DOCUMENT RESUME

ED 302 390 SE 050 175

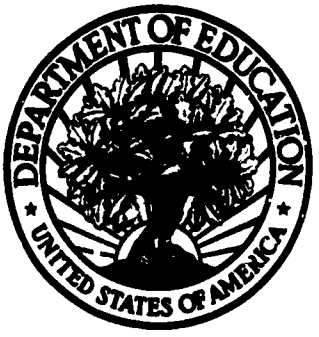
TITLE	Exemplary Projects. Mathematics-Science, Computer Learning and Foreign Languages. A Collection of Projects Funded through Title II of The Education for Economic Security Act.
INSTITUTION	Department of Education, Washington, DC.
PUB DATE	88
NOTE	213p.; Some pages may not reproduce well due to quality of print. Best available copy.
PUB TYPE	Reports - Descriptive (141)
EDRS PRICE	MF01/PC09 Plus Postage.
DESCRIPTORS	*Computer Science Education; *Demonstration Programs; Elementary School Mathematics; Elementary School Science; Elementary Secondary Education; *Federal Aid; Higher Education; Inservice Teacher Education; *Mathematics Education; Program Descriptions; *Science Education; Secondary School Mathematics; Secondary School Science; *Second Language Instruction
IDENTIFIERS	*Education for Economic Security Act 1984

ABSTRACT

This document is a collection of over 80 exemplary project summaries from projects funded in 39 states and the District of Columbia through Title II of the Education for Economic Security Act. The subject areas covered by these projects are limited to mathematics, science, foreign language, and computer learning. Each summary includes a description of the groups to be served by the project, rationale, goals, products that were produced by the project, a general program description, and the planned evaluation and anticipated impact of the project. Many of the summaries also include the names, phone numbers and addresses of contact persons and sponsoring institutions. (CW)

EXEMPLARY PROJECTS

Mathematics - Science
Computer Learning and Foreign Languages



A Collection of Projects funded through Title II of THE EDUCATION FOR ECONOMIC SECURITY ACT

U.S. Department of Education

STATE: Alabama

August 14, 1987
C. Lee

REGION: Southeast

TITLE II EXEMPLARY PROJECT SUMMARY

In those items wnere choices are to be made, circle the choice(s) that apply.

TITLE: Alabama Teachers' Space Orientation Course

PROGRAM CATEGORY: higher education; (cooperative); competitive; elementary/secondary education; demonstration/exemplary; other - please identify

This was a cooperative program developed and sponsored by the Alabama State Department of Education, the Alabama Space and Rocket Center, and the University of Alabama, Huntsville for public and private schools.

SUBJECT(S) FOCUS: (Mathematics); (Science); Computer Learning; Foreign Languages

PRIORITY AREA: (Underserved/underrepresented); partnership ((Ed-business) or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - (Government agencies) (see attacnment)

GRADE LEVEL(S): Grades 7-12 regular teachers - 4 weeks
Teachers of gifted pupils - 1 week

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)

The teachers of gifted students were included in this program because many of their students are interested and excell in science and mathematics. Their program included the standard program plus Ron Miller, a space artist and Rohes Seddon, a medical astronaut.

PROJECT RATIONALE: (National/State Priorities Needs Addressed)
The Alabama Course of study (K-12) contains one or more units on space or space related topics for each grade. The state needs assessment indicated that teachers were certified but did not always have up-to-date knowledge and motivation to teach in this area. Too few high school graduates are entering the field of science and mathematics. The low participation (7 to 10 per institute) in the ECIA, Chapter 2 Summer Institutes for the past four years emphasized the need for short-term inservice training in order to reach a larger number of teachers. The five-day workshops were designed to meet national, state and local priorities for the improvement of teachers in science and mathematics.

September 28, 1987
C. Lee

STATE: Alabama

REGION: Southeast/Region IV

TITLE II EXEMPLARY PROJECT SUMMARY

TITLE: Computer Competency Program

PROGRAM CATEGORY: Higher Education; Competitive

SUBJECT/S FOCUS: Computer Learning

PRIORITY AREA: Underserved/underrepresented; partnership (Ed-business or LEAs-IHEs; cooperative (SEA-SAHE)

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

During the period 1983-1986 at a cost of $20M, the State of Alabama purchased for its public schools approximately 20,000 computers. Seventy-five percent (75%) of the funding came as a result of the Governor's Education Reform Legislation appropriation and the balance was obtained through various other sources. With these resources, Alabama now ranks third in the Southeast with regard to computer/student ratio (1:37).

In spite of the abundant state resources allocated to the purchase of computer equipment, the state made no provisions for the training of teachers in computer competency beyond the traditional preservice and inservice programs of study. In addition, no plans existed for implementing a standardized program of study that would ensure that minimum levels of computer literacy were attained by Alabama's teacher and student populations.

The Alabama Commission on Higher Education Title II Computer Competency Program (CCP) was established for the purpose of providing Alabama's K-12 teachers with basic skills in computer knowledge using a standardized curriculum. It was anticipated also that the program would effectively interface with two initiatives of the Governor's Education Reform Legislation: purchase of computer hardware and utilization of teacher education centers established in eleven (11) geographical areas throughout the state.

GENERAL PROGRAM DESCRIPTION: The program was to be implemented in two phases; each phase was to include not only a video-taped instructional component, but also a hands-on instruction component based on the State Department of Education's Curriculum Guide for Computer Literacy, Computer Education, and Computer Science.

Phase One of the program was implemented in the 1985-86 school year. The objective was to provide inservice training for an estimated 22,000 K-8 teachers in the state. Twelve (12) competitive grants were awarded to state universities, one (1) for the design of the video-taped instructional package and eleven (11) for providing the hands-on experience. The State Department of Education contributed significant staff resources and funding for printed materials.

Phase Two of the program was implemented in the 1986-87 school year. The objective was to prepare K-12 teachers and administrators to integrate computer activities into instructional and administrative programs. Building on the computer literacy component of Phase One, instructional programs were developed in the use of Logo, Word Processing, and Data Bases with applications appropriate to teaching at all levels from kindergarten through high school. For administrative personnel and members of Boards of Education, one tape was developed on the legal rights and responsibilities of school systems, focusing in particular in the area of copyright laws.

Five competitive grants were awarded to state universities, one (1) for the design of the video-taped instructional package and four (4) for the implementation of staff development programs for computer education coordinators.

Due to the decrease in federal funding for this program in 1986-1987, monies were not available to provide the hands-on instruction component initiated in Phase One. Instead, approximately 150 Computer Coordinators selected by the school superintendents received specialized training in the materials developed. It was their responsibility to supervise/coordinate instruction at the local level. Coordinators began their work in August 1987.

PRODUCTS: Thirty-four (34) video-taped instructional programs were developed. Twenty-nine (29) comprised the instructional package of Phase One which introduced computer skills; four (4)

comprised the instructional package of Phase Two. All tapes were reviewed by the State Department of Education before being shown on Alabama Public Television. Individual school districts were encouraged to copy the programs for further viewing.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

The CCP program has been evaluated in terms of 1) its effectiveness in achieving cooperation between agencies and organizations of government and the private sector and in the utilization of existing state resources, 2) its impact on the value added to teacher knowledge and attitude about computers, 3) its ability to reach the target population, and 4) its cost effectiveness as an instructional delivery system.

The Cooperative Agents. Effective implementation of the Computer Competency Program required support at every level of the state educational system.

A committee representing School Superintendents, K-12 teachers, State Department of Education staff, and Deans of Education were involved in the development of the project.

Thirteen (13) institutions of higher education, both public and private, responded to requests for proposals and were totally responsible for the development of the videotapes and implementation of the personalized instructional component.

The State Superintendent of Education issued a memorandum (November 1985) to all City and County Superintendents describing the CCP and requesting the participation of all Local Education Agencies.

Local School Superintendents responded positively. All but two of the 131 school districts appointed Computer Education Coordinators to attend workshops and serve as advisors/instructors at the local level. Their participation during this two year period insured that the program would reach the target population. Teachers were encouraged to attend and their participation became part of their individual professional development programs when requested.

A dedicated State Department of Education (SDE) staff member worked closely with the project from the beginning to insure that the objectives of the Curriculum Guide on which the program was based were attained. In addition, the SDE provided the

publication materials for Phase One and has distributed approximately 10,000 copies of Phase One tapes to inservice centers, school systems, and teachers.

The Alabama Education Television Network provided free time for broadcasting the tapes. Phase One tapes were broadcast twice during January to March 1986 and the station continued to broadcast specific components throughout the 1986-87 school year. The Network committed free broadcast time in September 1987 for the Phase Two tapes.

Value Added to Teacher knowledge and attitude. All K-8 teachers were invited to participate in a testing program designed to measure the effectiveness of the CCP tapes in improving attitudes toward and knowledge about computers. A Computer Competency Survey was administered to teachers before and after viewing the series of programs and again following the hands-on instruction. Results indicated that gains had been made both in attitudes toward using computers and knowledge about computers.

Population Served. An estimated 20,000 K-8 teachers participated in Phase One; it is anticipated that an equal number of teachers as well as administrators will participate in Phase Two. One hundred eleven coordinators were trained to work at the local level. Through the use of public television, the distribution of tapes throughout the state by the SDE, the duplication of tapes at the local level, and utilization of tapes at the eleven (11) inservice centers throughout the state, it is impossible to determine the numbers of teachers, students and members of the public at large that will ultimately benefit from the program.

Cost Effectiveness of the Delivery System. A budget of $485,000 was committed to this project. Based on the program budget of Phase One, the cost of providing a teacher with sixteen (16) one-half hours of instruction was less than $20.00. In our view, this model of video-taped instruction combined with classroom application has exceeded expectations in cost effectiveness.

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Title II Exemplary Elementary/Secondary Project in Alaska

ABSTRACT

The Alaska Math Consortium strives to strengthen the math skills of all Alaska students through teacher training and exchange of successful classroom practices. Teachers from member districts participate in in-depth training which prepares them to lead efforts to enrich math programs in their school districts. The program relies on current math instructional practices being promoted nationally, modified to meet the unique Alaskan setting, employing available technologies.

The Math Consortium is a collaborative effort between Alaska school districts, the University of Alaska, and the Department of Education. Each institution provides human and financial resources to support the Consortium's training efforts. The Department of Education provides statewide coordination and promotes training opportunities and activities. A combination of LEA & SEA Title II and general funds are used to fund the Consortium.

The objectives of the Math Consortium are to:

Improve the quality of mathematics instruction at all levels.

Retrain high quality teachers in mathematics content and instruction and upgrade their knowledge of mathematics.

Provide training opportunities for minorities and women in the field of mathematics.

Develop teachers as leaders in order to disseminate ideas, techniques, and attitudes, and magnify the impact of the Consortium.

Summer institutes are the primary statewide training activity of the Consortium. The institute is a four credit graduate mathematics course designed to strengthen teachers' understanding of math content and instructional practices. The use of problem solving and manipulatives provide the instructional basis for learning about geometry, probability, statistics and number theory. Participants share successful practices they have used in their own classroom. Models for in-district efforts are shared during the institutes.

School year activities include bi-monthly instructional audioconferences, (on the state's telecommunications network) alternating with bi-monthly newsletters. There is an Annual Meeting for first year Consortium Fellows and District representatives. Training in the initial Institute is further augmented by in-district activities and Advanced Institutes on specialized topics. Each school district creates their own plan for in-district improvement of mathematics instruction, based on their own needs and opportunities.

Each member district may send a team of 2 to 6 participants to the summer institute. Participants are teachers with experience teaching mathematics at any level of K-12 instruction. Participants must be supported by their districts and are selected by their school districts.

ALASKA CONTINUED

- All Alaska school districts, universities, and the Department of Education are eligible for membership in the Consortium. Decisions governing the activities of the Consortium are made by member institutions at an annual Board meeting and through audioconferences. Member school districts carry out their own plans for strengthening math instruction based on, and supported by, the statewide efforts.

OIIE57

Title II Exemplary Post-Secondary Project in Alaska

ABSTRACT

This project is the result of a two-year process of assessment and action to meet the need to strengthen science instruction in Alaskan schools. It is based on a cooperative agreement between the University of Alaska's College of Human and Rural Development (CHRD) and the eight Alaskan school districts comprising the Central Alaska Curriculum Consortium (CACC): Alaska Gateway, Copper River, Fairbanks North Star Borough, Iditarod Area, Nenana City, Tanana City, Yukon Flats, and Yukon-Koyukuk.

CACC and UAF are uniquely suited for such collaborative efforts because of their proven networking abilities and mutual interest in educational issues affecting both urban and rural Alaska. This past experience is coupled with the identified needs of training teachers in using the northern environment, focusing on science methods which develop critical thinking and problem solving, and providing opportunities for teachers to communicate more with others about science teaching. The training is focusing exclusively and particularly upon guided-discovery science teaching within a more holistic, multi-disciplinary approach to teaching about the local environment.

The specific objectives of this proposal are thus:

1. To increase knowledge and application of guided-discovery, science teaching and multi-disciplinary teaching methodologies focused on the local environment.

2. To increase the involvement of teachers and districts in the planning and delivery of teacher training in science.

3. To increase communication and dissemination of science education information as related to using the local environment and developing critical thinking.

These objectives are being accomplished by the development of a core group of teacher-trainers and by provision of inservice and pre-service teacher training activities during the year, followed by an intensive summer institute and presentations at the 1988 Rural Instructional Improvement Academy, with all of these activities supplemented throughout by various networking activities. While school personnel in the eight CACC districts and UAF on- and off-campus students in methods courses will serve as the nucleus for this project with regard to training, other project activities will extend statewide.

This project therefore addresses the following state priorities:

1. providing inservice instruction for practicing teachers,

2. addressing the historic patterns of underrepresentation in science among Alaska Natives,

3. involvement of experienced teachers in the proposed activities.

Because of the unique blend of urban and rural schools participating in this project, its findings will also be readily transferable to other schools in the state. The project continues to coordinate with the model state science curriculum, and other science education programs or conferences, enhancing and pooling resources for all. This project also continues to serve as a model for collaborative efforts between higher learning institutions and local educational agencies in Alaska and the nation and will result in statewide application beyond the '87-'88 activities.

C. DIANE BISHOP
Superintendent

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ARIZONA TEACHERS' ACADEMY

The first annual Arizona Teachers' Academy was presented by the Arizona State Department of Education (ADE) and the Arizona Board of Regents. The Academy was hosted by the University of Arizona College of Education in Tucson during August 2-7, 1987. Financial support was provided through the Education for Economic Security Act-Title II (P.L.98-377) program, which funds state grants for strengthening the skills of teachers and instruction in mathematics, science, foreign languages, and computer learning. The Academy focused on Arizona's rural and small school science and mathematics teachers in the middle/junior high grades. Workshop presentors and keynote speakers were utilized from the three state universities, local educators/administrators, and national consultants in various fields of education. Participating teachers totaled 108 and they represented 39 school districts and 71 schools. The Academy was staffed by nine members of the ADE staff and three educators from schools throughout the state.

This intense week involved activities (home base, general sessions, integrated units, topical seminars, meals, social events) that all led to instructional and program improvement in mathematics, science, and technology. Overall, teachers were able to:

- form networks of colleagues that will support change and innovation throughout the school year
- gain new knowledge and apply the knowledge within mathematics and science classroom contexts
- assess their current philosophy, methods, and instructional programs
- design professional growth plans
- share exemplary programs

Vital to the Academy concept are follow-up and evaluation. A follow-up is being planned for early in the spring to bring participants back together for input on what was learned and what has worked back in the classroom. A comprehensive evaluation of the entire Academy, its participants, staff, and the follow-up is being conducted through the University of Arizona's College of Education. Initial reports have been generated covering the week of the Academy. Further reports are anticipated early in January.

cka849

CAREER INSTITUTE

Arizona State Department of Education, Education for Economic Security Act-Title II, (P. L. 98-377), in cooperation with Northern Arizona University in Flagstaff, has sponsored for the second year a unique summer Career Institute for underserved and underrepresented eighth grade students.

For the 1987 session one hundred eighth grade students were selected from a nomination list of over eight hundred. The nominations were made by any person who was acquainted with the student and knew of their academic record and interests. This might have been a teacher, a parent, a pastor, an adult friend or a school or activities counselor. An advisory committee made the selection of the "one hundred."

The purpose of the Institute was to acquaint students who were from ethnic monorities, or were females, handicapped, gifted/talented and also interested in mathematics, science, computer learning or foreign languages with career options in content areas that, historically, nave a low representation from among such groups. The students must be entering a secondary school in the fall semester.

During the week-long Institute, presentations were made by professional role models. The role models were selected due to their background as one of the underserved or underrepresented. These individuals have become successful in the areas of mathematics, science, computers or foreign languages. Examples of these presentations were:

Astronmical Possibilities
Career in Electrical Engineering
A Rational Approach of Math
Anthropolgy Careers
Power Engineering
What is Pathology
Planetary Data
Biomedical Research Wonders
Fiberoptics
Opportunities in Space Science
Math and Desert Sand
Geology on Earth and in Space
Foreign Language: What is in it for you and your Future?
No More Mickey Mouse Math
Halley's Comet Panel Presentation
Me? Medicine?
Women in Engineering

In addition, career inventories and interpretations were made for each student. The students kept a daily journal via the computer.

Arizona Department of Education, EESA Title II office, sponsors the Institute with the cooperation of the Center for Excellence at Northern Arizona University in Flagstaff, Arizona.

cka850

TITLE II EXEMPLARY PROJECT SUMMARY

STATE: Arizona REGION: IX

TITLE: Retraining Teachers in Low Demand Disciplines as Computer Learning Teachers

PROGRAM CATEGORY: Higher education; cooperative competitive; elementary/secondary education; demonstration/exemplary

SUBJECT/S FOCUS: Computer Learning

PRIORITY AREA: Partnership cooperative retraining of those teaching out of certification

GRADE LEVEL/S: Teacher Education 6-12

TARGET GROUP: Reduction in Force (RIF) Teachers

PROJECT RATIONALE:

Teachers with computing skills are in high demand as computer technology increasingly becomes an important part of our service-oriented economy. Concurrently, many highly skilled and experienced teachers across the country and in Arizona in low demand disciplines such as Physical Education, Home Economics and Fine Arts are being laid off due to declining enrollments. Many of these teachers may be unable to find work in other school distri s in their present disciplines. This loss of teachers who have years of hard-earned pedagogical experience and skills will have a serious impact on our society, the State of Arizona, and the education system.

PROJECT GOALS:

1) Increase the retention of experienced teachers in low demand disciplines by retraining them into the high demand discipline of computer learning. 2) Increase the available pool of teachers of computer learning. 3) Attract qualified teachers and give them an incentive to retrain rather than leave the profession by paying for all course tuition and a stipend upon completion of all courses and project requirements. 4) Develop a model program that can be used in cooperation with local school districts to retrain teachers in other disciplines into high demand disciplines like mathematics, science, and computer learning.

GENERAL PROGRAM DESCRIPTION:

The retraining project selected 32 participants to enter training. The selection process was based on the teacher's potential to be involved in a Reduction in Force (RIF). 25 of the participants were funded through the grant while seven paid their own expenses with the agreement that they would have the option to replace any of the original 25 who withdrew from the program.

The participants included the following: five special education, two music, two physical education, six English, three home economics, five business, three math, one science, two industrial arts, one social studies, and two foreign language teachers.

A major aspect of this project was the partnership between Arizona State University, the Phoenix Union High School District, and the Apple Computer Corporation. This partnership was an integral part of the grant's success since the participants were provided with assistance and resources from these three diverse areas. In fact, the Apple Computer Corporation provided an Apple IIc with a color monitor and printer to each participant to use during the program. Also, the splendid cooperation among the partners enabled the project to run smoothly and prevent problems from occurring.

The students enrolled at Arizona State University in a series of three semester courses: Computer Literacy and Applications, and Computer Programming during Fall, 1985; Introduction to Data Processing, Introduction to Pascal during Spring, 1986; and Intermediate Pascal, Summer, 1986. In addition all students were required to participate in 50 hours of internship which included attending conferences, participating in training sessions, assisting in teaching computer classes or individually helping teachers in using computers. Finally, in the Summer of 1987, additional funding was allocated to the project which enabled 15 of the participants to continue their training with a course on Computer Robotics, Artificial Intelligence and Expert Systems.

The project was completed by 19 teachers who each received a $600 stipend. Several of these teachers are now teaching computer classes but most have expanded their role as a classroom teacher to include computer usage. All teachers were rehired, or found computer education positions outside of their school districts.

PRODUCTS:

Based on data received from a Summer, 1986 survey, five teachers were assigned computer classes who had previously not taught these courses. Furthermore, two became computer instruction teachers in new school districts and one became the computer coordinator for her district. In a Summer, 1987 survey, 12 participants indicated that they have teaching assignments for the 1987-1988 academic year in which they will utilize their computer training by teaching computer classes, coordinating the district's computer program, supervising the computer lab, etc. Also, two participants are now teaching computer skills at Arizona State University on an as needed basis, and one will be integrating computers and computer instruction in her remediation program.

This survey also discovered that one unexpected, yet welcome, benefit of the program is that many participants' spouses became interested in computers and have integrated them into their work. One participant's husband, who was "anti-computers", became "hooked" on computers through his wife's participation in this project and submitted a grant to his school district for 35 computers to use in his classroom. He received the grant and, as a result, he will be integrating the computer into his English classes this year. Also, a majority of the participants now own a personal computer and use it extensively.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT: -

The participants were intensely prepared to utilize computers in education. The project was highly successful in maintaining jobs for all participants who completed the project and several are now employed as full-time computer education instructors while most of the others are utilizing computers extensively in their regular instruction. The project has shown that experienced teachers in low demand disciplines can be retrained into a new academic discipline through an intensive academic program with financial incentives. Without these incentives most would not have been able to afford this type of retraining. Now they may continue to be valuable members of the educational community.

This message and the successful results of the Retraining Teachers Project have been disseminated in papers and presentations at the National Education Computing Conference (NECC), and the 7th Annual Microcomputers in Education Conference. Each presentation is published in the Conference Proceedings. Furthermore, the success of this Retraining Teachers Project has demonstrated that it is an excellent model which can be used to retrain teachers economically and effectively in any academic area. It would be ideal for other high demand disciplines such as mathematics and science. It also provides an excellent way to retain teachers who might otherwise be lost to the profession.

STATE: Arkansas

REGION: VI

TITLE II EXEMPLARY PROJECT SUMMARY

TITLE: Science In-Service for Elementary Teachers

PROGRAM CATEGORY: Cooperative

SUBJECT FOCUS: Science

PRIORITY AREA: Cooperative

GRADE LEVELS: Grades 4 - 6

PROJECT RATIONALE: This project is designed to address the need for in-service for teachers of grades 4-6 in the area of science. Arkansas has just implemented a program of minimum performance testing in science for students in grades six and eight. Most teachers of sixth grade students have at fewer than six semester hours of science thus are not equipped to teach many of the skill areas that are now being tested. A survey of science lessons - when they existed - tended to focus on reading a section then answering questions at the end of the unit. Effective teaching practices suggest that students who participate in laboratory investigations learn the concept and retain it longer.

This project utilizes master teachers to model discovery and inquiry lessons in elementary classrooms. The lessons teach content selected from the basic skills identified for mastery in the science guide for grades four through six and all include either demonstration or hands-on experiments by the students.

GOALS:

1. To provide science content in-service training for teachers of grades four through six.
2. To model discovery and inquiry methods of teaching science for elementary teachers.
3. To serve as a resource to teachers as they plan and prepare to introduce activity teaching in the area of science.

GENERAL PROGRAM DESCRIPTION

This program provides in-service training for elementary teachers of science through demonstration lessons taught in the teacher's classroom. The in-service leaders (science instructors from the Southern Arkansas University's Tech Campus) model activities and experiments with students thus providing content background as well as process skills for teachers who assist with the lesson. Through this process teachers become familiar with these lessons and can replicate them in other classes and/or adapt the process to the development of another science concept.

A total of fifteen demonstration lessons have been developed and successfully used with students in grades four through six. Some of these lessons have been adapted for demonstration with students in grades K through three. Each of the demonstration lessons has been cross referenced to the "basic educational skills" that have been identified for mastery at the intermediate level in Arkansas schools.

This project is managed through a consortium of 21 school districts located in south central Arkansas. Many of the districts in this consortium are small rural districts that would receive small grants to the individual district, but through the consortium effort are able to provide meaningful in-service for the teachers.

PRODUCTS:

1. A summary of the 15 lessons that includes a general description of the content, cross-reference to he skill(s) from the course guide, equipment, and a brief statement of procedure for the demonstration.

2. A glossary of science words and terms students are expected to know throughout the series of demonstration lessons.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

The ultimate evaluation of the project will be student scores on the minimum performance test administered each yea by the Arkansas Department of Education. First year results do indicate improved scores over the field test administered one year earlier.

No attempt has been made to measure teacher knowledge of science content. However, the project is deemed a success by the number of requests from teachers for the development of additional units.

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August 14, 1987
C. Lee

STATE: California

REGION: Northern California

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: Science Inservice for Rural California

PROGRAM CATEGORY: higher education; cooperative; competitive; elementary/secondary education; demonstration/exemplary; other-please identify

SUBJECT/, FOCUS: Mathematics; Science; Computer Learning; Foreign Languages

PRIORITY AREA: underserved/underrepresented; partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify/ Networking

GRADE LEVEL/S: K-12

TARGET GROUP: Science teachers in rural California typically not serviced by university or National Science Foundation staff development.

PROJECT RATIONALE:

Much of California is extremely rural with large distances between schools and staff development facilities. Accordingly, teachers of science (especially those in grades K-6) often times are left out of large scale dissemination projects. The Science Inservice for Rural California (SIRC) Project is designed to bring high quality science education programs developed by the Lawrence Hall of Science to rural northern California teachers. The goals for SIRC are to disseminate currently available science education projects to a small but potent cadre of science teachers, mentor teachers, and department chairpersons. A side benefit of selecting high-visibility, high-energy individuals is the spinoff of secondary dissemination possibilities.

GENERAL PROGRAM DESCRIPTION:

The SIRC Project was one of 17 projects funded through the proposal review process jointly conducted by the SAHE and State Department of Education in California. It was one of nine projects funded for second year operation,

again funded by the competitive proposal review process. The principal investigator for the project is Dr. Larry Lowery of the University of California at Berkeley, School of Education. Larry and staff associates from the Lawrence Hall of Science essentially brought nationally acclaimed science education projects to teachers of science in rural California. Teachers were brought together, in part, by the Teacher Education and Computer Center and the local county offices of education. Staff support from these two agencies created both personal and electronic networks among program participants. There are three aspects of this program that make it exemplary in relation to other PL 98-377 projects here in California: First, the Lawrence Hall of Science, by bringing extant science projects to rural California, did not incur large development costs. In this way, the funds for the project were used almost exclusively for training. While many staff development projects spend the first six to nine months creating the training package, the Lawrence Hall merely selected from among the best materials available nationally. Second, the local staff assistance created the networks referred to above in a way that created a high degree of motivation and enthusiasm among teachers and other science specialists that are typically estranged from one another. And third, the selection of participants, including those with site level responsibilities for science inservice, create a ripple effect so that programs and materials collected through SIRC were disseminated to other classroom teachers who are not formal participants.

PRODUCTS:

None; this project used available curricula and standard (RBBS) telecommunications software.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

Quarterly reports from the SIRC Project detailed its effectiveness in preparing and motivating rural teachers of science to bring current science education initiatives to rural California students. The networking, both electronic and informal, will continue long after the SIRC project is completed.

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August 14, 1987
C. Lee

STATE: COLORADO

REGION:

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: Enhancement of Science Education in San Luis Valley Schools

PROGRAM CATEGORY : (higher education); cooperative; competitive; elementary/secondary education; demonstration/exemplary; other - please identify

SUBJECT/S FOCUS: (Mathematics); (Science); Computer Learning; Foreign Languages

PRIORITY AREA: underserved/underrepresented; (partnership) (Ed-business or (LEAs-IHEs)); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify

GRADE LEVEL/S: Grades 5-8

TARGET GROUP: (any other special characteristics, e.g., the (disadvantaged,) the gifted, vocational education)

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

STATE - Special attention to rural, isolated districts

GOALS:

To enhance science and math educational opportunity for 5th - 8th grade students through intensive in-service programs.

GENERAL PROGRAM DESCRIPTION:

Fifth to Eighth grade teachers from 14 school districts in the low socio-economic area of the San Luis Valley participated in a two week workshop involving biological and physical science and incorporating applied mathematics. Workshop included discussions, demonstrations, hands-on-activities and field trips.

PRODUCTS:

Video tapes made of demonstrations, and activities for future in-service use.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

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August 14, 1987
C. Lee

STATE: COLORADO

REGION:

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: Problem Solving Laboratory

PROGRAM CATEGORY : higher education; cooperative; competitive; elementary/secondary education; demonstration/exemplary; other - please identify

SUBJECT/S FOCUS: Mathematics; Science; Computer Learning; Foreign Languages

PRIORITY AREA: underserved/underrepresented; partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify

GRADE LEVEL/S: High School

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

STATE - Development of Critical Thinking Skills in Subject Areas.

GOALS:

To enable the low achiever or academically disadvantaged student to enter the regular "Math Stream" after participation in this special problem solving class.

GENERAL PROGRAM DESCRIPTION:

Program was initally used in Gateway and Hinkley High School, begining January 1987. This fall it is used in all Aurora High Schools, and several other districts are also initiating this course.

PRODUCTS:

Syllabus: TIPS - (Techniques in Probelm Solving)

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

Will continue to expand

CONTACT PERSON/S: Betty Huffman
PHONE NUMBER (INCLUDE AREA CODE): (303) 841-0579
DISTRICT/INSTITUTION/AGENCY: Aurora School District 28J
ADDRESS: 12105 N. Boot Hill Drive
Parker, CO 80134

August 14, 1987
C. Lee

STATE: Connecticut

REGION: 1

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: Thames Science Center

PROGRAM CATEGORY : higher education; cooperative; competitive; elementary/secondary education; demonstration/exemplary; other - please identify (Discretionary)

SUBJECT/S FOCUS: Mathematics; Science; Computer Learning; Foreign Languages

PRIORITY AREA: underserved/underrepresented; (partnership (Ed-business) or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify

GRADE LEVEL/S: K-12

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)
gifted and talented, districts serving historically underserved student populations

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

Teacher inservice education in mathematics and science
Technology-based learning programs for teachers and students
Creative, problem-solving approaches to mathematics and science

GOALS:

To provide students, teachers and the community-at-large with creative and exciting learning experiences in science and technology

GENERAL PROGRAM DESCRIPTION:

The Thames Science Center is a non-profit community educational institution serving Northeastern Connecticut, especially the Thames River Basin. The Center is open year-round and offers a wide variety of educational programs for both youth and adults in the region.

One purpose of the Center is " To function as a regional science and environmental resource, offering a diversity of innovative educational programs, exhibits, and environment-related field experiences for all age levels. "

Title II funds have been used to support the Thames Science Center's workshops for k-6 science teachers. This year, the Department of Higher Education will be sponsoring a summer institute for Northeastern Connecticut science teachers in robotics and the physical sciences.

Thames Science Center has received a national discretionary EESA Title II grant to develop a robotics curriculum at the secondary schoollevel. The Center has completed the curriculum and is in the process of publishing it.

The Center also has received funds through the National Science Foundation for Project Porifera. Project Proifera provides teacher training and student participatory surveys of the Thames River Basin's lakes, ponds and streams.

For the proposes of the National Title II Conference, the Thames Science Center will exhibit its Project RobotACTS work.

PRODUCTS: A curricula for the physical sciences introducing robotics to secondary science study.

The Center could also exhibit its Robot.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

Thames Science Center is working with local school districts to assess the impact of its curricular projects in science and technology. The Center undertakes ongoing research on program effectiveness for its own programs and for those which effect educational offerings in surrounding school systems.

CONTACT PERSON/S: Ms. Jane Holdsworth, Director (203) 442-0391
PHONE NUMBER (INCLUDE AREA CODE):
DISTRICT/INSTITUTION/AGENCY: Thames Science Center
ADDRESS: Gallows Lane
New London, Connecticut 06320

August 14, 1987
C. Lee

State: Connecticut

Region: State Wide

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: Computers in Mathematics and Science: An Inservice Training Institute for Middle and Secondary School Teachers.

PROGRAM CATEGORY: Other - Middle and high school

SUBJECT/S FOCUS: Mathematics; Science; Computer Learning. Presently the focus is on chemistry, math and bio/life sciences. Next year physics will be addressed.

PRIORITY AREA: Other - The program is designed primarily for new teachers, but any teacher may participate.

GRADE LEVEL/S: 7th through 12th

TARGET GROUP: The program is appropriate for teachers of students at all levels of ability.

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED) The Institute is concerned primarily with improving the teaching of science and math with the use of computers. The state of Connecticut maintains a strong commitment to continually improving teaching in math and science. Computer-aided instruction serves to bring these subjects to life for the teachers involved and, in turn, for their students.

GOALS: See attached brochure.

GENERAL PROGRAM DESCRIPTION: See attached brochure.

PRODUCTS: The products of this program include teacher workshops on science and mathematics, and software with a concentration on micro computer-based science laboratories.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT: The program is evaluated by several means. Participating teachers are asked to indicate on a survey their opinions of the software and interfacing presented during the program. Teachers are also surveyed for their general impressions at the end of each of six workshops and in an overall evaluation after the last workshop. On-site visitations are conducted at a school system's request. The goal of an on-site visitation in to observe and evaluate the extent to which teachers are applying the expertise they gained in the program. The amount of and success with the integration of computers in the classroom is also assessed in two written projects turned in by those teachers receiving credit for their participation in the program. A formal evaluation of all aspects of the workshops is currently being planned.

CONTACT PERSON: John D. Domijan, Director
Math & Science Institute
Quinnipiac College
Hamden, CT 06518-0569
Telephone: (203) 281-8730

7883L

Title II Exemplary Project Summary

Title: Mathematics-Science Resource Center

Program Category: Demonstration/Exemplary Program

Subject Focus: Mathematics, Science, Computer Science

Priority Areas: Basic Certification, Teacher Enhancement, Cooperative (LEA, SEA, SAHE)

Grade Levels: Pre-Kindergarten through grade twelve

Target Group: Teachers teaching mathematics, science, and computer science out of field; certified mathematics and science teachers from public, private, and parochial schools

Project Rationale: The Mathematics-Science Resource Center was established to coordinate the efforts of the LEA, SEA, and SAHE. The services provided by all agencies with Title II funds are based on an initial needs survey which indicated a shortage of certified mathematics, science and computer science teachers, a need for updating of currently certified mathematics and science teachers, and a need for classroom materials necessary to implement the local curriculum.

Goals: The goal of the Mathematics-Science Resource Center is to provide materials, equipment, and personnel to support the training or retraining of mathematics, science, and computer science teachers, thereby improving mathematics education in the District of Columbia.

General Program Description: The Mathematics-Science Resource Center--supported largely through SEA funds--continues to be the focal point for all Title II activity in the District of Columbia. The Center provides a centralized setting for:

- the preparation for entrance into college-level mathematics, science, and related education courses
- the demonstration of exemplary classroom strategies (including demonstration classes)
- college-level courses necessary for certification in mathematics and science
- recertification courses
- discussion among teachers with common interests and meetings of special interest groups
- access to resource material for professional development and classroom use

- a wide variety of seminars, lectures, symposia, workshops, and demonstrations of interest to mathematics and science teachers at all levels
- the review of selected books, equipment, materials, and supplies from publishers and manufacturers
- the propagation of live specimens for use in science classes
- the preparation of instructional materials for mathematics and science classes.

In addition, personnel at the Center assist teachers in implementing in their classrooms the techniques learned in courses and workshops.

Products: Calendars, Announcements, Agendas, manipulative kits, instructional activities

Evaluation/Anticipated Long-Term Impact on Project: The project is evaluated by the SEA Title II Office and, formatively, by monthly discussions among the Advisory Board. The long-term impact is expected to be reflected in a decrease in unlicensed teachers in mathematics, science, and computer science classrooms and by teachers who are able to apply updated mathematics and science materials more effectively in their classrooms. In addition, certified computer science teachers will be available to teach computer science courses in the schools.

August 14, 1987
C. Lee

STATE: District of Columbia

REGION:

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: Teaming Instruction in Science and Mathematics

PROGRAM CATEGORY: higher education; cooperative; competitive; elementary/secondary education; demonstration/exemplary; other - please identify

SUBJECT/S FOCUS: Mathematics; Science; Computer Learning; Foreign Languages

PRIORITY AREA: underserved/underrepresented; partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify

GRADE LEVEL/S: Current Teachers of Junior High School Mathematics and Science

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)
The early adolescent period, age 12-14, is an age cohort that is frequently neglected as a target for innovative programs. It is a particularly critical time in the formation of attitudes toward science/math and the development of investigation skills as well as ability to apply learning to various situations. This proposal speaks to the following needs: for teacher training in content and strategies; for development of inquiry techniques to invlolve and challenge students; for improving science/math literacy; and for encouraging further interest in the study of science/math among all students, particularly girls and minorities.

GOALS:

The George Washington University/School of Education and Human Development proposes to conduct an integrated science/mathematics course during the 1987-88 school year with follow-up classroom visits. The purpose is to improve the effectiveness of science and mathematics teaching in selcted 7th, 8th, and 9th grade classrooms in the District of Columbia's public and private schools.

The goals of the course will be:
1. To strengthen and expand the teacher's knowledge base of science and math that pertain to concepts in biology and chemistry. 2. To increase teacher effectiveness through the development of teaching strategies, emphasizing inquiry learning and hands-on experience. 3. To integrate and apply mathematical skills and manipulations to science investigation and experimentation.

DISTRICT OF COLUMBIA

TITLE: Teaming Instruction in Mathematics and Science (TIMS)

GENERAL PROGRAM DESCRIPTION:

Eighteen junior high school math and science teachers were selected to participate in 16 three-hour class sessions. This project pilots the joint presentation of mathematics and science concepts by two university professors, one from each discipline. Course will cover the following topics:

1. Principles of scientific and mathematical thinking;
2. Tools and strategies used in each discipline-showing crossover and application;
3. Application of Algebra to aid in understanding properties and states of matter, solutions, mixtures and gas laws;
4. Interrelatedness of math to types of chemical reactions and enthalpy;
5. Similarities between cell concepts and mathematical variation;
6. Using mathematics to understand rates of change, energy transformation, photosynthesis, respiration, and cell metabolism;
7. Application of probability (combinations and permutations to both Mendelian genetics and molecular genetics);
8. Understanding natural selection, mutations in light of binomial expansion, Hardy-Weinberg Principle;
9. Using probability distribution and fractals to understand ecosystems, biospheres and biomes.

Each session is co-taught and incorporates mathematical manipulations into science inquiry exercises. The instructors are concerned not only with content and the integration process but also cognizant that the methods they use in their presentations serve as a model of instruction from which the participants can benefit.

PRODUCTS:

Teacher participants will be expected to prepare a series of lessons which they will use in classrooms, demonstrating the integration of math and science.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT: Content based mathematics and science tests designed by the instructors were administered to the participants at the first class meeting. This pretest will be given again at the final session, thereby serving as the post-test. The tests are so coded that only the participants' teaching role in math or science is known. The purpose in administering the test is to determine the strengths and weaknesses of knowledge base to guide instruction choices. The instructors will visit the classrooms of all participants to assist in integrating math and science concepts. They will be evaluated on their performance.

CONTACT PERSON/S: Jean T. Green
PHONE NUMBER (INCLUDE AREA CODE): (202) 727-3685
DISTRICT/INSTITUTION/AGENCY: D.C. Department of Human Services, Office of Postsecondary Education, Research & Assistance
ADDRESS: 1331 H Street
Suite 600
Washington, D.C. 20005

OPERATION ENRICHMENT
Project Narrative
OKALOOSA-WALTON JUNIOR COLLEGE OPERATION ENRICHMENT

Overview of the Project

The purpose of OWJC's OPERATION ENRICHMENT will be to strengthen Mathematics, Science, and Computer Education programs in OWJC's service delivery area. This will be accomplished by undertaking special activities to improve the skills of both practicing and prospective teachers in Okaloosa and Walton Counties. Special emphasis will be placed on recruiting minority candidates. In addition, minority participants will be given first priority access to all OPERATION ENRICHMENT activities.

Project Justification

Proposals submitted under Title II of the Education for Economic Security Act for Fiscal Year 1987-88 must relate to one or more of the five programs set forth in Items 3a through 3e of the application instructions. Proposals must also be consistent with one or more of the seven areas of emphasis set forth in the instructions for Fiscal Year 1987-88. OPERATION ENRICHMENT complies fully with both of these requirements.

Project Activities

Funding received for OPERATION ENRICHMENT will be used to: 1) undertake a major outreach effort in conjunction with the local public school systems to identify practicing teachers in need of additional coursework to become certified or to recertify in Mathematics, Science, or Computers; 2) encourage practicing teachers identified through the outreach effort to enroll in Mathematics, Science, or Computer courses offered through Okaloosa-Walton Junior College; 3) promote a climate of excellence in education through the sponsorship of an "OWJC MATHEMATICS BOWL" involving all high schools in the College's service delivery area; and 4) make paid tutors available to practicing and prospective teachers enrolled in Mathematics, Science, or Computer courses through OPERATION ENRICHMENT.

Proposal Narrative

OPERATION ENRICHMENT

Okaloosa-Walton Junior College's OPERATION ENRICHMENT is a special project developed under Title II of the "Education for Economic Security Act" (EESA) for Fiscal Year 1987-88. The purpose of this project is to strengthen programs in Mathematics, Science, and Computer Education in the College's service delivery area. To do so, OPERATION ENRICHMENT will focus on enriching the Mathematics, Science, and Computer qualifications of practicing and prospective teachers with special emphasis on increasing the availability of quality minority certified teachers.

Proposals submitted under Title II of the EESA are required to relate to one or more of the five programs set forth in Items 3 (a-e) of the application instructions. Proposals must also be consistent with one or more of the seven areas of emphasis set forth in the instructions for Fiscal Year 1987-88. This project complies fully with both of these requirements.

OPERATION ENRICHMENT specifically relates to programs 3a, 3b, 3c, 3d, and 3e. In addition, this project is consistent with three of the seven areas of emphasis established for Fiscal Year 1987-88:

1. Promote a climate of excellence in education.
2. Assure a supply of quality teachers.
3. Provide diverse programs to meet student needs.

Documentation of the Need

The need for strengthening educational programs in Mathematics, Science, and Computers is well documented. "Technological literacy" has become a necessity if people are to function successfully in the high tech world of today and tomorrow.

Mathematics, Science, and Computers form the cornerstone of technological literacy. One cannot be technologically literate without a solid foundation of knowledge in the critical areas of Mathematics, Science, and Computers. The Center for Occupational Research and Development (CORD) in Waco, Texas lists the following as being the educational requirements of a high tech society:

Basics

. . .More Math

. . .More Science

. . .Computer Fundamentals

. . .Reading/Writing

. . .Social Studies

Skills

. . .Communication

. . .Analytical Problem Solving

America must depend on its public school system to meet society's needs for more breadth and depth in the areas of Math, Science, and Computers. If the public school system is to respond to this challenge, it must strengthen its educational programs in Math, Science, and Computers. More specifically, teachers in the Okaloosa-Walton service delivery area need help to meet the Mathematics and Science elements of the new middle-school certification requirement.

How the Purpose of OPERATION ENRICHMENT Relates to the Need

The need is to strengthen programs in Mathematics, Science, and Computers throughout the United States. The purpose of OPERATION ENRICHMENT is to strengthen such programs in OWJC's service delivery area. The College proposes to do this by enriching the Mathematics, Science, and Computer qualifications of practicing and prospective teachers in its service delivery area with special emphasis on increasing the availability of quality minority certified teachers.

Probability of the Project's Success

There is a high probability that OPERATION ENRICHMENT will be a successful project. The key personnel working in the project are highly qualified, vastly experienced, dedicated to the purpose of this project,and have over 400 years of combined experience. OPERATION ENRICHMENT has the full support of the Okaloosa-Walton Junior College administration and faculty.

NAME	POSITION	DEGREE	EXPERIENCE
James A. Durham	Dean of Instruction	Ed.D.	31 Years
David L. Goetsch	Director IR/Proj. & Grants	Ed.D.	11 Years
William S. Roberts	Projects & Grants Monitor	M.A.	32 Years
William T. Hall	Director of Special Act.	M.S.	11 Years
Roby Beal	Mathematics Instructor	Ed.D.	24 Years
Lewis Heckroth	Chair & Instr. Math Dept.	M.S.	28 Years
Myron Howell	Mathematics Instructor	M.Ed.	26 Years
Karen Baker	Mathematics Instructor	M.A.	14 Years
Shirley Howard	Mathematics Instructor	M.S.	7 Years
Martha Jordan	Mathematics Instructor	M.S.	34 Years
Julia Polk	Mathematics Instructor	M.S.	9 Years
Mary Henderson	Mathematics Instructor	M.A.	10 Years
Robin Olmstead	Mathematics Instructor	M.S.	13 Years
Mae Lynn McCardle	Mathematics Instructor	M.S.	16 years
Ronald Head	Chair & Instr. Phys. Science	Ph.D.	28 Years
Roswitha Zimmer	Physical Science Instructor	Ph.D.	28 Years
Andy Dale	Physical Science Instructor	M.S.	---
Donald Kampwerth	Physical Science Instructor	M.S.	9 Years
Roy Bundy	Chair & Instr. Biology Dept.	Ph.D.	28 Years
Ross Hamilton	Biology Instructor	M.S.	20 Years
Herbert Cash	Biology Instructor	M.S.	28 Years
Lionel Leon	Biology Instructor	Ed.D.	30 Years
Paul Szuch	Chair & Instr. Business Ed.	Ed.D.	19 Years

NAME	POSITION	DEGREE	EXPERIENCE
Robert Miller	Data Processing Instructor	MBA	6 Years
Joel Perdue	Data Processing Instructor	MBA	8 Years
James Holland	Data Processing Instructor	B.S.	7 Years

Dissemination and Facilitation Methods

The need to strengthen educational programs in the areas of Mathematics, Science, and Computer Education is universal. Consequently, there is a broad base of potential application for OPERATION ENRICHMENT. This project could be replicated in any of the 28 community college districts across the state. A full report of the results of OPERATION ENRICHMENT will be drafted by the Okaloosa-Walton Junior College office of Institutional Research in conjunction with the Dean of Instruction and the Chairpersons of the Mathematics, Physical Science, Biological Science, and Business Education Departments. This report will be made available to the Florida Department of Education and, by request, to all 28 community colleges in the State.

Cooperating Agencies

Project participants from Okaloosa-Walton Junior College will coordinate their efforts with their respective colleagues in the Okaloosa and Walton County Public School Systems. For example, the Mathematics Department Chairperson and selected faculty members will work with the Mathematics Supervisors for the Okaloosa and Walton County Public School Systems and with principals within each system.

Coordination of the Project Within the College

OPERATION ENRICHMENT involves four separate departments within Okaloosa-Walton Junior College: Business (Computers), Physical Science, Biological Science, and Mathematics. The vehicle for coordinating the efforts of these

four departments will be the OPERATION ENRICHMENT Coordinating Committee. This committee will be chaired by the College's Dean of Instruction and will consist of the Project Director, and the Chairpersons of the Mathematics, Physical Science, Biological Science, and Business Education Departments.

Determining If the Project Has Accomplished Its Objectives

All project participants will be asked to evaluate their experience with this project. OWJC department Chairs and faculty members will evaluate the project from their points of view. Prospective and practicing teachers who participate in the project will be asked to evaluate it from their perspective. The Okaloosa-Walton Junior College Office of Institutional Research will develop instruments for use by each of these participant groups. The completed evaluation instruments will be collected, summarized, analyzed, and made a part of the final report of this project. The OPERATION ENRICHMENT Coordinating Committee will assess the results of the evaluations and make determinations therein as to accomplishment of the project's objectives.

Explanation of the Project

OPERATION ENRICHMENT is a new project that will satisfy its goal of strengthening programs of Mathematics, Science, and Computers in the Okaloosa-Walton Junior College service delivery area by undertaking a multi-faceted approach to the problem. The approach to be used is especially designed to afford participants maximum flexibility in meeting the needs of the project clientele while giving first preference in all activities to minority participants. This will be accomplished by:

1. Undertaking a major outreach effort, in conjunction with the local public school systems, to identify practicing teachers in need of additional coursework/in-service points to become certified or to re-certify in Mathematics, Science, or Computers. Special emphasis will be given to identifying minority teachers. Special preference will be given to minority candidates relative to enrolling in courses and/or in-service activities.

2. Encouraging practicing teachers identified through the outreach effort to enroll in Mathematics, Science, or Computer courses/ workshops offered through the College by:

   A. Using project funds to pay their tuition, fees, and book costs.

   B. Using project funds to pay a stipend of $100 to each teacher who completes a course with a grade of "C" or better in any Mathematics, Science, or Computer course offered through OPERATION ENRICHMENT.

   C. Offering the courses/workshops at their schools any time the level of demand is sufficient to justify it.

   D. Allowing practicing teachers the option of enrolling in any regularly scheduled Mathematics, Science, or Computer courses that will meet their certification or preparation needs. Tuition, fees, and book allowances and the stipend will apply fully to teachers who select this option.

3. Promoting a climate of excellence in education through the sponsorship of an "OWJC MATHEMATICS BOWL" involving all high schools in the College's service delivery area. The purpose of this tournament will be to: recognize accomplishments in

Mathematics by high school students; allow gifted Mathematics students to meet and compete; and promote interest in Mathematics and Mathematics teaching. In addition, teacher trainees will be allowed to help organize and implement the "OWJC MATHEMATICS BOWL" as part of their training.

4. Making paid tutors available to practicing and prospective teachers enrolled in Mathematics, Science, or Computer courses through OPERATION ENRICHMENT. Special emphasis will be placed on giving minority candidates the tutorial assistance they may need to successfully complete their coursework.

August 14, 1987
C. Lee

STATE: FLORIDA

REGION:

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: Symposium for Elementary Teachers from Smaller School Districts

PROGRAM CATEGORY : higher education; cooperative; competitive; (elementary/secondary education); demonstration/exemplary; other - please identify Technical assistance

SUBJECT/S FOCUS: (Mathematics; Science; Computer Learning); Foreign Languages

PRIORITY AREA: underserved/underrepresented; partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); (retraining) (of those teaching out of certification); other - please identify

GRADE LEVEL/S: K-6

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)
elementary teachers from small school districts

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

For the past several years, the State of Florida has stressed its legislative mandate, a set of standards in science, mathematics, and computer education. The larger school districts have the resources to ensure that these initiatives will be implemented and followed. Smaller districts have difficulty in the implementation process. This symposium was used to make top quality instructors and instruction available to individuals who might not otherwise have either available.

GOALS:

GENERAL PROGRAM DESCRIPTION:

Program Description: In order to address the above mentioned problem. The Department let a contract with the University of South Florida. The University was to handle all arrangements i housing, meals, program materials, and classroom facility problems. The Department was to handle publicity, selection of parti'pants, staffing, and program.

Fourth-nine teachers took advantage of his two week experience covering the areas of mathematics, science, and computer education. The grant provided housing and meals for participants. Inasmuch as the program covered sixty hours of instruction, participants qualified for salary via summer institute funding.

PRODUCTS: None

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

Evaluation of the institute by participants has been mo positive. This program will be repeated during the 1988 with very little modification.

CONTAC' PERSON/S: Robert S. Lumsden
PHONE NUMBER (INCLUDE AREA CODE): (904/488-1701
DISTRICT/INSTITUTION/AGENCY: State D.C.E.
ADDRESS: Knott Bld.
Tallahassee, Flr 32399

VISUALLY INTERACTIVE COMPUTER EXPERIENCES

IN

MATHEMATICS

VOLUME I

Software and Manual

Produced By

Thomas Brieske

and

Hiram Johnston

Georgia State University

This document was prepared in December 1986 for the Georgia Department of Education pursuant to a grant funded by the State Board of Education of the State of Georgia under Title II P. L. 98-877.

PREFACE

This resource manual, Visually Interactive Computer Experiences in Mathematics, Volume I, is designed for inservice and preservice teachers of mathematics who wish to learn fundamental concepts of transformational geometry and elementary linear algebra. The modules cover several important concepts listed in the Mathematics Objectives (Grades 7-12) for the Georgia Teaching Field Criterion-Referenced Test.

The modules and the software can be used with high school students to explore fundamental concepts of geometry, transformations, and mappings or functions. Thus, these materials may be used to supplement the content typically taught in 10th grade geometry or precalculus courses.

These materials were developed as the result of two summer institutes for mathematics teachers at Georgia State University. These institutes were funded under Title II of P.L. 98-377(Georgia Plan). The major purpose of these institutes was to help mathematics teachers learn fundamental concepts of mathematics that are related to functions (mappings and transformations). Computer graphics provided the motivation for the study of R^2 to R^2 and R to R^2 functions.

Teachers in these institutes developed instructional modules and software that involved dynamic visual interpretations of R^2 to R^2 linear functions, translations, rotations, dilations , and their compositions.

This manual and the accompanying software were developed under a grant from the Georgia Department of Education. This manual and the accompanying software represent the first set of materials produced as a result of these institutes. For information concerning the availability of additional modules and software, please contact either

Dr. Thomas Brieske
Department of Computer Science and Mathematics
or
Hiram Johnston
Department of Curriculum and Instruction

Georgia State University
Atlanta, GA 30303

INTRODUCTION

This manual is divided into three sections: Instructional Modules, Mathematics and Programmming Background, and Appendices. It is recommended that you begin by reading the User's Guide in Appendix A. Also be sure to make a backup copy of the program disk and put in a safe place. There are two equally acceptable ways to begin using the materials and software depending on your background and interests. You can begin by working through the instructional modules and referring to the mathematical background as needed. The other approach is to begin with the mathematical background section and then work through the modules. It is recommended that you complete the GEOMETRICIAN and FLAG PATTERNS modules before you proceed to the other modules. These modules contain more detailed instructions and examples and are designed to introduce you to some of the fundamental concepts, notation, and vocabulary used throughout the manual. Below you will find a brief overview of each section in the manual.

Instructional Modules

Each of the modules contains a description of the options in the program, objectives, prerequisites, pre-computer activities, examples, explanations, computer activites, and post-computer activities. The instructional modules were written two audiences: preservice or inservice teachers, and high school students. The explanation and examples given in each module provide the necessary background to understand the computer activities. This should be treated as information for the teacher or background material. In most cases the computer activities are on separate pages and can be reproduced for classroom use.

Mathematics and Programming Background

These sections contain background information. The mathematics section provides visual and symbolic illustrations of the mathematics presented in the instructional modules. The prerequisites sections of the modules contain references to specific pages or concepts. A thorough understanding of the concepts presented in these sections is vital for a complete understanding of the content developed in the instructional modules.

The programming section provides a brief overview of microcomputer graphics programming techniques. This section is included so that students or teachers interested in changing or adapting the programs contained on the project disk can do so. Since the VICE-MATH disk and manual are copyrighted, it is unlawful to copy the disk or the manual in its entirety. However, teachers may copy programs contained on the disk onto student disks or supplementary disks. Teachers may choose to ask students to make modifications or additions to programs as programming assignments in their mathematics or computing classes.

Appendices

Appendix A contains the User's Guide that provides information concerning booting the disk, making a backup copy, and avoiding problems. Appendix B contains an evaluation form for the software and instructional materials. Appendix C contains a list of the objectives on the Georgia Teaching Field Criterion-Reference Test in Mathematics (Grades 7-12) covered in this manual.

August 14, 1987
C. Lee

STATE: Georgia

REGION: IV

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE:

PROGRAM CATEGORY : higher education; (cooperative;) competitive; elementary/secondary education; demonstration/exemplary; other - please identify

SUBJECT/S FOCUS: (Mathematics; Science;) Computer Learning; Foreign Languages

PRIORITY AREA: underserved/underrepresented; partnership (Ed-business or LEAs-IHEs); (cooperative) (SEA-SAHE); retraining (of those teaching out of certification); other - please identify

GRADE LEVEL/S: 3 - 8

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)

All

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

GOALS:

Train teachers to use the resources of the Cooperative Extension service of the University of Georgia for environmental education

GEORGIA CONTINUED

GENERAL PROGRAM DESCRIPTION:

Teachers are trained in outdoor classroom setting - the same setting they are encouraged to bring their students to (2 of 3 day camp experiences) attend during the school year. Resident staff at Georgia's 4-H centers serve as primary instructors. Mini courses created for this experience include: Pond Ecology, Forest Ecology, map & compass orienteering, archeology, and astronomy.

all are hands-on experiences. Videotape of the program available, Mini-courses created for and keyed to state curriculum in science.

PRODUCTS:

Videotape (s)
Instructional Units
Mini Courses For Students

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

Usage and feedback by teachers / 1) Acceptance of the importance of environmental concerns 2) Motivation to study science and mathematics

CONTACT PERSON/S:
PHONE NUMBER (INCLUDE AREA CODE):
DISTRICT/INSTITUTION/AGENCY:
ADDRESS:

404-542 4546
Dr Ed Davis
Mathematics Education
105 Aderhold
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404-485 2831
Sue Garrison
Staff Development Coordinator
Rock Eagle 4-H Center
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STATE OF IDAHO
DEPARTMENT OF EDUCATION
LEN B. JORDAN OFFICE BUILDING
BOISE, IDAHO 83720

JERRY L. EVANS
STATE SUPERINTENDENT OF PUBLIC INSTRUCTION

EESA EXEMPLARY TEACHER TRAINING AND/OR RETRAINING PROGRAM

A. Purpose

The purpose of the proposed program is to reach elementary and secondary school teachers of science and mathematics who teach in relatively remote areas in Idaho. Because of family and other commitments, many teachers living in areas far from a university or college find it very difficult, if not impossible, to leave home for several weeks during the summer to improve their backgrounds in science and in mathematics. Due to their remoteness and/or distance from training centers, there are no feasible opportunities for them to enroll in evening courses during the school year. Teaching commitments obviously curtail participation in workshops and conferences. It is, therefore, the purpose of this proposal to take a team of mathematics and science educators into such comminuties for periods of from one to three weeks during the summer.

The primary objective is to better prepare certified teachers, misassigned teachers, teachers' aids and administrators by presenting concepts in mathematics and science in a more interesting and meaningful manner, ultimately resulting in students better prepared to study mathematics and science as they proceed in school. In meeting this goal, we expect to better prepare teachers in both content and in methods.

B. Objectives for which exemplary funds will be expended.

To meet objectives, funds will be expended for the following items of expense.

1. Educational materials, including handouts, manipulative materials, reference books, and computer diskettes.

2. Salaries for the instructors. Reimbursement for expenses incurred for housing, meals and mileage for the instructors is also requested.

3. Postage, limited secretarial costs, and telephone toll charges incurred while making arrangements with the participating districts.

4. A mileage allowance for those participants who must travel 20 miles or more per day to attend classes.

As their part in this cooperative program, participating districts will provide classroom space and use of projectors and other equipment at no cost to the project. The school district will also undertake the task of recruiting teachers from their own district and from nearby districts to participate in the program. Currently six consortiums are planned. Central sites will be chosen and approximately 30 LEA's will be involved. Program participants will not receive a stipend. However, it is anticipated that any books or other necessary educational materials will be provided to the participants from exemplary funds.

C. Program Activities

An important aspect of this proposal is to fill the needs and desires of each participating district insofar as is possible. To this end, it will be made available to each participating district a variety of courses in mathematics and in science at different grade levels. Courses will meet in half-day blocks for one, two, or three weeks depending upon local interests and the amount of time local teachers can give to the project. Because of summer activities and commitments of the participating teachers, most of the course work will be offered either in June, just after summer vacation has begun or in mid-August, just before classes resume for the school year.

All teachers and administrators in a participating district will be invited to enroll in one or more of the courses offered in that district. As space allows, teachers from neighboring districts will also be invited to enroll.

College credit will be available for those teachers desiring credit. The courses will carry either graduate credit in Education or undergraduate credit in Mathematics or Science, as appropriate. There will be no cost to the participating teacher who does not seek credit. Those seeking credit will be charged per credit. One unit of credit in each course will be available for each week of half-day classes attended. Those seeking credit will be expected to complete projects, papers, tests, and other activities as outlined by the instructor at the outset of the course. It is

expected that those teachers wishing credit will pay for it from their own funds. Thus, none of the exemplary funds will be used for this purpose.

The following courses will be available. Participating districts may choose one or more of these courses to be offered to teachers in their district. A district may request one or more of the instructors for any given week or two-week period, depending upon the interests and needs of the teachers in the district. Since there will be only three or four instructors available, it is clear that a given district might not be able to have each and every course taught at the time they prefer it to be taught. The project coordinator will develop the final schedule for each participating district in consultation with administrators from the various districts.

1. Teaching of Problem Solving in Arithmetic. Suitable for teachers in grades 3-8. One, two, or three weeks. Class participants will learn a variety of problem solving techniques and how to better solve problems, and will receive a large collection of problems to use in their own classes.

2. Use of Manipulatives and Visual Aids in the Arithmetic Classroom. Suitable for teachers in grades K-8. Two or three weeks. Each teacher will construct or develop a collection of free and inexpensive materials which appeal to the child's intuition in learning mathematics.

3. Drill Techniques and Activities. Suitable for teachers in grades K-8. One, two, or three weeks. Teachers will be provided with numerous ideas for providing necessary drill in arithmetic in an interesting and exciting manner.

4. Investigations in Mathematics for Secondary Students. Suitable for teachers in grades 9-12. One two, or three weeks. Participants will be given a large collection of interesting investigations in mathematics for use in their classrooms.

5. Devices Approach to Mathematics. A one-week class designed for elementary school teachers. The course is built around construction (by students) and use of instruments such as the abacus and the surveyor's transit. The abacus involves

mathematical concepts of place value, counting, calculation, etc.; the transit involves geometry, measurement, use of drawing instruments. Both involve considerable mathematics history.

6. Mathematics Applications in Life. For teachers in grades 7-12 for one or two weeks. The course features numerous examples of mathematical application to sports, medicine, architecture, etc. Hands-on class activities are included.

7. Euclid's Geometry. For high school teachers. One or two weeks. An examination of plane geometry as originally set out by Euclid (as compared to current "high school" geometry), leading to an introduction of non-Euclidean geometry. The course offers a chance for geometry teachers to increase their knowledge of the subject of examining it from new directions.

8. Probability. For high school teachers. One or two weeks. An introduction to probability and its applications to gambling, predicting election results, etc.

9. Number Theory. For high school teachers. One or two weeks. An introduction to the mathematics of unsolved problems involving the integers.

10. Use of the Computer in the Elementary Classroom. One week. An introduction to effective uses of the computer at the elementary school level. Designed primarily for teachers in schools that have acquired computers previously but who need help in making the best use of them.

11. Hands-On Science for Primary Grades. One week. Discussions, activities, and experiments using simple and inexpensive materials appropriate for children in the lower elementary grades. Participants will prepare materials to take back to their classrooms.

12. Hands-On Science for Intermediate Grades. One Week. Discussions, activities, and experiments using simple and inexpensive materials appropriate for children in the upper elementary grades. Participants will prepare materials to take back to their classrooms.

In those communities desiring it, each instructor will be available on at least one evening during the sessions to make presentations to members of the community-at-large. The purpose of such a public presentation would be to help build ties between the district and the community as well as to inform the public on some aspect of of science or mathematics.

Instructors for the above-mentioned courses are available.

D. Program Resources

Over the years, each of the instructors has accumulated a large collection of activities appropriate to teaching the subjects listed above. In their collections are many hundreds of interesting books, transparencies, problem sheets, science experiments, and manipulatives. Each instructor will make their collection of materials available to class participants. Courses planned are within the focus of what the SDE, ICTM, NCTM and education deem essential for upgrading the quality of mathematics education.

E. Long-range benefits relative to strategic need of the state, the participants, and the institution.

It should not be necessary to cite any of the numerous studies that have been conducted in the United States in recent years. Collectively, these studies have shown that students in the United States are falling far behind students in other developed nations, particilarly in mathematics and in science. There is, of course, no simple solution to the extremely serious problem. It is clear, however, that a necessary condition to any solution is to have well-trained teachers in the classroom. Clearly, two or three weeks of extended training will not turn a poorly-trained teacher into a well-trained teacher, but the superior and the better-than-average teacher or aid can gain important new insight into the subject matter and into methods of presenting that subject matter in courses that are being proposed. Thus, this project addresses only one small part of the solution to the problem. We are further restricting our attention to those teachers employed in areas of the state too far from a college or university to make it practical for them to continue their education in an on-going manner by attending evening classes or short courses offered during the school year. Nonetheless, students in the "outback" are as deserving of good education as students who happen to live in the more populous portions of the state.

An ongoing professional growth program for teachers, and their participation in the program, is one means of improving all facets of education.

In summary, better teachers today will mean better informed citizens in the years ahead.

F. The Target Population and Target Geographical Areas

The various course offerings available through the project will provide instruction for teachers at all levels, grades K-12. Principals and other administrators will be strongly urged to attend the classes along with their teachers. This can help to convey to the teachers the importance of improving mathematics and science in the school district.

Sites and consortiums will be located in the north, north central, central, west, east and south regions of the state.

G. Expected Outcomes and Program Evaluation

The ultimate impact upon students in the State of Idaho can only be surmised. However, if it is assumed that 12 teachers will be enrolled for each class and if elementary teachers have 30 students in their classes the following year and that secondary school teachers will contact 125 students, then over the next few years many hundreds of students will be affected in varying degrees. It seems reasonable to assume that at least several of these students will continue the study of mathematics or science in college as a result of more inspired teaching by participants in this project.

Evaluation of the teaching portion of this project will be conducted at the close of each course. Participants will be asked to anonymously complete a course evaluation form. As instructors move from one site to another, information provided on these forms can be used to improve the program at the next site. Other than this, there are no plans to conduct studies on test results of students taught by participants before and after the course offerings.

H. Continuation of Program

It is hoped that many of the teachers will permanently change some of their teaching practices after these courses and workshops. Many new and relearned methods, concepts and activities will be covered. Some districts may wish to invite the program back the following school year or summer for additional work and follow up. This project is an outgrowth of a "trial run" during the summer of 1987 when courses were offered at three different sights. The success of those classes prompt the SDE to try to expand the project to other sections of the state.

I. Budget

The project, hopefully, will reach up to 240 teachers and many hundreds of children for approximately $20,000. The $20,000 figure is based upon expenses that include materials, travel, meals, lodging, instructors salaries, and administrative costs. A more detailed budget will be prepared at a date closer to the start of the project, but projected expense items are covered in part in Item B, Objectives.

August 14, 1987
C. Lee

STATE: Indiana

REGION: Five

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: Implementation of Mathematics Achievement through Problem Solving

PROGRAM CATEGORY : higher education; cooperative; competitive; elementary/secondary education; demonstration/exemplary; other - please identify

SUBJECT/S FOCUS: Mathematics; Science; Computer Learning; Foreign Languages

PRIORITY AREA: underserved/underrepresented; partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify

GRADE LEVEL/S: 9-12

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)

Entire school corporations; teachers of students taking "non-academic" curriculum; most probably disadvantaged students

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

1. addresses state priorities regarding improved school performance (SEA) and improved pre college preparation (SHEA)
2. capable of having statewide, perhaps nationwide impact

GOALS:

1. to train mathematics teachers in use of MAPS curriculum (Math Achievement in Problem Solving) for students in non-academic curriculum
2. to improve student learning through MAPS
3. to change attitudes toward mathematics teaching within entire school corporations.

Strengths: institutional commitment; evidence of effectiveness

AN EVALUATION OF THE
STATE OF INDIANA'S FY 1985-86
TITLE II-A EDUCATION FOR ECONOMIC SECURITY PROGRAM

The 3 attachments are from this report.

Conducted for:

The Indiana Commission for Higher Education
Indianapolis, Indiana

Prepared by:

A. Michelle Smith
Marnia F. Kannon

Indianapolis, Indiana
February 1987

Attachment 1
Indiana SHEA

Purdue University - West Lafayette

"Implementation of Mathematics Achievement through Problem Solving (MAPS)"

Grant Award: $53,999
Project Dates: August, 1985 - July, 1986

"Implementation of Mathematics Achievement through Problem Solving" was designed to implement a new mathematics course (MAPS) for non-academic high school students. The MAPS curriculum, developed by Purdue in cooperation with Marion High School and the Indiana Department of Education, stresses mathematical reasoning, problem solving, and use of calculators and computers, rather than the development of computational skills. In the classroom, a group approach to mathematical problem solving is stressed over more traditional methods. Over the course of the project, thirteen schools from across the state took part. MAPS implementation was initiated with a series of fall seminars on the West Lafayette campus, followed by on-site workshops in the spring at seven high schools, ending with a week-long intensive summer workshop at Purdue.

An on-site workshop at the Blackford County High School was visited on April 8, 1987. Questionnaires were completed by ten participants. The project co-director and session leader, Grayson Wheatley, was interviewed; project co-director Erna Yackel was interviewed by telephone in the fall. 50% of the respondents were women, 90% were from public schools, 80% were teachers at the high school level, and the remaining two were administrators. Median years teaching was fourteen; 80% had a master's degree or higher. 40% said they had been invited to participate, 20% had asked that their schools be included, and the other 30% had been "drafted." The project final report showed forty participants, approximately 15% of whom were from private schools.

Participants were enthusiastic about MAPS and its potential. Many were taking part because of a perceived need to upgrade "non-academic" math, both in response to new state requirements and in response to their own classroom experiences. One administrator caught the mood of the group with his remark that "every school in this country could use some help with general math."

Ratings of the project split 60/40 between excellent and good. Participant enthusiasm for the project is probably muted by two factors. First, the MAPS structure takes time and exposure to assimilate; project directors reported initial disappointment in many participants who were looking for a "quick fix." Second, to implement MAPS fully in the classroom would require a substantial additional commitment of time (particularly classroom preparation time) and materials -- resources which are already in short supply among many teachers.

Participants reported no substantive problems with the operation or the organization of the project. The variety of activities, settings, and meeting times seemed to provide sufficient variety and flexibility.

According to the project final report, two of the original participating schools withdrew after the fall workshops: one, an independent Christian school, because general mathematics was rarely taught. Other schools were added as openings occurred. The selection of participants seemed more opportunistic than rational: it was not clear where project designers saw the greatest need for MAPS or how they were implementing a statewide program that addressed areas of greatest need first.

Project staff evaluation used attitude surveys, interviews with administrators, and pre- and post-test results of students who took part in two-week problem solving units presented by MAPS participants in their own classrooms. Their attitude survey and interview data mirrored our findings, and the ratings of the summer workshop were higher than what we found in the April workshop. Students' pre- and post-test results seemed inconclusive: though the experimental group (that exposed to two weeks of MAPS) out-performed the control group on the post-test, for both groups, the average score on the post-test was lower. The project director attributes this change for the worse to the greater difficulty of the post-test, and concludes that "in general, these results indicate that experimental classes benefited from the two week heuristic problem solving unit." If one of their goals is to establish the effectiveness of the MAPS approach, greater care should be taken by project designers to document the benefits of the program more convincingly.

While other projects incorporated aspects of group problem solving and critical thinking skills into their workshops, MAPS provided a comprehensive approach and was successful in obtaining school-wide and system-wide commitments to its program. (The Richmond school system has adopted MAPS for all its general math classes for 1986-1987, for example.) Along with a good approach to content and methodology, the project was well organized, no mean feat given the numbers of school corporations involved and the geographical reach of the activities. MAPS deserves high praise for what it has accomplished already, and we believe it

has even greater potential for serving the state in a thoughtfully implemented program.

Attachment 2
Indiana SHEA

Vincennes University

"Building on Fables"

Grant Award: $47,524
Project Dates: May, 1986 - August, 1986

"Building on Fables" used the elementary science television series "Feathersby's Fables" as the cornerstone in a week-long intensive summer seminar designed to improve science teaching among first and second grade teachers. Eight science segments ("The Body," Ecology, et cetera) were examined through viewing of the appropriate television episode and through classroom presentations, activities, and experiments. The project team included faculty from Vincennes, Indiana State University, Purdue University, the Crawfordsville Community Schools, and the Vincennes Community School Corporation, and members of the Hasty Pudding Puppet Company. Workshops were offered in June and August; all first and second grade teachers in Indiana were invited to apply through a direct-mail campaign.

The project was visited on June 24. Questionnaires were completed by eighteen respondents, and the project directors, Karen Sutton of Vincennes University (with responsibilities for fiscal and physical management) and William Hopper of Tecumseh-Harrison Elementary School (with responsibilities for coordinating educational content) were interviewed. All of the respondents were women, 94% were from public schools, and all were teaching at the K-3 level. Median years in teaching was 13.5, and 72% had master's degrees. All had volunteered for the programs. Final project demographics showed sixty-five participants, 80% from public schools, 6% from private schools, and 13% "other."

Participants overall gave this project high marks (three respondents called it the best workshop they had ever attended),and the attitudes and levels of participation we observed matched their positive written responses. The teaching staff was especially impressive as a team; their experience in the issues of teaching elementary science, their familiarity with the "Feathersby" television segments, and their abilities to integrate the material were outstanding. The sessions were tightly organized and fast paced.

Respondents singled out two problems with the project: the application and the pacing. The application process was envisioned to be competitive, and aspiring participants were

required to submit an application and two letters of reference and to show the support of their administration to offer in-service training in their school corporation. Seven participants complained about this in the evaluation questionnaire. Since only sixty-five people applied for the 100 available position , the applications were not used as a basis for selecting one applicant over another. But given the importance of commitment and awar. ss by school principals and administrators of teachers' effort to improve or refresh their science teaching, we think the process served an extremely useful function and agree with project designers about its importance.

However, we agree with the respondents who commented on the exhausting pace. While it is beneficial to have the teachers actually perform the experiments themselves, too much may have been crammed into these sessions. In the welter of activity, the scientific content was sometimes unclear (though covered in extensive written materials); one respondent commented that the principle and the activity were not tied in enough.

Project staff evaluation was conducted over time using three instruments. Their demographic profi e and "Personal Report of Teaching Comfort and Competency" done via mail in October 1986 supported the high expectations of usefulness of the project which were reported to us by participants in our mid-stream evaluation in June.

Though there were some operational problems and attendance fell short of expectations, this project was very good. The linkage with the television series was an innovative, successful approach. The summer institute design was an effective, efficient way of reaching a diverse statewide audience, and the broadly experienced workshop faculty were a model of inter-institutional cooperation and commitment.

Attachment 3
Indiana SHEA

IV. EXEMPLARY PROJECTS

Out of a field of eleven projects, three have been selected as exemplary. Excellence in these projects required outstanding performance in both project design and project delivery. Good ideas were not enough.

To come up with this list, we drew on all available sources of data and tried to incorporate the participants' and project directors' viewpoints, as well as our external viewpoints. Our choices were also the three top-ranked in terms of participant response (refer back to Table II): a happy concurrence of quantitative and qualitative assessments.

Recommendations for Exemplary Projects

1. Tri-State University's "Physics and Chemistry for Young Children," Susan Van Wagner, Director.

This project was distinguished by outstanding performance and service in all areas. It brought together a team of education and science professors at Tri-State to serve the public elementary schools of an entire county. It presented a balance of scientific content and pedagogy which met the needs of the teachers, and it was remarkably well executed.

The Tri-State project was exemplary because it took a well-defined group of participants and provided thorough inservice training in science and teaching science. The comprehensive working relationship established with the two participating school districts gave a firm foundation to the delivery of the project services and increased the potential for ongoing improvement of elementary science education in the county in the future.

2. Vincennes University's "Building on Fables: A Television Approach to Elementary Science Education," Karen Sutton (Vincennes University) and William Hopper (Tecumseh-Harrison Elementary School), Directors.

This project linked an existing, widely used educational resource -- the "Feathersby's Fables" television series -- with an intensive summer institute. Its design was an effective, efficient way of reaching a diverse statewide audience, and its

broadly experienced faculty was a model of inter-institutional cooperation and commitment.

The "Fables" project was exemplary because it was extremely well designed and executed by an inter-institutional educational team. It also was notable for providing a workable means of serving the reservoir of elementary teachers in Indiana who are seeking voluntary enrichment of their skills.

3. Purdue University's "Implementation of Mathematics Achievement through Problem Solving (MAPS): A curriculum for Nonacademic High School Students," Erna Yackel and Grayson Wheatle,, Directors.

MAPS provided a comprehensive, innovative curriculum for general mathematics and was successful in obtaining school-wide and system-wide commitments for its implementation in 1986-1987. It was well-organized, with a design that encouraged participation of educational policy-makers and teachers, thereby increasing its potential long-term effectiveness.

The MAPS project was exemplary because of its success as an experimental approach to teaching mathematics. Funds provided through Title II-A were used to field test an educational program in its developmental stages at Purdue. By providing inservice training at selected sites across the state, the project also afforded school corporations the opportunity to evaluate the potential of the MAPS approach for their needs.

August 14, 1987
C. Lee

STATE: Indiana

REGION: Five

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: Building on "Fables": A Television Approach to Elementary Science Education

PROGRAM CATEGORY : higher education; cooperative; competitive; elementary/secondary education; demonstration/exemplary; other - please identify

SUBJECT/S FOCUS: Mathematics; Science; Computer Learning; Foreign Languages

PRIORITY AREA: underserved/underrepresented; partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify

GRADE LEVEL/S: 1-2

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)
First and second grade teachers demonstrating commitment to project

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

1. Perceived state need for improved elementary science teaching
2. Designed for statwide impact

GOALS:

1. To train elementary science teachers to work with television series "Leathersby's Fables" to improve classroom instruction
2. To improve student learning through the series and related activities

Strengths: effective partnerships; creativity; evidence of effectiveness

August 14, 1987
C. Lee

STATE: IOWA

REGION:

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: Physics Resources and Instructional Strategies for Motivating Students (PRISMS)

PROGRAM CATEGORY : **higher education; cooperative; competitive; elementary/secondary education; demonstration/exemplary; other - please identify**

SUBJECT/S FOCUS: **Mathematics; Science; Computer Learning; Foreign Languages**

PRIORITY AREA: **underserved/underrepresented; partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify**

GRADE LEVEL/S: 10-12

TARGET GROUP: **(any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)**

Students lacking motivation to study physics

PROJECT RATIONALE: **(NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)**

As the result of surveys by the Iowa Department of Education a task force was created which worked together with local school systems, state Area Education Agencies and physics educators from two of the state universities to address the following needs:

1. Physics teachers needed additional background in physics to be properly qualified for endorsement and conducting meaningful learning experiences.
2. The method of teaching physics needs to cultivate reasoning/science problem solving skills.

GOALS:

1. To develop curriculum materials for high school physics students that will help cultivate reasoning/science problem solving skills.
2. To develop a teacher's resource guide that relates physics to student's common experiences and promotes more meaningful understanding of physics.
3. To provide a cost effective in-service model for teachers so that the above goals may be realized.

ABSTRACT

Physics Resources and Instructional Strategies for Motivating Students PRISMS

The PRISMS program was developed for the purpose of 1) providing learning activities that related physics to the lives of high school students and 2) advocating a teaching strategy that stimulates students to develop reasoning/science problem solving skills. The intended audience is all students in grades 10 - 12 with a background in beginning algebra, especially those students that need additional motivation for learning about practical applications of physics.

A teacher's resource guide contains over 125 activities which support a teaching strategy that blends exploratory activities, concept development and application activities into a learning cycle. High-interest activities involving cars, bicycles, balloon rockets, dart guns, sailboats, etc. are utilized to teach the major concepts in physics. Activities employing computer software and interfacing to acquire laboratory data are attractive options to add to students' computer literacy experiences. The guide supports the teacher in developing a physics curriculum which is compatible with any text. With the listing of the concepts, objectives and teaching activities in each unit of the guide, the teacher identifies the concepts to be taught and then uses the guide to select the learning activities. The guide contains student activity sheets which may be photocopied and teacher notes with suggestions on how to implement the PRISMS strategy, expected observations and student evaluation aids. In addition to the guide, two video tapes have been produced which represent phenomena which can be used to make observations and collect data to analyze motion and conservation of energy.

Students and staff must be evaluated in accordance with the goals of the program in order for the objectives to be attained. Forms have been developed to help teachers assess the degree of student involvement in the participation of these learning experiences. This allows teachers to assess the students in terms of curiosity, attitude toward learning, investigative spirit, personal responsibility and group responsibility. The same instrument can be used by the students for their self-evaluation of these characteristics. A test bank of approximately 2700 questions has been developed and stored on computer discs which can be sorted by objective and Bloom's taxonomy for student evaluation. Staff must be evaluated on the basis of how well they manage the teaching environment and the kind of learning experiences they create more so than on the quality of a lecture.

Observable outcomes in this program are that students become engaged in making meaningful observations, developing hypotheses, identifying and controlling variables, operationally defining, designing investigations. Studies have shown that teachers employing the PRISMS philosophy have found their students to perform significantly better on physics achievement tests and also on integrated science process skills which are correlated to reasoning skills.

During an academic year of physics instruction, using the PRISMS materials and teaching strategy, 10th - 12th grade students (n = 287) showed a significantly greater gain at the .001 level in physics achievement relative to a comparable

control group (n = 222) which used conventional materials and teaching strategies. Gain was measured by using two forms of the New York Regents Physics Examination on a pre-post test basis.

The same group of 10th - 12th grade students showed a significantly greater gain at the .02 level in reasoning/scier . problem solving skills while using the PRISMS materials and teaching strategy during an academic year compared with a control group which used conventional materials and teaching strategies. Gain was measured by using two forms of the Test of Integrated Process Skills (TIPS II) on a pre-post test basis.

These results support the informal observations and feedback that we have from PRISMS teachers who have participated in our workshops. They have noted that learning and understanding physics concepts has become much more meaningful when students can observe phenomena familiar to their life's experiences. The PRISMS program has demonstrated that the features of creating interesting learning experiences, having a functional understanding of physics concepts and developing reasoning/thinking skills can be accomplished when there is the application of a learning theory base to developing deliberate and structured teaching strategies. Many teachers in our workshops have less that 15 semester hours of physics and have experienced very positive results with their students. Enrollments in physics have increased by as much as 100 percent in some of the participating schools. This study has shown that reasoning skills and understanding major concepts can be taught in concert, using effective teaching strategies with activities that are intellectually motivating.

In addition to Title II funds, the PRISMS Project has received support from the Iowa Legislature, the Iowa Department of Education, the U. S. Department of Education and the National Science Foundation. The Joint Dessemination Review Panel selected the PRISMS Project into the National Diffusion Network and will be funded for further dissemination. The Title II funds were important to the PRISMS Project because it gave the necessary early support for development and evaluation which lead to the inclusion of the project into the National Diffusion Network.

C. Lee

STATE: Kentucky

REGION: Southeast

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: Consultant Assistance for Science Education Program Improvement

PROGRAM CATEGORY : higher education; cooperative; competitive; (elementary/secondary education;) (demonstration/exemplary;) other - please identify

SUBJECT/S FOCUS: Mathematics; (Science;) Computer Learning; Foreign Languages

PRIORITY AREA: (underserved/underrepresented;) partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify
Upgrade inservice training of teachers with minimum qualifications.

GRADE LEVEL/S: 9-12

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)
Physical science teachers and physics teachers represent groups with a relatively high number of out-of-field teachers, particularly in the fifth and seventh Federal Congressional districts in Kentucky.

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

The Kentucky State Assessment of Need identified physical science and physics as areas experiencing a relatively high level of out-of-field teachers. Physical science is the major area of deficiency for science teachers who are teaching out-of-field. In 1986-87, 78 schools (32%) did not offer physics as a part of their secondary program. While enrollment in credit course work should be encouraged, inservice consultation and training are needed for teachers who are teaching out-of-field or who are marginally qualified, and to address needs for program improvement including curriculum, facilities, and equipment. Inservice consultation can also help focus resources including local and state Title II funds.

GOALS: To upgrade science teaching and instruction in grades 9-12 with an emphasis on physics and physical science.

GENERAL PROGRAM DESCRIPTION:

An initial survey will identify school districts in the fifth and seventh Congressional Districts which have the greatest needs for teacher training and instructional program improvement, particularly in the areas of physics and physical science. Selected districts will be provided the opportunity for in-depth assessment and consultation toward staff development and program improvement. "In-depth" districts will be selected on the basis of the following:

1. Desire to upgrade programs
2. Teacher training needs
3. Curriculum needs
4. Equipment, facilities and supply needs
5. Willingness to update with modern technology

The project director will conduct a number of pre-school and early school physics/physical science workshops to help establish credibility with prospective participants. The project director will seek commitments for improvement from prospective school districts. In-depth assistance will be made available to selected school districts. Assistance may include but is not limited to the following:

1. Assist district staff in identifying training needs and resources.
2. Assist in defining/refining a minimum scope and sequence and in identification/development of other curriculum materials.
3. Provide classroom assistance to teachers in the areas of identification and use of equipment, teaching techniques, demonstrations, clarification of concepts, and use of computers as a classroom/laboratory tool.
4. Assist teachers in the development of appropriate laboratory observational activities.
5. Assist districts in identifying facility, equipment and supply needs, and advise concerning available resources.
6. Schedule follow-up visits to participating districts.
7. Conduct special regional meetings for teacher involvement in science program/class/laboratory development.
8. Consult with local school administrators for assessing program status relative to current trends/needs in science education.

PRODUCTS:

Project Final Report
Physics/Physical Science Resource Packet.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

1. The number of teachers teaching out-of-field will decrease.
2. The number of schools offering physics and physics enrollment will increase.
3. The quality of curriculum and instruction will improve.
4. Laboratory/observational experiences will be more effectively integrated into instruction.

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Lexington, KY 40505

August 14, 1987
C. Lee

STATE: Kentucky

REGION: IV

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: An Integrated Approach to the Teaching of Mathematics in the Middle Grades -- A Cooperative Teacher Training Project -- Bellarmine College

PROGRAM CATEGORY: (higher education;) cooperative; (competitive;) elementary/secondary education; demonstration/exemplary; other - please identify

SUBJECT/S FOCUS: (Mathematics;) Science; Computer Learning; Foreign Languages

PRIORITY AREA: underserved/underrepresented; partnership (ED-business or LEAs-IHEs); cooperative (SEA-SAHE); (retraining) (of those teaching out of certification; other - please identify

This project focuses on middle school math teachers who are elementary certified and thus have had only one six hour college credit sequence in mathematics.

GRADE LEVEL/S: 6 through 8

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)
Of great concern in Kentucky and other states throughout the nation is the fact that "most teachers in the primary and middle school grades have not had training in science and mathematics or courses in methods to teach these subjects." Most teachers in the middle grades are elementary certified. Approximately 70 percent of the middle grade teachers in Jefferson County (including Louisville) fall into this category. This project provides the training needed by these teachers to teach mathematics effectively in the middle school.

GOALS:
- To increase knowledge and understanding of that portion of mathematics which constitutes the curriculum of the middle grades.
- To better the teacher's ability to construct lesson plans.
- To build upon a reservoir of mathematical applications for the classroom.
- To introduce the computer as a support tool.
- To motivate the middle school teachers to seek out appropriate opportunities and academic programs which will aid in their growth and expertise as teachers of mathematics.

GENERAL PROGRAM DESCRIPTION: This program is for those presently teaching mathematics in the middle grades and specifically addresses the curriculum, problem solving, lesson plan creation, and microcomputer software support. It is also intended for those who might wish to obtain middle school certification. Twenty-four teachers in the middle grades participated in a four-week summer program from July 7 to August 1, 1986. Each teacher was visited in their classrooms four times during the following academic year. The purpose of these visits was to evaluate how the lesson plans developed during the summer session were presented in the classroom. The visits also allowed for consultation with the instructors of the program. This program was funded again in the second year with 15 teachers participating (July 6 to July 31, 1987).

PRODUCTS: Lesson plans were created using the actual texts of the middle grades. Programs of computer support for these lesson plans were developed to be taken back and shared at the schools.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT: The program was evaluated in the following manner:

- A pre- and post-test on the content.
- Construction of five lesson plans which were evaluated as to practicality, level, and the manner in which they include materials complementary and supplementary to the text.
- Applications developed for the classroom were evaluated as to how well they supplement the content and the texts.
- Computer support components were evaluated on their quality and on their transferability to other teachers.
- Follow-up tracking of the educational endeavors of participants.

A comparison of the pre-test vs. the post-test showed that the class increased their understanding of the content by 55 percent. Problem solving and lesson plan creation were evaluated in the summer session and in the follow-up classroom visits. All have commented on the important contribution this part of the course has made to their subsequent classroom presentations. Several of the teachers are now enrolled in further mathematical studies at the graduate level, which fulfills one aim of the summer program.

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Louisville, Kentucky 40205

FY. 1985 - 87

August 14, 1987
C. Lee

STATE: Louisiana

REGION: Governor's 7th Planning District

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: A Retraining Program to Facilitate Secondary Education Certification in Mathematics and Natural Science in Louisiana

PROGRAM CATEGORY : higher education; cooperative; competitive; elementary/(secondary education); demonstration/exemplary; other - please identify

SUBJECT/S FOCUS: (Mathematics); (Science); Computer Learning; Foreign Languages

PRIORITY AREA: (underserved)/(underrepresented); partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); (retraining) (of those teaching out of certification); other - please identify

GRADE LEVEL/S: High School (Grades 9 through 12)

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)
gifted and talented students, reluctant learners, disadvantaged students

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

There exists a shortage of certified secondary school teachers of natural science, mathematics and computer learning in Louisiana and the nation. This shortage contributes to the impaired learning of these subjects among diverse groups of high school students. The EESA-Title II program has been set up at the State level to retrain public and non-public secondary school teachers, as well as industrial professionals, to make them eligible for secondary certification in these subject areas. The retraining program is expected to result in the increase in the number of trained and certified secondary school teachers of natural science, mathematics and computer learning. Correspondingly, the anticipated increase in pedagogical manpower is expected to enhance the learning of these subjects by diverse groups of high school students.

GOALS:

1. To provide a mechanism for early intervention against impaired learning of natural science, mathematics and computer science at the pre-college level in Louisiana and the nation.
2. To increase the number of trained and certified secondary school teachers of of natural science, mathematics and computer science.
3. To enhance the learning of natural science, mathematics and computer science

among the underserved and underrepresented students, the reluctant learners, the disadvantaged students, and the gifted and talented students at the secondary school level.

GENERAL PROGRAM DESCRIPTION:

A college-level, retraining program designed to provide appropriate knowledge and skills in mathematics and natural science through coursework and seminars is being implemented with the objective of facilitating secondary education certification for prospective teachers of these subjects in Louisiana Retrainees are recruited from the Governor's 7th planning district and comprise (a) secondary school teachers of mathematics and science who are presently not certified in these subjects; (b) secondary school teachers of other subjects wh wish to become certified to teach mathematics or science; and (c) non-teaching professionals in industries and other careers who wish to become certified to teach mathematics or science at the secondary school level. A special effort is made to recruit into this program those prospective teachers who especially wis to work with the underserved and disadvantaged students, the reluctant learners and the gifted and talented students. Courses and seminars are offered in biology, chemistry, physics, earth science and mathematics in the evening and on week-ends during Fall and Spring semesters; day classes are offered during the Summer session. Academic counseling and related support system are provided to the retrainees to ensure their success in the program. The local education agencies in all the parishes in the Governor's 7th planning district provide input in the retraining process. The retraining program is evaluated at the end of each semester by the retrainees, the program staff and the local education agencies in an effort to guage program effectiveness in meeting program goals and objectives.

The retraining program started on August 29, 1985, and is now in its third year of implementation. The program has enabled retrainees to earn enough semester hours of credit to become academically eligible for certification. Several retrainees have received secondary certification, and are presently teaching science and mathematics in various high schools in Louisiana.

PRODUCTS:

During the project period from August 29, 1985, through August 14, 1987, a total of 50 retrainees attained academic eligibility for secondary certtification in mathematics and natural science. Twenty-seven have applied and received certification.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

Both the retraining process and product have been evaluated as successful by the local education agencies and the retrainees. The program has been endorsed by the retrainees and the local education agencies as effective in meeting program objectives and goals. The program is expected to lead to a larg increase in the number of high school graduates electing to major in science and mathematics in college. This trend is expected to lead to advances in science and technology in the near and distant future.

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August 14, 1987
C. Lee

STATE: *LOUISIANA*

REGION: VI

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: *Louisiana's Educational Space Science Resource Center / "NASA and Louisiana... Preparing for our Future"*

PROGRAM CATEGORY : higher education; cooperative; competitive; elementary/secondary education; demonstration/exemplary; other - please identify

Resource development

SUBJECT/S FOCUS: Mathematics; Science; Computer Learning; Foreign Languages

PRIORITY AREA: underserved/underrepresented; partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify

GRADE LEVEL/S: *K - 12*

TARGET GROUP: (any other special characteristics e.g., the disadvantaged, the gifted, vocational education)

Project serves student/teacher groups of the gifted and talented, disadvantaged, underserved/underrepresented (females & minorities)

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

- *Upgrading skills of teachers by adding new resources especially at the elementary and middle school levels*
- *Encouraging the underserved and underrepresented population (females, minorities, etc.) to participate and become more involved in the areas of science and mathematics*

GOALS:

- *Re-energize our nation's commitment to educational excellence and increase scientific literacy among our people.*
- *Equip teachers with new tools and strategies to produce more creative, effective science and math instruction.*
- *Teach students how to master scientific and problem-solving skills.*

GENERAL PROGRAM DESCRIPTION:

The "NASA and Louisiana...Preparing for our Future" program provides teacher training, student presentations' and makes assessable current scientific data reflective of today's science technological society, to teachers and students particularly of the areas of the population historically underrepresented/underserved. This program aids in encouraging our young people (women and minorities) to explore and excel in their study of science and mathematics, through the application of new technology such as computer interactive communication systems and satellite broadcasting/teleconferencing.

The unique environment of space holds new promise for the more adaptable female, the gifted, and the talented physically handicapped persons, where weightlessness becomes a friend, enabling new mobility and research opportunities. This program encourages these students in the areas of science and math.

It is important to rekindle the spirit of scientific adventure and help nurture it in our nation's schools in order to maintain positions of leadership in a world of high technology. Elementary and secondary level teachers are instructed in developing comfortable methods of integrating space educational and space science concepts into existing curriculums.

Under the auspices of the Educational Space Science Resource Center, this program disseminates vast amounts of NASA educational materials, videotapes, and other space science educational materials, to teachers throughout many educational systems.

The program provides teachers and students the opportunities to explore innovative experimental techniques, vs didactic approach to science and math education, through in-service teacher training, and "hands-on" projects.

The integrating of space information into the curriculums assist in fostering new enthusiasm and interest among students which are underserved/underrepresented, gifted and talented. The program enables these students to explore through "hands-on" projects their own potentials, creating a new sense of unparalleled wonder and excitement.

PRODUCTS:

- *"S.T.E.P. OUTSIDE" (Science Technology and Education Partnership / an elementary and middle school multi-disciplinary Resource Guide which integrates space science information into classroom curriculum)*
- *"S.T.E.P. OUTSIDE" accompanying videotape*
- *Work shops (teacher training)*
- *Educational Teleconferencing*
- *Networking*
- *Dissemination of existing edu. material*

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

- *Continued upgrading of science and math through a United States depart agency - the National Aeronautics and Space Administration (NASA). (a valuable source for high technology information)*
- *Improved attitudes towards education in general. (if children find high technology within the cassroom, they look to the classroom)*

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2719 Airline Drive
Bossier City, Louisiana 71111

STATE: Maryland

REGION: Prince George's County Public Schools

TITLE II EXEMPLARY PROJECT SUMMARY

TITLE: EESA Grant - Developing Elementary Science Leadership

PROGRAM CATEGORY: Elementary

SUBJECT FOCUS: Science

PRIORITY AREA: Underserved/underrepresented; retraining of elementary teachers (hands on experiences) in schools with predominantly minority student enrollment

GRADE LEVELS: K-6 and special education

TARGET GROUP: The primary focus is with the Millikin II schools. Twenty-eight elementary schools with a predominately minority population.

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

The need for science in-service and teacher retraining programs is critical since most elementary teachers take only the minimum science courses required for college/university graduation. As a result, the average elementary teacher lacks the prerequisite knowledge and understanding of the processes, concepts and content of science. Thus, science at the elementary level is too often, a reading assignment for the student, rather than a hands-on, active, never-ending search for knowledge. There is a need to increase student participation and performance in science by upgrading the skills, concepts and content knowledge of the elementary teachers.

GOALS:

- To increase minority student participation and performance in science by upgrading the skills, concepts and content knowledge of teachers of elementary science.
- To improve the science teaching strategies of minority, elementary teachers of science and elementary teachers of science whose classes are predominantly minority.

OBJECTIVES:

A. Increase teachers' content knowledge in science topics studied at the elementary school level.

B. Strengthen the teacher's teaching strategies in science.

1. Focus on process skills and utilize "hands-on" activities.

2. Recognize and address factors which may affect minority students in science.

3. Provide minority students with information and experience in the application of science concepts and skills.

4. Provide minority students with career awareness activities/experiences related to science.

C. Provide an instructional model for teachers of elementary science.

GENERAL PROGRAM DESCRIPTION:

Developing Elementary Science Leadership
Elementary Science Resource Teacher

To implement an effective training/retraining program for teachers of elementary science, the proposal sought the funding for a full-time Elementary Science Resource position.

The major task of the Elementary Science Resource Teacher (ESRT) is the responsibility of in-service training for teachers in selected schools for a period of one week per school. Follow-up and monitoring services for each school will be built into a yearly plan.

During the school assignment period, the elementary science resource teacher shall be responsible for conferring with the school principal, assessing the status of implementation of the science program, conferring with classroom teachers, and developing an action plan designed to meet the in-service needs of that school. Such action plans will include, but are not limited to:

- demonstration lessons
- hands-on activities
- videotape modeling
- team planning } coaching
- team teaching }
- classroom observation/feedback

The ability to plan and teach well and demonstrate and teach science content process is a prerequisite for this position. The efficient use of time periods such as delayed openings, pre/post school sessions and classroom time is a necessity.

The Staff Development Center staff and the Science Supervisors will be involved in the implementation of this proposal in an effort to maximize the in-service potential of the total program.

An evaluation instrument will be developed by the Office of Program Review to assess the effectiveness of this model of resource teacher utilization. (Teacher and student survey)

The Elementary Science Resource Teacher will work with (and report to) the Science Supervisors to develop instructional and management strategies for the following activities/programs:

- Identifying the model of science teaching to be utilized as an exemplar.
- Defining the materials of instruction and organizational plans that must be in place in each school (curriculum science labs, texts, schedules, sample lesson plans).
- Assessing, with elementary principals and staff, the current status of program implementation and the needs of teachers in science instruction.
- Developing and presenting science workshops(content & process) and demonstration lessons.
- Identifying classroom teachers who may serve as demonstration teachers of science.
- Developing appropriate teaching strategies for identified teachers.
- Monitor the science program and determine program implementation through observations and conferences.
- Developing and presenting science workshops (content and process-instructional strategies) at the Staff Development Center for teachers who volunteer to attend after school hours.
- Developing and presenting in-service programs which will assist the teachers of the selected schools in recognizing and addressing factors which are likely to affect minority students in science settings.
- Develop and teach science demonstration lessons to individual teacher's classes for demonstrative purposes and for videotaping and school system distribution.
- Conducting State approved workshops in elementary science (content - processes, instructional strategies, factors affecting minority student achievement) in the summer, fall and spring.
- Developing an annual planning calendar after conferring with school principals to identify in-service needs and appropriate visitation dates.

PRODUCTS: Demonstration Video Tapes
Model Lesson Plans
Supplemental Instructional Activities
Warm-Up Activities for Students
Guidelines for Science Program Implementation
An in-service training model
In-service survey

EVALUATION: A pre and post in-service survey was administered to 28 principals and approximately 560 elementary teachers.

- 100% of the principals surveyed indicated a preference for direct, continuous, classroom-level resource assistance for teachers. (helping teachers at the level of implementation).
- 80% of the teachers surveyed indicated that they have increased the number of hands-on science lessons presented to students.
- A special focus on minority recruitment has resulted in an increase in the number of minority teachers registering for and attending SAW-Me's or in-service programs
- An increased number of minority teachers have assumed the role of Elementary Science Coordinator.
- A significant increase in the number of minority students participating in the elementary Science Fairs has been observed.

The training/retraining program with a special focus on assistance and support at the level of program implementation will serve as a training/retraining model as we address the needs of all other elementary schools in increasing the student and teacher participation in hands-on science instruction.

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Margaret Boles - Elementary Science Resource Teacher

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Margaret Boles - 386-1504

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William Paca Instructional Services Center
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August 14, 1987
C. Lee

STATE: Maryland

REGION: III

TITLE II EXEMPLARY PROJECT SUMMARY

TITLE: "Computers to Enhance Science Education"

PROGRAM CATEGORY: higher education; competitive

SUBJECT/S FOCUS: Computer Learning

PRIORITY AREA: underserved/underrepresented; partnership

GRADE LEVEL/S: Senior High; Grades 9-12

TARGET GROUP:

The Baltimore City Public School student population is overwhelmingly minority, economically disadvantaged and below grade level in achievement. Based on 1986 enrollment data, 29,547 students attend high schools (grades 9-12), the population targeted in this grant program. Over 80 percent of these students are minority, and 61 percent qualify as low income. As determined by the California Achievement Test, 59 percent of high school students perform below grade level in reading and 46 percent perform below grade level in mathematics (Baltimore City Office of Education, 1986).

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

National Perspective and Need: While not synonymous with technological literacy, computers are an important component and may correctly be viewed as "the core of the information era" (Lewis, 1983). Hence, if care is not taken in the dissemination of this technology, microcomputer education will compound the problem of equity. Large, poor, urban school districts have less access to computer enhanced learning than more affluent areas. Therefore, the risk of empowering some learners and disenfranchising others is greater (Mullen & Chaffee, 1983).

Computer education must be integrated into the science curriculum so that students see the computer as a powerful tool which enables them to probe their environment and to process information. The Classroom teacher is the key to this integration. Unless the computer becomes a familiar tool in the hands of science teachers in the classrooms, "it appears unlikely

that this new technology will have a major impact on science teaching and learning in our schools" (Lehman, 1986, p. 124).

State Perspective and Need: While approximately 13,500 Baltimore students are enrolled in 9th and 10th science courses, only 5,000 are enrolled in any elective science courses beyond the tenth grade (Bowden, 1985). This demonstrates a critical decrease in the number of city students choosing science and underscores the necessity of reaching high school students with more relevant engaging science programs.

Date collected in Baltimore City clearly establishes the need to develop and implement an appropriate inservice model to provide requisite training and support for integration of computer technology into science courses. The Baltimore City Office of Instructional Computing conducted a survey (French & Smith, 1985) that identified the following local problems which severely limit integration of computers into instruction:

- There are relatively few computers in schools. Baltimore City has 29, 547 high school students and a total of 375 computers for use with this population (a ratio of 80 students for every computer).
- Science teachers have few computers available for their classroom use.
- There has been little formal staff development in computer instruction that provides for the specific needs of science teachers in Baltimore City.
- Those teachers who are computer literate and have access to machines often lack the time to effectively incorporate this technology into lesson planning.

GENERAL PROGRAM DESCRIPTION:

There is a critical need to introduce students to the use of technology in science instruction, particularly in school systems which serve large minority populations and lack resources to develop programs unassisted. To address these needs Johns Hopkins University's Education Division and Baltimore City Public and Archdiocesan schools collaborated t train 40 high school teachers to use computers to ennance science instruction. Title II funds (first and second year) supported this effort and expanded the pilot project to the remaining city high schools. Teachers received instruction in computer applications, operating procedures laboratory interfacing, programming, troubleshooting, and individual project development. Teachers constructed and used computer interfaces for the science laboratory, used a variety of software applications, and developed and presented a series of science lessons which integrate the computer into current curricula. Ideas and materials were exchanged with colleagues at planned conferences and at special users group meetings instituted as part of this program. Assessment procedures included ongoing evaluation of training sessions, site

visits to classrooms, compilation of teacher logs and review of prepared projects.

PRODUCTS:

Outcomes of this project were trained teachers and teacher-tested lessons which integrated computer technology into science instruction. Use of the lessons have immediately impacted 7,000 primarily minority and disadvantaged students in 20 schools and has the potential to affect many more.

Project outcomes included the following production (or acquisition) of these essential elements:

1. At the conclusion of the project participating high school science teachers were able to use computers in the following areas:

   * use computers for word processing, data base management, spreadsheeting, and laboratory interfacing;

   * analyze and apply the above applications to the teaching of science;

   * select and appropriately use science software in their instructional programs;

   * relate the use of computers to the work of applied and basic scientists;

   * develop and teach at least one science lesson which incorporates computer technology;

   * perform simple maintenance of hardware components.

2. The participating science teachers were able to integrate computers into their instructional programs.

3. A product of the project was a packet of over 40 tested model lessons for integrating computers into science instruction.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

Rationale/Factors Promoting Success: Trained teachers, appropriate hardware and software, ready-to-use classroom materials, and support for classroom integration of these materials, will provide access to computer technology to 7,000 Baltimore City high school students each year.

Public School/University Collaboratives: Because research shows that the most successful inservice projects have strong involvement by universities (Wade, 1985), care has been taken to enlist continuing university support. The partnership between Baltimore schools and Johns Hopkins, which proved so critical to

both the development and implementation of the pilot as well as the design of this proposal, is in place and will continue. For example, the Johns Hopkins Masters in Technology to Educators program serves as the source of instructors for teacher training described in this proposal and the university Apple computer laboratory is utilized for training.

Classroom Integration: The cadre of teachers trained during this project will form a strong team capable of effectively communicating to others the correct use of materials produced during training. They will be instrumental in generating interest and providing guidance to other science teachers in their own schools and to wider audiences.

Curriculum Development: One outcome of this proposal was a collection of computer-based science lessons. These lessons were developed by teachers during the training component. Lessons were classroom tested, refined and disseminated within Baltimore City Public Schools and surrounding districts, and demonstrated at local conferences.

Project Continuity: To ensure ongoing integration of computers into science instruction the program provided for a cadre of trained teachers who serve as role models and trainers in their schools. Baltimore City Public Schools will make use of these teachers to demonstrate effective use of the developed curriculum materials.

To broaden the support and communication network, a science education "users group" established during the project will continue. This group will meet monthly to foster discussion, problem solving, and exchange of ideas among teachers. Also included in this group are teachers from other school systems who are conducting teacher training programs.

In addition to the Funds provided by Title II (Higher Education, this project was also supported by matching fund contributions from the Johns Hopkins University, the Baltimore City Public School System, the Archdiocese of Baltimore-Division of Catholic Schools, and the gift of computers and computer equipment from Apple Computer, Inc., and the National Cristina Foundation, Inc.

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09/17/87:jlj
eesasum

HARBOR EXPLORATIONS

A Collaborative Inservice Science Program for Teachers Using the Marine Environment as a Learning Lab

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Mr. John Crowley, Program Coordinator
Dr. Robert Spayne, Senior Program Advisor
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I. Program Goals

Harbor Explorations is an exciting and innovative collaborative program at the University of Massachusetts at Boston that focuses on: a) professional development for secondary science teachers using the marine environment as a motivating lab setting to explore scientific method and thinking; and b) providing local students the opportunity to be exposed to basic on-water marine science procedures. It is a program that has been planned and is being implemented through a very active partnership between the University, Project Oceanology of Avery Point, Groton, Connecticut, a Consortium of local Science Agencies, businesses, the National Park Service, and science teachers in 35 local school systems.

The program has five major goals. These are:

1) To provide an institutional base and solid academic connection for experienced and new science teachers who want to improve their knowledge of science content, teaching skills, and to engage in field research opportunities by using the Boston Marine environment as a laboratory setting;

2) To provide motivating "hands-on" on-water learning experiences for students that would become part of the learning activities of a full Boston Harbor classroom curriculum;

3) To provide a unique opportunity for teachers and students to collect marine specimens and to perform basic research activities to be brought back into the classroom for further study;

4) To become the catalyst to bring together the institutions, professional groups, agencies and resources that can assist teachers in the development of curriculum resources that focus on the local marine environment;

5) To develop a Masters program in Science Teaching that would establish UMass/Boston as a key leader in preparation and inservice support for Science teachers.

II. Program Activities

To accomplish these program goals, three major performance objectives have been identified. These are:

A. To enhance inservice teachers' scientific knowledge and ability to teach science concepts effectively;

B. To empower teachers to become trainers of other teachers;

C. To develop resource and curriculum materials that use the local marine environment as the lab setting.

These objectives are presently being met through four coordinated types of training activities. These are:

1) A Teacher-Training On-water Demonstration program

In April of 1986 for one week, and again in May of 1987 for three weeks, and in September of 1987 for four weeks, a series of 2 1/2 hour ocean trips aboard the Envrio-Lab, a 50' fully equipped oceanographic research vessel were offered for over 300 teachers and 2500 students. Working in groups of 40 aboard the Enviro-lab, teacher and student participants had the opportunity to carry out measurements of the physical, geological, chemical and biological characteristics of the ocean. They used nets, dredges, corers, and other oceancgraphic equipment to obtain samples of the water, bottom muds, plankton, fish, crabs and other marine life. The program demonstrated to teachers in an active "hands-on" way the various critical scientific thinking skills that students could be exposed to through the marine environment. In addition, teachers were allowed to take specimens, water samples, and curriculum guides back to their classrooms for further study.

2) Intensive Teacher Training Summer Institutes

Two intensive teacher training institutes have been offered in 1986 and 1987. 50 experienced science teachers from 22 school systems who want to take leadership roles in working with other teachers were selected for the two week and three week intensive programs which focused on: 1) the latest thinking and issues in Marine Science; 2) critical environmental issues impacting the marine environment; 3) developing research and sampling techniques which are instrumental in encouraging students and teachers to scientifically resolve problems in the marine environment; 4) establishing procedures whereby samples can be brought back to the classroom for further study; 5) developing teacher resources for using the marine environment as a lab setting for science instruction; 6) exploring additional on-water sites and programs using Boston Harbor locations; 7) learning effective science teaching and teacher training techniques so they may increase their classroom effectivness and be trainers of other teachers. The Institutes are co-led by Science faculty, teachers, and the expert staff from Project Oceanology. In addition, faculty from various local institutions, Mass Water Resources Authority, staff from the Harbor Island Parks, the MDC and Metro Parks have been session presenters. The research vessel from Project Oceanology has been available for "hands-on' learning activities.

3) Academic Year Teacher Workshop Series

To follow-up on the intensive summer session and to also introduce a new group of teachers each year to the program, two ten session workshop series are being offered for 50 urban and suburban teacher participants. The workshops are full day Saturday sessions held at the campus, and at classroom lab sites. They focus on both science content topics and curriculum and teaching issues.

Graduate credit is available for this activity if participants do a substantive teaching unit or a major paper. All participants are doing teaching units for publication.

Since an additional four week on-water program is already planned for the Spring of 88, teachers who participate in the summer institute and workshop series are being prepared to become co-leaders with Project O and UMB staff of the student on-water trips to demonstrate to other participating teachers new teaching techniques. These teachers will be released from their schools for this activity to do four (4) demonstrations each. These demonstrations will focus on research techniques as well as sample collecting techniques necessary for basic scientific training of both teachers and students.

4) A Curriculum Resource Development Initiative

Since a major focus of the institute and workshops is on developing effective teaching strategies and curriculum to put the new content learned into practice, we have also engaged two staff people to pull the materials together into: a) A Teacher Resource Guide of local marine science resources, field trip sites, and materials; and b) a Marine Science Curriculum Supplement to the Project Oceanology materials that expands lessons by including units based on local marine shore and water settings. This will be disseminated to 250 teachers.

III. Impact and New Directions

As an effort to focus on improvement of science teaching and provide "hands- on" learning experiences for teachers and students together, the program is clearly a huge success, earning documented (evaluation forms, teacher journals, classroom observations) praise from all the teacher and student participants, positive news coverage from three local TV channels, and a strong endorsement from local school systems and businesses. Every program activity is filled as soon as it is announced with school systems and teachers from Plymouth to Gloucester, Ma urging the University to expand its activities so they can participate. The National Park Service in Salem, Ma has opened its facilities to the project in order to make the program available to North Shore school systems

Teachers involved in the program have certainly felt empowered, and took the initiative to prepare a Commonwealth Inservice Education Program to continue professional development activities for teachers and a program proposal to the Board of Regents to expand on-water learning activities. Their efforts have leveraged an additional $75,000 in State funds to match the $54,000 in Title II funds. School systems have responded eagerly and have also committed an additional $30,000 of their own resources to subsidize on-water trips. It has also been possible to get an experienced science teacher from Hingham High School released on sabbatical to staff the continuing program for 86-87 and 87-88. This was a big step since very few teachers have been granted sabbaticals recently. The Hingham School System assumed all costs. Businesses in Boston, intrigued by the unique opportunity for learning that the program provides to urban youngsters, have approached the University to donate funds to support school involvement. The Massachusetts Water Resources Authority hopes to assist the project in involving schools from all of the 43 cities and towns that are dumping sewage into the Harbor.

The results of ongoing formative evaluations have been so positive that it has provided the incentive for the University to establish a Center for the Advancement

of Science Teaching that involves UMB faculty from Chemistry, Physics and Biology as well as several senior teacher partners from Swampscott, Hull, Dover-Sherborn, Canton, Quincy, Marblehead, Hingham, and Boston. The major focus of the Center will be to provide professional support to teachers in the field, to recruit more preservice students as science teachers, to retrain experienced professionals in the sciences for teaching and to plan a joint Masters in Science Teaching with faculty from the Sciences and education.

While this is a program development effort still in process, a great deal of progress has been made. At the end of September 1987, 2500 students will have been have been involved in innovative science learning activites; 100 teachers will have taken leadership roles in program development activities; 300 teachers will have been involved in innovative and sucessful professional development activities. One teacher generated resource guide is in process of development and a teacher-developed supplemental curriculum guide will be available by Spring. Thirty-five (35) school systems are now involved with UMB Science and education faculty; and successful collaborations have been established with other institutions and groups (University of Connecticut, Suffolk University, Eastern Nazarene College, Museum of Science, and The Aquarium, Mass Marine Educators). The University is now working actively with Project Oceanology to obtain another research vessel so that the program can truly be institutionalized and can offer 36 weeks per year of on-water learning activities and ongoing teacher training activities.

MESTEP
(Math English Science Technology Education Project)
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Since its inception in 1983, the central goal of MESTEP has remained constant: to recruit, prepare, place and retain in teaching outstanding college graduates, including significant minority representation, with strong academic majors in math, English, or a science. The vehicle for achieving this goal is a school-University-corporate partnership which is involved in all aspects of the 15-month MESTEP M.Ed. program, and particularly in national recruitment, candidate selection, operation of a summer school, sponsorship of semester-long paid internships in schools and corporations, and support for graduates including summer corporate employment.

In January, 1988, MESTEP will place its 100th candidate in the Massachusetts secondary schools. The 100 to date from 56 colleges and universities have been selected from more than 400 applicants, and include 2/3 women, 14 minority members, and 92 math or science graduates. Their mean Graduate Record Exam scores are above the 80th percentile. Of 79 graduates between 1984 and 1987, 66 have remained in education. Since 1983, the number of participating corporations has expanded from two to twelve, and the number of school systems hiring interns has tripled.

With its emphases on selection, professional preparation at a Master's level, heavy clinical orientation, active research and linkage with graduates, the program is responsive to Holmes Group and Carnegie Commission concerns. Through its work with the Acton summer school, intensive placement of teaching interns in the city of Lawrence, and use of Mentors, MESTEP has in effect pilot-tested several of the current recommendations of the Massachusetts Commission on the Conditions of Teaching and Joint Task Force on Teacher Preparation. The state of Arizona has replicated MESTEP under the name, "Partner Project." In February, the American Association of Colleges of Teacher Education honored MESTEP with its award for Distinguished Achievement in Teacher Education.

Title II funds (in FY 1987 and in FY 1989) have complemented a $100,000 annual University investment and a three-year FIPSE grant ('86-'88) in three important ways: (1) strengthening our capacity for effective minority recruitment; (2) helping us to cover partial basic operating costs in the early stages of program development; and (3) furthering our research/documentation/writing agendas.

The attached recruiting brochure describes the basic components of MESTEP. Also enclosed is a description of the in-depth interviewing process which represents our major research, as well as program assessment, vehicle, and a selected bibliography of publicity about the program.

Northwest Regional Consortium
for the Improvement of Math and Science Teaching

offered by
North Adams State College
in cooperation with Berkshire and Greenfield Community Colleges

Contact Person: Dr. Mary M. Fuqua, Dean, Community, Continuing and Graduate Education, North Adams State College, North Adams, Massachusetts, 01247. Telephone: (413) 664-4511

The Northwest Regional Consortium for the Improvement of Math and Science Teaching is a collaborative program of North Adams State College, Berkshire and Greenfield Community Colleges, the Northwest Regional Office of the Massachusetts Department of Education, and twenty-three public school districts in the northwestern area of Massachusetts. It was formed in 1985 for the purpose of consolidating and thus increasing the impact of Title II funding available to all educational agencies in the region. Its goal is to strengthen math and science teaching at all levels through the creation of a regional in-service program and resource network.

In its first year, five hundred thirty-one teachers participated in workshops; one hundred ninety seven hours of consultant time were provided to participating schools; and an Inventory of Area Resources was assembled and distributed. The empowerment of teachers is a particularly important first-year outcome that had not been specifically sought and that cannot be quantified. Teachers were given responsibility to identify needs in their own schools and in the region and to recommend ways to address them. As a result, they have moved toward leadership in science and math education in their schools. Programs for the second year are based on and will enhance this important outcome.

Now in its second year, the Consortium is strengthening and expanding its services. Programs will focus on the processes and results of curriculum review and re-design. This focus was chosen by the Members Advisory Committee. This Committee, representing all the districts in the Consortium, was originally made up of principals and other administrators. Its members are now mostly teachers. It has been through their ongoing input that the Consortium has identified common needs and goals and shaped plans for the second year.

The core of the second year program is a sequence of eight day-long symposia which address math and science curriculum; technical subjects and the special needs student; and instructional technology. The Symposia will bring teachers to the college campuses for a full day of lectures, workshops, demonstrations, and discussions. Each symposium will end with a 'round table' discussion where college faculty and public school teachers can exchange and share expertise. Symposium leaders include faculty from the schools and colleges and other authorities in the field.

From this series of symposia, teachers will proceed to the process of selecting topics and individuals for the consultancies their schools will use. These consultancies will reinforce information presented in the symposia and assist in the development of math and science lessons and programs. Consortium staff will assist the teachers with the identification of resources and with scheduling. The staff will place a priority on identifying shared needs and coordinating resources. Total consultant hours provided are expected to be higher than the first year as a result of this coordination.

Involvement of College faculty in the symposia and as consultants is a major goal. Their participation has been promoted by 'Consultants Briefings', which acquaint college faculty who have not previously or recently worked in teacher in-service training with the needs of schools today.

Teachers are also being identified to serve as leaders for a concurrent Technological Enrichment Program. These programs take qualified teachers, a small group of junior-high age students, and a volunteer from the private sector to investigate a problem away from the school grounds after school hours. The teachers are involved in the entire process of developing and executing their projects. Links are formed and maintained between the participants, and the Consortium sees to it that these partnerships between the public and private sector are well planned, and that materials, such as soil science and hydroponics supplies, are provided.

The Inventory of Area Resources is being updated. It presently lists 30 businesses, 43 speakers, and 25 field-trip destinations in the region. All the entries are being verified, and additional listings are being sought. A revised version will be published at the end of the academic year.

The formal evaluation process for the Consortium programs includes systematic analysis of the responses on evaluation forms to each presentation at our symposia and consultancies. The Members Advisory Committee meets regularly to convey feedback from the schools. The most telling evaluation is that in the second year of operation, the number of districts affiliated has increased. Now every Franklin and Berkshire county school in the Northwest Region is part of the Consortium, and the average contribution has risen from 58% of the district's Title II allocation to over 70%, with most of the districts contributing 100%.

The project has been disseminated nationally in formal presentations at annual meetings of the Association of Continuing Higher Education and the National Association of Science Teachers. It has been presented regionally to governing boards of regional organizations of science teachers, math teachers, and special needs directors. Plans for additional dissemination include production of a slide-tape presentation and publications by the project staff.

September 22, 1987

STATE: MICHIGAN

REGION: V

TITLE II EXEMPLARY PROJECT SUMMARY

TITLE: Michigan Middle School Mathematics Resource Teacher Project

PROGRAM CATEGORY: Higher Education; Cooperative; This cooperative program was linked to several higher education competitive projects.

SUBJECT/S FOCUS: Mathematics

PRIORITY AREA: Retraining

GRADE LEVEL/S: Grades 5 through 8

TARGET GROUP: Selected middle school mathematics teachers.

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

Approximately 60% of all middle/junior high school teachers of mathematics in the State of Michigan are teaching with insufficient mathematics background. The 5-8 grade range is critical for development of positive attitudes by students. The need is for improvement of instruction beyond traditional basic skills.

GOALS:

The goal of the project was to collect, design, disseminate, and evaluate instructional materials to support instruction in the EESA Higher Education Competitive Grant projects focusing on middle school mathematics curriculum improvement and teacher inservice.

GENERAL PROGRAM DESCRIPTION:

The project involved eight Michigan public four-year higher education institutions (Central Michigan University, Eastern Michigan University, Grand Valley State Colleges, Michigan State University, Northern Michigan University, University of Michigan, University of Michigan-Dearborn, and Western Michigan University). (Western served as the fiscal agent).

Professors from MSU, U-M and WMU worked together closely to develop a set of mathematics resource materials. Input was provided from colleagues in peer institutions, classroom teachers, curriculum directors in local and intermediate school districts, and consultants in the State Department of Education.

The product that emerged is titled MICHIGAN MIDDLE SCHOOL MATHEMATICS RESOURCE TEACHER PROJECT. Thirteen teaching and curriculum modules and an instructor's guide comprise the three volume publication. A three-day workshop for teaching teams associated with each of the eight universities was held at a quiet and pleasant MSU Biological Station Conference Center. (Some members of the teams were middle school teachers.) The team members returned to their own geographic areas equipped to use the newly developed materials in workshops.

The cooperative project provided for a large and appropriate collection of resource materials and classroom sets of manipulatives, to be housed at each of eighteen participating sites across the state.

An impressive cadre of mathematics resource teachers has begun to emerge as a result of the networking and workshops. Additional workshops and follow-up activities continue to occur as a result of second and third-year funding.

Project directors have used creative funding techniques by planning inservice packages with other potential grant recipients. Such packages have been partially financed by EESA Higher Education grants, EESA Local Formula Grants and State Professional Development Grants.

PRODUCTS:

A thirteen module collection of teaching and curriculum materials with instructor's guide.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

Primary: A cost-effective program for training selected school personnel who can effect change in the curriculum and instruction of middle/junior high school mathematics in Michigan.

Secondary: Students in grades 5-8 will be provided a higher quality mathematics education which could result in improved performance and the election by them of further mathematics coursework at the high school level.

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REGION: V

Title II Exemplary Project Summary

TITLE:

Ypsilanti Secondary Mathematics Program (YSMP)

PROGRAM CATEGORY:

Elementary/Secondary, Demonstration/Exemplary Grant Program

SUBJECT FOCUS:

Mathematics

PRIORITY AREA:

The program is designed for high school students who are educationally "at risk" and for students needing remedial assistance in mathematics.

GRADE LEVEL:

7 - 12

TARGET GROUP:

While the students are the beneficiaries of any program that improves instruction, the immediate target group of all curriculum and staff development programs is the educators who deliver instruction. The high school mathematics faculty is the target group for this program and the middle school mathematics faculty i the secondary target group.

PROJECT RATIONALE:

Ypsilanti's tenth grade Michigan Education Assessment Program (MEAP) mathematics scores show that approximately 50% of the students in the district over the last five years failed to master the basic skills expected of tenth grade students. These results parallel the statewide MEAP results which show that approximately 35% of the tenth grade students in the state fail to perform adequately on the tenth grade mathematics test.

In addition, there is national concern to improve general mathematics education as addressed in An Agency for Action: Recommendations for School Mathematics of the 1980's (NCTM). The project utilized current research data to develop a program to address these current needs.

GOALS:

1. High school mathematics faculty will develop at least five instructional units suitable for the general mathematics course which will emphasize learning at the high cognitive levels and consonant with accepted models for effective mathematics instruction.

2. High school mathematics faculty will develop an increased understanding of the instructional processes component of the GMM and the principles of the Effective Teaching techniques Model (ETTM).

3. The district will disseminate information about the project to other school districts, to mathematics teachers, and to professional organizations.

4. Middle school mathematics teachers will increase their understanding of the GMM, the principles of the ETTM as it relates to general mathematics instruction, and their understanding of the process of curriculum revision.

GENERAL PROGRAM DESCRIPTION:

The program emphasizes activities that engage students in higher order cognition. The project is based on research findings related to general mathematics content, processes and instruction and the emerging research on effective teaching techniques.

The YSMP includes a series of activities to help the mathematics faculty develop, pilot test, and revise instructional units for the general mathematics course. These activities include after-school meetings, day-long inservice workshops, peer support activities, and a summary workshop to prepare the new instructional units for dissemination.

The instructional program:

a. redefines the content areas covered in the district's general mathematics courses,

b. broadens the range of mathematics skills emphasized in the program to include problem solving, mental arithmetic, and using computers and calculators.

c. emphasizes conceptual understanding through manipulative-based instruction, and

d. improves instructional teaching strategies.

PRODUCTS:

Five units for the high school general mathematics course have been developed. The lessons rely heavily on the use of manipulatives and problem solving activities to enhance conceptual learning.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

1. The YSMP achieved its principal objective; developing five units for the high school general mathematics course.

2. The YSMP achieved its second objective, help high school mathematics faculty develop an enhanced understanding of the principles of the GMM and the ETTM. In addition, faculty members attended conferences, presentations and special workshops.

3. The district achieved its third objective, the active dissemination of information about its program. The district sent copies of its five units to the MDE for distribution. In addition, the mathematics faculty made presentations at professional meetings and conferences, provided materials to other school districts, responded to requests for information from other districts and encouraged visits by mathematics faculty from other high schools.

4. The project director of the YSMP and central office administrators described the importance of generalizing the program to the district's two middle schools. However, the district's 1986-87 proposal was not fully funded and implementation efforts focused on high school.

5. Students enrolled in the district's general mathematics course made significant gains in computational performance as evidenced by student performance on the Shaw-Hiele Computation Test.

6. Student attendance in the general mathematics classes improved from the previous year.

7. The project is having a positive impact on the attitudes of the faculty. They now express positive attitudes toward the course.

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STATE: Michigan

REGION: V

Title II Exemplary Project Summary

TITLE:

Mathematics/Science Title II Staff Development Grant

PROGRAM CATEGORY:

Elementary/Secondary Education, Local Formula Grant

SUBJECT FOCUS:

K-12 Mathematics and Science

PRIORITY AREA:

Staff development and partnership (some reassigned teachers)

GRADE LEVEL:

K-12

TARGET GROUP:

All K-12 math/science teachers

PROJECT RATIONALE:

Update content area knowledge for K-12 teachers of mathematics and science.

GOALS:

1. To improve the instructional process and content in K-12 mathematics and science.
2. To form a partnership with industry and prepare for the 21st century.
3. To increase students' awareness (especially females) of the need for mathematics and science.

GENERAL PROGRAM DESCRIPTION:

The changing demands of mathematics and science instruction as well as the impact of technology require the updating of teachers' knowledge and skills.

This project addresses three critical issues:

1. Updating teacher skills in mathematics and science consistent with the current demands of technology.

2. Arranging for adequate staff development time that is compatible with the teacher's standard work day.
3. Developing a long-term program that provides for continual improvement of the mathematics and science programs.

Curriculum Review:

First, K-12 teacher/administrator committees were established to assess the K-12 sequence of skills in science and mathematics. Key teachers from 24 elementary schools, seven junior high schools, and four high schools assessed the current curriculum and then, using the Michigan Essential Skills, Standards of Quality, and current research in mathematics and science, wrote sequential skill lists for each discipline. Content and the process model of learning were emphasized. In mathematics, special attention was given to teaching through the use of manipulatives. In science, the emphasis was on "hands-on" activities. These K-12 committees prompted much interchange and improved articulation between grade levels. In addition, specific curricular goals were set and staff inservice needs identified.

Staff Development Planning:

Groups of teachers and administrators, with support from business, the Michigan Department of Education, and local universities, designed teacher inservice sessions based on the needs identified in the curriculum review.

Staff Development Session for Mathematics/Science:

Teacher/administrator/counselor mathematics and science inservice sessions were held from 4:15 to 6:00 p.m. throughout the school year. The focus of these sessions was to introduce new methods, content, materials, and research. The elementary sessions were provided by a team of secondary and elementary teachers along with Michigan Department of Education consultants. The secondary sessions were given by Michigan Department of Education consultants, university professors, and system-wide department chairpersons. Assessments of the inservice sessions were extremely positive (data available).

Inservice Design:

The teacher attendance at these voluntary inservice sessions was indicative of their professional dedication, as well as their satisfaction with the off-site locations of the inservice sessions. Sessions were held in small conference rooms at local restaurants; so that following the presentations, teachers could be served a meal and have the opportunity to discuss, in a casual environment, the things they had learned from the lecture. Although this may sound like a small detail, it proved to be an extremely positive way to give the teachers a feeling of being well treated, as well as an opportunity to reflect on the inservice experience with teachers in their own school or grade level.

Partnership with Industry:

The system-wide mathematics department chairperson has also been released this year from his full-time teaching assignment to assist in coordinating these activities. Mathematics chairperson, Dr. Eschenburg, is also working with General Motors on a cooperative project to increase students' awareness, especially females, on the importance of mathematics and science instruction as preparation for entry into skilled trades and engineering careers in industry. Other Utica teachers will be trained using the GM materials in mathematics and science classes.

PRODUCTS:

The Project products and results include:

- compilation of sequential skills in mathematics and science, K-8,
- increased dialogue between elementary, junior and senior high school teachers,
- mathematics and science instruction have become a greater priority, and
- process mathematics instruction helped to link mathematics and writing instruction.

EVALUATION/ANTICIPATE LONG-TERM IMPACT OF PROJECT:

The teacher evaluations of the inservice sessions have been extremely positive, and teachers are requesting additional sessions. We will monitor all student test scores to determine the long-term impact of efforts to improve instruction.

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REGION: V

Title II Exemplary Project Summary

TITLE:

Detroit's Middle School Science Planning and Implementation Project

PROGRAM CATEGORY:

Demonstration and Exemplary Grant Program, Elementary and Secondary

SUBJECT FOCUS:

Science - Technology - Society

PRIORITY AREA:

Underserved/Underpresented populations

GRADE LEVEL:

7-8

TARGET GROUP:

Approximately 45,000 middle school science students in 62 middle schools will be impacted by this program. Additional students in other school districts will also benefit.

PROJECT RATIONALE:

Society today is beset with problems of a complex scientific and technological nature, thus, it is imperative that students become scientifically literate. If students are to solve these problems as adults, it is imperative that K-12 education equip students to:

- use technology to improve the quality of many personal and professional technology-based decisions.
- participate intelligently as informed citizens in the transition from an industrialized society to a post-industrialized service and information age.
- be more active in shaping public policy, which often involves the use of sophisticated technology

There is an immediate need for the infusion of science, technology and society into the existing science curriculum. This infusion includes the areas of: 1) energy, 2) population, 3) human engineering, 4) environmental quality, 5) utilization of natural resources, 6) national defense and space, 7) the sociology of science, and 8) the effects of technological developments.

GOALS:

The overall goal of improved student achievement is being accomplished through the following objectives:

1. All eight areas of the STS program previously listed, will be integrated into the basic science curriculum.
2. At least 70% of middle school science staff, trained in teaching contemporary science, will implement and maintain these new teaching strategies.
3. At least 70% of Michigan Science Education Specialists will be informed of the Detroit project.
4. Curriculum briefings will be held throughout the state and at intermediate school districts to acquaint other districts with the project.

GENERAL PROGRAM DESCRIPTION:

Statement of Purpose

The project staff designed a new middle school science curriculum which infuses Science-Technology-Society concepts and prepared middle school teachers to effectively implement the program.

Result

Over the past two years, the eight areas of the Science-Technology-Society Program have been fully integrated into the district's basic science curriculum through the use of well-planned lessons. A copy of the instructional sequence is available.

In addition to the development of a booklet of 50 STS activities, approximately 100 middle school teachers received awareness training on the materials and a core of 10 teachers were trained as in-service leaders. Additional hands-on training will be provided to all middle school teachers.

PRODUCTS:

- Handbook of 50 STS activities correlated to regular middle school science curriculum.
- The quality and effectiveness of middle school science instruction is improving.
- Middle school science demonstration classrooms for on-site visits and observations by staff from other school districts will be available.
- A cadre of master teachers will present briefings, curriculum information, program content, and effective instructional methodology to staff in other school districts.

EVALUATION:

Teachers reported that the training was critical to implementation of the new activities, additional training is needed. The materials have been used successfully by the teachers; the project will revise materials upon teacher recommendation.

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September 25, 1987

Nancy Walters
Coordinator for
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TITLE II EXEMPLARY PROJECT SUMMARY

TITLE: Mathematics and Science Teacher Excellence in Rochester (MASTER)

PROGRAM CATEGORY: higher education competitive

SUBJECT/S FOCUS: mathematics and science

PRIORITY AREA: LEAs-IHE partnership

GRADE LEVEL/S: K-6

TARGET GROUP: The inservice training goals include providing courses addressing the needs of individualized instruction. This need was addressed through courses entitled: Mathematics for Slow Learning Children and Mathematics for Gifted Children

PROJECT RATIONALE: The rural areas of Minnesota often lack the resources to satisfy the diverse educational needs found in every district. This project was developed from a needs assessment that targeted small, rural public and private school districts within close proximity to Rochester, Minnesota, the administrative center for the program. The results of the assessment determined the specific inservice training needs in mathematics, science and computer learning for the elementary teachers from the 10 participating LEAs. The commitment of project partners to the MASTER program is reflected in their financial support. The Title II grant payed 75% of the cost. The students payed 9% of the project cost and the University of Minnesota provided 16% of the project cost.

GOALS: The overall goals for the MASTER program were:

*to satisfy the diverse educational needs of school districts in rural southeastern Minnesota,
*to develop effective training procedures for individualized instruction in mathematics and science,
*to broaden the teachers' understanding of basic skills, a
*to develop curriculum leadership capabilities.

GENERAL PROGRAM DESCRIPTION: During the first year, six graduate level courses were provided for 220 participants. The six courses were: Mathematics for Slow Learning Children, Mathematics for Gifted Children, Using the Calculator in the Mathematics Classroom, Learning Mathematics through Science, Teaching Problem Solving, and Using Mathematics to Make Predictions.

The first two classes addressed the first goal--developing effective training procedures for individualized instruction. The other classes were provided to meet the second goal.

To develop curriculum leadership, the 10 participating LEAs were encouraged to nominate the same individual teachers, so that they would participate in all of the courses. These teachers now work as curriculum leaders, sharing their knowledge with their colleagues.

The second year of the program had 230 participants enrolled in the following courses: Computers in the Elementary School, Mathematics Applications, Computational Skills, Outdoor Mathematics, Elementary School Science: Materials and Resources, Outdoor Science Education and Curriculum Implementation in Elementary Science. Each year the MASTER program included: a follow-up needs assessment, site visitation by teaching faculty and final evaluation by participants and the participating school administrators.

A Mathematics and Science Resource Center has been established at the U of M - Rochester for participating school districts. To enhance instruction in mathematics and science, teachers from participating schools are able to check out materials for use in their classroom. These materials were used by teaching faculty in MASTER inservice sessions. The Project Coordinator hopes to further develop the Resource Center, because smaller districts do not have accessibility to these quality materials, nor do they have curriculum specialists to make recommendations about appropriate resource material.

The fact that the U of M - Twin Cities faculty traveled to the Rochester area to conduct the inservice sessions and to provide on-site school district consultation has been a key element in the success of the program. On-site consultation gives the teacher immediate feedback on their teaching behavior and strategies. This consultation provision provides for a general critique of participants in a positive and constructive manner.

PRODUCTS: A teacher training program that has resulted in improvement of elementary student performance in mathematics. One school has already provided evidence that students have scored significantly above state norms and district norms in almost all areas on the mathematics portion of the Minnesota Educational Assessment Program.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT: Project evaluation included:

-Course evaluation by participating teacher/student,

-Faculty evaluation of projects conducted by the teacher/student

-On-site visitation to observe implementation of specific teaching methodologies and content enhancement

-Principals of participating schools completed an assessment of the MASTER program and its effects on teachers, students and the district.

It is anticipated that all districts will see improvement in student performance in mathematics and science as reflected in the Minnesota Educational Assessment Program.

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REGION: Region V

September 25, 1987

Nancy Walters

TITLE II EXEMPLARY PROJECT SUMMARY

TITLE: Learning to Integrate Norwegian, the Classroom and the Community (LINC) Project

PROGRAM CATEGORY: demonstration/exemplary

SUBJECT/S FOCUS: foreign languages

PRIORITY AREA: partnership LEAs-IHEs

GRADE LEVEL/S: K-6

TARGET GROUP: All students in grades K-6, with a special activity addressing the needs of gifted and talented students.

PROJECT RATIONALE: This project addressed the following state needs:

- *the statewide need to develop models for offering foreign languages at the elementary level,
- *the need to differentiate curriculum for the gifted and talented, so that greater emphasis is placed on advanced conceptualization, and
- *the need for curricular improvement in international or global education. This need has been identified as a priority because tests show that Minnesota students know very little about other countries and cultures.

GOALS: To enable students in grades K-6 and their teachers to communicate verbally and nonverbally in the Norwegian language in settings that correspond to learning experiences in the classroom context, to identify and interpret elements of Norwegian culture found in the immediate geographic area and to apply perspectives of Norwegian culture to topics taught throughout the daily curriculum.

To involve the gifted and talented students in planning, organizing and presenting media projects on the LINC Demonstration Project.

To produce a replicable plan for integrating the study of foreign language and culture into the total curriculum of an elementary school.

GENERAL PROGRAM DESCRIPTION: This program was a cooperative venture between the Dilworth Elementary School and the Norwegian and Scandinavian Studies program of Concordia College, Moorhead, Minnesota.

A pair of Concordia College students - one native Norwegian and one American - taught Norwegian language and culture to the elementary students, one-half hour per day, three days per week for a nine week period. Emphasis was placed on listening comprehension, physical involvement and cultural experience. A second nine week period was devoted to developing a classroom exchange project with elementary students in Hamar, Norway. Children in the program for gifted and talented produced videotapes and developed formal presentations of slide and audio tapes. The project established linkages between the Norwegian language, the partner school in Norway and the elements of Norwegian cultural heritage found in the local community.

Intensive training in methodology and in the goals of the program was provided for the Concordia College students before the program began. Dilworth elementary teachers received training to prepare them for the second phase of the project and to help incorporate the language and cultural experiences into the entire curriculum. Key elements of these sessions were also made available on videotape. The project provided a model for integrating language and culture into the general curriculum of any elementary school. It also demonstrated a format for building and sustaining curriculum by teaching and learning a foreign language and an ethic heritage peculiar to a particular region.

This Demonstration Project included partnerships with business, industry and higher education. A state-of-the-art museum that houses the Viking ship Hjemkomst and cultural-historical exhibits, the Heritage-Hjemkomst Interpretive Center participated in the project kick-off event and provided many fieldtrip opportunities. The major attraction at the Center was the exhibit Promises of America, which discussed immigration to the United States from Scandinavia. Scandinavian Design, a retail store, participated in the project kick-off event and provided a field trip opportunity for students in which Scandinavian designs, designers and products were discussed.

Concordia College provided the teachers and a Norwegian Christmas Party for the students.

PRODUCTS: slide tape presentation on the LINC Project, prepared by the students, cultural exchange material (videotapes and photographs) received from and sent to the partner school in Hamar, Norway,
inservice material for participating classroom teachers to acquaint them with the program and their role in integrating foreign language into other disciplines,
inservice material for participating teacher/trainers.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT: The project had an on-going evaluation by teachers at the regularly scheduled staff meetings. The Concordia students/teachers also met to evaluate the programs. The evaluations produced changes that resulted in a more effective program. The total project was also evaluated by the parents and students through a survey. The results indicated that the students enjoyed the language instruction and developed an appreciation for the differences and likenesses of others (global education.)

The project director anticipates that the students will develop an awareness and an appreciation of foreign language, so that they will take more intensive courses later in school.

An additional anticipated outcome is for the students to have a better awareness of the world and an appreciation for the similarities and differences of people.

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STATE: MISSISSIPPI

REGION: IV

TITLE II EXEMPLARY PROJECT SUMMARY

TITLE: Mathematics and Science Staff Development, K-6

PROGRAM CATEGORY: Higher Education; Cooperative; Elementary/ Secondary Education

SUBJECT/S FOCUS: Mathematics; Science

PRIORITY AREA: Underserved/Underrepresented; Partnership (LEA's-IHE's); Cooperative (SEA-SAHE)

GRADE LEVEL/S: K-6

TARGET GROUP: LEA's with low student achievement as measured by ACT scores.

PROJECT RATIONALE:

The architects of education reform in Mississippi conceived of staff development as the mechanism school districts should use to develop and implement the detailed provisions of the Mississippi Educational Reform Act of 1982. The responsibility for developing, implementing, and evaluating staff development programs resided with the local education agencies (LEA's).

Unfortunately, many school districts in the state had minimum human and financial resources through which to plan, conduct, and evaluate staff development activities. For staff development to be successful, an effective collaboration of institutions of higher learning, schools, teachers, education agencies and local communities was needed.

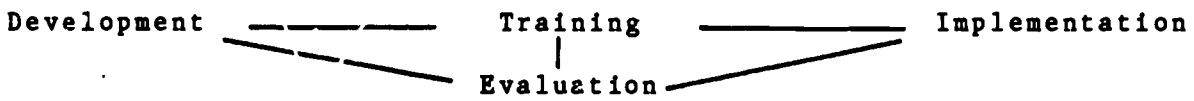
GOALS:

This project encompassed the development, training, implementation, and evaluation of a staff development trainers program in mathematics and science. The purpose of this program was to enhance the instructional capabilities of K-6 teachers related to the basic and integrated science processes, critical thinking, computorial logic, proportional reasoning and basic manipulative and mathematical skills. Special emphasis was placed on the need for greater access to and participation in mathematics and science for students from historically underrepresented and underserved groups.

TITLE II EXEMPLARY PROJECT SUMMARY

GENERAL PROGRAM DESCRIPTION:

STAFF DEVELOPMENT TRAINERS MODEL



Mathematics and Science, Grades K-6, were selected as the priority areas for Title II ESEA funds by the IHE's of Mississippi. The Mississippi Association of Colleges for Teacher Education, Inc. (MACTE), a consortium of public and private institutions of higher education, was formed to maximize the IHE's effort to improve education in Mississippi.

The MACTE Mathematics and Science project encompassed the development, training and implementation, and evaluation of a staff development trainers' program for K-6 teachers.

Two trainer manuals were developed, field-tested, and revised--one for mathematics and one for science. These manuals were designed to be used to train LEA leaders (trainers) and to serve as resource materials for staff development activities. The science manual was submitted and accepted by ERIC for RIE (see attached letter).

Thirty-four LEA's with mean ACT scores below 10 in mathematics were invited to participate in an organizational meeting to finalize plans for the project. Sixteen LEA's, represented by the superintendent and/or other administrators, attended and subsequently elected to participate in the project.

The LEA's selected teams of mathematics and science teachers, two master teachers per team to become staff development trainers. The members were trained and they returned to their respective LEA's to conduct staff development for their teachers during current and subsequent years.

SEA/IHE/LEA COOPERATIVE EFFORTS:

The State Education Agency (SEA) and MACTE cooperated in this project. The LEA's formed a consortium through the SEA to: (1) conduct a second week's workshop for mathematics team members and (2) purchase science staff development materials and supplies for each of the LEA's. MACTE planned and conducted the trainers workshops, and paid participants expenses and stipends, and purchased mathematics materials for the LEA's.

General Program Description (contd.)

PRODUCTS:

1. Staff development trainers in mathematics and science, Grades K-6

2. Development of manuals for Mathematics/Science Staff Development

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

1. Significant positive attitude changes toward teaching science were obtained as a result of workshop participation. Measured anxiety levels of both mathematics and science teacher were reduced.

2. Follow-up evaluations indicate that 1,694 teachers and their classroom students have been impacted as a result of the inservice training.

3. Partnerships have been established among SEA, LEA's and IHE's for ongoing cooperative efforts in staff development.

CONTACT PERSON/S:

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SDE

TITLE II EXEMPLARY PROJECT SUMMARY

State: Missouri

Region: VII

Title: Training In-service Leaders for Elementary (K-6) Mathematics and Science

Program Category: Higher Education-Competitive

Subject Focus: Mathematics and Science

Priority Area: Underserved/underrepresented;
Partnerships LEAs-IHEs;
Cooperative SEA-SAHE

Grade Levels: Kindergarten-Sixth Grade

Target Group: The target group is the elementary teachers employed in rural school districts in the southeastern quadrant of the state. Most of these school districts are located in one of the more geographical remote areas of the state and serve a large number of underprivileged children.

National Priorities: Funds were provided to an institution of higher learning for a program to improve the skills of teachers and instruction in mathematics and science at the local level and thereby contribute to strengthening the economic security of the United States. This program addresses the critical role that elementary science and mathematics play in establishing children's potential for success in later studies.

State Priorities: This program meets the state priorities as determined on the basis of the needs assessment for higher education. These priorities are to provide in-service training opportunities for practicing teachers at all levels of instruction in mathematics, science, and computer learning. Based on the findings of the Department of Elementary and Secondary Education's need assessment, the need for the in-service training of elementary teachers was determined to be greater than that of secondary teachers.

Goals:

1. To encourage teachers to incorporate more hands-on science and mathematics instruction in their classes and to increase the amount of time spent in the elementary classroom on science and mathematics.

2. To increase teacher confidence in teaching mathematics and science and to provide teachers with information regarding available methods and materials for incorporating science and math activities in the classroom.

General Program Description: The Training In-service Leaders for Elementary (K-6) Mathematics and Science program is an example of a cooperative program among the National Science Foundation, Southeast Missouri State University, a SEA (the Department of Elementary and Secondary Education) and a SAHE (the Coordinating Board for Higher Education), as well as a partnership between LEAs and IHEs.

Using the mentor teacher concept, the Training In-service Leaders for Elementary (K-6) Mathematics and Science program incorporated a summer institute program targeted at elementary teachers with a fall follow-up program. To accomplish the program goals, the project consists of providing four short courses--one each in the subject areas of biological science, earth science, physical science, and mathematics--for the elementary classroom. Owing to the program being located in a region of the state where the geographical location of schools make it difficult to provide service the program disseminates knowledge in the region through the mentor/lead teacher concept. Mentor/lead teachers are selected from among the in-service course participants and are trained to offer courses to other teachers. Together with university faculty, this group of mentor/lead teachers constitute a pool of resource teachers in the area of mathematics and science. The mentor/lead teacher concept not only allows the benefits of the program to be shared with a wider audience but also addressees the state's need for training mentor teachers for continuous teacher certification to be implemented in Missouri.

The training of mentor/lead teachers is based on research indicating the significant role mentor teachers play in disseminating knowledge and assisting peers in improving classroom instruction. The program content is also designed to help elementary teachers incorporate state developed key skills and competencies into the classroom curriculum and to assess these skills and competencies.

Products: Title II funds, administered by the Coordinating Board for Higher Education, have been used to provide training for 20 lead teachers who will serve as mentor/lead teachers and resource persons in mathematics and science for a school or school district. Products resulting from funding provided by NSF and funds distributed by the Department of Elementary and Secondary Education include the development of a resource guide containing classroom-tested, hands-on instructional activities to be used by teachers to help incorporate the state developed science and mathematics key skill and competencies into the school curriculum. This guide is to be published and made available for statewide dissemination.

Evaluation/Anticipated Long Term Impact of Product: The project does not claim that a single course in a subject will completely change the effectiveness of instruction in the classroom. The anticipated outcome is the expectation that teachers will be stimulated to develop confidence and interest in teaching science and mathematics, thus encouraging the teachers to increase the time

they spend on these subjects in the elementary classroom. Research indicates that the primary cause of many current problems in education lie in the early grades and that many students become "turned off" to science and mathematics by grades 5 or 6. Therefore, if the goal of improving students' attitudes toward these subjects could be accomplished during the elementary years, students' negative attitudes toward and lack of interest in mathematics and science at higher grade levels might not develop and students might not avoid courses in mathematics and science.

Another long term impact of this project is to provide a cadre of lead teachers who will continue to serve as mentors and resource individuals in their schools. These individuals will continue to provide training and help to other elementary teachers.

Evaluation of the success of the model is not, at the present time, fully nor statistically documented. Such evaluation will occupy a significant portion of project efforts during 1987/88. However, all results so far, including anecdotal feedback from teachers and schools and formal feedback from participants, have been extremely positive and encouraging.

Contact Person: Dr. Cynthia Phillips

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District: Northeastern

Agency: Coordinating Board for Higher Education
101 Adams Street
Jefferson City, MO 65101

September 23, 1987

STATE: Missouri:

REGION: Mid-West

TITLE II EXEMPLARY PROJECT SUMMARY

TITLE: INTERFACE

PROGRAM CATEGORY: higher education; cooperative; competitive; elementary/secondary education; **demonstration/exemplary;** other - please identify

SUBJECT/S FOCUS: **Mathematics; Science**: Computer Learning; Foreign Languages

PRIORITY AREA: underserved/underrepresented; **partnership (Ed-business or LEAs-IHEs)**; cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify

GRADE LEVEL/S: K-12

TARGET GROUP: mathematics and science teachers

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

The INTERFACE program, initiated in 1986, is designed to meet a need expressed by Missouri science and math teachers to become more familiar with the roles high technology used in business, education, and industry play in our late 20th century society.

GOALS: The general goals of the INTERFACE project are:

1. to familiarize science and math teachers with the demands and needs of a high tech society by exploring resources and applications utilized by business and industry,

2. to improve instructional delivery systems by making them more student active and more relevant to careers in technological fields,

3. to improve the quality of instruction through the use of applicable technologies.

GENERAL PROGRAM DESCRIPTION: Since its inception, the INTERFACE program has been guided by a steering committee that meets twice each year to provide leadership in developing the annual conference. The committee is composed of representatives from teacher organizations, administrator organizations, the non-public schools, business, industry, vocational education, higher education and the general public.

The steering committee, to attain its stated goal, specified 6 objectives the INTERFACE conference is to meet each year. These objectives are to provide opportunities for teachers to:

1. become aware of the linkage between science/math theory and technology,

2. understand the interactions among science, math, and technology,

3. make contacts with business and industry,

4. explore careers for students in business and industry,

5. investigate creating partnerships between education and business and industry,

6. exchange ideas and concerns.

The INTERFACE conference is held each spring and runs three days. Each day features a general session conducted by a presenter speaking on a topic of general interest, and 4 time blocks having 13 concurrent sessions each. The concurrent sessions are special interest sessions conducted by presenters from business, industry, state and federal government, and education. The following is a partial list of organizations presenting at past conferences. Phillips Petroleum, Westinghouse, McDonnell Douglas, Bell Communications Lab, Chesebrough Ponds, Union Electric, Woods Hole Oceanographic Institution, U.S. Geological Survey, U.S. Bureau of Mines, Jet Propulsion Laboratory, NASA, the Rand Corp, Stanford University, University of Missouri, American Cyanamid, University of Denver, Chevron Chemical Company, Colorado Alliance for Science, IBM Missouri Alliance for Science, National Diffusion Network, Bendix Corporation, many individual science and math teachers.

PRODUCTS: The INTERFACE program does not produce tangible products (e.g. curriculum guides, resource manuals, etc.) However, the approximately 700 teachers that attend daily have indicated that the primary "products" of the conference are renewed and increased enthusiasm for teaching as well as

receiving many new teaching ideas and strategies. Additionally, presenters from business and industry have expressed gratitude in being able to interact with teachers and to gain insights into the needs of the teaching profession.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT: The conference has been well received. We have on file many evaluation forms that request continuing the project. The major impacts have been a heightened awareness of math and science education for all students and a greater commitment to quality math/science education at the pre-college level.

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August 14, 1987
C. Lee

STATE: Nebraska

REGION: VII

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice(s) that apply.

TITLE: HIGH SCHOOL PHYSICS DEMONSTRATION/LABORATORY INSTITUTE

PROGRAM CATEGORY: (higher education); cooperative; competitive; elementary/secondary education; demonstration/exemplary; other - please identify

SUBJECT(S) FOCUS: Mathematics; (Science); Computer Learning; Foreign Languages

PRIORITY AREA: underserved/underrepresented; partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); (retraining) (of those teaching out of certification); other - please identify

GRADE LEVEL(S): 11-12 (senior high)

TARGET GROUP: (any other special characteristics, e.g. the disadvantaged, the gifted, vocational education)

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED): Approximately one third of Nebraska physics instructors do not have a physics endorsement.

GOALS: HIGH SCHOOL PHYSICS DEMONSTRATION/LABORATORY INSTITUTE - Twenty eight high school physics teachers will be selected to participate in the institute. They will observe numerous demonstration that they can use to teach physics to their students. The institute participants will have time to do lab work and to build equipment to take back to their home schools. They will learn some basic electronics and construct some electronic devices to help them teach physics. They will meet and work with physics teachers from three different high schools who have been selected as exemplary teachers.

GENERAL PROGRAM DESCRIPTION: The high school physics demonstration/laboratory institute was held at Omaha Westside High School from June 7-13, 1987. The participants arrived in Omaha on Sunday evening and stayed until after lunch on the following Saturday. The physics content of the institute included topics from kinematics, mechanical energy, wave motion, heat and light, and electricity. The participants studied how experienced high school physics teachers demonstrate physics phenomena. They had time to do the demonstrations and build demonstration and laboratory equipment to take back to their schools. The institute participants also performed physics laboratory experiments such as the ones they can ask their students to do. They were given an introduction to electronics and built some simple electronic devices they can use to help their students learn physics.

A typical featured two lecture demonstration sessions lead by the exemplary teacher of the day. A schedule for the week is:

Day	Lecturer	Topic
Monday	Chuck Lang	Motion
Tuesday	Chuck Lang	Energy
Wed.	Chuck Lang	Wave Motion
Thur.	Jack Skrocky	Heat and Light
Friday	Doug Wilson	Electricity
Sat.	Cliff Bettis	Interactive Technologies

A typical daily schedule: The schedule for a typical week-day is as follows:

8:00-9:00 a.m.--First lecture demonstration by the physics teacher exemplar of the day
9:00-12:00--The institute participants were divided into three groups and changed activities after an hour. Group A: Examined and discussed demonstrations. Group B: Put together physics kits and performed experiments with Mr. Klein. Group C: Introduction to Electronics with Mr. Adwers
12:00--Lunch
1:00-2:00--Second lecture demonstration by the physics teacher exemplar
2:00-5:00--Participants were divided into three groups and changed activities after about 1 hour.

Some evening physics related field trips to an amusement park and zoo were planned.

On Saturday, Dr. Bettis demonstrated the use of new technologies to teach physics, interactive videodiscs and the use of applications computer software to analyze physics laboratory data.

A complete set of printed handouts and teaching guides were prepared by the workshop staff. In addition, the participants built demonstration and electronic apparatus to take back to their schools. The cost of these materials were covered by the laboratory fees paid by this proposal.

The participants were able to earn three graduate credits in Physics 870, Special Topics in Physics by completing the requirements of the institute.

PRODUCTS:

From the beginning we had hoped for an Institute that would eventually interest more young people in Nebraska in careers in science, particularly physics. This is more likely to happen if the teacher who introduces a student to physics is enthusiastic about the subject. Therefore, we believed that the main emphasis of the Institute should be to have skilled, energetic, and committed high school physics teachers deliver to the participants concepts and materials that could be put almost directly into classroom use. Then the participants would be able to develop an improved self-image of themselves as high school physics teachers and have more interest in physics. The energy the participants demonstrated at the follow-up meeting in Columbus in October showed us that we had achieved that goal far beyond the widest hopes with which we started this project.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

The following are examples of the kinds of very positive anonymous comments we received at the Institute:

"Congratulations to your staff. I have taken many summer classes before this, but nothing else has been nearly as useful."
"I have attended 5 summer institutes since I have been teaching and this was the most interesting and the most beneficial to me."
"The workshop was in my opinion an overall success...This was the first time the needs of the small school have been addressed in an institute I have attended."
"I can honestly say that the Institute was planned very well, was extremely beneficial and would be very difficult to improve upon."
"I thought it was a wonderful institute, I loved it and the ideas and I can hardly wait until classes start to use all the things I learned."
"This was a very well run class. I have told people that have asked me about the class that it was the best graduate class that I have ever taken, probably because it was taught by high school teachers."
"I have over 200 hours of college credit which means I have taken lots of teacher workshops. This was the best workshop I have ever taken."
"Overall I felt that this was probably the best class, workshop I have ever attended as far as being able to use its content directly in the classroom."
"Outstanding Physics Institute. This is probably the best class I've ever had for useful ideas for the classroom."
"This Institute was the most educationally worthwhile thing in which I have ever participated."
"The summer institute was the most valuable class that I have ever taken. I have never taught physics before and was at a loss as to what to do until I took the class. The instructors were excellent and very helpful as well as enthusiastic."

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August 14, 1987
C. Lee

STATE: Nebraska

REGION: VII

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice(s) that apply.

TITLE: Technology, Ecology, Kids (T.E.K.) Camp

PROGRAM CATEGORY: higher education; cooperative; competitive; elementary/secondary education; demonstration/exemplary; other - please identify

SUBJECT(S) FOCUS: mathematics, science; computer learning; foreign language

PRIORITY AREA: underserved/underrepresented; partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify

GRADE LEVELS: middle school (6-9)

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

The following situation was identified by the Nebraska Needs Assessment:

> Sixty three percent of public schools do not provide special programs for instruction in math, science, or computer learning for gifted students.
>
> Female enrollment in public schools' secondary science and computer classes is less than 40%.

In order to address those needs, TEK Camp was established to capture the enthusiasm of middle school students through the use of technology and environmental studies.

GOALS:

Identify and invite underserved/underrepresented students to participate in TEK Camp so they may be exposed to the interaction of technology and the environment so as to increase their enrollment in science courses.

Provide gifted students with an opportunity to work with master teachers in the areas of robotics, environmental studies, micro-based laboratories, technical physical fitness, word processing and data-base computer applications, project adventure, mapping and science related art activities.

GENERAL PR 'RAM ACTIVITIES:

During the summer of 1986 and 1987, middle school students were invited to attend TEK Camp. These camps were held at rural accredited youth camps in Nebraska. Equipment for these experiences was provided by an educational service unit. The general program consisted of having students rotate through three sessions of seven selected activities. Each activity was taught by teachers with strong backgrounds in their areas of expertise.

In environmental biology, students realized the significance of their environment and explored their feelings about how the world affects their everyday lives. This was accomplished through filed experiences and student-centered discussion sessions.

Micro-based laboratory (mbl) experiences gave students an introduction into the fundamentals of integrating a computer with laboratory experiences. Students became acquainted with how to connect input and output probes to a computer, discovered the possibilities and limitations of mbl, and became familiar with mbl software. They also constructed an interface for a personal computer which they were able to take back to their schools in order to continue developing skills for mbl experiments.

Robotics gave students the chance to use a computer to facilitate a programming task. Participants programmed Hero II robots through a learning mode operation. They also had the opportunity to examine the role robotics is playing in our society.

By using radio transmitting heart monitors, gravionics, stress management computer interfacing, body fat percentage calculations, and other high tech physical monitoring devices, students were able to make intelligent decisions about healthy life style choices in the technical physical fitness sessions.

By measuring and mapping a closed traverse, making a cross-sectional map, and doing an environmental grid study, students were able to record information about the environment, accurately depict where information was collected, finally comparing and using information to solve problems.

All of the students were able to spend time learning word processing and data base computer skills. They wrote letters home and used data collected from other study areas to become familiar with the potential of computer assisted office management.

The aim of Project Adventure was to educate the whole student through academics, physical activity, and learning activities that enhance self-concept. This was done by giving students the chance to work in small groups and solve problems based on specific reality-based tasks in the natural environment.

Visual art activities enabled the students to relate art and science. A wood carver discussed wood types and how they affect carving while giving some students a chance to create a wood sculpture. Other students received a bag of ceramic bones and created an imaginary pre-historic animal skeleton. After they built their creature, they had to describe the animal's probable habitat based on its structure. The last group of students created giant inflatable objects from large sheets of plastic. This activity gave students an opportunity to solve an engineering problem.

PRODUCTS:

A group of students who interacted with technology and their environment with equipment and in settings not available to them in their schools.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

Student evaluations at the end of the camp indicated they had fun, learned a great deal about science, technology, and their environment, and all of them would recommend that their friends attend this camp.

CONTACT PERSON(S):

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Science Consultant
Nebraska Department of Education
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Lincoln, NE 68509
402/471-4329

August 14, 1987
C. Lee

STATE: NEVADA

REGION:

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: Earth and Space Science Institute for Teachers. Sponsored by: University of Nevada-Reno, Mackay School of Mines

PROGRAM CATEGORY : **higher education; cooperative; competitive; elementary/secondary education; demonstration/exemplary; other - please identify**

SUBJECT/S FOCUS: **Mathematics; Science; Computer Learning; Foreign Languages**

PRIORITY AREA: **underserved/underrepresented; partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify**

GRADE LEVEL/S: Middle School and High School teachers

TARGET GROUP: **(any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)**

Teachers were selected for participation in the institute based on the following criteria: teaching assignment in the earth and space sciences, teachers of the underserved or academically talented, a statewide representation of teachers.

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

A major portion of Nevada's economy is tied to mining and the minerals industry and depends on a current and future workforce trained in scientific and engineering disciplines. The goal of the summer institute was to demonstrate to teachers a unique and exciting approach to the earth and space sciences. The project was for middle and high school teachers in order to improve student understanding of the sciences in these critical pre-college grades.

GOALS:

- To demonstrate to teachers a unique and exciting approach to teaching earch & space sciences that is very relevant to Nevada.
- To improve student understanding and performance in the earth and space sciences.
- To involve the following organizations in a cooperative project for teacher training in Nevada: Nevada State Museum, Nevada Department of Minerals, Nevada Mining Association, Local School Districts, and the University Continuing Education Department.

GENERAL PROGRAM DESCRIPTION:

The program was designed in cooperation with the Science Coordinator for Washoe County School District to provice science teachers with an approach for teaching earth and space sciences. The institute was held for three weeks during the summer of 1987 at the University of Nevada-Reno campus. Faculty from the University of Nevada-Reno, Mackay School of Mines provided two weeks of morning lecture sessions followed by afternoon laboratory sessions. Topics covered included: origin and classification of minerals and rocks, planetary geology, structure and origin of the earth, earthquakes, geothermal sources, oceanography and remote sensing, plate tectonics, geomorphic processes, and economic geology. Lab sessions included hands on experience in seismology and computer labs. The third week of the institute was spent in field trops to surrounding areas to observe the subjects discussed over the first two weeks.

All participants were required to develop workbooks of classroom lectures and lab sessions appropriate to their teaching assignment. A workshop of institute participants is planned for later this year to evaluate the effectiveness of teaching materials developed.

Teachers from throughout the state attended. Financial support for their tuition, living expenses, and a stipend was provided by private industry.

PRODUCTS:

Workbook of lectures and demonstrations in the earth and space sciences developed by each participant.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

The project was successful in generating interest and financial support for the project goals. Private industry has pledged support for similar teacher institutes in the state.

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Reno, Nevada 89557

August 14, 1987
C. Lee

STATE: New Hampshire

REGION:One

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: University of New Hampshire/Seacoast Educational Services Summer Elementary Mathematics and Science Institute Summer 1987

PROGRAM CATEGORY : higher education; cooperative; competitive; elementary/secondary education; demonstration/exemplary; other - please identify

SUBJECT/S FOCUS: Mathematics; Science; Computer Learning; Foreign Languages

PRIORITY AREA: underserved/underrepresented; partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify

GRADE LEVEL/S: K-8

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)
Master teachers of Science/Mathematics

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)
The Seacoast Educational Services, SES, area represents a consortium of districts which employ approximately 1,000 mathematics and science teachers, grades 1-12. In the summer of '86, the consortium used its funds to train 8 Master Teacher Leaders in elementary mathematics and to prepare these 8 to conduct workshops for and serve as consultants to their colleagues. As of mid-year (86-87) some 150 teachers had received introductory training from the Master Teacher Leaders and several workshops were to be held in the spring.

The task to re-train all teachers is monumental. SES and its participating districts have thus determined to target their EESA Title II funds for the training of MTL's in both elementary science and mathematics and to use the MTL's to provide local training at the district level.

Goals: To train 8 MTL's in math and science and provide other teachers with an in-service program.

continued

The 8 will consist of some teachers from '86 and some new individuals. SES should then have approximately 11 MTL's to use for training.

GENERAL PROGRAM DESCRIPTION:

See attached "Overview"

PRODUCTS:

Workshop design and materials (print) for a total of 6 different in-service workshops in math/science.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:
Review of qualty of workshops. Review of quantity of workshops and number of teachers served.

Long Term: A cadre of MTL's will be trainind to work with staff in the SES districts.

CONTACT PERSON/S: Mr. Frank Wilson, Executive Director, SES
PHONE NUMBER (INCLUDE AREA CODE): (603) 742-4233
DISTRICT/INSTITUTION/AGENCY: Seacoast Educational Services
ADDRESS: 414 High Street, Somersworth, New Hampshire 03878

March 30, 1987

University of New Hampshire/Seacoast Educational Services
Summer Elementary Mathematics and Science Institute
Summer, 1987

Overview

The 1987 UNH/SES Summer Institute will focus on the teaching and learning of mathematics and science in the elementary school. A major goal will be to convey the perspective that students learn most successfully when they are active participants in the learning process; the Institute will be centered around this notion. We shall provide experiences and resources for the teachers which assist them in adopting such a perspective, and which offer classroom strategies for its implementation. Some participants will be engaged in the preparation of workshop materials, which they will then offer to their colleagues through the 1987-88 academic year as in-service activities. Others will concentrate more directly on methods for implementing the strategies in their own classrooms. We will focus on central concepts in the elementary mathematics and science curriculum, particularly those which are difficult to teach and to learn. The use of manipulatives and models, experiential strategies, and inquiry-based approaches will be emphasized. Teachers will be introduced to resources and approaches, and will develop their own adaptations. Based on the evaluations of last year's group, we will plan to include a component which emphasizes connections betewen mathematics and science.

Week 1 will address both mathematics and science learning in the context of a problem solving emphasis. During weeks 2 and 3, participants will need to choose to focus on mathematics or science; there will be time each week for the groups to share their experience with each other. In Week 4, all will explore computer software which can be used effectively to enhance the teaching of elementary school mathematics and science; the "microcomputer-based laboratory" concept will be emphasized.

The basic format will include morning workshop sessions led by staff and visitors, followed by afternoon activity sessions. During the afternoons, about half of the participants (those who are more confident, more experienced, and interested in offering in-service workshops for their peers) will be assisted by the staff in developing workshops. The others will engage in more direct follow-up to the morning sessions, with leadership from the staff, with the particular goal of assisting the teachers with plans for implementation of the strategies in their own classroom. There will also be time for the 1986 participants to revise and polish their 1986 workshops. Everyone will receive 3 graduate credits in mathematics education for this experience.

We envision that half of the participants will be well prepared to offer a total of 6 different in-service workshops. We will suggest that the other participants be paired with the workshop leaders at various times during the 1987-88 academic year as assistants in leading workshops.

August 14, 1987
C. Lee

STATE: NEW JERSEY

REGION: II

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: THE NEW JERSEY ALGEBRA PROJECT

PROGRAM CATEGORY : higher education; cooperative; competitive; (elementary/secondary education;) demonstration/exemplary; other - please identify

SUBJECT/S FOCUS: (Mathematics;) Science; Computer Learning; Foreign Languages

PRIORITY AREA: underserved/underrepresented; (partnership) (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify

GRADE LEVEL/S: ALGEBRA I, usually taught in grades 8 and 9

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)

Diversified - Through appropriate adjustment of pacing and scope by teachers this algebra approach can be used in a variety of classes ranging from weak to honors.

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

Since 1978, approximately 50,000 students entering New Jersey colleges each year have taken the New Jersey College Basic Skills Placement Tests in mathematics. The test results have consistently indicated that a great many of these students have an inadequate grasp of elementary algebra and have difficulty in doing quantitative reasoning. The January, 1987 report on the Second International Mathematics Study, "THE UNDERACHIEVING CURRICULUM: Assessing U.S. School Mathematics from an International Perspective", indicates that the New Jersey results are representative of a nationwide problem. The Project has addressed algebra because algebra is fundamental to further work in mathematics and to so many other fields.

GOALS: To enable a much broader spectrum of students to be successful in learning algebra and to be able to use it in doing quantitative reasoning.

GENERAL PROGRAM DESCRIPTION:

CURRICULUM: Development of the curriculum was heavily influenced by the results of analysis of student error patterns on the New Jersey College Basic Skills Placement Tests. Dr. Charles Pine, Algebra Project Director, worked with a team of mathematics educators in formulating the curriculum, writing the text materials, and creating the teacher training program. The initial curriculum study was funded by the Ford Foundation; all subsequent activities of the Algebra Project have been and continue to be supported by the New Jersey Department of Education, the New Jersey Department of Higher Education, Rutgers University, and AT&T. In the Algebra Project curriculum, the traditional order of topics has been rearranged into a logically unified sequence. The emphasis in the course is on problem solving, verbalization occurs throughout. The approach in general is from concrete to abstract and skills are learned in context rather than drilled in isolation. Homework problems are very carefully sequenced so as to allow guided discovery and self-teaching by the students (answers are provided for all homework problems).

TEACHER TRAINING: Training for teachers new to the Project is done for five days during the summer with six follow-up days during the school year. Teacher training stresses the need for classroom discussion and participation by all of the students in the class. Discovery rather than "show and tell" is to be emphasized. The teachers are urged to encourage students to propose alternative methods of solution.

EVALUATION: During 1984-85 and 1985-86 a total of 180 Algebra I classes in 18 school districts representing a broad spectrum of urban, suburban, and rural areas was involved in the pilot implementation of this curriculum. Evaluation of pre- and post-test results for these pilot classes and for carefully matched control classes taught by standard methods with standard textbooks showed that the Algebra Project students were considerably more successful in learning algebra than were the control students (see attached results). The pre- and post-testing is ongoing and is invaluable in providing information for continued improvement of the program.

PROGRAM STATUS: In 1987 the Algebra Project was expanded into 14 new districts, 40 teachers were added and trained, and the number of students more than doubled; so the Project is now being taught in 29 districts, by 94 teachers, in 182 classes, to about 5,000 students.

PRODUCTS: 1) The Algebra Project book
2) Teacher training program
3) Supplemental materials

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

Evaluation of pilot/control pre- and post-test results has demonstrated the superior effectiveness of the Algebra Project approach to the teaching of algebra. It is expected that the Project will continue to expand throughout New Jersey; replication of the program in other states would be the next step.

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ALGEBRA PROJECT

Two-Year Results: 1984-85 + 1985-86

Frequency Tables

Algebra Post-Test Scores vs. Computation Pre-Test Scores

- - - - - PILOTS ONLY - - - - -

PRE-TEST / FREQUENCY ROW PCT	POST-TEST 26-30	21-25	16-20	0-15	TOTAL
25-30	318	210	93	50	671
	47.4%	31.3%	13.9%	7.5%	
21-24	104	220	189	214	727
	14.3%	30.3%	26.0%	29.4%	
16-20	50	147	236	436	869
	5.8%	16.9%	27.2%	50.2%	
0-15	6	50	127	585	768
	0.8%	6.5%	16.5%	76.2%	
TOTAL	478	627	645	1285	3035
	15.7%	20.7%	21.3%	42.3%	

- - - - -CONTROLS ONLY- - - - -

PRE-TEST / FREQUENCY ROW PCT	POST-TEST 26-30	21-25	16-20	0-15	TOTAL
25-30	37	122	140	140	439
	8.4%	27.8%	31.9%	31.9%	
21-24	5	68	138	285	496
	1.0%	13.7%	27.8%	57.5%	
16-20	4	33	91	410	538
	0.7%	6.1%	16.9%	76.2%	
0-15	1	5	29	323	358
	0.3%	1.4%	8.1%	90.2%	
TOTAL	47	228	398	1158	1831
	2.6%	12.5%	21.7%	63.2%	

Please See Explanation On Other Side

EXPLANATION OF PILOT/CONTROL ALGEBRA POST-TEST RESULTS
for 1984-85 and 1985-86

In each of the two years of pilot implementation of the Algebra Project, a study was done to evaluate the effectiveness of the program in enabling students to learn algebra. Through the cooperation of school districts which agreed to serve as controls, we were able to compare the year-end performances of students taught by the Algebra Project methods (the pilot students) with students taught by traditional methods (the control students).

All of the students, pilots and controls, took the same computation pre-test at the beginning of the school year. At the end of the school year all of the students took an algebra post-test and also a computation post-test. Having pre-test results for each student enabled us to do two important things: first, internally, we could assess the relative effectiveness of the Algebra Project instruction for students coming into the program with various degrees of preparedness; and second, externally, we were able to compare the performance of pilot students at given levels of preparedness with that of control students at corresponding levels of preparedness.

The pre-test was a multiple choice test consisting of 30 computation items. The content of the test was such that students scoring in the range of 25-30 correct were considered to be well prepared with regard to computation while those scoring only 0-15 correct were considered to be poorly prepared. Students scoring in the 21-24 range were deficient in some areas, and students scoring in the 16-20 range were deficient to a greater extent.

The algebra post-test consists of 30 multiple choice items. Students scoring in the range of 26-30 correct show a good command of the material generally considered appropriate to an Algebra I course, while those scoring only 0-15 correct are clearly unprepared for any further work requiring competency in basic algebra. The in-between scores encompass a continuum of weaknesses in both skills and concepts.

The combined results for 1984-85 and 1985-86 for totals of 3035 pilot students and 1831 control students are given in the tables on the next two pages. Both sets of tables are based on the same data; however, they convey the sense of the results in slightly different but useful ways.

The left hand column in the two tables on the first page contains the four score ranges for the computation pre-test. Across the top of each table are the four score ranges for the algebra post-test. The number shown in each box is the number of students in a particular pre-test score range and a particular algebra post-test score range. For example, there were 671 pilot students who were in the 25-30 score range on the pre-test. Of these 671 pilots, 318 (47.4% of 671) achieved an algebra post-test score in the 26-30 range, 210 (31.3%) in the 21-25 range, 93 (13.9%) in the 16-20 range, and 50 (7.5%) in the 0-15 range.

In the table on the right, of the 439 control students who were in the 25-30 score range on the computation pre-test, 37 (8.4% of 439) achieved an algebra post-test score in the 26-30 range and 140 (31.9%) had an algebra score in the 0-15 range.

Overall, 478 pilots (15.7% of 3035) scored in the highest algebra range while 47 controls (2.6% of 1831) scored in the same range.

August 14, 1987
C. Lee

STATE: New York State

REGION: II

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: Math/Science Mentor Teacher-Internship Program

PROGRAM CATEGORY : higher education; cooperative; competitive; elementary; secondary education; demonstration/exemplary; other - please identify

SUBJECT/S FOCUS: Mathematics; Science; Computer Learning; Foreign Languages

PRIORITY AREA: underserved/underrepresented; partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify
training in math

GRADE LEVEL/S: Junior High 7, 8,

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)

Disadvantaged

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

State priority - retention of teachers in the teaching profession
- capitalizing on experience of teachers already in profession
- increased professionalism of teaching
- improving quality of teachers

GOALS:

GENERAL PROGRAM DESCRIPTION:

A program in which experienced teachers assist a first year teacher to adjust to teaching in a city school where many of the students are hispanic speaking and disadvantaged. Training was provided based on the teacher's needs; substitute time was used to release two experienced teachers, one in science, one in math to meet with the first year math teacher.

PRODUCTS:

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

- retention of teachers in the teaching profession
- greater satisfaction with teaching
- better adherence to completion of required paper work
- better understanding of special needs of the school in which the intern teaches

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TITLE II EXEMPLARY PROJECT SUMMARY

STATE:	New York
REGION:	II
TITLE:	Woodrow Wilson Fellowship Foundation Institutes
PROGRAM CATEGORY:	Higher Education Competitive
SUBJECT/S FOCUS:	Mathematics; Science (chemistry and physics)
PRIORITY AREA:	Cooperative IHE/LEA; Partnership (business and private foundations)
GRADE LEVEL/S:	Secondary school
TARGET GROUP:	115 high school teachers of chemistry, mathematics and physics

PROJECT RATIONALE:

The Regents Action Plan to Improve Elementary and Secondary Education Results in New York State, adopted in 1984, establishes new enhanced standards for student performance in all academic areas including mathematics and science. As part of the implementation of the Action Plan, the State Education Department is developing and disseminating new curricula in mathematics and science. There is a critical need to provide teachers with timely training in the content of the new curricula and strategies to teach them.

GOALS:

The Institute's goals are:

- Improve mathematics and science curriculum and teaching in high schools through a network of dedicated, well-trained teachers;
- Provide for the wide-spread dissemination of instructional materials developed by master teachers and college faculty;
- Improve cooperation between college faculty and high school teachers; and
- Develop a corps of teacher-leaders who will undertake increased responsibility for the improvement of high school education.

GENERAL PROGRAM DESCRIPTION:

The program consisted on one-week institutions for high school teachers taught by three teams of master teachers, one each from chemistry, mathematics, and physics. The teams presented topics they helped to develop at previous institutes. In chemistry and physics, a daily background lecture and demonstration was reinforced by

afternoon laboratory experiments and work with computers. Specific topics covered were: kinetics, equilibrium, descriptive chemistry and classical mechanics. The mathematics program was built around lectures, discussion, and the use of computers focusing on pre-calculus and using new technology to solve mathematical problems.

Additional funding for the institutes was provided by IBM Corporation, Conoco-du Pont, the Camille and Henry Dreyfus Foundation, Inc., and the Greenwall Foundation.

PRODUCTS: various curriculum and training materials.

EVALUATION/ANTICIPATED LONG-TERM IMPACT OF PROJECT

The institutes were widely viewed by participants as an outstanding success and far exceeded their expectations. A recurring theme was the participants' appreciation of the fact that the materials presented were directly applicable to classroom use. Virtually every participant was enthusiastic about the week, would attend a second institute and would recommend it to his or her peers.

The institute's participants have met, and will continue to meet periodically for professional discussions and interaction. This project's model of "teachers teaching teachers" has proven to be a highly effective strategy for disseminating up-to-date information.

CONTACT PERSON:	Dr. Sidney Trubowitz - Executive Director
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TITLE II EXEMPLARY PROJECT SUMMARY

STATE:	New York
REGION:	II
TITLE:	Comprehensive Math and Science Program (CMSP)
PROGRAM CATEGORY:	Higher Education Cooperative
SUBJECT/S FOCUS:	Mathematics; Science
PRIORITY AREA:	Underserved/underrepresented; Cooperative IHE/LEA
GRADE LEVEL/S:	9-12
TARGET GROUP:	9th graders in eight New York City high schools (students are predominately minorities)

PROJECT RATIONALE:

The underrepresentation of minorities, especially Blacks and Hispanics, in the professions and in the science and technical fields is a serious and pervasive problem. This problem arises from the small pool of minority students who pursue and perform well in mathematics and science during high school. Consequently, even fewer minorities undertake collegiate study in these disciplines and gain access to professional and graduate schools.

The Education Department, through the Regents Statewide Plan for the Development of Postsecondary Education in New York State, identifies as a major priority increasing the number of economically disadvantaged persons, minorities and women who participate in, and complete, programs in technical fields such as mathematics, science, health and engineering. Successful completion of mathematics and science courses at the secondary level is an important prerequisite for achieving this goal. Also, the Regents Action Plan to Improve Elementary and Secondary Education Results in New York State establishes as priorities for elementary and secondary education improving student academic performance and enhancing the equity and quality of instruction for all students.

GOALS:

The Comprehensive Mathematics and Science Program addresses the priorities of both plans through curriculum development, instructional strategies, and staff development activities. The overall goal of CMSP is to increase significantly the number of urban high school students who enroll and achieve highly in the study of advanced mathematics. Specifically, the purposes of the project include:

- Increase the number of students who pass the Regents mathematics examinations with high scores;

- Establish a model network for a data communications system among participating high schools.

- Create models for effective staff development and project dissemination.

GENERAL PROGRAM DESCRIPTION:

All incoming ninth graders in the participating eight high schools are exposed to the mathematics curriculum which is both sequential and developmental. There is a strong emphasis on problem solving based on "real-life" situations and which are closely tied to the essential themes and concepts being taught. Student performance is assessed frequently; at the end of each of the 12 modules during a semester. Remedial work is provided to those students who do not perform satisfactorily on each test.

In addition, staff development is undertaken by pairing a teacher, experienced in the curriculum with a less experienced one. Seminars and conferences are also conducted.

PRODUCTS:

Mathematics curriculum and related instructional materials.

EVALUATION/ANTICIPATED LONG-TERM IMPACT OF PROJECT

As part of the project, student test results are shared with the participating school personnel who use the grades as part of their ongoing assessment of the students. Project staff compares the results from standardized Regents mathematics tests taken by participating and nonparticipating students to help evaluate the effectiveness of the curriculum developed by the project. Reactions from the mathematics chairpersons and teachers from the participating schools are included in the project's evaluation.

The CMSP model is currently being replicated in several other New York City high schools and by the Fulton County, Georgia school district.

CONTACT PERSON:	Mr. Gilbert Lopez - Director, CMSP
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August 14, 1987
C. Lee

STATE: NORTH CAROLINA
SOUTH CAROLINA
REGION: IV

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: South Carolina's SAT Mathematics Improvement Project Adaptation in North Carolina

PROGRAM CATEGORY : higher education; cooperative; competitive; elementary/(secondary education) demonstration/(exemplary); other - please identify

SUBJECT/S FOCUS: (Mathematics); Science; Computer Learning; Foreign Languages

PRIORITY AREA: (underserved/underrepresented); partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify (teacher training in problem solving/higher order thinking skills)

GRADE LEVEL/S: 9-12

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, (the gifted), vocational education) (college preparatory students)

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

The project emphasizes mathematical problem solving in the teaching of higher order thinking skills. Problem solving and higher order thinking skills are priority areas in the mathematics curriculum in the State of North Carolina and are being heavily emphasized by the National Council of Teachers of Mathematics.

GOALS:

1. To improve the problem-solving instruction in mathematics classes in grades 9-12.
2. To improve problem-solving skills of students in grades 9-12.
3. To enable teachers to emphasize instruction at levels of thinking higher than recall and application.
4. To enable students to apply higher levels of thinking in mathematics classes.
5. To enable students with non-college preparatory backgrounds to learn content and skills tested on the SAT.
6. To improve SAT scores throughout the state.

GENERAL PROGRAM DESCRIPTION:

The SAT Mathematics Improvement Project was initially conceived and developed by the South Carolina Department of Education as part of its Education Improvement Act of 1984. North Carolina with the South Carolina Department of Education's permission has taken the materials and adapted them for use throughout North Carolina with teachers grades 9-12. It is anticipated that over the course of this academic year approximately 1,000 secondary mathematics teachers will participate in two-day workshops in which they will examine PSATs, SATs and the kinds of mathematical content and levels of thinking required in the problems encountered on those tests. The emphasis in the workshops will be on problem solving with improvement on the SAT being a highly desirable outcome, assuming that teachers become better teachers of problem-solving and students become better problem solvers. One will see upon examining the materials that North Carolina made an effort to improve the packaging of the materials developed in South Carolina, to correct the errors found in the "first edition" developed by its "neighbors" to the south, but was careful to maintain the integrity of the product as it was originally developed. Much work went into putting the project together, and North Carolina in no way has attempted to gain credit or recognition for developing the project.

PRODUCTS:

See attached list of items which teachers receive who are trained in the workshops.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

Improved pupil performance in problem-solving activities, particularly as it relates to the SAT is anticipated. Teachers' abilities to teach problem solving more effectively and pupil capability in solving non-routine mathematics problems will be informally and formally assessed throughout the project.

The long-term effect of the project is expected to be significant in both student and teacher problem-solving abilities and in pupil performance on the SAT.

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Sat Mathematics Improvement Project - North Carolina Version
Contents of Instructor's Manual

GENERAL

Overview Booklet

*PSAT (Form S, Saturday, October 18, 1986) and Answer Sheet

*Answer Sheet for Diagnostic Tests

ARITHMETIC

*Arithmetic Diagnostic Test

*Arithmetic Diagnostic Test Student's Solution Key

Arithmetic Diagnostic Test Teacher's Solution Key

*Answer Sheet for Arithmetic Student Practice Booklet

*Arithmetic Student Practice Booklet

ALGEBRA

*Algebra Diagnostic Test

*Algebra Diagnostic Test Student's Solution Key

Algebra Diagnostic Te acher's Solution Key

*Answer Sheet for Algebra Student Practice Booklet

*Algebra Student Practice Booklet

GEOMETRY

*Geometry Diagnostic Test

*Geometry Diagnostic Test Student's Solution Key

Geometry Diagnostic Test Teacher's Solution Key

*Answer Sheet for Geometry Student Practice Booklet

*Geometry Student Practice Booklet

PROBLEM SOLVING

*Problem Solving Diagnostic Test

*Problem Solving Diagnostic Test Student's Solution Key

*Ten copies of each of these starred items will be provided to every teacher attending the staff development activity.

August 14, 1987
C. Lee

STATE: NORTH CAROLINA
REGION: IV

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: TITLE II CONTRIBUTIONS TO ROBOTICS

PROGRAM CATEGORY: Higher education; cooperative; competitive; elementary/secondary education; demonstration/exemplary other - please identify

SUBJECT/S FOCUS: Mathematics; Science; Computer Learning; Foreign Languages

PRIORITY AREA: underserved/ underrepresented; partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification), other-please identify

GRADE LEVEL/S: 9-12

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education) Teachers of mathematics and science

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

THESIS I: There is a need for introductory Hi-tech education (i.e., fundamentals of industrial automation and robotics) in the high schools of our nation

THESIS II: The key to implementing hi-tech education components into the High School curriculum is:

(a) well trained teachers

(b) digital logic and computer interfacing hardware which is suitable for use in a high school setting

(c) Computer programming concepts/techniques which are:

(1) suitable for driving/monitoring industrial automation and robotics devices;
(2) easy to teach at the high school level

(d) Hi-tech educational modules which are progressive and which can be utilized as supplemental instructional units.

THESIS III: Given the courses and curriculum requirements already in place, components of Hi-tech coursework can be most efficiently intoduced as supplemental instruction in existing math/science courses.

THESIS IV: Introducing Hi-tech concepts through supplemental experiences in existing courses is the most effective way to assure that all capable students, particularly women and minorities, will be given meaningful exposure (theory practice) to this emerging technology (i.e., "add on" coursework will recruit only a select sub-set of the capable students).

GOALS: PROJECT OBJECTIVES:

1. To fully develop teacher training programs in Robotics at level I (beginning) and

2 To develop understanding of fundamental robotics concepts and teacher proficiency in conducting robotics labs.

3. To fully develop classroom curriculum materials in Robotics/Instructional Automation:

   (a) 12 introductory modules suitable for junior high students;
   (b) 12 introductory modules suitable for intermediate level (high school) students;
   (c) 12 advanced modules suitable for advanced level work by high school students.

4. To assist the robotics trained teachers in implementing robotics labs, and the concepts behind them, as a new classroom resource - i.e., building upon their understanding of math and science.

5. To provide minimal basic equipment to allow the teachers to pursue their professional development in Robotics while beginning to introduce robotics concepts in their classroom.

6. To assist the participants to disseminate the course products to other classes and to neighboring school/systems (Note: these participants will form the nucleus of an area-wide network of teachers who are beginning to implement robotics concepts into their classwork).

7. To provide a significant impact on the students at Robeson County and the surrounding region which will lead to more minorities and women entering "Hi-Tech" careers.

GENERAL PROGRAM DESCRIPTION:

The Robotics Project (Implementing Robotics Education in the Classroom) consisted of a series of workshops taught on an intoductory level to provide teachers with an overview of robotics and industrial automation through "hands-on" experiences.

PRODUCTS: The major products to be developed are curricular materials that can be used in implementing robotics and industrial automation labs.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

The long range plans include:

1. Multi-level curriculum materials and training programs operated by "master teachers" for teachers in the region.

2. A cadre of trained teachers with sufficient "know-how" and leadership to assure continued growth in robotics and "Hi-Tech education. (These teachers will establish an area-wide nucleus of teachers who are "technologically" literate.)

3. A high quality robotics exhibit at the Science and Technology Center owned by the schools to help build community and industry commitment to education.

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919/738-4841

Mary H. Lamm, Title II Coordinator
NC Dept. of Public Instruction
116 West Edenton Street
Raleigh, N. C. 27602-1712

Exemplary Title II Projects
STATE: North Carolina
REGION: Education Region One
CONTACT: Katharine Hodgin
Science/Math Education Center
East Carolina University
Greenville, NC 27834
919/757-6885

TITLE : Modified Certification Program to Supply Rural Areas with Qualified Mathematics and Science Teachers

PROGRAM CATEGORY:
Higher Education: Utilize IHE to provide training to certify candidates to teach mathematics and/or science on a high school level.
Competitive: Limited to a maximum of 20 participants the first year.

SUBJECT FOCUS: Mathematics and Science

PRIORITY AREA:
Underserved: Under the auspices of the East Carolina University Center of the University of North Carolina Mathematics and Science Education Network and the School of Education of East Carolina University, the program is designed to provide certified teachers to the rural parts of eastern North Carolina.

The 1980 Census reported that 75 percent of the North Carolina population live in rural areas, and the North Carolina State Department of Public Instruction has identified 121 of the 142 school systems in the State as rural. The eastern region of North Carolina, where the program originated, is largely composed of these rural school districts, and faces the problems of having a large number of mathematics and science teachers who are teaching out-of-field and without advanced degrees.
Partnership: The program represents a partnership between an IHE and the surrounding LEAS to develop a program to address the need for qualified mathematics and science teachers in the area.

TARGET GROUP: The objective of the program is to certify as science or mathematics teachers college graduates who are currently working in industry or the military service, or who are attending graduate school.

GRADE LEVEL: To prepare high school teachers.

PROJECT RATIONALE: The initial idea for the program came from a chemical engineer who was working in industry, but was interested in becoming certified to teach high school science. Through a series of

discussions with an area superintendent, which led to the involvement of the School of Education and the Mathematics and Science Education Center at East Carolina University , the program was developed.

A unique feature of the program is that it takes participants who live in the rural areas and trains them in area rural schools. The rationale of this feature is that the candidates are familiar with the needs of the rural area, and that training in a rural school will further develop an understanding of the problems of rural education.

The length of the program, 12-15 months, allows candidates to expedite their transition to the educational environment.

Another problem faced in the rural setting is distance. The program is designed to provide a central location to ease the problems of travel for the students.

GOALS: The goals of the program are to provide an alternative certification method to supply rural areas with qualified middle grade and high school mathematics and science teachers.

GENERAL PROGRAM DESCRIPTION: The program is a developmental experience with three major components: 1) three weeks of pre-service training in "teaching survival skills," 2) one academic year in a rural school, and 3) six weeks of synthesizing activities. The last component can provide additional credit toward an M.A. Ed. in Middle Grades Education or Secondary Science/Mathematics Education provided candidates are admitted to graduate school and choose the six week experience.

Component 1 is for three weeks during the summer. Candidates receive instruction that provides them with a working knowledge of the following seven areas: the nature of the learner; management of instructional time; management of student behavior; instructional planning and presentation; instructional monitoring; feedback; and interactions of the educational environment.

Component 2 requires each candidate to spend two semesters in a rural public school. Candidates are on site and adhere to the system's schedule for the academic year. Participating school systems pay each candidate $2,500 per semester. The configuration of this experience is as follows:

1. A mentor teacher supervises two candidates in his/her school.
2. Mentor teachers have a reduced schedule enabling them to observe candidates and have daily conferences with them. Also, mentor teachers receive special training. Mentor teachers receive graduate credit for this training if they desire.
3. Candidates teach two or three science or math classes per day the first semester.
4. Second semester candidates teach at least three classes plus a class

they develop to meet the specific needs of the rural student.
5. Candidates attend one two and a half hour seminar each week at a central location. Topics for seminars include: special education, reading in content areas, educational media instruction, and content methods.
6. Candidates participate in on-going study of the social, historical and philosophical foundations of education through special programs.

In Component 3, the synthesizing experience, candidates return to the University campus for a period of six weeks for instruction in educational foundations, learning theory, curriculum development, content methodology and classroom management.

CANDIDATE SELECTION CRITERIA: Individuals are selected on the following criteria: 1) academic preparation in one or more of the basic sciences or mathematics with a grade point average of 2.2 or better in their major; 2) an evaluation of work experiences to determine competencies met in non-academic environments; 3) scores on Core Batteries I (General Knowledge) and II (Communications Skills) of the National Teachers Examination that meet or exceed the North Carolina minimums of 632 and 627; and, 4) positive recommendations by an interview panel consisting of the project director, the local superintendent and mentor teacher.

EVALUATION AND LONG TERM IMPACT: Of the 19 participants who began the program in the summer of 1986, 16 completed the program. Of those who completed the program, 11 have accepted teaching positions, three have decided not to teach at this time and two have excellent prospects for jobs at this time.

Due to the success of the program, it will be continued in eastern North Carolina, with an emphasis on other counties in the region. If after further evaluation, the program continues to meet its objectives, the program will be expanded to other sections of the state.

The need for qualified mathematics and science teachers is a national problem, especially in the nation's rural areas. This program appears to be an effective tool for meeting the needs of qualified teachers in the rural parts of North Carolina, and it should be applicable to other rural areas of the nation.

FUNDING:
-Title II money from ECU MSEC $29,610, provided through the higher education competitive grants program.
-Title II money from each of three LEAs: Craven $15,133, Jones $2,571 and Pamlico $2,272.
-Total $49,586 or 13 teachers working or soon to be working at $49,586=$3,814.30 to train each teacher (not including pay of $5,000 per teacher from school systems).

STATE: Ohio

REGION: V

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: NEW DIMENSIONS IN SCIENCE EDUCATION
(Ohio Science Education Framework Plan)

PROGRAM CATEGORY: Demonstration/exemplary, identify

SUBJECT/S FOCUS: Science

PRIORITY AREA: Educational Curriculum Framework

GRADE LEVEL/S: K - 12

TARGET GROUP: All Ohio Students

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

School practices in science education that are most evident today reflect goals that were established in the late 1950's. The primary goal of that time was to produce more students who would pursue further studies in engineering and science. Other areas of student needs were ignored. "Project Synthesis" has identified three other goal clusters to be addressed - personal development, social issues, and career education.

The purpose of NEW DIMENSIONS IN SCIENCE EDUCATION is to promote a complete science program in K-12 in the elementary and secondary schools in Ohio. The will include the four goal clusters and integrate them with other subject matter.

GOALS: NEW DIMENSIONS IN SCIENCE EDUCATION is designed as a primary tool for local science curriculum committees and individual writers. It structure for a science curriculum is based on a balanced treatment of four goals clusters. It has 22 detailed program objectives, examples of subject objectives and activities coordinated with the subject objectives.

The guide also provides a rationale for the proposed structure and a discussion of the learning theory used as a basis for determining the emphasis on the given objectives within the range of grade levels.

The guide offers a detailed strategy for the evaluation of the current program and the planning and implementation of the new program.

GENERAL PROGRAM DESCRIPTION:

The Science Supervisors Advisory Committee was organized with the responsibility of developing ideas and writing the complete manuscript that is the NEW DIMENSIONS IN SCIENCE EDUCATION. The committee was organized into task forces with the following tasks and goals.

Task Force I:
1. Develop rationale and philosophy of the science guide and framework
2. Develop major goals and objectives of the science guide and framework
3. Develop textbook analysis system with the focus on content, process, instructional strategies and reading level

Task Force II:
1. Develop learner expectations, instructional implications and instructional strategies
2. Develop evaluation of current programs

Task Force III:
1. Develop program characteristics and criteria for excellence
2. Develop steps to be used in implementation process

Task Force IV:
1. Develop appendices

   Reference/Resource Materials
   Evaluation of Instructional Materials
   Students with Special Needs
   Evaluation Questionnaire
   Scientific Literacy Statement

After a final review and publication of the NEW DIMENSIONS IN SCIENCE EDUCATION the following will be used to develop use of the plan in Ohio Schools.

Implementation Workshops

Workshops will be used to:

1. Define the programs designed with the use of the NEW DIMENSIONS IN SCIENCE EDUCATION
2. Follow-up evaluations of implementation process

PRODUCTS:
1. Publication for use by Ohio School Districts NEW DIMENSIONS IN SCIENCE EDUCATION
2. Textbook Analysis System
3. Evaluation of School Science Program Format
4. Implementation Workshops for Teachers

CONTACT PERSON: Kay Wagner
Inservice Education Science Consultant
Rm 1013, 65 S. Front Street
Columbus, OH 43266-0308

August 14,1987
C. Lee

STATE: Ohio
REGION: V

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: The Living Environment- Resource Base for Science Teachers Bowling Green State University, Center for Environmental Programs

PROGRAM CATEGORY: (higher education;) cooperative; (competitive;) elementary/secondary education; demonstration/exemplary; other- please identify

SUBJECTS/FOCUS: Mathematics; (Science;) Computer Learning; Foreign Languages

PRIORITY AREA: underserved/underrepresented; partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); (other- please identify Cooperative between IHE/LEAs and City, State, and Federal Agencies, industry, and environmental organizations.

GRADE LEVEL/S: 5-12

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education) Teachers from underserved rural counties in northwest Ohio

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

Students need practical examples and hands- on activities in science courses. Teachers need to be aware of local resources, to be comfortable in field activities, and to be familiar with environmental concepts if they are to teach environmental and related sciences effectively. This program seeks to accomplish this and to show the relevance of scientific principles in a technological society.

GOALS:

To improve science instruction by using practical examples and available physical and human resources, and to illustrate current concepts in environmental science.

GENERAL PROGRAM DESCRIPTION:

A two- week summer workshop for 39 middle and junior high school teachers, primarily of northwestern Ohio, which emphasized practical examples and use of available resources. Local resource persons, agencies, and materials were used in an effort to heighten teacher awareness of unique opportunities that are available for augmenting science education in the classroom. Materials were presented on biology, ecology, and geology.

Hands- on laboratories, field trips, and computer activities on ecosystem models and management, endangered species, aquatic organisms, ecosystem contamination, environmental biotechnology, captive breeding, and preservation were among the primary activities of this program. Teachers visited a number of Natural Areas and the Toledo Zoo. Professional from the Ohio Environmental Protection Agency, Ohio Department of Natural Resources, Ohio Fish & Wildlife, the United States Department of Agriculture, and several private preservation agencies presented lectures and ass..ted with the program.

Teachers have integrated many of this program's materials and concepts into their teaching and have had opportunities for curriculum development and exchange during follow- up activities.

PRODUCTS:

A book of environmental education activities for classroom use. The program provided 3 semester hours of graduate credit.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

Improved teaching and establishment of a teacher- community network for continual interchange of ideas and use of local r.sources.

CONTACT PERSON: Dr. Thomas B. Cobb, Director
Center for Environmental Programs
Bowling Green State University
Bowling Green, Ohio 43430

(419) 372-8207

August 14, 1987
C. Lee

STATE: Ohio

REGION: V

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: Science Preparatory Enrichment Program
University of Cincinnati, College of Medicine

PROGRAM CATEGORY: (higher education) (cooperative;) competitive; elementary/secondary education; demonstration/exemplary; other- please identify

SUBJECTS/FOCUS: Mathematics; (Science) Computer Learning; Foreign Languages

PRIORITY AREA: (underserved/underrepresented;) partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other- please identify

GRADE LEVEL/S: 9-12

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)
Minorities- Blacks

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

In Ohio's colleges and universities, Blacks comprise approximately 6% of the students, whereas 11% of the college- age population is Black. Blacks are most underrepresented in mathematics, physical sciences, and engineering. This project seeks to increase the percentages of Blacks who attend and graduate from high school and university.

GOALS:

To provide an experiential learning model for high school students that will encourage an appreciation for the sciences, improve high school retention, and improve learning.

GENERAL PROGRAM DESCRIPTION:

This was a four- week summer program for minority students which provided classroom and field activities in cooperation with Cincinnati Public Schools, Proctor & Gamble, and the Cincinnati Zoo.

Classroom sessions included the following topics: 1) study skills, including time management, concentration, and retention; 2) reading skills; 3) vocabulary; 4) analytical thinking; and 5) career exploration and research skills. A student self-assessment was used to determine knowledge gained in the program.

Field activities included trips to the Cincinnati Zoo, the Natural History Museum, Proctor & Gamble, and Wright Patterson Air Force Base and Air Force Museum.

An awards ceremony at the program's conclusion included an address by a member of the National Organization of Black Chemists and Chemical Engineers, a presentation by each student of his or her research project, and a presentation by a medical student on the need for perseverence and self- motivation.

PRODUCTS:

Evaluations, tests, materials to improve skills, and materials for motivational and informational seminars in selected high schools were generated.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

This successful program improved students' knowledge and understanding of the medical profession, helped students develop learning skills, and impressed upon them the need for career planning. The program is an extension of the Minority Introduction to Medical Education Program for High School Seniors.

CONTACT PERSON: Dr. Sandra Bridwell, Assistant Dean
or Dr. Debra Zoia
University of Cincinnati College of Medicine
206 Beecher Hall, ML 225
Cincinnati, Ohio 45221-0225

(513) 872-7212

August 14, 1987
C. Lee

STATE: OKLAHOMA

REGION: SOUTHEAST

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: Adoption and Implementation of "The Voyage of the Mimi"--an interdisciplinary math and science program for middle school gifted and talented students (Tulsa Public Schools, Tulsa, Oklahoma)

PROGRAM CATEGORY : higher education; cooperative; competitive; elementary; (secondary education); (demonstration/exemplary); other - please identify

SUBJECT/S FOCUS: (Mathematics; Science;) Computer Learning; Foreign Languages

PRIORITY AREA: (underserved/underrepresented;) partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify

GRADE LEVEL/S: Middle School: 6th grade
(to be expanded to 7th and 8th grades next year)

TARGET GROUP: any other special characteristics, e.g., the disadvantaged, (the gifted,) vocational education)

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

Project addresses strengthening the skills of teachers and instruction in mathematics and science established as a national need with the passage of EESA Title II of P.L. 99-377. State priority needs were officially established with the Oklahoma Legislature's passage of legislation requiring each school district to develop and implement a Five-Year Plan for Improving Instruction in all curriculum areas with emphasis on the basic skills. In assessing the needs of the Tulsa Public School District in response to the State Plan and the School Effectiveness Program initiated by the district, the Science Advisory Committee identified a need for improving interdisciplinary instruction in mathematics and science for the gifted and talented.

GOALS:

--To create greater interest in and erthusiasm for mathematics and science

--To demonstrate increased student achievement in mathematics and science

To develop higher order critical thinking skills and reasoning

--To graduate students totally prepared for college level work in mathematics and science

GENERAL PROGRAM DESCRIPTION:

The interdisciplinary mathematics and science program "The Voyage of the Mimi" is being adopted and implemented at the middle school level. "Voyage of the Mimi" is a Bank Street College of Education program developed under a grant from the U.S. Department of Education.

The project is innovative in that it includes curriculum to supplement existing instructional materials, identifies appropriate teaching strategies, and has an inservice program to train gifted and talented teachers. It is also exemplary in that it will serve as a model for any school system interested in implementing an instructional program for their gifted and talented students.

A multi-media learning package, which includes video tapes, printed materials, and microcomputer software introduces students to scientific and mathematical concepts as they participate in whale research.

Science and math are viewed from an interdisciplinary perspective. Science is viewed as a process of learning and discovery. Math, although a context in its own right, is viewed as a tool within the context of scientific investigation.

A pre-seminar was provided to team leaders who were then responsible for teaching the summer seminar. The teacher training part of the program consisted of project directors, four project leaders, and twenty math and science teachers (including private school teachers) of sixth grade gifted and talented students. The seminar was designed to assist teachers in how to teach the high-tech interdisciplinary program and the unique classroom management skills required to coordinate the use of video, computers, and reading materials in math and science; also included was training in the use of small group hands-on activities. These teachers are working with approximately 225 sixth grade gifted and talented students in ten middle schools this school year. Plans are to expand the programs to seventh and eighth grade as soon as teachers can be trained.

Tulsa Public Schools will nominate this project for participation in Oklahoma's annual ECIA Chapter 2 Education Fair.

PRODUCTS:

--Increased Student Achievement

--Expansion (Summer 1988) to serve remaining middle school (6th grade) teachers and students and the upper middle school grades (7th and 8th). Instructional program materials are currently being developed for 7th and 8th grade levels.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

--Graduates fully prepared for college level work in mathematics and science

--Graduates with well-developed higher order critical thinking skills and reasoning ability

CONTACT PERSON/S: Roger Kruse
PHONE NUMBER (INCLUDE AREA CODE): (918) 745-6252
DISTRICT/INSTITUTION/AGENCY: Tulsa Public Schools
ADDRESS: P.O. Box 470208
Tulsa, Oklahoma 74147-0208

August 14, 1987
C. Lee

STATE: Rhode Island

REGION: New England

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply. (Four Programs)

TITLE:
1. Brown Science Institutes
2. Program for Excellence in Teaching Science
3. Mathematics Excellence Project
4. Improving Elementary School Science Teaching

PROGRAM CATEGORY: (higher education; cooperative; competitive; elementary/secondary education; demonstration/ exemplary; other - please identify

SUBJECT/S FOCUS: (Mathematics); (Science); Computer Learning; Foreign Languages

PRIORITY AREA: (underserved/underrepresented); partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify

GRADE LEVEL/S:
1. High School
2. High School & Jr. High School
3. High School
4. Elementary School

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)

Retraining and updating of teachers in the schools with special emphasis on underrepresented groups.

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

Contact between college professors and elementary and secondary teachers will improve instruction at all levels. The Title II funds provide another means by which articulation and communication between levels can be encouraged.

GOALS: To improve the quality of mathematics and science teaching throughout the State of Rhode Island.

GENERAL PROGRAM DESCRIPTION:

1. Brown Science Institutes, Brown University.

The purpose of the Brown University project is to provide direct inservice training for secondary school biology and chemistry teachers throughout the state, as well as an opportunity for collegial exchange. The project consists of three components: a school-year laboratory/seminar series in biology, a school-year laboratory/seminar series in chemistry, and a three-week summer institute in chemistry.

2. Program for Excellence in Teaching Science, University of R.I.

This project makes available short, one-credit inservice courses on special topics in chemistry, biology and physics. Topics are selected to match the needs of the teachers. In addition, this year's program will develop inservice training and curriculum materials for geology teachers, since this area has previously received little attention.

3. Mathematics Excellence Project, Rhode Island College.

This project provides direct inservice instruction to improve the quality of mathematics instruction throughout the state. An addition to this year's project is the development of a "Teacher Enhancement Lecture Series" through which teachers trained during the project will be able to share knowledge they have gained with their peers who have not previously participated.

4. Improving Elementary School Science Teaching, Providence College.

To meet the needs of students at the elementary and middle school level, this project provides appropriate inservice training in science to teachers in grades K-8.

An innovative component of the project involves an "adopt a school program". A primary goal of the project is to serve as a model for other institutions of higher education throughout the region.

PRODUCTS: Better trained teachers
Curriculum packets in geology and mathematics

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

To upgrade the offerings in science and mathematics to the students in the public and non-public, elementary and secondary schools in Rhode Island.

CONTACT PERSON/S: Cynthia V.L. Ward, Associate Commissioner
PHONE NUMBER (INCLUDE AREA CODE): (401) 277-2685
DISTRICT/INSTITUTION/AGENCY: Rhode Island Office of Higher Education
199 Promenade St. .t, Room 217
Providence, Rhode Island 02908

August 14, 1987
C. Lee

STATE: South Carolina
North Carolina
REGION: IV

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: SAT-Mathematics Improvement Project

PROGRAM CATEGORY: higher education; cooperative; competitive; elementary/secondary education; (demonstration/exemplary;) other - please identify

SUBJECT/S FOCUS: (Mathematics;) Science; Computer Learning; Foreign Languages

PRIORITY AREA: (underserved/underrepresented;) partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify teacher training in problem solving/thinking skills

GRADE LEVEL/S: 7-12

TARGET GROUP: (any other special characteristics, e.g., the (disadvantaged, the gifted,) vocational education)

College preparatory students

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

The project emphasizes mathematical problem solving instruction and instruction in and teaching of higher thinking skills. Problem solving and higher order thinking skills are mandated in South Carolina's Education Improvement Act of 1984 and are priority items in the National Council of Teachers of Mathematics Agenda for the 1980s.

GOALS:

1. To improve the problem solving instruction in mathematics classes in grades 7-12.
2. To improve problem solving skills of students in grades 7-12
3. To enable teachers to emphasize instruction at levels of thinking higher than recall and application.
4. To enable students to apply higher levels of thinking in mathematics classes.
5. To enable students with non-college preparatory backgrounds to learn content and skills tested on the SAT.
6. To improve SAT scores throughout the state.

GENERAL PROGRAM DESCRIPTION:

See attached program description: Overview of SAT Mathematics Improvement Project.

An estimated five thousand teachers have been provided instruction in the use of the materials through regional workshops provided by the State Department of Education and subsequent local inservices by those trained in the regional sessions.

PRODUCTS:

See the section titled Project Materials on the attached SAT-Mathematics Improvement Project overview.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

The results of the 1985-86 implementation of the program statewide indicated improvement in SAT performance in all classes at all grade levels (9-12) in which materials were used. The degree of use was directly related to the degree of improvement as measured by pre/post test scores. Teachers rated the program and materials above average to excellent.

CONTACT PERSON/S: Marjorie Claytor, Mathematics Consultant
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ADDRESS: 801 Rutledge Building
1429 Senate Street
Columbia, South Carolina 29201

SAT-MATHEMATICS IMPROVEMENT PROJECT

Inititated by Dr. Charlie Williams, State Superintendent of Education, and with the cooperation of The College Board and The Educational Testing Service, the SAT-Mathematics Project was designed around the identification of the skills and concepts tested on the SAT-M and the thinking processses necessary to apply those skills. The development of the program as outlined below was presented to and approved by the State Board of Education.

BACKGROUND

In an effort to aid the schools in South Carolina in preparing students for successful college performance, the State Department of Education began an SAT-Mathematics Improvement Project in 1984. A committee of master teachers analyzed mathematics questions from PSATs and SATs (furnished by the Educational Testing Service) for content, difficulty, and thinking level. This analysis led to the development of a package of materials emphasizing the improvement of mathematics content skills and problem solving abilities and designed to increase the thinking levels of college preparatory students in South Carolina schools.

PROJECT MATERIALS:

Each package of materials includes the following items:

1. General Introductory Booklet (containing)

    a. a content outline showing the areas of arithmetic, algebra, and geometry found to be tested on the SAT,

    b. a frequency distribution of items by content, difficulty, and thinking level,

    c. a table correlating content tested to content included in the textbooks currently on the South Carolina state adopted list,

    d. general information for teachers in the use of materials, testing in general, and specifics related to the SAT,

2. PSATs to be used as pre-tests and post-tests,

3. content diagnostic tests in the areas of arithmetic, algebra, and geometry and a diagnostic test in problem-solving.

4. Student practice booklets of PSAT and SAT math questions arranged according to content area and levels of difficulty and thinking,

5. a supplementary textbook in the development of problem solving skills,

6. a teacher card file of PSAT and SAT items organized by content and difficulty and color-coded by level of thinking to be used by teachers in classroom instruction or testing.

PILOT

The program was pilot tested in fifteen selected high schools in South Carolina. In December, 1984, representatives from each of these schools received a set of materials and instructions in their use. The project was then implemented during the spring of 1985. The Department's project coordinator monitored the pilot schools during this trial program.

At a follow-up workshop in April, 1985, representatives from the pilot schools reported on their use of the materials and the results obtained to date. School utilization ranged from familiarization of faculty and staff with the analysis, to brief classroom exposure of students to SAT items, to a complete program of pre-testing, diagnosis, remediation, practice, and post-testing. Evaluation results of seven of these schools which administered the entire package showed average score increases from pre-test to post-test of 16, 44, 45, 52, 55, 60, and 90 points.

Student comments were positive, indicating an appreciation of their exposure to the program and a feeling of having benefited from the experience. Many reported greater confidence in knowing how to approach solving the problems when they took the SAT this spring. Teacher evaluations of the program gave ratings of above average to excellent for the materials developed for classroom use and suggested that these be made available to all teachers of college preparatory mathematics classes.

STATEWIDE IMPLEMENTATION

Based on input from pilot teachers, materials were revised, printed, and shipped to all school districts in South Carolina in August, 1985, for distribution to every school containing any of the grades seven through twelve. Regional workshops were held throughout the state in August to train representatives from each district and school in the uses of the materials. Each workshop participant would in turn train the mathematics staff in his/her school. Additional printing and distribution of materials took place in the fall of 1985, the summer of 1986, and the summer of 1987; and additional training workshops were conducted in August, 1986 and August, 1987. Currently each participating district should have adequate materials for use by every teacher of college preparatory mathematics in grades 10-12 and a quantity sufficient for one set for every two mathematics teachers of potentially college-bound students in grades 7-9. Materials appropriate to their grade levels are included in packages designed for middle or secondary schools. For teachers of potential college preparatory students, the emphasis is on increasing students' problem solving abilities and improving their thinking skills.

The complete package provides the following: tests for SAT readiness; tests to check on each student's knowledge of content and problem solving abilities; references to sources of remediation; problem-solving teaching aids; and booklets and cards to provide experience and practice in SAT-M items at all levels of difficulty and thinking.

Computer programs have been reviewed for consistency with the design of the State Department of Education project. One program, "Improving College Admission Test Scores: Math Series", produced by NASSP, was piloted in twenty schools in South Carolina in the spring of 1986.

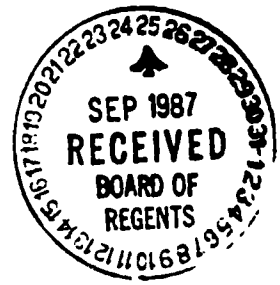
The results of this first year of the SAT-M Improvement project were analyzed to determine the effectiveness of the program and the ways of using the materials to achieve the greatest benefits. The statewide results of this analysis showed statistically significant pre/post test gains in all classes and at all grade levels in which the materials were used. The greater the degree of use of the materials, as reported by teachers, the greater the gains found when test results were analyzed. Teacher comments were positive and overall ratings of materials were above average to excellent.

FUNDING

The SAT-Mathematics Improvement Project was initiated and developed through the use of state funds. Piloting and statewide implementation were supported by state funds, federal funds available under the Education for Economic Security Act, and funds supplied by the Southeastern Regional Council for Educational Improvement.

FUTURE

The SAT-Mathematics Improvement Project program has been adapated for use in Arkansas, North Carolina and Virginia. In South Carolina the emphasis on the problem solving/thinking skills emerging from this program has inspired the development or implementation of several other programs at the elementary and secondary levels. The program at the elementary level will better prepare students for the type thinking required for successful college performance and the programs at the secondary level reinforce and extend the emphases of the SAT-Mathematics Improvement Project.



STATE: South Dakota

REGION: VIII

TITLE II EXEMPLARY PROJECT SUMMARY

TITLE: Modern Biological Field Investigations

SUBJECT: Science

PRIORITY AREA: Partnership with special provisions for underserved/underrepresented

GRADE LEVEL: Secondary

TARGET GROUP: Two of the eight student slots were reserved for teachers from Indian Reservations.

PROJECT RATIONALE: State Priority: This project addressed the number one state priority for inservice teacher training.

The National Science Teachers Association (1982) has stated that scientific literacy for all citizens should be a primary aim for science education in the 1980s. The science teacher is the most important vehicle for promoting scientific literacy (Collette and Chiappetta, 1984). It has been shown (Hurd, 1964; Tamir, 1976) that a "hands-on" approach is an extremely powerful tool for learning, and contributes to an appreciation for the methods and spirit of science.

The South Dakota Board of Regents "Project Curriculum Share", the recent report of the Northwest Area Foundation Grant (1985), points out that increasing rates of scientific discovery make continuing education necessary for science teachers.

The course described here was formulated with the cooperation, support, and input of local education agencies and Black Hills State College. The course addresses the need of classroom secondary science teachers to keep current in selected areas of biology and geology. The means for accomplishing this

task was participation in an ongoing research project. Both field and laboratory work were included in the five week course.

The described project offers a content-related course providing teachers with the opportunity to directly participate in scientific research. Modern Biological Field Investigations directly used the hands-on approach to learning by providing secondary science teachers the opportunity to participate in an ongoing research project headed by Dr. Mark Gabel at Black Hills State College. Eight students were selected for the course, with two slots reserved for minority applicants.

The goal of the on-going research project is to determine the Miocene vegetation of the northern High Plains. The nature of the vegetation will help us determine if the modern expansive grasslands were present in the Miocene. Collection and analysis of fossil plants from strata of known ages will help answer this question. Correlations with animal fossils are noted whenever possible.

GOALS:

The goals of the program include infusion of participants with excitement and insights gained only by participating in a scientific research project. Other benefits provided a review or new exposure to modern field and laboratory techniques, scientific method, binomial system of nomenclature, the history of the earth, and evolution. The participants themselves were a good source of information and exchanged ideas and classroom methods. Through the combined exposure to facts, techniques, and the excitement of research, the participants will bring the new enthusiasm and knowledge back to the classroom to their students.

GENERAL PROGRAM DESCRIPTION:

The five week program began with two days of classroom review of basic botany, plant taxonomy, and historical geology. The remainder of the first week was spent touring fossil bearing strata of various ages to allow the participants to become familiar with the strata in the northern High Plains and to demonstrate correlations of strata with the geologic time scale. We observed the Cretaceous Pierre Shale Formation; Chadron, Brule, and Sharps Formations of Oligocene age in Badlands National Park (near Wall, South Dakota); and Harrison, Upper Harrison, Turtle Butte, Valentine, and Ash Hollow Formations of Miocene age in Agate Fossil Beds National Monument (near Harrison, Nebraska) and in various places in south-central South Dakota.

Weeks two and three were devoted to field work, which consisted of observing and identifying strata, finding, removing, and labelling plant fossils. We revisited a number of the sites studied the previous week. Collections were made in Bennett County, SD at established collecting sites including Big Spring (Gregory, 1942; Skinner and Johnson, 1984) and several new sites (Gabel, 1987). Other sites studied were in Tripp County. SD which included the Turtle Butte sites of Skinner, Skinner, and Gooris (1968).

During our third field week, we collected at Agate Fossil Beds National Monument (Hunt, 1981). We were fortunate to visit the site at the same time Dr. Robert Hunt Jr. of the University of Nebraska (Lincoln) and his crew were searching for vertebrate remains, and had uncovered some of the main fossiliferous "bone beds" in the monument. Permission to trespass

and to remove fossils was obtained at all sites prior to the start of the course.

Upon returning to the laboratory, the participants removed fossils from the remaining surrounding matrix. A three percent hydrochloric acid solution was used to help clean some fossils. Final cleaning of specimens was completed using ethanol or acetone in an ultrasonic cleaner. Selected specimens were mounted on aluminium stubs with silver paint or paste, and were then coated in a sputter coater with gold and paladium to make them electrically conductive. Instruction in basic electron microscopy was presented, and all participants were able to independently operate the scanning electron microscope to observe their specimens by the end of the course.

In addition to photomicroscopy, participants also learned standard darkroom procedures including development of 35 mm film, printing on photographic paper, and production of 2x2 positive slides from larger format negatives.

During the final week of the course we were able to work with Dr. J. R. Thomasson of Fort Hays State University at the "Dead Cow Quarry" in Kansas (Thomasson et al., 1986). We saw new plant and animal fossils and were able to compare our findings from the northern High Plains with fossils from similar strata of the Kansas central High Plains.

Scientific literacy was promoted by continual access to a collection of all relevant literature. The literature was made available to participants both in the laboratory and in the field. Familiarity with the literature was strongly encouraged, and critiques of three recent journal papers were prepared by each participant.

Travel time to and from sites was used productively to

review the vegetation and geology of the area and to consider learning and education. The many hours we spent on and near Indian reservations provided excellent opportunities to discuss the education of the underserved and underrepresented.

PRODUCTS:

The plant fossils collected during our two weeks of field work were well-preserved, enabling us to study cellular detail. Most fossils were roots, leaves, or reproductive structures, such as achenes, nutlets, anthoecia, and endocarps. Comparisons were made to modern taxa when possible.

Fossils found include roots (Figs. 1a-b), dicot leaves (Fig. 1c), nutlets (Figs. 1d-e) of Cryptantha (Boraginaceae), endocarps (Fig. 1f) of Celtis (Ulmaceae), and anthoecia (Figs. 1g-h) of Berriochloa (Gramineae). All figures presented here were specimens prepared and micrographed by the participants during the course. Preprints of two papers generated from our work and prepared by the instructor and some participants have been accepted and will be published in the near future. (Gabel and Bich, 1987; Gabel, Fahy, and Person, 1987). A third manuscript is in prepation (Gabel, Melvin, and Stanley, 1988). Copies of the accepted manuscripts are included in Appendix A.

Participants also received fossil plants for classroom use, as well as 8 x 10 inch copies of SEM micrographs taken by themselves and other class members (See Fig. 1).

EVALUATION:

The participants critiqued the program on the final day. The reviews were uniformly positive and generally emphasized the

positive aspects of participating in an on-going research project. Informal course evaluations by all participants are included in Appendix B. The "hands-on" approach was well-received. The chance of discovery of fossils added to the excitement of the session. Understanding of geologic time spans and correlation of the strata with the fossil record promoted a clearer understanding of paleobiology and a different perspective than is garnered from text books. The interpretations of paleoecology resulting from our discoveries were often mentioned by the participants as new insights and for some led to a new synthesis of ideas about evolution.

Excerpts from the participant comment section of Gabel, Fahy, and Person (1987) are included below:

Participant One:

My participation in the summer research program was a very rewarding experience in many ways. The exposure to paleobotany was outstanding. In addition to locating fossil plant structures, considerable time was spent observing and identifying the flora of the area in which we were working. We also located many fossils of animals. It was a great opportunity to work closely with several very well-known paleontologists.

The stipend was instrumental in my participation. I, for one, could not afford out-of-pocket expenses to go to summer school.

I would like to see other science programs developed for secondary science teachers. This type of training and education is vital if science teachers are going to stay current in science education.

Participant Two:

Speaking as a science teacher who is a solid proponent of the "hands-on" approach to secondary science, I appreciated the opportunity to participate in a research project for my own benefit. I have been involved in many of my students' research projects, but have had very little opportunity to actually get my own hands dirty in such an endeavor. It was refreshing to be a part of some of the most current research methods and to be a part of a professional team under the very capable leadership of our instructor. Everyone was treated as a scientific equal and we were made to feel that we were an integral part of a complex scientific problem.

In addition to keeping current in selected areas of biology and geology, I felt rejuvenated and eager to go back to my students, with renewed enthusiasm for research projects. The most unique part of this course was the opportunity to be involved in "hard science," rather than simply another course in educational theory. This course was "on the leading edge" of science. Science teachers need this type of science experience, on a regular basis, in order to be more effective with their students.

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August 14, 1987
C. Lee

STATE: Tennessee

REGION: Southeast (IV)

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: Video Tapes for Science Teacher Training

PROGRAM CATEGORY : higher education; cooperative; competitive; (elementary/secondary education;) demonstration/exemplary; other - please identify

SUBJECT/S FOCUS: Mathematics; (Science) Computer Learning; Foreign Languages

PRIORITY AREA: underserved/underrepresented; partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); (other) - please identify Program that relates to State priority

GRADE LEVEL/S: K-6

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

The EESA Title II Comprehensive Statewide Needs Assessment indicated that increasing qualifications for elementary science teachers was one of the priorities in Tennessee. "Video Tapes for Science Teacher Training" meets this statewide need as well as the LEA priority.

GOALS: (1) To address the need for improving elementary science instruction through additional training/retraining of elementary science teachers : the LEA (Haywood County).

(2) To address a statewide need for additional training/retraining of elementary science teachers.

GENERAL PROGRAM DESCRIPTION:

"Video Tapes for Science Teacher Training" utilized the talents of Tennessee Career Ladder Level II and III science teachers, as well as other outstanding science teachers, to produce video tapes for training K-6 teachers in how to teach science based on the Tennessee Instructional Model (TIM) lesson design. The activities were taken from the Science Activities Manual K-6, Instructional Strategies for Elementary School Science. The manual, which is correlated to Tennessee's Science Curriculum Guide, was developed through the Center of Excellence for the Enrichment of Science and Mathematics at the University of Tennessee at Martin and was disseminated to all LEAs during the fall of 1986.

The tapes were used to provide training/retraining to Haywood County's K-6 teachers and are available for distribution to LEAs statewide upon request. In addition, local funds were used to develop a science kit for each grade level. The kits contain all necessary supplies and materials for presenting the activities.

"Video Tapes for Science Teacher Training" was presented at Tennessee's ~~EESA~~ Title II Exemplary Programs workshops in June 1987, and at the Title II Statewide Conference in August 1987.

PRODUCTS: (1) Video tapes
(2) Science kits

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

The participating teachers will evaluate the project by responding to a checklist related to improving elementary science instruction. Too, test scores of students of participating teachers will be compared with test scores from previous years to determine the impact on improving instruction.

CONTACT PERSON/S: Barbara Adkisson.
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East Tennessee State University
College of Education
Department of Curriculum and Instruction • Box 23020A • Johnson City, Tennessee 37614-0002 • (615) 929-4429

October 5, 1987

Dr. John Bogert
Coordinator, Educational Services
Tennessee Higher Education Commission
501 Union Building, Suite 300
Nashville, Tennessee 37219-5380

Dear Dr. Bogert:

During 1986 a project was funded by THEC at East Tennessee State University which was designed to meet a great need in Tennessee. Science education, especially at the elementary level, must become more active and application-oriented if our children are to develop the attitudes and skills necessary to function in our modern world. We must increase our "hands-on" experiences if science education is to improve.

The primary purpose of this project was to develop a series of science activities for each grade level which were keyed to the state science curriculum guide. These activities were then organized in loose-leaf manual form so that each grade level, or even each individual activity, may be used separately. At least one activity was developed for all major units of the curriculum guide. Each activity included (a) a specific objective (or objectives), (b) a list of equipment and/or supplies needed, (c) any cautions which the teacher should exercise--i.e., any possible dangers, and (d) very specific instructions for the teacher, including set and closure comments.

A secondary objective was to develop a list of all supplies and materials needed for all activities in each grade level. Virtually all items listed are inexpensive and available in local stores.

Another secondary objective was to develop the plans and a prototype experiment cart which could be built at low cost.

All materials were to be disseminated throughout the state to each school district and to selected state department personnel.

During completion of the project an Advisory Committee consisting of seven elementary teachers and two science education faculty from ETSU met with project staff to provide direction and to critique work of the staff. In addition, an outside evaluator provided input on all materials.

All objectives were attained to a considerable degree. Due to a tight time frame, however, some of the activities were not adequately field tested. In order to insure a high quality product, therefore, a proposal to thoroughly field test the activities manual and revise as needed was funded by THEC in 1987.

In conducting the field test and revision, twenty-two teachers in the Upper East Tennessee area received sample equipment kits, along with individual activity manuals. These teachers were asked to provide input regarding needed revisions, and to obtain input also from other teachers in their schools.

The project director visited each of the twenty-two teachers in their schools, along with other teachers as well. An outside evaluator was consulted also. After all input was received, a total of ninety-seven pages of the activities manual was revised. It should be noted that most of the input received from teachers and administrators was highly favorable.

After revision was completed the revised pages, hole-punched for insertion into the loose-leaf manual, were disseminated to each school district in Tennessee by way of regional education offices.

It should be noted here that the Tennessee State Department of Education has been highly supportive and has greatly assisted in dissemination of these materials. Dr. Geraldine farmer, State Science Supervisor, has been personally involved in distribution of the activities manuals. The regional offices have contributed greatly to our success.

We appreciate the opportunity to serve science education and extend our thanks to THEC for providing the necessary funding. A revised activities manual is hereby forwarded, along with the original pages which were replaced.

Very sincerely,

William N. Pafford
Director, THEC Project

WNP:mh

Institution: Texas Christian University
Project Director: Kathleen Martin

August 14, 1987
C. Lee

STATE: Texas

COORDINATING BOARD

REGION: Fort Worth and surrounding metroplex
Federal District #6
State District #12

SEP 14 1987

DIVISION OF UNIVERSITIES AND RESEARCH

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: Training of Elementary School Teachers in Mathematical Thinking and Problem-Solving.

PROGRAM CATEGORY : higher education; cooperative; competitive; elementary/secondary education; demonstration/exemplary; other - please identify

SUBJECT/S FOCUS: Mathematics; Science; Computer Learning; Foreign Languages

PRIORITY AREA: underserved/underrepresented; partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify

GRADE LEVEL/S: K-6

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)
Disadvantaged Gifted

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

A profusion of recent national reports have attested to the declining abilities and interest by school children in mathematics and to the mathematics teacher shortage. Texas suffers the added problem of housing a large minority population which is underserved and underrepresented in mathematics education. This problem is magnified in urban settings such as Fort Worth where minority students tend to concentrate in remedial classes. The problem is even further exacerbated by economic conditions in Texas which are forcing the state to shift its reliance from natural resources to human resources. In the area of mathematics these human resources are dismally inadequate to meet the challenge of transitions. Because elementary school teachers have little formal training in mathematics, usually a minimal 3 to 6 hours of college credit, mathematics education in grades K-6 is especially impoverished.

GOALS:

The EESA project described herein sought to address the need for identifying and adequately instructing high ability students in mathematics, particularly minority students from disadvantaged environments. The goal of the project has been to train elementary school teachers how to establish classroom learning environments that stimulate high level thinking skills in mathematics.

The project has tried to shift teacher perceptions of their teaching role from that of dispenser of information to that of curriculum designer. This shift has required that teachers feel confident in their mastery of the concepts they teach and are knowledgeable in modes of communicating those concepts.

GENERAL PROGRAM DESCRIPTION:

The project has involved a cooperative arrangement between Texas Christian University, the Gifted Students Institute for Research and Development, and four school districts in the DFW Metroplex - Fort Worth ISD (65,000 students), Arlington ISD (36,900 students), Birdville ISD (16,000 students), and Cedar Hill ISD (2,300 students). The 50 participating teachers were drawn from a pool of teachers representing 111 elementary schools numbering over 2,500 teachers. Where feasible, teachers were selected who taught predominately minority populations of students. Sixty percent of the teachers represented Fort Worth ISD where 36% of the student population is black, 25% is Hispanic, 3% is Asian, and 37% is white.

The project has sought to accomplish its goals by involving participating teachers in three components of instruction: 1) a graduate course in mathematics education, 2) the field-testing of mathematics modules developed during the graudate course, and 3) a summer seminar in the assessment of mathematical thinking.

The specific objectives of the graduate course were to help teachers: 1) to become more knowledgeable in those content areas of arithmetic and geometry which are applicable to elementary school children; 2) to develop skill in recognizing high ability students in mathematics; 3) to become familiar with instructional strategies which encourage the continuous mathematical progress of high ability students while simultaneously supporting the progress of less gifted students; 4) to establish confidence in using 3-dimensional manipulatives to teach mathematical concepts in a more meaningful way; and 5) to become adept at designing problem-solving activities in mathematics which stimulate higher level thinking among students.

During the graduate course, teams of teachers designed mathematics modules which encouraged students to explore widely and delve deeply into mathematics. Each module was based on a problem-solving approach using concrete mathematics materials such as pattern blocks and Cuisenaire rods. Instruction emphasized how to think about mathematical content rather than merely memorizing it.

The second component of the project involved the field-testing and revision of the mathematics modules. Each teacher field-tested two modules appropriate for the grade level being taught. The teachers met as a group at the end of each month to exchange information about the progress of its field-testing and to resolve any problem encountered. The course instructor and district-level mathematics directors participated in these meetings.

The third component of the project consisted of a 2-day seminar in the summer following the graduate course. The seminar addressed the question of how to assess the levels of student learning as they worked through the mathematics modules. The assessment training emphasized methods of evaluation which were not restricted to the limitations of written tests.

Through project funds each participating teacher received concrete mathematics materials amounting to $250 for use in their classrooms. These included Cuisenaire rods, pattern blocks, base 10 blocks, multilinks, pentominoes, tangrams, polydrons and calculators. These materials were carefully selected to complement and to extend activities which encourage investigation of important mathematical concepts.

PRODUCTS:

The project produced a set of 8 mathematics modules focused on concepts appropriate in the elementary grades. Each teacher received a module. The school districts have assumed responsibility for further distribution of the modules.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

Participating teachers were pre- and post-tested on their ability to draw pictures depicting fundamental arithmetic operations. Significant differences were found in test scores, thereby demonstrating that teachers had achieved a better understanding of these concepts.

Each teacher participating in the project was requested to share some dimension of what had been learned in the graduate course with other teachers in their respective schools. Some did this through formal in-service activities, while others shared at a more informal level. A ripple effect has been observed and attested to in these schools.*

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*In the year following this initial project, the number of teacher participants in a subsequent project doubled. The school districts continued to pay one-third of the tuition costs for these teachers.

STATE: Texas

REGION: VI

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

PROGRAM CATEGORY: demonstration/exemplary

SUBJECT/S FOCUS: Foreign languages

PRIORITY AREA: underserved/underrepresented

GRADE LEVEL/S: 7-12

TARGET GROUP: Hispanic students

PROJECT RATIONALE: The large Hispanic student population of the state necessitates a differentiated approach to the study of Spanish as a second language, since Spanish is the native language for many of these students. This approach recognizes the importance of native speakers of Spanish to the state and nation. The sites for this project were selected (1) for their large Hispanic student population, (2) the diversity of proficiency levels among that student population, (3) the districts' access to a foreign language specialist through a supervisor, and (4) the districts' interest in Spanish instruction as evidenced by the size of their secondary Spanish program.

GOALS: The project's focus was on staff development and curriculum development. Teachers in the project explored the history of teaching Spanish to native speakers of Spanish in this country, reviewed instructional materials developed for this target student population, acquired instructional strategies to improve the delivery of Spanish instruction to their students, and helped to develop curriculum publications that describe several of the approaches and techniques practiced.

STATE: Utah
REGION: 8

TITLE II EXEMPLARY PROJECT SUMMARY

TITLE: Computers in the Mathematics Classroom

PROGRAM CATEGORY: Elementary/Secondary Education, Demonstration/Exemplary

SUBJECT/FOCUS: Mathematics and Computer Science

PRIORITY AREA: Partnerships; Inservice and Retraining

GRADE LEVEL: Junior High School

TARGET GROUP: Mathematics Teachers

PROJECT RATIONALE: The National Science Foundation recently called for the development of computer mathematics materials for elementary and secondary school students. In addition, a recent report from the Office of Technology Assessment noted the importance of teacher-training in bringing computer technology in the classroom.

This project addressed two of three state priorities:

1) Inservice--plan, develop, and implement in conjunction with local educational agencies, regional training programs that will create a regional network of trained resource agents and consultants in mathematics and science to assist local school district personnel to improve teaching skills in these disciplines.

2) Retraining--plan, develop, and implement in conjunction with local education agencies, training programs in mathematics and science to provide opportunities for acquiring teacher certification to those teaching in math/science with no corresponding state certification.

GOALS: It is intended that the project will develop and implement a computer mathematics training program for teachers. Forty teachers from grades five through nine will be involved in a training experience and then an on-going computer network with the Weber State College faculty. School districts will be encouraged to use these trained teachers as resource agents and workshop leaders in the training of other teachers. The long-term goal is to create an exemplary model of how higher education can effectively interface with schools and teachers to present students with state-of-the-art educational experiences.

GENERAL PROGRAM DESCRIPTION: The project will train two mathematics teachers from each of twenty middle schools in north central Utah. During of period of six months, the teachers will attend a series of one night a week course activity sessions. The course will emphasize interesting applications of the computer to middle school/junior high mathematics instruction. Using workbooks developed by the principal investigators, course participants will also develop their software for use in their own local school.

In preparation for this project, a Computer Mathematics Center was established within the Department of Mathematics at Weber State College using microcomputers donated by AT&T. AT&T also donated two minicomputers, and is planning to donate additional microcomputers to each of the middle schools involved in the program. Other funding sources included the Utah State Board of Education, the WORDPERFECT Corporation, and three area school districts.

PRODUCTS: Two workbooks have been developed, "Explorations in Computer Mathematics Using LOGO" and "Explorations of Computer Mathematics Using BASIC." A third workbook, "Applications of Computer Mathematics in the Classroom" is in process. A software library has been developed, accessible to the teachers from their school building via modem to the Weber State College Computer Network.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT: The two workbooks were pilot tested with groups of local teachers prior to use in the project. Additional critiques of the workbook occurred during the courses and at the conclusion of the training.

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0699T

STATE: Utah
REGION: 8

TITLE II EXEMPLARY PROJECT SUMMARY

TITLE: Strengthening the Skills of Teachers and Instruction in Mathematics and Science--Southern Utah State College

PROGRAM CATEGORY: Higher Education, Cooperative

SUBJECT/FOCUS: Mathematics and Science

PRIORITY AREA: Cooperative; Retraining; Inservice

GRADE LEVELS: Elementary; Middle School and High School

TARGET GROUP: Elementary Teachers; Middle and High School Mathematics and Science Teachers

PROJECT RATIONALE: This project addressed two of three state priorities:

1) Inservice--plan, develop, and implement in conjunction with local educational agencies, regional training programs that will create a regional network of trained resource agents and consultants in mathematics and science to assist local school district personnel to improve teaching skills in these disciplines.

2) Retraining--plan, develop, and implement in conjunction with local education agencies, training programs in mathematics and science to provide opportunities for acquiring teacher certification to those teaching in math/science with no corresponding state certification.

GOALS: 1) Provide inservice education for 20-25 elementary science and mathematics teachers with focus on encouraging and maintaining student interest in science and mathematics, especially among minority, female, and underserved populations.

2) Begin training of 20-25 mathematics and science teachers at the secondary level who are teaching mathematics and science or of teachers who specialized in disciplines other than mathematics or science but who will be teaching in these subjects without appropriate subject endorsement.

3) Develop a network of resource agents in mathematics and science in the Southern Utah College service area.

GENERAL PROGRAM DESCRIPTION: This project was intended to promote mathematics education among underprepared secondary mathematics teachers and to promote science education among teacher leaders and principals in elementary schools, and to improve student understanding and performance in mathematics and science.

1) Science
   a) Train teachers for the physical-earth science and biological-earth science courses in the science core as adopted by the Utah State Board of Education.
   b) Develop teacher trainers for the K-6 science core.
   c) Retrain science teachers who are teaching the greatest number of science classes with the least amount of preparation in science.
   d) Develop school level inservice leaders for the core courses in science in grades 7-12.

2) Mathematics
   a) Retrain secondary mathematics teachers who are teaching the greatest number of mathematics classes with the least amount of preparation in mathematics.
   b) Develop elementary school mathematics leaders for the K-6 core courses in mathematics.
   c) Develop secondary school level inservice leaders for the core courses in mathematics in grades 7-12.

PRODUCTS: Better trained teachers; Inservice leaders

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT: Workshop leaders will pre- and post-testing of participants' mathematics and science competencies. Consultants from the State Office of Education and other teacher training higher education institutions will review workshop materials.

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Prof. Steven Heath
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Southern Utah State College
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Area Code 801-586-7902

Dr. Mark H. Spencer
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Salt Lake City, Utah 84180
Area Code 801-538-5247

August 14, 1987
C. Lee

STATE: VIRGINIA

REGION: Southeast

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: Excellence in Physics Teaching
Virginia Polytechnic Institute and State University

PROGRAM CATEGORY : (higher education); cooperative; (competitive); elementary/secondary education; demonstration/exemplary; other - please identify

SUBJECT/S FOCUS: Mathematics; (Science); Computer Learning; Foreign Languages

PRIORITY AREA: underserved/underrepresented; partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); (retraining) (of those teaching out of certification); other - please identify

GRADE LEVEL/S: junior high/high school

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES [illegible]S ADDRESSED)

Virginia has established as a priority teacher retraining programs that enable secondary school teachers currently endorsed in subject areas other than mathematics and science to become endorsed in these disciplines. This project addresses the shortage of qualified physics and physical science teahcers in Virginia.

GOALS: Now in its second year of funding under Title II, the primary goal of the Excellence in Physics Teaching program is to provide instruction leading to certification in physics and physical science for teachers not currently certified in these areas. The program also offers those already endorsed in and teaching physics the opportunity for recertification and intensive study in physics.

GENERAL PROGRAM DESCRIPTION:

During the summers of 1986 and 1987, an intensive summer institute was held on the campus of Virginia Tech. During the eight-week institute, 14 hours of academic credit in physics are offered to 16 high school and junior high teachers from around the state. Courses are chosen for their basic importance to physics as well as their interest to high school students. Topics include "Electromagnetic Device Physics," "Space Physics," "The Personal Computer in Physics Teaching," and "The Art of Classroom Demonstration."

Of the 17 participants from the 1986 program, 12 returned for the second summer. Teahcers are offered tuition waivers and stipends to cover summer housing costs.

The project is co-directed by Dr. Dale Long of the Physics Department and Dr. Tom Teates of the School of Education. During 1986-87, the co-directors visited each participant from the first year program to offer assistance and to assess the effectiveness of the program on physics instruction.

PRODUCTS:

A total of 19 newly-certified physics and physical science teachers are expected to result from the program. Evaluation visits indicate that the program has had a major impact on (1) teachers' confidence in the classroom, (2) the use of laboratories and demonstrations in class, and (3) the use of relevant examples from everyday experience.

~~EVALUATION/ANTICIPATED LONG-TERM IMPACT OF PROJECT:~~

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DISTRICT/INSTITUTION/AGENCY: Virginia Polytechnic Institute &
ADDRESS: State University
Blacksburg, VA 24061

August 14, 1987
C. Lee

STATE: Virginia

REGION: III

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: 1987 THIS FORUM (Tamorraw's Horizons Impact Schools and Society)

PROGRAM CATEGORY : higher education; cooperative; competitive; elementary/secondary education; demonstration/exemplary; other - please identify

SUBJECT/S FOCUS: Mathematics; Science; Computer Learning; Foreign Languages

PRIORITY AREA: underserved/underrepresented; partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify

GRADE LEVEL/S: Teachers and administratcrs far grades PK-12, thus all instructional staff, participated in the 1987 FORUM.

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)

The 1987 FORUM was for all educators with emphases an teachers of mathematics and science.

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)
Natianal, state, and local initiatives are underway to address the mutual benefits which business, industry and educatian can derive from unified efforts. The literature is full of the need fc- schaals to work coaperatively with business and industry as public education alone can not meet the financial demands of maintaining currency in this technalogical/information age.

GOALS: The goal of THIS is ta provide a FORUM in which the business and industrial cammunity of the Highlands and the Alleghany Highlands School Division can join ta examine the projected effects of technalagy, how schaals can better prepare students to succeed, and how business, industry, and the school division can benefit each other as the future unfolds. Specific objectives of THIS are ta: project what tomorrow holds; examine technology's projected impact on the warkplace and work force; consider technology's impact on education--an curriculum content in science and math, an delivery of instruction, and on preparation needed by students and teachers; consider how the humanities can ameliorate the depersonalizing effects possibly resulting from technological advances; explore ways in which business and industry can provide assistance to public education in meeting fiscal demands--provide alternate sites for instruction, give used equipment to schools, and provide instructors; explore ways in which the Alleghany Highlands School Division can reciprocate.

GENERAL PROGRAM DESCRIPTION:

The 1987 THIS FORUM, held on August 31 and September 1, 1987, during the pre-school staff development activities for all instructional personnel, featured Dr. Ernest Boyer, President of the Carnegie Foundation for the Advancement of Teaching; Dr. Gene Calvert, Director of Technology Transfer, the Center for Innovative Technology; and Dr. S. John Davis, Superintendent of Public Instruction, the Commonwealth of Virginia. Forty-five seminars or workshops ranged from specifics regarding certain operations at local industries to the value issues related to genetic engineering to the concerns associated with the effects of living in the information age on third world countries to considerations for the teaching of foreign language, world geography, and world cultures. Presenters ranged from a computer systems analyst to university professors to a nuclear energy engineer, to a State Board of Education member to equipment vendors to members of the Department of Education.

Regular meetings to plan for the FORUM were held from fall 1986 through spring 1987 Enthusiasm for the partnership concept and for the objectives of THIS, in particular, has been a motivating factor throughout the project. The Alleghany Highlands Education Foundation, Alleghany Regional Hospital, Clifton Forge-Waynesboro Telephone, Columbia Gas, Dominion Bank, First Virginia Bank of the Highlands, Greater Alleghany Highlands Chamber of Commerce, Hercules, Virginia Power, and Westvaco are Planning Partners together with the Alleghany Highlands Public Schools.

The 1987 THIS FORUM was funded by a $13,000 grant from the Virginia Department of Education under Title II, the Economic Security Act.

PRODUCTS: Products include closer ties among business, industry, and education and a Speakers' Bureau currently being compiled. Excellent publicity helps to build/enhance a positive image concerning schools for the general public. THIS has projected the schools and the Planning Partners most positively.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:
Teachers, community leaders, representatives from business and industry, and presenters from the Virginia Department of Education have expressed extremely positive evaluations of THIS. Financial support to continue THIS has been pledged by some Planning Partners. Quarterly meetings to continue a dialogue to address the needs of schools, business, and industry have been recommended. Closer ties among business, industry, and schools are observable.

The external evaluation is being completed at this time. Please see attached materials.

CONTACT PERSON/S: Mary Litts Burton, Director of Instruction
PHONE NUMBER (INCLUDE AREA CODE): (703) 962-3968
DISTRICT/INSTITUTION/AGENCY: Alleghany Highlands Public Schools
ADDRESS: 110 Rosedale Avenue, Covington, Virginia 24426

St... 'rginia

REGION. III

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: Breaking Through

PROGRAM CATEGORY: higher education; cooperative; competitive; elementary/secondary education; demonstration/exemplary; other - please identify

SUBJECT/S FOCUS: Mathematics; Science; Computer Learning; Foreign Languages

PRIORITY AREA: underserved/underrepresented; partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify

GRADE LEVEL/S: 7 - 12

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)

Female and Minority Students

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

The impact of the Brown Decision and the Coleman studies on educational equality, and efforts to attain equity for women in our society through the provisions of Title IX, have shaped numerous aspects of public education and perhaps, most notably, have raised our society's consciousness concerning the social, educational, and occupational hurdles facing these special populations.

Breaking Through is a reflection upon the current status of these groups of Americans, with a primary focus on their achievement in the schools and the workplaces of our society, particularly in the areas of mathematics and science. If the efforts to eliminate negative social, educational, and occupational biases against these special populations have been sufficient, then why are females and minorities not proportionately represented in high school and college math and science courses or programs of study, and why are they not employed in occupations which rely on mathematical and scientific skills?

The project seeks the answer to the above questions by examining three significant perspectives on math and science achievement by these special populations: that of successful female and minority role models, that of educators who work with these students, and that of the students and their parents.

GOALS:
1. To provide incentives for these special populations to break through the societal and psychological barriers which have slowed their entrance into mathematical and scientific fields of study.
2. To increase educators' capacities to identify and nurture math and science potential in female and minority students.
3. To help parents of female and minority students understand and accept the value of an advanced education in math and/or science and its relationship to their children's self esteem and economic success.

GENERAL PROGRAM DESCRIPTION: Three school divisions, working collaboratively with the regional public television station, will develop, produce, and telecast a three-part program addressing the topic of female and minority student participation in math and science education. The first part, "Successful Role Models," will be a 90-minute live interactive telesymposium which will feature a panel of successful role models for female and minority achievement in math and science. The second part, "Teaching for Success," will be a 60-minute live interactive telesymposium which will focus on ways in which educators can identify, seek out, and nurture the potential for math and/or science achievement that exists within female and minority populations. Both of these telesymposia will be broadcast over all Virginia PBS stations, and will be broadcast nationally via satellite. The third part will examine the home-school relationship as it impacts on expectations for female and minority students in math and science education. Selected excerpts from the previous programs as well as interview with students and parents will address ways in which social and psychological barriers affect their pursuit of education and/or careers in math or science.

PRODUCTS: The three television programs described above and a print support package which will include selected readings, sample lesson plans, and a listing of educational programs and resources.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT: The print support materials and videotapes of the three programs will be made available free of charge to requesting schools, districts, civic groups, and colleges/universities, thereby providing an ongoing resource to those interested in encouraging female and minority students to pursue math or science education and careers.

A more immediate project evaluation will be conducted via questionnaires to students, educators, and parents who view the initial telecasts.

CONTACT PERSON: Katherine M. Rodgers
PHONE NUMBER (INCLUDE AREA CODE): (804) 898-0300
DISTRICT/INSTITUTION/AGENCY: York County Public Schools
ADDRESS: 302 Dare Road
Grafton, Virginia 23692

August 14, 1987
C. Lee

STATE: Washington

REGION: X

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: Physical Science/Earth Science for Teachers of 7th, 8th, and 9th Grades

PROGRAM CATEGORY: higher education; cooperative; competitive; elementary/ secondary educaiton; demonstration/exemplary; other - please identify

SUBJECT/S FOCUS: Mathematics; Sciences; Computer Learning; Foreign Lanuguages

PRIORITY AREA: underserved/underrepresented; partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify

GRADE LEVEL/S: 7th, 8th, and 9th Grades

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

This outstanding program addresses the following indentified Washington State priorities:

1. Programs for the training of teachers currently assigned to teach science subjects in secondary schools and who do not have a major or a minor in the subject or an endorsement in a science field.

2. Programs for retraining teachers currently assigned to teach science subjects who have an academic background in science but who are less than fully qualified in the specific subjects to which they are assigned.

GOALS:

To significantly improve the knowledge and skills of those teachers who have limited training in physical science and earth sciences, but have been assigned to teach in those subject areas.

CON'T

GENERAL PROGRAM DESCRIPTION:

Science teachers of 7th, 8th, and 9th grades of all schools in Washington were invited to apply for 30 funded positions to attend a six-week renewal and up-date program during the summer of 1987 at Western Washington University. All expenses for room, board, tuition, and materials were covered by the grant. Teachers were selected on the basis of need for up-dating and subject-matter renewal in physical science and earth science. They enrolled in courses amounting to 12 credits of university gradate courses which involved 10 hours per week of physical science and 10 hours per week of earth science classes and a variable number of hours of field trips. Courses convered subjects of current interest with an emphasis on activities which can be used in their classrooms. The purpose of the program was to raise the competencies of teachers who are teaching in physical science and earth science without the appropriate background. The six-week program was conducted from June 29 to August 7, 1987.

In the selection of participants, preference was given to those teachers who are currently teaching physical science or earth science without an endorsement or baccalaureate major or minor in these fields.

Publicity about the program was distributed to all schools in Washington, public and private, teaching at the 7th, 8th, and 9th grade level asking teachers to apply. The applying teachers had to show a need for the program in terms of their training and current teaching assignment. This has to be documented with a letter of endorsement from their principal or science supervisor. In addition, applying teachers were asked to provide statements as to why they wished to attend and what they expected to accomplish by attending the program.

Special consideration was given to include teachers from "historically underrepresented and underserved groups" if their "need" was identified by their science supervisors or principals.

The program was particularly attractive to teachers in small, remote schools who found it difficult to obtain additional training or to up-date themselves during the academic year.

As physical science and earth science include many subject areas which have practical applications and which are of natural interest to students, one major goal of the program was to bring the teachers to a level of competency that would allow them to feel comfortable in teaching these subjects. For example, in the physical science portion a variety of topics, many relating to modern technology, were studied so teachers could answer questions of how-does-it-work? Topics included elements, organic compounds, radio-activity, lasers, optic fibers, digital watches, liquid crystals and silicon chips. Participants were asked to suggest other topics for inclusion. Field trips included the Intalco aluminim refinery, the Bellingham cement plant and Georgia Pacific. In the earth science portion, topics included earthquakes, volcanoes (particularly Mount St. Helens), plate tectonics, rocks/minerals, shoreline features and ocean- ography. Field trips included Coleman glacier on Mt. Baker, rock- and fossil-collecting, coastal features and a general geology trip through the Cascade Mountains to Central Washington. This trip included a visit to Windy Pass of Mount St. Helens.

CON'T

PRODUCTS:

The aim of the program was to retrain teachers in subject matter and provide them with a wealth of activities which they can use in their classrooms. Besides needing subject-matter knowledge, most of these poorly trained teachers needed to spend much time doing laboratory investigations which were appropria

ANTICIPATED LONG TERM IMPACT OF PROJECT:

When Title II funds are not available, it is hoped because of the success of the program that contracts might be negotiated with school districts, or service districts, to provide summer training programs for teachers of science.

The program gave the teachers credits in science which could be used towards a Masters degree, if they were interested in pursuing their education. Teachers accepted in the 1987 program could apply to the Graduate School for admission if they wished to apply these credits towards a degree at Western Washington University.

In order that the participants could maintian contact with each other to exchange ideas and compare notes about activities developed during the program, Dr. Christman, the project director, arranged an informal meeting of the group as part of the Washington Science Teachers Association Fall Conference in Spokane, October 31, 1987.

Program Evaluation:

The program was evaluated by a pre-test and a post-test. Individual teachers were evaluated on the basis of general performance and special projects which were aimed at developing materials that could be used in the classroom. Because we wished to develop the concept that "science is fun", the program was designed not to be "stressful" because of quizzes and assignments. Final exams were required only for individuals working for an A.

CONTACT PERSON/S: Dr. Robert Christman
PHONE NUMBER (INCLUDE AREA CODE):
DISTRICT/INSTITUTION/AGENCY: Western Washington University
ADDRESS: Geology Department
Western Washington University
Bellingham, Wa. 98225

August 14, 1987
C. Lee

STATE: Washington

REGION: X

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: Science and Math Course Bulletin for Elementary and Secondary Teachers

PROGRAM CATEGORY: Higher Education; Cooperative

SUBJECT/S FOCUS: Mathematics; Science

PRIORITY AREA: Partnership of LEAs-IHEs; Cooperative (SEA-SAHE); Retraining (of those teaching out of certification)

GRADE LEVEL/S: K-12

TARGET GROUP:

Although the project is designed to meet the inservice needs of all K-12 math and science teachers, teachers in remote and isolated districts will especially benefit from the project.

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

Washington state has 297 separate school districts, many of which are small and isolated in the eastern part of the state. Due to the need for multiple subject area assignments a number of the math and science teachers in these districts were not initially prepared to teach in the math and science subject areas, and have a real need to improve their subject area knowledge and skills. The computerized AppleLink clearinghouse listing of all inservice offerings in Eastern Washington will make available a variety of opportunities for math and science teachers to upgrade their skills.

GOALS:

To upgrade the knowledge base and instructional skills of elementary and secondary math and science teachers in eastern Washington who do not have a degree, a major, a minor, or an endorsement in math or science, or are, in some other way, less than fully qualified in their subject area.

GENERAL PROGRAM DESCRIPTION:

Proposal Summary

The proposed project will provide a clearing house for up-to-date information on the availability of courses, workshops, and inservice education opportunities for elementary and secondary science and math teachers in the four Educational Service Districts (ESD's) in eastern Washington. The information for the system will be solicited weekly from the six universities in eastern Washington and the ESD's will provide information to the system directly through an AppleLink hookup. Teachers can obtain a hard copy of the Science and Math Bulletin by contacting the center directly by telephone or mail, or through their school district's office, or through the monthly bulletins of the ESD's. Although the proposed Bulletin is limited to eastern Washington, the information contained in it could be shared through the AppleLink system with a consortium of west side universities and ESD's similar to the proposed consortium for the east side. The course information from the west side could be incorporated in the Science and Math Bulletin weekly and distributed as described above.

Priorities Addressed

Although we will solicit information on all science, mathematics, and computer science courses, workshops, and inservice educational opportunities, we will concentrate on programs for the retraining of teachers currently assigned to teach mathematics or science subjects in elementary and secondary schools who lack necessary degrees or endorsements, or are less than fully qualified. The program will respond to requests from teachers, school districts, and ESD's for up-to-date information on educational offerings at various colleges, universities, and ESD's. This information will also be available to the consortium of colleges, universities, and ESD's on an instant basis through AppleLink which will help in coordinating educational offerings and helping to determine what courses need to be offered.

Program Goal

Earth science teachers taking a series of earth science workshops supported by a Title II grant last summer were the catalyst for designing the proposed project. They complained bitterly about the difficulty in learning about which science and math offerings were available at the various institutions. These teachers agreed that there should be a central clearinghouse of up-to-the-moment information on such course offerings. Teachers in rural and small private schools were especially vocal in explaining how they were the last to find out about programs and were usually too late to be included in the courses. The computerized "Science and Math Course Bulletin" will go a long way toward rectifying this statewide problem.

PRODUCTS:

More fully-qualified math and science teachers and students who are better trained in the fields of math and science.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

The program will be monitored throughout its duration and will be evaluated at the end of four months and at it's conclusion. The program is flexible and program activities can be modified to make them more responsive to the needs of the school districts and teachers as needs are identified. An advisory board will be established to help monitor and direct the program.

CONTACT PERSON/S: Dr. Ernest Gilmour

PHONE NUMBER (INCLUDE AREA CODE): (509) 359-2201

DISTRICT/INSTITUTION/AGENCY: Eastern Washington University

ADDRESS: Acting Vice Provost for Graduate Studies and Research
220 Showalter, Mail Stop 132
Eastern Washington University
Cheney, WA 99004

A509L8.00

August 1 1987
C. Lee

STATE: West Virginia

REGION: Southeast

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: Basic Skills - Mathematics

PROGRAM CATEGORY : higher education; cooperative; competitive; elementary/secondary education; demonstration/exemplary; other - lease identify

SUBJECT/S FOCUS: Mathematics; Science; Computer Learning; Foreign Languages

PRIORITY AREA: underserved/underrepresented; partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify

GRADE LEVEL/S: 9-12

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

See Attached

GOALS:

BASIC SKILLS - MATHEMATICS

The State of West Virginia has implemented a new program at the adolescent level which gives the general student the opportunity to study algebra I and II, using different strategies, use of technology, and a slower pace for learning. With the introduction of this program, a need was identified - addressing the needs of the very low achiever who is not identified for this program and yet needs additional learning experiences in mathematics. The Basic Skills Program was designed to meet the needs of this group of students.

Under the current model, the emphasis is placed on the use of mathematics in application rather than mechanics. The topics chosen are those which most individuals will use in a real life setting. Computation is addressed as the application requires, and at the same time, the use of calculators is emphasized. The curriculum for this program is being written by a special group of mathematics educators and is being field tested through the pilot.

The identified need for remediation within this program is being addressed by using computers and managed computer program.

At the end of this school year, a report will be written which identifies the process by which such a program can be established. In addition, the developed curriculum will be prepared for distribution throughout the state. The site will serve as a model and will be open for visits upon request.

1102n

August 14, 1987
C. Lee

STATE: West Virginia

REGION: Southeast

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: Technical Assistance - Mathematics

PROGRAM CATEGORY : higher education; cooperative; competitive; (elementary/secondary education); demonstration/exemplary; other - please identify

SUBJECT/S FOCUS: (Mathematics); Science; Computer Learning; Foreign Languages

PRIORITY AREA: underserved/underrepresented; partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify

GRADE LEVEL/S: 3-12

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

See Attached

GOALS:

TECHNICAL ASSISTANCE - MATHEMATICS

The State of West Virginia has placed a special emphasis on the teaching and learning of mathematics. For this reason, a program was developed which would offer assistance to individual teachers in addressing the needs of their students.

Under this program, the mathematics software developed by the University of Northern Iowa was purchased on a state-wide contract. The material covers concepts from the introduction on place value through the concepts of algebra two.

In order that this material would reach teachers in all parts of the state, copies were placed in each of the eight regions and sets of the masters supplied in order that any educator can make copies of any or all of the material needed.

The individuals responsible for the mathematics program within the counties were trained in the use of the software, methods for distribution, identification of components, and available assistance from the Mathematics Coordinator at the State Department of Education. They were also informed that within this school year, a correlation will be done, using the new software and the state adopted learning outcomes.

1101n

August 14, 1987
C. Lee

STATE: West Virginia

REGION: Southeast

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: Remediation - Mathematics

PROGRAM CATEGORY : higher education; cooperative; competitive; elementary/secondary education; demonstration/exemplary; other - please identify

SUBJECT/S FOCUS: Mathematics; Science; Computer Learning; Foreign Languages

PRIORITY AREA: underserved/underrepresented; partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify

GRADE LEVEL/S: Middle School

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

See Attached

GOALS:

REMEDIATION - MATHEMATICS

There have been four pilot sites established to serve as exemplary programs in remediation. These sites are within the mathematics program, but will be studied and reported in such a manner that the models may serve for remediation within any curriculum area.

Each of the sites is to represent a different method of addressing student needs. The models are as follows:

Site one: Three teachers are working together within self-contained classrooms. The planning of the topics to be addressed is done as a unit. Upon completion of teaching the unit, the teachers prepare the test and administer

Site two: The teacher at this site is in a self-contained classroom and responsible for addressing individual student needs as well as teaching the required curriculum for the level of assignment.

Site three: This site involves four teachers of math assigned to the same level. The students were grouped prior to scheduling, using the results from the county testing program. The identification of student needs and the methods used to address them in an attempt to show that the four groups will be closer, with possibly the exception of the upper group, which receives horizontal enrichment rather than the so often used vertical approach.

Site four: At this location, the teacher is used in a laboratory setting and students are pulled from their other classes to receive individual help in areas of need. These students are called to the lab periodically according to need and teacher time for assistance.

At the conclusion of the year, the report will include information related to planning, preparation, assignments, identification of need, and methods used. This report will serve as a way to assist other county systems or individual schools in planning to offer such services. In addition, all sites are open for visit and review at any time.

1103n

August 14, 1987
C. Lee

STATE: Wisconsin

REGION: V

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: EESA Minority Scholarship Program

PROGRAM CATEGORY: higher education; cooperative; competitive; elementary/secondary education; demonstration/exemplary; other - please identify
Cooperative SEA/IHE Project

SUBJECT/S FOCUS: Mathematics; Science; Computer Learning; Foreign Languages

PRIORITY AREA: underserved/underrepresented; partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify

GRADE LEVEL/S: High School Seniors
College Sophomores

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)

Historically underrepresented and underserved Ethnic Minorities

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

Statewide needs assessment survey determined that minorities are grossly underrepresented in advanced courses in mathematics, science, foreign language and computer learning. It was felt that the lack of minority role models in the schools was a large part of the problem and that financial incentive was needed to encourage bright minority students with aptitudes and interests in these subject areas to enter the teaching profession.

The primary goal of this program is to increase the number of minority science, mathematics, foreign language and computer learning teachers in the state so as to provide the necessary role models for future generations of minority students.

GOALS:

GENERAL PROGRAM DESCRIPTION:

Scholarships were awarded to Black, Hispanic and American Indian students planning to enter the teaching profession in mathematics, science, computer science, and foreign language. Selection was based upon strength of aptitude and interest in these areas, demonstrated commitment to and potential for teaching, and academic standing. In all, thirty, one thousand dollar scholarships were awarded. Eleven went to high school seniors, the remainder to college students of at least sophomore status. A reception honoring the awardees was held, with certificates of scholarship presented by Dr. Herbert Grover, State Superintendent and Dr. Kenneth Shaw, President of the University of Wisconsin System.

See attached for more detailed information.

PRODUCTS:

Not applicable.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

The success of the program and its long term impact will be evident in the numbers of scholarship recipients who ultimately teach EESA subjects. It is the hope of the cooperating agencies, that eventually more and more minority students will be able to realize that there is an important place for them within these professions. That realization will be due, in part, to the fact that their teachers are living proof that such opportunities exist.

CONTACT PERSON/S: Anne Conzemius / Jim Sulton
PHONE NUMBER (INCLUDE AREA CODE): (608) 267-2443 / (608) 262-8636
DISTRICT/INSTITUTION/AGENCY: Dept. of Public Inst. / UW System
ADDRESS: 125 S. Webster St. P.O. Box 7841 Madison, WI 53707 / 1632 Van Hise University of WI Madison, WI 53706

EESA, TITLE II MINORITY SCHOLARSHIP PROGRAM
Co-Sponsored by the Department of Public Instruction and the University of Wisconsin System Administration

A. PROGRAM RATIONALE

The statewide assessment of needs conducted as a part of Wisconsin's Education for Economic Security Act (EESA) program revealed that Black, Hispanic and American Indian students are not opting to enroll in advanced level science, mathematics, computer science or foreign language classes in numbers proportionate to their relative populations. The survey results also reveal a serious shortage of these students choosing careers in science, mathematics, computer science, and foreign language education. It is believed that this condition exists in large part, because of a paucity of appropriate role models in the schools. Increased numbers of minority educators would help to demonstrate that career choices in these disciplines are available to all students.

B. MISSION

To create a condition within Wisconsin's K-12 schools, colleges and universities in which ethnic minority students will have equitable access to advanced courses and careers in science, mathematics, computer science and foreign language.

C. PROGRAM GOAL

To increase the number of Black, Hispanic and American Indian teachers of science, mathematics, computer science and foreign language in the state of Wisconsin.

D. PROGRAM OBJECTIVES

1. To identify Black, Hispanic and American Indian high school seniors and college or university students whose major areas of academic interest and aptitude are mathematics, science, computer science, or foreign language.

2. To encourage talented Black, Hispanic and American Indian students, with special aptitudes for science, mathematics, computer science or foreign language to enter the teaching profession.

3. To provide continuing incentive for Black, Hispanic and American Indian students to remain in college and to pursue teacher education as a primary course of study.

E. PROGRAM OPERATIONS

Scholarships will be awarded to Black, Hispanic and American Indian students planning to enter the teaching profession in mathematics, science, computer science or foreign language. Selection will be based upon demonstrated teaching potential. Scholarship amounts will range from $1,000 to $2,000 depending upon the number of qualified applicants and funds available. Announcement of scholarship awards will be made by March 15, 1987.

Renewal of scholarship awards will be contingent upon the recipient maintaining good academic standing and making satisfactory academic progress. Continuation of this program is contingent upon funding availability.

ELIGIBILITY FOR INITIAL SCHOLARSHIPS

A. HIGH SCHOOL SENIORS

1. Black American, Hispanic American or American Indian heritage.
2. Graduated in top 50% of class.
3. Evidence of desire and potential to succeed in college.
4. Acceptance into a college or university with a teacher preparation program. Applicants who have not been officially accepted into a college or university at the time of application will be given full consideration as a scholarship candidate, but must submit a copy of the letter of acceptance before a scholarship award can be made.
5. High interest in and aptitude for science, mathematics, computer sciences or foreign language.
6. Commitment to enroll in a teacher education program.

B. POST-SECONDARY STUDENTS

1. Black American, Hispanic American or American Indian heritage.
2. Graduated in top 50% of high school class or maintaining a college grade point average of 2.5 or better.
3. Evidence of potential and desire to remain and succeed in college.
4. Completion of at least 12 credits per semester; of sophomore status.
5. Declared major or high interest in science, mathematics, computer science or foreign language.
6. Commitment to enroll in a teacher education program.

APPLICATION PROCEDURES
(HIGH SCHOOL SENIORS)

A. Complete and submit the application form by ~~February 13~~ March 1, 1987.

B. Submit a copy of your high school transcript, including grade point average and class standing.

C. Submit a copy of an acceptance letter from the college or university you will attend. (If you have not yet received a letter of acceptance, please forward a copy at the time it is received.)

D. Contact the three individuals listed on your application form. These people will be asked about your potential to succeed in college, the qualities you possess which will contribute to your success as a teacher, and whether they would recommend you as a scholarship recipient.

E. Send all required documents to:

Director, EESA, Title II
Department of Public Instruction
125 South Webster Street
P.O. Box 7841
Madison, WI 53703-7841

ISPD 4

STATE: WYOMING

REGION: REGION VIII

TITLE II EXEMPLARY PROJECT SUMMARY

In those items where choices are to be made, circle the choice/s that apply.

TITLE: PORTABLE PLANETARIUM PLANNING/TRAINING/PILOT PROGRAM FOR ENHANCEMENT OF SCIENCE EDUCATION IN WYOMING.

PROGRAM CATEGORY : higher education; cooperative; competitive; elementary/secondary education; demonstration/exemplary; other - please identify

SUBJECT/S FOCUS: Mathematics; Science; Computer Learning; Foreign Languages

PRIORITY AREA: underserved/underrepresented; partnership (Ed-business or LEAs-IHEs); cooperative (SEA-SAHE); retraining (of those teaching out of certification); other - please identify

GRADE LEVEL/S: Grades 3 through 12

TARGET GROUP: (any other special characteristics, e.g., the disadvantaged, the gifted, vocational education)
Wyoming school districts which lack access to planetarium facilities; underserved Native American students on the Wind River Reservation; and gifted/talented student programs.

PROJECT RATIONALE: (NATIONAL/STATE PRIORITIES NEEDS ADDRESSED)

The 1987 Wyoming Department of Education Executive Summary of the PL 98-377 Title II Needs Assessment reports that about half of all school districts in all categories rated facilities/space as a problem at elementary, middle, and secondary school levels. The Needs Assessment also indicated that an extremely low number of identified minority students are enrolled in advanced science classes and are still generally underserved. This project has been designed to address both of these needs while enhancing the teaching of astronomy and the earth sciences.

GOALS: Through a qualified consultant team and staff of Wyoming science educators, this project was designed to provide pilot curricular materials and to plan for the effective use of portable planetarium systems to improve and enhance science education in Wyoming's schools, with equal emphasis on serving underserved, gifted/talented, and minority student populations; to conduct a statewide inservice training and recertification workshop for teachers and science coordinators, grades 3 through 12; to provided and schedule one

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portable planetarium system with related educational materials to Wyoming school districts for one year on a pilot basis; and to collect and assimulate teacher evaluation data and other information needed for planetarium and curricula program refinement.

GENERAL PROGRAM DESCRIPTION:

Although a working knowledge of time, place, and space on earth and in the universe was essential to Lewis and Clark, John C. Fremont, and other mountain/plains explorers, the need to comprehend these basic scientific precepts has never been greater than it is today. Since man first set foot on the moon eighteen years ago, space travel and satellite communications have become commonplace. Yet Wyoming's educational resources have lagged critically behind contemprary space age technology in providing teachers with opportunities to adequately access learning laboratories, equipment, and materials to teach the principles of astronomy and earth science. Although it is the Union's ninth largest state, Wyoming has had only four planetariums to serve forty-nine school districts. Immense distances and current economic conditions, as well as adverse winter weather, preclude two-thirds of these school districts from using existing planetarium facilities.

Through cooperative programming funded by a Title II-Public Law 98-377 regrant, the Wyoming State Museum acquired a basic Starlab portable planetarium system in 1987 and engaged contractual services of well qualified science educators in astronomy to prepare pilot curricular and teacher aid materials; to plan for effective testing and statewide use of the planetarium and its related educational materials; and to conduct a statewide inservice training workshop for elementary/middle school/secondary teachers and science coordinators.

Sixty-two teacher/coordinators from thirty-four Wyoming school districts attended the planetarium training workshop in Riverton on August 6th-7th, and received either one hour University of Wyoming graduate level credit or one hour inservice credit from the Wyoming State Department of Education. Each participant received a set of the curricular and teacher aid materials, and was also certified to use the planetarium system. The planetarium system was also scheduled at the workshop for one week's use in each of the thirty-four attending school districts during the current school year including those on the Wind River Reservation and the Wyoming Boys School at Worland. Curricular materials and the planetarium are currently being used and evaluated in these school districts.

PRODUCTS: One portable planetarium system, including northern hemisphere starfield and mythological constellation projection cylinders; pilot curricular/teacher aide materials and four audio cassettes for statewide testing during the current school year; an a/v tape containing instructions on the assembly, disassembly, and use of the planetarium; and one statewide teacher/science coordinator inservice training workshop for use of the planetarium system and related educational materials and activities.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:
Prototype curricula and other educational materials, user orientation/training schedules, programs and evaluation procedures prepared by the project team were presented to and approved by the Wyoming State Department of Education. Participant Evaluation of Inservice Program forms were also completed by all Riverton workshop participants and submitted to WSED. To date, input from workshop participants and users strongly endorse the acquisition of additional portable planetarium systems to expand the program's availability in terms of the number of user schools and scheduled time per school.

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REGION: REGION VIII

TITLE II EXEMPLARY PROJECT SUMMARY

TITLE: IDEA SHARING IN SCIENCE AND MATHEMATICS

CATEGORY: Competitive

FOCUS: Mathematics - Science

PRIORITY: Geographically isolated schools

GRADE LEVELS: Grades 6 through 12, College

TARGET GROUP: Science and faculty of small isolated schools

SUBMITTED BY: John E. Enger

PROJECT RATIONALE:

Ours is a rural area with many schools having but one or two teachers in a particular discipline. The lack of opportunity to "talk shop" within a discipline can, for many cause stagnation and lack of professional growth. This affects the traditionally underserved student as well as the traditional student, often depriving them of the motivation radiating from an involved, interested teacher.

The state needs assessment identified statewide a need for updating of science and mathematics content and teaching skills on the part of many science and mathematics teachers. Additionally, the traditionally underserved groups were found to still be underserved in these two areas.

Within the framework outlined above, this project seeks to set up a collaborative effort between local teachers in science and mathematics of grades 7 through college. The project attempts to create an interest and excitement in the areas of science and mathematics, on the part of the teachers, and indirectly on the part of the students. This is done by offering "Sharing Sessions" where teachers get together and share their ideas with their professional colleagues. The opportunity to "talk shop" provides the inspiration to professionally grow and remain active and interested in science and mathematics. A series of inexpensive demonstration and thought provoking items are provided to all participants at each session. These serve as a catalyst for additional brainstorming, plus illustrate that large budgets are not always necessary for laboratories. A third component of this effort is a newsletter describing the ideas of the sharing sessions and Brown Bags (as the demo giveaways are called), attempting to carry some of the excitement to others unable to attend the sharing session.

It is hoped that in this effort the teacher will accomplish his or her own updating as interest and techniques grow, and that the traditionally underserved student will in particular profit from the interest and enthusiasm of a "turned-on" teacher.

Originally an effort reaching but 70 teachers in north-central Wyoming and south-central Montana, the effort has grown through the Newsletter to reach 375 people in 20 states.

GOALS:

1. To foster a sharing of ideas among science and mathematics teachers, in particular, those who are lone teachers in a discipline in a particular school.

2. To enhance the self image, professional growth, and effectiveness of local science and mathematics teachers by providing a stimulating environment of professional colleagues.

3. To encourage students, in particular the underserved groups, to participate in science and mathematics opportunities.

4. To promote interaction of as many teachers as is possible with minimal expenditure.

SCIENCE AND MATHEMATICS
TEACHING CENTER

ADDRESS REPLY TO WRITER

THE UNIVERSITY OF WYOMING
UNIVERSITY STATION, BOX 3992
LARAMIE, WYOMING 82071

STATE: WYOMING

REGION: REGION VIII

TITLE II EXEMPLARY PROJECT SUMMARY

TITLE: PROJECT RENEW - A System for Educational Renewal of Wyoming Teachers in Science and Mathematics

PROGRAM CATEGORY: Higher education; competitive

SUBJECTS FOCUS: Mathematics; Science

PRIORITY AREA: Partnership (LEAs-IHEs)

GRADE LEVELS: K-12

TARGET GROUP: Teachers of Science and Mathematics

PROJECT RATIONALE:

Funds from the 1986 Project Renew grant were used to establish a conference and seminar center. The overall goal of the center was "...to establish a continuing schools-university partnership that will evolve into an effective vehicle for the improvement of science and mathematics education in Wyoming and the region." 1987's grant was used, in its entirety, to continue this center.

This concept meshes with a program currently underway in the Rocky Mountain Region which is attempting to create school-university partnerships for educational renewal. This program, led by John Goodlad, is already in place in Utah where it involves Brigham Young University and five adjacent school districts. As Goodlad points out in a discussion paper prepared for a 1985 meeting in Denver, school-university collaboration is essential for solving the problems of education and "the responsibilities of these two institutions for the quality of schooling are virtually inseparable." A school-university partnership has also been established in Wyoming and is in the early stages of development.

GOALS: See Above

GENERAL PROGRAM DESCRIPTION:

During its first two years of operation, the Science and Mathematics Teaching Center Conference and Seminar Center made great strides toward accomplishing its goal. Specifically:

1. Teams of teachers and administrators from the following school districts visited the center for professional renewal experiences: Casper, Douglas, Torrington, Lovell, Cheyenne, Laramie, Rock Springs, Wheatland, Powell and Star Valley.

2. Cooperative programs with the Gillette and Casper school districts were established for the delivery of a Masters of Science in Natural Science degree to interested teachers in the district.

3. A cooperative staff development program with Laramie County School District #1 was developed for the delivery of a research course designed to train participants to become "action researchers" with respect to the development of student thinking skills in science. This program will be continued and expanded in 1988.

4. Staff development programs for science and mathematics have been planned and delivered to Fremont County School District #1, Carbon County District #1 and Albany County District #1.

5. Two summer Institutes focused on the development of student thinking skills in science and mathematics were held. These institutes have been attended by over one hundred teachers and administrators from Wyoming, Colorado, Utah, Montana, Nebraska, New York and Kansas.

6. A network of outdoor centers was established and will be continued. A recent teleconference indicated strong support for continuation and upgrading the network.

The evaluations of the 1986 and 1987 activities were strongly positive about existing activities. When suggestions for future activities were requested, several participants in the 1987 program encouraged expansion beyond the existing emphasis on pedagogy to include opportunities for teachers to become more familiar with research activities and researchers on campus.

PRODUCTS: Local School Curriculum guides and classroom activity lists.

EVALUATION/ANTICIPATED LONG TERM IMPACT OF PROJECT:

The future program will continue existing services of the Conference and Seminar Center, and expand the program for visiting educators to include opportunities to visit research laboratories and facilities, and have the opportunity to consult with faculty engaged in research. Interested teachers will be encouraged to become actively involved with the UW research faculty in the faculty projects. A major benefit of involving teachers in 'real life' research will be the fact that their own students will be able to see them as 'scientists' as well as 'science teachers'.

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WYOMING

Exemplary Project -- TITLE II

TITLE: Science Content Courses for Elementary Teachers

PROGRAM CATEGORY: Higher education; cooperative; elementary education

SUBJECT/S FOCUS: Mathematics; Science; Computers

PRIORITY: Underserved; partnerships(Community colleges and University); cooperative programs(higher education institutions and local school districts)

GRADE LEVEL/S: K-8 primarily; all levels participated

TARGET GROUP: Those teachers interested in increasing their science content knowledge

PROJECT RATIONALE: Science education needs to begin as early as possible in the formal educational process, for elementary students are generally quite interested in science and the world about them and are willing to ask questions.

Many elementary teachers are unprepared to present science concepts and are uncomfortable with questions related to these science concepts. As a result, science education is not always included in the elementary curriculum at the most opportune time. These findings are substantiated by a Blue Ribbon Commission report on Public Education in Wyoming, a survey conducted by Westinghouse Electric Corporation and Science Service, and the report, "A Nation at Risk." The solution to the problem involves the elementary teachers themselves. All elementary teachers must have a good science background and must have the opportunity to enhance and expand that background. If the teachers have the necessary skills and background in the scientific principles, the students will receive the necessary knowledge and experiences to eliminate scientific illiteracy.

GOALS:

a. To offer elementary teachers an opportunity to update and upgrade their science content knowledge.

b. To provide elementary teachers with hands-on experiences they can carry back to the classroom.

c. To establish a procedure whereby science content courses can be readily available to elementary teachers in rural Wyoming.

d. To develop a model program to serve the science content needs of elementary teachers.

GENERAL PROGRAM DESCRIPTION:

Over the last two years a series of one credit science content courses have be coordinated and offered around the State of Wyoming. Plans begar in the fall of 1985, when Dr. Dick Birkholz, Sheridan College, Sheridan, and Wes Vining, Northwest Community College, Powell, submitted a grant for Title II funds for a coordinated effort to offer graduate level science courses at various locations around the state. The courses were designed to be offered by community colleges in cooperation with the Science and Math Teaching Center at the University of Wyoming under NASC 679, Topics in Natural Science, for one credit which could be used for recertification. The state of Wyoming has eight higher education institutions, the University of Wyoming, Laramie, which is located about 20 miles from the southern border, and seven community colleges scattered around the state.

According to information in a Wyoming Blue Ribbon Commission report on public education within the state, a survey by Westinghouse Electric Corporation and Science Service , NSTA position papers and course requirement lists for elementary education programs in Wyoming and surrounding states, most of the elementary teachers have had science methods courses. However, most have had only a few if any science content courses. To solve the science content problem the use of mini-courses was proposed.

From a preliminary survey of all community colleges and branch campuses, locations for offering science content courses were selected based on the interest of potential coordinators for each site. The locations selected were Powell (Northwest Community College), Cheyenne (Laramie County Community College), Rock Springs (Western Wyoming College), Gillette (Sheridan College branch campus) and Sheridan (Sheridan College). In Sheridan Dr. Birkholz worked directly with the Sheridan public school districts using District Title II entitlement funds to provide the same courses as the statewide project. Casper College (Casper) indicated an interest but the local school district offered their teachers science content materials within their district using local entitlement funds.

All elementary teachers within a location service area were surveyed to determine the top six potential course topics (sample survey attached). At each location five or six priority courses were developed and offered in 1986 (mostly during the summer) and the same courses plus a few new ones were offered in 1987. Because of a lack of funds no courses were offered in Rock Springs in 1987 and only two courses in Cheyenne during 1987.

About 60% of the courses in 1986 and 80% of the courses in 1987 had sufficent enrollment(14 students) to be offered . In 1986, lack of enrollment was attributed to several factors including lack of advertisement, changes of administration in some districts, lack of school district support and lack of support from some UW extension personnel. During the second year many of these problems were worked out. The courses offered received high marks regarding the instructors, usefulness of the science content offered and hands-on experience and problem solving.

As the projects moves into the third year, another site, Torrington (Eastern Wyoming College), will be added along with Rock Springs, subject to funding. Three new projects to help elementary teachers will be tried in Sheridan and Powell. In order to help the elementary teachers more directly in the classroom, a series of two-hour workshops will be offered at individual schools on various topics during the school year and a science specialist will be made available to work one-on-one with individual teachers and to act as a resource person. The third project will be to offer two courses at each location for updates for secondary teachers.

After evaluating the project for two years, a model procedure for offering science content courses for teachers has been established. It is important that teachers do not have to travel 100-400 miles to the University of Wyoming or go out-of-state to take a science course but instead use resources available at the local sites. The best ambassadors for the program are the teachers who have taken the courses. They are encouraging others to take the courses and want to take more courses themselves. With the cooperation from the University of Wyoming a procedure has been established whereby course description, syllabi and the instructor qualifications are submitted to the Science and Math Teaching Center, University of Wyoming for approval and if the course has sufficient enrollment the UW Extension Office pays the instructor's salary.

For an ongoing project one problem that needs to be worked out is the funding for coordination of the various sites and the statewide project. Currently those expenses are covered by Title II funds.

With more interest in science and math by elementary teachers we hope that students will be turned on to math and science and not turned off before they reach middle school and high school where more highly trained content area science teachers are available.

PRODUCTS:

After only two years thirty one-credit courses have been developed. The course descriptions, syllabi and handouts have been collected for sharing with instructors among schools so that others can teach the courses in different locations.

EVALUATION/ LONG-TERM IMPACT

The science content courses so far have been evaluated by the participants as being very useful for the elementary classroom teacher. It will take time to determine if students are turned on by science if the teachers have more knowledge about the topic and are more enthusiastic about science in general. The two ideas should go hand-in-hand.

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