scotland Counties

Contact: Carl Howalds, Richmond Community College, 919-582-7000

GESA/EQUALS: An Inclusive Approach to Excellence in Science and Mathematics

Contact: Patricia S. Bowers, University of North Carolina at Chapel Hill, 919-962-2211

Saturday Academy for Teachers

Contact: Kenneth A. Cutler, University of North Carolina at Chapel Hill, 919-962-2211

Science and Archeology: Native American History and How We Know What We Know

Contact: Russell J. Rowlett and Lin Dunbar-Frye, University of North Carolina at Chapel Hill, 919-962-2211

OREGON

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Promoting Interdisciplinary Science, Mathematics, and Technology through Real-World Problem Solving

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Preparing Preservice Science and Math Teachers to Teach Minority Students (SMILE Program)

Contact: Miriam Orzech, Oregon State University, 541-737-2388

Preparing Minority Teachers in Math and Science (TMS-96)

Contact: Deborah Cochrane, Portland Teachers Program, 503-978-5444

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Environmental Education for Under-Served Students

Contact: John Carpenter, University of South Carolina-Columbia, 803-777-6920

Science Safari for Girls

Contact: Marsha Bollinger, Winthrop University, 803-323-2211

Garden Explorations: Promoting Science Participation by Girls

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Peer and Group Education: PAGE ONE

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TEXAS

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Minority Mathematics and Science Education Cooperative -- The Second Generation

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WISCONSIN

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Family Math Training: Linking Teachers and Parents for Equity in Mathematics

Contact: Linda Riley, University of Wisconsin-Stout, 715-232-1885

Elementary School Mathematics Improvement in CESA 12

Contact: John Rusch, University of Wisconsin-Superior, 715-394-8355

Teacher to Teacher: The Multicultural Connection

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