

Dwight. D. Eisenhower
Mathematics and Science Education Program
P. L. 100-297

**SIX-YEAR REPORT:
ALABAMA HIGHER EDUCATION
PROJECTS FOR
K-12 MATHEMATICS AND SCIENCE
1989-1995**

prepared for the
Alabama Commission on Higher Education

**Alabama Commission on Higher Education
(A.C.H.E.)**

Fred D. Lee, Jr., Chairman
Florence

Charles R. Sittason, Vice Chairman
Tuscaloosa

Ben F. Beard
Troy

Jane H. McPherson
Oneonta

Bettye Fine Collins
Trussville

Charles H. Morris, III
Selma

Gaynell K. Dixon
Montgomery

Cindy B. Paler
Decatur

Fournier J. Gale, III
Birmingham

Trip Pittman
Montrose

Jane Gullatt
Phenix City

William L. Roberts, Jr.
Mobile

Henry J. Hector, Executive Director

March 1, 1996

MEMORANDUM

TO: ACHE Commissioners and other interested persons

FROM: Henry J. Hector, Executive Director

SUBJECT: ACHE-Eisenhower program, 1989-1995

The accompanying report describes the role and activities of the Alabama Commission on Higher Education (ACHE) in awarding grants authorized by the Dwight D. Eisenhower Education Act (DDEA) to Alabama institutions of higher education from 1989 through 1995.

The objective of the report is to inform ACHE commission members and other interested persons how these funds have been used, acknowledge the degree of success in achieving the program's goals, and recognize project directors and other key persons who contributed to the success of the program.

Inquiries about the content and operation of individual projects may be directed to the project directors. Information on the administrative policies and procedures for Alabama's higher education DDEA program may be obtained from ACHE's Office of Non-Resident Institutions and Interagency Programs.

ACKNOWLEDGMENTS

Achieving Eisenhower program objectives is the result of collaboration among all sectors of the state's education community. A number of agencies, their very capable staffs, the higher education institutions, and certainly the teachers who participated all contributed directly to the productive, efficient realization of the grant's goals.

In particular, ACHE expresses its appreciation to--

- Congress for the vision to authorize and appropriate funding for this program;
- The Eisenhower program staff of the U. S. Department of Education for the effective national administration of this program;
- Officials of the Alabama State Department of Education who provided the guidance and background to make these projects practical, useful, and available to all teachers in the state;
- The participating institutions of higher education and their officers who provided facilities and resources;
- The project directors and coordinators who developed and administered the projects, their presenters, and their support staffs;
- Officers of public and private corporations who provided guidance and resources in support of a number of projects;
- Local education agencies for supporting their teachers' participation, which assured the success of this program in meeting its overall objectives.

The projects, their directors, supporting institutions, and amounts of grants awarded are listed in Appendix A. We appreciate the work and accomplishments of all of them.

ACHE EISENHOWER PROGRAM STAFF

Dr. Elizabeth C. French, Director
Office of Non-Resident Institutions
and Interagency Programs

Dr. James H. Conely
Title II Staff Assistant

**Six-Year Report: Alabama Higher Education Projects
for K-12 Mathematics and Science
1989-1995**

TABLE OF CONTENTS

EXECUTIVE DIRECTOR'S MEMORANDUM	iii
ACKNOWLEDGMENTS	iv
ACHE EISENHOWER PROGRAM STAFF	v
SUMMARY OF PROGRAM ACCOMPLISHMENTS.....	1
EISENHOWER PROGRAM BACKGROUND.....	4
OBJECTIVES AND DESIGN	7
SELECTION PROCESSAND DESCRIPTION OF PROJECTS	8
1989-90: Project ASSET Phase II.....	8
1989-90: Summer Laboratory Programs for K-3 Teachers.....	8
1990-95: Category A: Science.	9
1990-95: Category B: Mathematics.	10
1989-94: Category C: Incentive.	12
1995: Category C: Interdisciplinary Science/Mathematics.....	13
1989-95: Category D: Computational Science.	14
DISSEMINATION OF PROGRAM INFORMATIONAND PUBLICATIONS.....	16

SUMMARY OF PROGRAM ACCOMPLISHMENTS

Total Amount Awarded

In the six years of the Eisenhower mathematics and science program, the Alabama Commission on Higher Education (ACHE) awarded a total of \$5,461,414 in ninety-nine individual awards ranging from \$4,846 to nearly \$150,000. These awards were made in individual grants to eighteen Alabama institutions of higher education, including five private institutions.

These funds provided professional development and inservice training for nearly 4,500 mathematics and science teachers in kindergarten through grade 12, representing all of Alabama's school districts. The number of K-12 students directly impacted from the teachers' participation in this training was reported as more than 150,000 across the state. Among the results is the publication of a number of documents produced in the projects, including lesson activity books supporting the Alabama Courses of Study in mathematics and science, thus benefitting far more teachers than just those who participated directly in these Eisenhower projects.

National Recognition of ACHE Eisenhower Program

Besides the direct benefit of these projects to the participating teachers, significant national recognition has been accorded the program. One example is the per-college computational science program: In 1991 a National Science Foundation study panel recognized this program as an exemplary program. Then based on this program in summer 1992, the Department of Energy initiated teacher training programs at three of its National Laboratories: Oak Ridge National Laboratory in Tennessee, Sandia National Laboratories in New Mexico, and Ames Laboratory at Iowa State University. This program, titled "Adventures in Supercomputing," was modeled after Alabama's "High Performance Computational Methods in Mathematics and Science" (later "Computational Science" and ultimately named "ASPIRE--Alabama Supercomputing Program to Inspire Computational Research in Education").

More recent recognition for this program includes the RCI (a research consortium of industry, academic, and government organizations with world headquarters in Minneapolis) High Performance Computing Industry Recognition Award for 1993. In 1994 the ASPIRE program was selected as an exemplary model of technology in pre-college education, with on-site visits by WESTAT Research Corporation of Rockville, Missouri. These awards demonstrate the quality of projects and continuing recognition of achievements resulting from Alabama's higher education Eisenhower program.

Another example of national recognition is a paper presented at the 1994 National Rural Education Association's national conference on Auburn University's ENLIST-Micros program, a multi-year project funded with ACHE Eisenhower grants from 1990 through 1993. The presenters were the project directors, Dr. William Baird and Dr. Daniel Swetman.

Also notable is that the Alabama higher education coordinator for the Eisenhower program was selected as a member of the national steering committee, which provided guidance to and linkage between the U. S. Department of Education and all state coordinators. This appointment occurred in the first year of the Eisenhower program and continued in all succeeding years, a further recognition of the status and significance of ACHE's role in the program nationally.

Local Recognition of ACHE Eisenhower Program

In-state acknowledgement may be even more significant since it reflects the immediate relevance of the program. The most public acknowledgement came in the form of a number of news reports on teacher training workshops generated by this program. One very recent example is a front page article with color photograph on "Integrated Science/Mathematics based on Materials Technology" directed by Ralph Zee at Auburn University in 1995 with followup in the teachers' schools in 1996. This article reported a teacher "raved about her experience in the summer course, where she learned new ways to convince her students that physics is fun" (Ref.: "Professor Shares Visions of Future," *Montgomery Advertiser*, 31 January 1996, pp. 1A, 7A).

Additional evidence of in-state recognition of this program comes from the participating teachers themselves. More than just comments they have made, their knowledge of the benefits of this program and their continuing interest in it is readily apparent by teachers who have chosen to participate in more than one ACHE Eisenhower project. This has been observed repeatedly throughout the years of this program, most recently in a followup session of the "Middle School Science Institute" at Auburn University in which several participants had already been active in two other ACHE Eisenhower projects: "Integrated Science: A Comprehensive Training Program for Middle School Science Teachers" at the University of Alabama and "Computational Science" at the University of Alabama in Huntsville (Ref.: ACHE Staff Site Review Report, "Middle School Science Institute," Auburn University, 20 January 1996).

Collaboration with the Alabama State Department of Education

Within the state, a clearly recognizable effect of the program is the collaboration and cooperation cultivated between ACHE and the Alabama State Department of Education in developing the higher education project objectives and designs. This assured relevance and practicality of the grant projects to meet Alabama's most immediate needs in mathematics and science inservice training.

Direct Benefit to Alabama K-12 Teachers

It is especially important to note that this program provided certain benefits to teachers and their classes otherwise unavailable to them. For example, one project reported that for some of underserved schools teachers the only materials available for teaching science were those distributed to the project's participating teachers in project kits. The same project reported that this was the only Eisenhower workshop in their region they had been able to attend, indicating that the grant met needs of an area of the state that would not have been met otherwise (ref: narrative report, "Science on a Shoestring," University of North Alabama, 11 November 1994). Similar results were reported by virtually all projects.

Alabama K-12 Student Achievement in Mathematics and Science

Ultimately, accomplishment of program objectives is best measured in student achievement in mathematics and science. While quantitative results can be directly reported only by the State Department of Education, ACHE project directors' annual reports indicate improvement. Even so, we recognize that the desired level of achievement is still to be attained. Goals are yet to be reached in increasing students' interest and ability in these core subjects that will reflect the level of improvement needed overall. However, indications are clear that the ACHE Eisenhower program has contributed directly toward progress and that continued support of these efforts will lead to still more progress.

EISENHOWER PROGRAM BACKGROUND

Education for Economic Security Act (EESA)

In August 1984 Congress enacted legislation to address the need to improve learning of critical core subjects. Included in an omnibus education bill (P. L. 98-377), the program was specifically designed to strengthen instruction in mathematics, science, computer learning, and foreign languages at the elementary and secondary levels, thereby strengthening the economic security of the United States. Named therefore as the Education for Economic Security Act (EESA), it was one of only certain titles of the bill that were funded. Allocations to state departments of education and higher education agencies under EESA provided financial assistance for projects to improve the skills of teachers and increase the access of students to instruction in the designated subjects. Funds were allocated to the states based on K-12 students population with 70% administered by the state education agency and 30% by the agency for higher education in each state.

From 1985 through 1989, the higher education component of this federal program, administered by the Alabama Commission on Higher Education, created teaching improvement opportunities for more than 50,000 Alabama teachers from a number of private schools and all 131 public school districts, indirectly impacting well over 600,000 students. Federal regulations restricted the use of higher education funds to inservice and retraining professional development projects for K-12 teachers in the critical needs areas of the four subjects named above. In order to enhance Alabama reforms for public schools, ACHE projects focused first on computer learning and foreign language education. Mathematics and science projects were added in 1988.

During the four years of EESA legislation, appropriations to Alabama for higher education totaled \$1,600,778. Seventy-five percent of these funds was distributed to institutions through competitive grants and twenty percent was used to support cooperative projects. The remaining five percent was used to cover costs of administration in accordance with EESA legislation.

The Dwight D. Eisenhower Education Act (DDEA)

With the expiration of EESA in 1989, Congress elected to continue the objectives of the program in new legislation but limited to the objectives of the program in new legislation but limited to mathematics and science. The result included these objectives in the Augustus F. Hawkins-Robert T. Stafford Elementary and Secondary school Improvement legislation of 1988 (P. L. 100-297), an amendment to the Elementary and Secondary Education Act of 1965, as the Dwight D. Eisenhower Mathematics and Science Education Act. Known more

commonly as the Eisenhower program, it was authorized for appropriation in fiscal year 1989-90 and for each of the four succeeding fiscal years. Continuing legislation extended the program one additional year. That legislation then expired on September 30, 1994 to be replaced by P. L. 103-382, "Improving America's Schools Act."

The purpose of this program was "to strengthen the economic competitiveness and national security of the United States by improving the skills of teachers and the quality of instruction in mathematics and science in the nation's public and private elementary and secondary schools" (ref: P. L. 100-297, Title II, Part A, Sec. 2002).

Appropriations under DDEA to ACHE totaled \$5,461,414 with \$5,188,834 of this amount (95%) awarded competitively to Alabama institutions of higher education for K-12 teacher training projects in mathematics and science. The remaining 5% (\$272,580) was used for technical assistance, project monitoring, and administrative expenses of the program as provided by law. Each year's appropriation gradually increased from \$565,204 in 1989-90 to a high of \$1,142,429 in 1993-94 as shown below:

<u>Year</u>	<u>Appropriation</u>
1989-90	\$ 565,204
1990-91	595,415
1991-92	958,106
1992-93	1,122,018
1993-94	1,142,429
<u>1994-95</u>	<u>1,077,242</u>
Total	\$5,461,414

Implementation of the Eisenhower Program

Receiving the appropriation was not automatic. Under both EESA and DDEA, each state was required to submit an application for approval by the U. S. Department of Education showing the plan for use of the funding and how the program's objectives were to be achieved. Regulations further required the plan to be prepared jointly by the state education and higher education agencies. The intent was to foster collaboration among state agencies for planning and developing the projects.

ACHE in turn determined use of its funding through Requests for Proposal (RFP) distributed throughout the state to institutions of higher education, both public and private. In all years of this program, ACHE staff and other professional evaluators made regular on-site visits to projects awarded grants to ensure that their objectives as well as those of the EESA and DDEA legislation were fulfilled. At the conclusion of each project, grant

recipients filed detailed reports with ACHE. These reports and observations provided the primary information for annual reports ACHE submitted to the U. S. Department of Education and for the conclusions of this six-year report.

Summary of Program Benefits

The benefits of this program were immediate and significant. The cooperative relationship between the State Department of Education and ACHE ensured the relevance and success of the projects. Innovative teaching methods and resources have been implemented, and in notable instances science and mathematics kit materials and aids were provided to teachers who had none in their schools. Renewed enthusiasm in teaching was fostered, and underserved students and geographic areas were reached. In general, this program has been instrumental in moving toward improved learning of these critical subjects.

The result overall has been continued improvement in Alabama's teacher preparation in mathematics and science through efficient use of the significant resource to the Alabama Commission on Higher Education made available by the Dwight D. Eisenhower Education Act.

OBJECTIVES AND DESIGN

The Eisenhower program continued the basic purpose of the previous program under the Education for Economic Security Act (EESA). ACHE also developed new ones to fulfill Eisenhower objectives. Thus, one two-phase project ("Project ASSET") was completed in the first Eisenhower year, another one ("High Performance Computational Methods," renamed later as "Computational Science") continued from its development as an EESA project through the Eisenhower program, and mathematics and science continued together for a year as a single category of projects.

At the same time, new categories were developed in the first and fifth years (Incentive and Interdisciplinary respectively) to encourage mathematics and science projects with particular applications, and in the second and subsequent Eisenhower years the single mathematics/science category was separated in order to address particular objectives for these two subject areas.

Most projects limited enrollment to twenty participating teachers to assure individual attention to participants and their personal involvement in all project activities. All of their expenses were covered by the Eisenhower program grant together with matching or in-kind support from the host institutions, private corporations, and/or other agencies such as the National Science Foundation. There was no cost to participating teachers for the workshops nor for any materials distributed to them.

All projects included hands-on activities and the most recent developments in technology. In addition, follow-up after summer workshops was a required feature of all projects. The follow-up varied according to project goals and circumstances, but in most cases it included visits by project leaders to participants in their schools to provide on-site assistance. Most projects also conducted follow-up mini-workshop sessions during the school year after a summer workshop. Other types of follow-up included regular correspondence, e-mail links, newsletter, and telephone contact to resolve questions arising from classroom application of project methods, share ideas and experiences, and distribute new information.

Administration of this program included on-site ACHE staff observation and technical assistance visits to summerr workshops and a number of follow-up sessions. Thus, consistent direction of the program and continual communication between projects and ACHE staff were assured.

SELECTION PROCESS AND DESCRIPTION OF PROJECTS

Requests for proposals were distributed to presidents of all public and private institutions of higher education in Alabama, deans of education, and directors of inservice centers. Applications were requested for projects in specific categories. The 1989-90 categories were Summer Laboratory Programs for K-3 Teachers, Incentive Grants, Project ASSET/Phase II, and High Performance Computational Methods/Phases II and III. Categories in the next four years were Elementary Science, Mathematics Manipulatives, Incentive, and Computational Science. In the sixth year the categories were Science, Mathematics, Interdisciplinary Science/Mathematics, and Computational Science.

Applications accepted in these categories were reviewed by teams of consultants. Members of the team included master teachers in Alabama public schools who were recipients of the National Science Foundation (NSF) Presidential Awards in Science. Applications were also reviewed by curriculum specialists in the State Department of Education to assure relevance of the proposals to the state courses of study and appropriateness for meeting educational needs in Alabama schools. With these evaluations, ACHE selected projects of merit for funding that would also provide balance among geographic locations in the state, inclusion of both public and private institutions of higher education, representation of all grade levels from kindergarten to grade twelve, and balance among the subjects of science and mathematics.

Thirteen projects were awarded grants for 1989-90. Well over 600 teachers from all parts of the state benefited directly as participants. By 1994, the year of the highest appropriation, twenty-three projects were funded, again representing the entire state with nearly 1,700 participants from all of the state's 131 school districts. For 1995 twenty-one projects received grants.

A brief description of the categories of projects follows:

1989-90: Project ASSET (Achieving Successful School Experiences Together) Phase II.

Implemented in the final EESA year as a multi-year demonstration project for at-risk students, Project ASSET was completed in 1990. Two curriculum guides for at-risk students in mathematics and science were developed by Alabama A&M University. The project was designed in close cooperation with the State Department of Education to assure that it would meet a recognized need.

1989-90: Summer Laboratory Programs for K-3 Teachers.

The purpose of the Summer Laboratory Programs was to improve confidence and

knowledge in mathematics/science teaching in lower elementary grades. In each laboratory, the teachers were active participants learning and applying teaching techniques with children and/or each other. The six universities conducting these programs were Alabama State University, Auburn University, Faulkner University, Livingston University, the University of Alabama, and the University of Alabama at Birmingham.

A study on the effectiveness of this approach to professional development was completed in 1991 by the University of Alabama at Birmingham. This study concluded that the--

Teachers exhibited the most positive attitudes at the end of the inservice activity; attitudes toward these subjects became less positive during the academic year.

Further, "Student's attitudes toward mathematics and science were related to grade level, with second graders having the least positive attitudes" and girls showing more positive attitudes than boys, a difference "most pronounced at the second grade."

Regarding inservice content and method--

. . . programs which contained the elements of theory, demonstration, practice, and feedback were considered to produce the teachers who appeared to be the most competent in using manipulative.

(Ref: 1990-91: *Longitudinal Assessment of Mathematics and Science Teaching Project: Grades K-3*, University of Alabama at Birmingham, p. 61.)

ACHE Requests for Proposals in succeeding years integrated these findings, stressing the importance of offering principles with practice, especially hands-on experiences. In addition, emphasis on followup increased, resulting in followup becoming a required part of all projects selected for grants.

1990-95: Category A: Science.

Four categories of projects were established for the remaining five years of this program. The first of these, Category A, was designated for science.

Category A initially focused on helping teachers of early grade levels through middle school to improve attitudes toward, and basic knowledge of, science and to help them increase their teaching confidence and ability. In the last year the range of grades was increased to K-12 to support a revised *Alabama Course of Study: Science*, which refined

objectives and organization of this course for all grade levels. This in turn provided new focus for all science teachers, and the ACHE Eisenhower program was adjusted to include projects that would help science teachers in kindergarten through grade 12 implement the revised course.

All projects in this category developed hands-on training sessions as the most effective way to teach science and improve the participating teachers' knowledge of science as well as skill in teaching it. This included integrating mathematics with science in certain projects and using current technology in teaching.

This design provided diverse approaches to teaching science, some of which extended for more than one year. Two of these were developmental projects: "Physical Sciences for Elementary Teachers (PS4ET)" was modeled on the "Chemistry for Elementary Teachers (C4ET)" at the University of Southern Mississippi, a trainer of trainers project. This project was developed at the University of Alabama at Birmingham with co-sponsorship of the Experimental Program to Stimulate Competitive Research (EPSCoR). In this project's first year, four-member teams were trained in a number of hands-on science activities and in methods to teach other teachers. In its second year, this project dispersed those teams to train teachers in all parts of the state using the facilities and administrative services of Alabama's regional inservice training centers. The project emphasized guided discovery, cooperative learning, and hands-on activities to change attitudes toward science teaching and improve science knowledge.

Another multi-year developmental project was "Systemic Change of Science Education," later named "Reforming Elementary Science Education" developed by the Institute for Science Education at the University of Alabama in Huntsville. Building on a project funded by the National Science Foundation, this one assisted schools in adopting the Hands-On Activity Science Program (HASP), which initiated and tested hands-on curriculum modules, provided classroom teachers with materials for students to perform the activities, and demonstrated an effective model for reforming elementary science instruction. The project also established a position for a fulltime education coordinator to conduct school year training, visit teachers in their classrooms following training, and assist a cadre of school resource teachers in developing their leadership and training capabilities. Beginning in Madison County, successive years of development made the project available in Athens, Morgan County, and metropolitan Birmingham.

Through calendar year 1995, twenty-three other projects in this category provided intensive, hands-on workshops in various content areas of science, projects offered across the state to provide the widest availability to as many teachers as could be accommodated.

1990-95: Category B: Mathematics.

On advice from the State Department of Education regarding Alabama achievement

scores in mathematics and the most current approaches to teaching this subject, ACHE Eisenhower grants were re-designed in late 1990 to adopt a specific focus on updating teaching techniques for mathematics in projects to be funded in 1991. At the same time, a statewide systemic initiative (SSI), later named the "Mathematics and Science Training and Education Reform (MASTER) Plan," was proposed for funding from the National Science Foundation. Coordination of the SSI with Alabama's Eisenhower program was a major objective, and this helped define the focus for Category B. Unfortunately, the state was not successful in obtaining funding for its SSI. However, the Eisenhower program objectives for mathematics continued as they had been developing, specifically, implementing manipulatives in teaching mathematics.

Initially, manipulative projects were not limited by grade level, except that grade 7 was excluded in calendar year 1992 because in that year intensive teacher training workshops were conducted by the State Department of Education for seventh grade mathematics. Later, the State Department of Education advised ACHE that special attention to algebra and geometry was needed, and projects funded were then limited to those two content areas and the grades in which they are taught.

To assure consistent workshop objectives, content, and methods compatible with the course of study, project presenters attended a training program provided by the Alabama Department of Education Staff Development Section. Each teacher participating in the workshops was provided a State Department of Education approved mathematics manipulative kit to use in the project workshops and to keep for their own teaching in their schools. The kits included graphing calculators, pattern and attribute blocks, geoboards, fraction bars, algebra tiles, and other manipulatives. Emphasis was on visualizing abstract mathematical concepts by manipulating tangible objects in order to observe and apply the principles learned.

With manipulative instruction well established, Category B was refined again in 1995 to address a continuing but increasing concern about student achievement scores in algebra and especially geometry. Working in close collaboration with the State Department of Education, ACHE maintained specific focus on algebra, geometry, and subjects leading to these courses but without requiring manipulative exclusively. Projects were designed for teachers of Algebra I, Unified Geometry, and/or Grade 7 or 8 mathematics.

1995 projects were expected to involve partnerships between colleges and local education agencies (LEAs) that combine training efforts with local efforts to increase enrollment in Algebra I and Geometry. In addition, projects were asked to propose an evaluation plan that included specific LEA performance on the Algebra I and/or Geometry End-of-Course Assessments as one of the measures of project effectiveness. Seven grants were awarded to six institutions across the state to meet this objective, resulting in a total of thirty-two projects awarded grants for professional development in teaching mathematics during the period of this report.

In all years, the mathematics category was designed to (1) provide long-term, intensive training that would have statewide impact, (2) be in accord with the statewide systemic initiative as it had been developed, and (3) directly support the *Alabama Course of Study: Mathematics*.

1989-94: Category C: Incentive.

This category of mathematics/science grants was established in the first Eisenhower program year to foster projects based on grants from other sources, such as the National Science Foundation and private industry. The purpose was to leverage funding from those other sources and apply them to projects for K-12 teachers, thus providing them access to newly acquired knowledge.

The range of project content was not limited to any grade or grade levels within K-12, nor was it limited to particular subjects within science and mathematics. Thus, each project developed its own design. Some involved extensive field study, others concentrated on laboratory work, and still others developed teaching strategies with workshop demonstrations, lesson planning, practice teaching, and training trainers. In addition, interdisciplinary connections were also integral in a number of projects even before the redesignation of Category C as "Interdisciplinary." Examples of these designs follow:

Field Study: "Discover Alabama" (Troy State University). Offered in all but the last year of this report, "Discover Alabama" involved teachers in hands-on mathematics/science experiences at various museums and other places of scientific interest across the state, including the Alabama Science Center, Space Camp, Bon Secour Wildlife Refuge, archaeological digs, and numerous others. Participants wrote activity booklets to accompany the Alabama Courses of Study for mathematics and science based on presentations by technical experts, teacher consultants, and their own experiences in these sites. Following the summer field study they shared the results of their study in at least two in-service programs during the school year.

Laboratory: "A Microscale Approach to Teaching High School Chemistry" (University of Alabama at Birmingham). Also offered in successive years through 1994, this project trained teachers in microscale experiments, projection materials, techniques, and activities. The microscale materials were developed in the National Science Foundation Teacher Enhancement program at the University of Alabama at Birmingham and the Institute for Chemical Education at the University of California at Berkeley. Each teacher received a kit of materials for a year's worth of classroom laboratory activities. A laboratory resource manual was prepared. Participants gave practice teaching lessons and evaluated the teachers-designed laboratory activity units for use in their classrooms.

Workshop Demonstrations: "Developing Teacher Trainers for Technology in the Mathematics Classroom" (University of South Alabama). In a "trainer of trainers"

project, participants reviewed the curriculum and teaching standards of the National Council of Teachers of Mathematics, the most current curriculum materials, and new emerging technology. Moreover, they improved their computer skills, investigated successful programs, improve their graphing calculator skills, and gained confidence in their ability to advise on purchase of software and hardware. They also collaborated on adapting current curriculum materials to meet the objectives of the Alabama Course of Study for mathematics.

Interdisciplinary Connections: "Integrating Earth Science into the Social Studies Curriculum" (Jacksonville State University). This institute used the expertise of the Alabama Geographic Alliance to organize and conduct the program. Besides lectures, it consisted on indoor and outdoor labs covering earth science concepts, integration of these concepts with the social studies curriculum and hands-on development of science process skills. The project was based on physical geography concepts and skills featured in the National Geography Standards.

Other Incentive Approaches. Additional projects in this category pursued a variety of other objectives and methods for achieving them, three of which are mentioned here as illustrations of the range or purposes and types of implementation.

1. "ENLIST-Micros," conducted by Auburn University was a trainer-of-trainers model program using microcomputers. This project created a network of 75 science teachers in central and east Alabama schools, a program based on the Colorado Biological Sciences Curriculum Study underwritten by the National Science Foundation.

2. Auburn University at Montgomery conducted two-day workshops in Huntsville, Montgomery, and Birmingham for a total of 600 teachers on "Teaching Mathematics/Science to Secondary Students with Learning Disabilities." Support for this project included the Program for Exceptional Children and Youth, the Division of Rehabilitation and Crippled Children Service, and the Veterans Administration.

3. Another unique incentive category project was the University of Alabama's "Alabama Natural Resource Science Education Institute," the purpose of which was to develop critical awareness of natural resource science concepts based on results of a project sponsored by the U. S. Department of Agriculture.

1995: Category C: Interdisciplinary Science/Mathematics.

What had been "Category C: Incentive" from 1989-1994 became "Category C: Interdisciplinary" in 1995 because achieving the incentive objectives had become assured and because other concerns were now identified. In part, this category was redesignated to anticipate the revised legislation that would expand the program to all core subjects. At the same time, the redesignated category addressed another concern included in the ACHE application for Eisenhower funding, namely teacher training in interdisciplinary connections

between science and mathematics and between these subjects and others. In all years, therefore, Category C was one which addressed particular aspects of teacher training in science and mathematics not targeted in other categories.

Seven projects were selected for funding, most of which focused on connections between science and mathematics. The most obvious of these was "Connecting Math and Science" conducted by the University of South Alabama which offered training in the latest technology and curriculum materials for science and math teachers.

However, this category was not limited to just science and mathematics connections. It also included "Integrating Art and Music into a Hands-On Science Program" offered by Spring Hill College. This project reinforced science and math learning by its application to the fine arts, thus fulfilling the objectives of the current Eisenhower Program while anticipating the revised legislation that would include all core subjects in some measure.

1989-95: Category D: Computational Science.

Computational Science was first awarded ACHE Eisenhower grants under the predecessor Title II program, the Education for Economic Security Act (EESA). The project was then called "Secondary Teaching Training in Supercomputing," a multi-year long-range approach for supercomputer education. It was established in 1989 with resources of the Alabama Supercomputer Network, cooperative assistance of Boeing Computer Services Corporation, and institutions of higher education in Alabama. Alabama A&M served as fiscal agent in its inaugural year. In succeeding years the fiscal agent was the University of Alabama in Huntsville.

Under the Eisenhower program, computational science continued to evolve as a major and nationally recognized project in advanced supercomputing for teachers. Its designers observed that computational science, as an emerging field, is of key importance to the United States in maintaining world leadership in high technology. The project developed from laboratories and workshops to a network providing access to supercomputer resources for teachers across the state. As it continued to develop, in 1994 the project was renamed the "Alabama Supercomputing Program to Inspire computational Research in Education (ASPIRE)" to reflect the project's objective and service as well as its subject.

In all years of this program the objective was to train high school teachers in computational science and high performance computing. The purpose was to provide hands-on experience in engineering and scientific research that could not be accomplished without access to a supercomputer. Because of its scale, only one grant was awarded each year to develop and operate this as a statewide inservice training program. Principals and superintendents of the participating schools were required to provide the requisite equipment and ongoing support to access the Alabama Supercomputer Network. Participating teachers were committed to supervising student projects for state and national competitions.

The development and introduction of the Alabama Precollege Supercomputing Program (APSP) into 113 Alabama secondary and middle schools allowed Alabama to emerge as a national leader in the transfer of this knowledge at the pre-college level. Six schools from Mobile to Huntsville were identified as Regional Training Centers and have 56KB connections to the Alabama Supercomputer Network (ASN). These centers provided teachers with training, resources, and local contacts. (See Appendix C for a list and diagram of the sites connecting to ASN). The ASN connections were funded by the different agencies supporting the program. All other schools were provided free dial-up access via three toll free 800 numbers donated by DeltaCom. Approximately 330 teachers had accounts through APSP.

The project provided materials for teachers to implement computational science in their schools as well as workshops, technical support, development of new materials, and coordination of the Alabama Supercomputing EXPO. In addition to ACHE Eisenhower support, funding was provided by the Department of Energy, NASA Marshall Space Flight Center, the National Science Foundation, and the Alabama Supercomputer Authority.

DISSEMINATION OF PROGRAM INFORMATION AND PUBLICATIONS

The most visible and widest dissemination of results occurred in publications produced by or in cooperation with the projects. These included a *Longitudinal Assessment of Mathematics and Science Teaching Project: Grades K-3* prepared by Gypsy Abbott at the University of Alabama at Birmingham; two documents for Project ASSET, *Alternative Instructional Strategies in Mathematics* and *Alternative Instructional Strategies in Science* distributed to the 131 school systems throughout the state by the State Department of Education; proceedings of regional conferences on *Teaching Math and Science to Secondary Students with Learning Disabilities* written by the Center for Rehabilitation Resources at Auburn University at Montgomery; *Instructional Activities for Alabama Mathematics Manipulative Kit: K-6* edited by Evelyn Van Devender at the University of South Alabama; and *Alabama Supercomputing Program: Fortran and Parallel Processing* at the University of Alabama in Huntsville.

In addition to these publications, each year saw the development and distribution of a number of lesson activity booklets prepared by workshop participants. These are listed by source and by title in Appendix D. Thus, the ultimate impact of these workshops extended well beyond the limits of the workshops themselves and their participants.

While printed products are the most tangible, most easily acknowledged distribution of program recognition, other forms occurred in ACHE staff presentations to state and national conferences on the Eisenhower program. Among them were sessions conducted in annual meetings of the Alabama Science Teachers Association and Alabama Council of Teachers of Mathematics from 1993 through 1995. In these sessions the purposes were (1) to inform teachers attending the meetings of the inservice professional development opportunities available through the ACHE Eisenhower program and (2) to provide information and guidance for college representatives interested in applying for an ACHE Eisenhower grant.

A representative national meeting in which information was disseminated on the ACHE Eisenhower program was the 1994 annual conference of Fellows of the American Council on Education. Presentation to these distinguished administrators of higher education nationally served both to inform others about the Alabama program and to provide information on application procedures to those attending from Alabama.

In all, dissemination of information on and publications produced by the ACHE Eisenhower program was a continuing activity to assure the widest possible knowledge of the program and benefits of its results.

APPENDIX A:
EISENHOWER PROGRAM
HIGHER EDUCATION PROJECTS
IN ALABAMA
1989-1995

**EISENHOWER PROGRAM
HIGHER EDUCATION PROJECTS IN ALABAMA
1989-1995**

I. 1989-90

Summer Laboratory Programs for K-3 Teachers

Alabama State University:

Project: "Laboratory Instructions for the Integration of Mathematics and Science"

Director: Dr. Evelyn White

Grant: \$16,000.00

Auburn University:

Project: "Mathematics/Science Summer Laboratory Program"

Director: Dr. Peter Williamson

Grant: \$19,872.00

Faulkner University:

Project: "Science, the Forgotten Subject in the Elementary School"

Director: Dr. Donna Bentley

Grant: \$12,000.00

Livingston University (now University of West Alabama):

Project: "Math/Science Program for Teachers K-3"

Director: Dr. Ann Morgan Jones

Grant: \$4,000.00

University of Alabama:

Project: "Doing Science in Grades K-3"

Director: Dr. Barbara Rountree

Grant: \$16,000.00

University of Alabama at Birmingham:

Project: "Mathematics/Science Summer Laboratory Program"

Director: Dr. Virginia Horns-Marsh

Grant: \$32,000.00

Incentive Grants

Auburn University:

Project: "Central Alabama ENLIST-Micros Center for Enhancing Science Teachers' Uses of Microcomputers"
Director: Dr. William Baird
Grant: \$29,511.00

Auburn University at Montgomery:

Project: "ACHE Regional Symposiums on Teaching Secondary Math and Science to Students with Learning Disabilities"
Director: Dr. Letta Gorman
Grant: \$90,546.50

Troy State University:

Project: "Discover Alabama: Getting a Hand on Math and Science"
Director: Dr. Betsy Dismukes
Grant: "33,503.41

University of Alabama:

Project: "Alabama Natural Resource Science Education Institute"
Directors: Dr. Dennis Sunal; Dr. Cynthia Sunal
Grant: \$21,882.00

University of Alabama at Birmingham:

Project: "A Microscale Approach to Teaching High School Chemistry"
Director: Dr. Larry K. Krannich
Grant: \$8,618.40

Project Asset/ Phase II

Alabama A&M University

Director: "Dr. James H. Hicks
Grant: \$125,000.00

High Performance Computational Methods/ Phases II and III

University of Alabama in Huntsville

Director: Dr. John Ziebarth
Grant: \$149,911.00

II. 1990-91

Category A: Elementary Science

Alabama State University:

Project: "Laboratory Instructions for the Development of a
Science/Mathematics Curriculum Guide for Grades K-3"

Director: Dr. Evelyn White

Grant: \$24,000.00

University of Alabama:

Project: "Doing Science in Grades K-3"

Director: Dr. Barbara Rountree

Grant: "\$18,413.00

University of Alabama in Huntsville:

Project: "UAH Science Education Workshop"

Director: Dr. John C. Wright

Grant: \$28,203.00

University of North Alabama:

Project: "Field Science for Elementary Teachers"

Director: Dr. Terry Logue

Grant: \$2,436.57

University of South Alabama:

Project: "Implementing Technology-Assisted Science Instruction"

Director: Dr. Edward Shaw, Jr.

Grant: \$43,563.05

Category B: Mathematics Manipulatives

Livingston University (now University of West Alabama):

Grade level: K-3

Director: Dr. Ann Morgan Jones

Grant: \$16,000.00

Troy State University:
Grade level: Secondary
Director: Dr. Janelle Elrod
Grant: \$37,932.17

University of Alabama:
Grade level: K-3
Director: Dr. C. J. Daane
Grant: \$21,160.00

University of Alabama:
Grade level: 5-8
Director: Dr. John Owens
Grant: \$24,067.00

University of Alabama:
Grade level: 9-12
Director: Dr. John Owens
Grant: \$24,847.00

University of Alabama at Birmingham:
Grade level: K-4
Director: Dr. Virginia Horns
Grant: \$126,621.00

University of North Alabama:
Grade level: 4-8
Directors: Dr. Earl Gardner; Dr. John Locker
Grant: \$49,997.00

Category C: Incentive

Auburn University:

Project: "Central Alabama ENLIST-Micros Network: Enhancing Science and
Mathematics Teaching with Microcomputers"

Director: Dr. William Baird

Grant: \$25,844.00

Troy State University:

Project: "Discover Alabama II"

Director: Dr. Betsy Dismukes

Grant: \$38,684.56

University of Alabama at Birmingham:

Project: "A Microscale Approach to Teaching High School Chemistry"

Directors: Dr. Larry K. Krannich; Dr. Lee Summerlin

Grant: \$12,685.00

University of South Alabama:

Elementary Project: "Using Videodisc Technology to Enhance the Teaching of
Mathematics for Beginning Teachers"

Director: Dr. Phil Feldman

Grant: \$76,680.00

Category D: Computational Science

University of Alabama in Huntsville

Director: Dr. John Ziebarth

Grant: \$50,000.00

III. 1991-92

Category A: Elementary Science

Alabama State University:

Project: Training Elementary Teachers to Teach Science More Effectively"
Director: Dr. Evelyn M. White
Grant: \$36,000.00

University of Alabama:
Project: "Enhancing the Teaching and Learning of Science through
Technology (ENLIST-Micros)"
Director: Dr. Jill Shearin
Grant: \$7,560.00

University of Alabama:
Project: Comprehensive Training for the Teaching of Seventh and Eighth
Grade Integrated Science"
Director: Dr. William L. Rainey
Grant: \$32,400.00

University of Alabama:
Project: "Doing Science in Grades K-3"
Director: Dr. Barbara Rountree
Grant: \$30,000.00

University of Alabama at Birmingham:
Project: "Physical Sciences for Elementary Teachers (PS4ET)"
Director: Dr. Robert Sol Davis
Grant: \$38,685.60

University of Alabama in Huntsville:
Project: "Systemic Change Model for Science Education"
Director: Dr. John C. Wright
Grant: \$50,000.00

University of North Alabama:
Project: "Field Science for Teachers"
Director: Dr. Terry Logue
Grant: \$4,846.00

Category B: Mathematics Manipulative

Athens State College
Grade level: Elementary
Director: Dr. Virgiana Hamm
Grant: \$25,665.00

Livingston University (now University of West Alabama)
Grade level: K-3
Director: Dr. Ann Morgan Jones
Grant: \$19,123.00

Troy State University:
Grade level: Secondary
Director: Dr. Janelle A. Elrod
Grant: \$52,237.00

University of Alabama:
Grade level: K-3
Director: Dr. C. J. Daane
Grant: \$18,505.00

University of Alabama:
Grade level: 4-6
Director: Dr. C. J. Daane
Grant: \$30,335.00

University of Alabama at Birmingham:
Grade level: 4-6
Director: Dr. Charles Calhoun
Grant: \$62,180.00

University of North Alabama:
Grade level: K-3
Director: Dr. Earl Gardner
Grant: \$25,847.00

University of North Alabama:
Grade level: 4-6
Director: Dr. Earl Gardner
Grant: \$35,960.00

University of North Alabama:
Grade level: 8-12

Director: Dr. Earl Gardner
Grant: \$47,072.00

University of South Alabama:
Grade level: K-12
Director: Dr. Evelyn Van Devender
Grant: \$95,977.00

Category C: Incentive

Auburn University:
Project: "ENLIST-Micros Science and Math Teacher Network"
Director: Dr. William Baird
Grant: \$37,025.00

Jacksonville State University:
Project: "Science Workshop for Fourth Grade Teachers: Using Cooperative
Education for Hands-On Experiences"

Director: Dr. Mary Jean W. Paxton
Grant: "\$12,000.00

Jacksonville State University:
Project: "Science Workshop for Fifth Grade Teachers: Using Cooperative
Education for Hands-On Experiences"
Director: Dr. Mary Jean W. Paxton
Grant: \$12,000.00

Troy State University:
Project: "Discover Alabama III"
Director: Dr. Betsy Dismukes
Grant: \$48,187.00

University of Alabama:
Project: "Alabama Science Teaching and Learning Center's Professional
Development Project (Grades 4-8)"
Director: Dr. Judith A. Burry
Grant: \$93,125.00

University of Alabama at Birmingham:

Project: "A Microscale Approach to Teaching High School Chemistry"

Directors: Dr. Larry K. Krannich; Dr. Lee R. Summerlin

Grant: \$14,180.00

Category D: Computational Science

University of Alabama in Huntsville

Director: Dr John Ziebarth

Grant: \$100,000.00

IV. 1992-93

Category A: Elementary/Middle Grade Science

Alabama State University:

Project: "A Comprehensive Approach to Training Elementary Teachers to Teach Science More Effectively"

Director: Dr. Evelyn White

Grant: \$36,000.00

Birmingham Southern College:

Project: "Teaching Science to Elementary Students Using Clusters"

Director: H. Wayne Shew

Grant: \$17,900.00

Livingston University (now University of West Alabama)

Project: "Hands-On Science for Teachers, Grades 3-5"

Director: Dr. Ann Morgan Jones

Grant: \$20,259.00

University of Alabama:

Project: "Comprehensive Training for the Teaching of Middle School Integrated Science"

Director: Dr. William L. Rainey

Grant: \$52,920.00

University of Alabama at Birmingham:

Project: "Physical Science for Elementary Teachers (PS4ET)"

Director: Dr. Robert Sol Davis
Grant: \$80,160.00

University of Alabama in Huntsville:
Project: "Systemic Change of Science Education"
Director: Dr. John C. Wright
Grant: \$84,833.00

Category B: Mathematics Manipulative (high school algebra, geometry)

Athens State College (one project each in algebra and geometry):
Director: Dr. Virgiana Hamm
Grants: 2 @ \$45,760.00 = \$91,520.00

Auburn University at Montgomery:
Director: Dr. Morgan Simpson
Grant: \$53,730.00

Livingston University (now University of West Alabama):
Director: Dr. Louise Boyd
Grant: \$40,524.00

Talladega College:
Director: Dr. Thomas Lawrence
Grant: \$82,413.00

Troy State University:
Director: Dr. Janelle Elrod
Grant: \$52,752.00

University of Alabama at Birmingham:
Director: Dr. Tommy Smith
Grant: \$35,343.00

University of North Alabama:
Director: Dr. Earl Gardner
Grant: \$53,406.00

University of South Alabama:
Director: Dr. Evelyn Van Devender
Grant: \$73,506.00

Category C: Incentive

Auburn University:

Project: "ENLIST-Micros Science and Math Network"
Director: Dr. Daniel Swetman
Grant: \$28,848.00

Jacksonville State University:

Project: "Environmental Science Education: from Awareness to Action"
Directors: Dr. Margaret Bogan; Dr. Stanley Easton
Grant: \$21,988.00

Troy State University:

Project: "Discover Alabama IV"
Director: Dr. Betsy Dismukes
Grant: \$44,807.00

Troy State University:

Project: "Project for Interdisciplinary Instruction in Mathematics and Science
(PIIMS)"
Director: Dr. Betsy Dismukes
Grant: \$52,895.00

University of Alabama at Birmingham:

Project: "A Microscale Approach to Teaching High School Chemistry"
Directors: Dr. Larry K. Krannich; Dr. Lee R. Summerlin
Grant: \$26,606.00

University of North Alabama:

Project: "AC2E Summer Institute: for Teachers of Per-Algebra, Algebra I,
and Algebra II"
Directors: Dr. Mary Lou Meadows; Dr. Earl Gardner
Grant: \$22,799.00

Category D: Computational Science

University of Alabama in Huntsville:

Director: Dr. John Ziebarth
Grant: \$112,500.00

V. 1993-94

Category A: Elementary Science

Birmingham-Southern College:

Project: "Using Connections to Teach Science to Elementary Students"

Director: Dr. H. Wayne Shew

Grant: \$19,210.00

Jacksonville State University:

Project: "Environmental Science Education from Awareness to Action:
Integrating Science and Technology in Society"

Directors: Dr. Margaret B. Bogan; Dr. Stanley E. Easton

Grant: \$14,000.00

Livingston University (now University of West Alabama)

Project: "Hands-On Science for Choctaw County Teachers"

Director: Dr. Ann Morgan Jones

Grant: \$23,887.00

University of Alabama:

Project: "Comprehensive Training for Middle School Science Teachers
Participating in Integrated Science"

Director: Dr. William L. Rainey

Grant: \$113,400.00

University of Alabama in Huntsville:

Project: "Reforming Elementary Science Education"

Director: Dr. John C. Wright

Grant: \$96,256.00

University of North Alabama:

Project: "Science on a Shoestring Workshop for Elementary Teachers"

Director: Dr. Terry Logue

Grant: \$5,926.00

Category B: Mathematics Manipulative (high school algebra, geometry)

Athens State College (one project each in algebra and geometry):

Director: Dr. Virgiana Hamm

Grant: 2 @ \$45,760.00 = \$91,250.00

Auburn University at Montgomery
Director: Dr. Morgan Simpson
Grant: \$60,400.00

Talladega College
Director: Dr. Thomas Y. Lawrence
Grant: \$82,413.00

Troy State University
Director: Dr. Diane Porter
Grant: \$49,702.00

University of Alabama at Birmingham:
Director: Dr. Tommy Smith
Grant: \$37,444.00

University of North Alabama
Directors: Dr. Earl Gardner; Dr. Mary Lou Meadows
Grant: \$53,406.00

University of South Alabama
Director: Dr. Evelyn Van Devender
Grant: \$69,512.00

Category C: Incentive

Jacksonville State University:
Project: "Integrating Earth Science into the Social Studies Curriculum"
Director: Dr. Howard G. Johnson
Grant: \$19,217.00

Troy State University:
Project: "Discover Alabama - V"
Director: Dr. Betsy Dismukes
Grant: \$47,587.00

Troy State University:

Project: "Project for Interdisciplinary Instruction in Mathematics and Science - 2 (PIIMS-2)"
Director: Dr. Betsy Dismukes
Grant: \$56,000.00

University of Alabama:

Project: "Alabama Natural Resource Science Institute"
Directors: Dr. Dennis Sunal; Dr. Cynthia Sunal
Grant: \$34,978.00

University of Alabama at Birmingham:

Project: "Using the Chemistry Laboratory to Develop Math Skills"
Directors: Dr. Lee R. Summerlin; Dr. Larry K. Krannich
Grant: \$37,373.00

University of North Alabama:

Project: C2PC and C3E Summer Institutes"
Directors: Dr. Mary Lou Meadows; Dr. Earl Gardner
Grant: \$11,923.00

University of South Alabama:

Project: Developing Teacher Trainers for Technology in the Mathematics Classroom"
Director: Dr. John LeDuc
Grant: \$57,713.00

Category D: Computational Science

University of Alabama in Huntsville

Directors: Dr. John Ziebarth; Dr. Carl Davis
Grant: \$117,875.00

VI. 1994-95

Category A: Science

Athens State College:

Project: "The Chemistry Project"

Director: Dr. Virgiana Hamm

Grant: \$43,200.00

Auburn University:

Project: "Middle School Science Teachers Institute"

Director: Dr. Robert E. Rowsey

Grant: \$31,590.00

University of Mobile:

Project: "Habitats and Their Environment"

Director: Dr. M. Faye Neathery

Grant: \$13,608.00

University of Alabama:

Project: "Implementing the New *Alabama Course of Study: Science: A*
Comprehensive Training Program for Middle School Science

Teachers"

Director: Dr. William L. Rainey

Grant: \$100,000

University of Alabama:

Project: "Training of Trainers in Elementary Hands-On Science Teaching"

Director: Dr. Jill Shearin

Grant: \$40,000.00

University of Alabama at Birmingham:

Project: "Birmingham Region Hands-On Activities Science Program"

Director: Dr. Stephen Underwood

Grant: \$99,965.00

Category B: Mathematics

Auburn University at Montgomery:

Project: "Workshop for Algebra and Geometry Teachers"

Director: Dr. Morgan Simpson

Grant: \$50,000.00

Talladega College:

Project: "Math Learning Packets and Technology Program, Grades 7-12"

Director: Dr. Thomas Y. Lawrence

Grant: \$87,804.00

Troy State University:

Project: "Improving Algebra Performance (IAP)"

Director: Dr. Diane Porter

Grant: "36,420.00

Troy State University:

Project: "Improving Performance in Geometry (IPG)"

Director: Dr. Diane Porter

Grant: \$26,278.00

University of Alabama at Birmingham:

Project: "Strengthening Algebra and Geometry Achievement (SAGA)"

Director: Dr. Tommy Smith

Grant: \$33,831.00

University of North Alabama:

Project: "Algebra and Geometry Framework Institute with Manipulative"

Directors: Dr. Earl Gardner; Dr. Mary Lou Meadows

Grant: \$47,466.00

University of South Alabama: "Linking Problem Solving, Technology, and
Manipulatives to Improve Understanding in Middle School
Mathematics"

Director: Dr. Evelyn Van Devender

Grant: \$50,038.00

Category C: Interdisciplinary Science/Mathematics

Auburn University:

Project: "Integrated Science/Mathematics Enhancement Based on Materials
Technology"
Director: Dr. Ralph Zee
Grant: \$40,000.00

Jacksonville State University:

Project: "Interdisciplinary Environmental Science Education: Fostering Local
Action, Developing a Global Perspective"
Directors: Dr. Margaret Bogan; Dr. Stanley Easton
Grant: \$35,000.00

Spring Hill College:

Project: "Integrating Art and Music into a Hands-On Science program"
Director: Dr. Lois Silvernail
Grant: \$39,781.00

Troy State University:

Project: "Project for Interdisciplinary Instruction in Mathematics and
Science - 3 (PIIMS-3)"
Directors: Dr. Betsy Dismukes; Mr. Jimmy Holley
Grant: \$25,000.00

University of Alabama at Birmingham:

Project: "The Science Laboratory as an Interdisciplinary Site for Integrating
Math, Science, and Technology Skills"
Directors: Dr. Lee Meadows; Dr. Larry K. Krannich
Grant: \$45,000.00

University of North Alabama:

Project: "Developmental Approaches in Science, Health, and Technology
(DASH)"
Directors: Dr. Mary Lou Meadows; Dr. Earl Gardner
Grant: \$55,000.00

University of South Alabama:

Project: "Connecting Mathematics and Science"
Director: Dr. John LeDuc
Grant: \$37,020.00

Eisenhower Higher Education Projects
1989-1995
Page 19

Category D: Computational Science

University of Alabama in Huntsville:
Director: Dr. Carl Davis
Grant: \$149,919.00

APPENDIX B:

ALABAMA SUPERCOMPUTER NETWORK:

SITES FOR PRECOLLEGE SUPERCOMPUTING

APPENDIX C:
EVALUATORS OF PROJECT PROPOSALS

EVALUATORS OF PROJECT PROPOSALS

<u>Evaluator</u>	<u>Institution</u>	<u>Years of Evaluation</u>
Charla Adkison	Enterprise Jr. College	1988-89; 1991-92
Suzanne Alexander	Central High School, Tuscaloosa	1989-90
Desiree Bishop	Baker high School, Mobile	1992-93
Patricia Burchfield	Murphy High School, Mobile	1991-92; 1992-93; 1993-94; 1994-95
Timothy Burgess	Murphy High School, Mobile	1993-94; 1994-95
Patricia Cassidy	Thurgood Marshall School Evergreen	1994-95
Cathryn Coleman	Semmes Elementary School	1994-95
Dorothy Dale	Huntsville High School	1988-89
Shirley Dean	Mountainview Elementary School Sylacauga	1991-92; 1992-93; 1993-94
Carolyn Eck	Bradshaw High School, Florence	1994-95
Clyde Green	Department of Education, State of South Carolina	1988-89
Peggy Harrel	Shades Valley High School, Birmingham	1991-92
Robert Hayes	Tallassee High School	1992-93; 1993-94; 1994-95

<u>Evaluator</u>	<u>Institution</u>	<u>Years of Evaluation</u>
Mara Jambor	Cahaba Heights Community School, Birmingham	1994-95
Linda Joseph	Hall-Kent Elementary School, Homewood	1991-92; 1993-94
Terry Kirchler	J. F. Drake Middle School Auburn	1992-93; 1994-95
Edith Merritt	Verner Elementary School Tuscaloosa	1993-94
Jane Nall	University of Mobile	1988-89; 1989-90; 1991-92; 1992-93; 1993-94; 1994-95
Mary Nell	Bradshaw High School, Florence	1989-89
Pamela Sloan	Tuscaloosa City Schools	1991-92
Linda Winters	Ridgecrest Elementary School, Huntsville	1992-93; 1993-94
Nancy Bell Vawter	Vawter and Associates	1988-89; 1989-90; 1990-91

APPENDIX D:

BIBLIOGRAPHY OF PRINT MATERIALS

PRODUCED BY OR IN COORDINATION WITH

ACHE TITLE II AND DDEA PROJECTS

**BIBLIOGRAPHY OF PRINT MATERIALS
PRODUCED BY OR IN COORDINATION WITH
ACHE TITLE II AND DDEA PROJECTS**

I. Listing by Author/Source

A. Title II: Education for Economic Security Act {PL 98-377}

Four-Year Report: Alabama Higher Education Projects for K-12 Computer Learning, Foreign Languages, Mathematics, and Science 1985-1989. 1989. Montgomery: Alabama Commission on Higher Education.

Abbott, Gypsy. 1986. *Alabama Computer Competency Program.* Evaluation Report. Birmingham: University of Alabama at Birmingham.

Center for Rehabilitation Resources. 1988. *Strategies for Teaching and Testing Students with Learning Differences in Math and Science Grades_K-12.* Four regional symposia: Montgomery, Huntsville, Mobile, Birmingham. Montgomery: Auburn University at Montgomery.

Institute for Social Science Research. 1989. *Undergraduate Outreach Institutes: Innovative Delivery of University Foreign Language Training for High School Teacher Certification in Alabama. A Cost-Effectiveness Analysis.* Tuscaloosa: The University of Alabama.

Lomangino, Heide R. 1989. *Resources Directory for Foreign Language Teachers in Alabama.* Revised Edition. Mobile: University of South Alabama.

Northwest Alabama Regional Inservice Education Center. 1987. *A Training Manual for Computer Education Coordinators: Data Base Management, Word Processing, Spreadsheets, Copyright, LOGO.* Florence: University of North Alabama.

Rountree, Barbara S., ed. 1989. *"Doing Science"; Summer 1989 Science Laboratory Program for Teachers of Grades K-3.* Lesson plans for hands-on teaching developed by participating teachers. Tuscaloosa: The University of Alabama.

South Alabama Research and Inservice Center. 1989. *K-2 Computer Activities. Computer Education Curriculum Guide; Bulletin 1989, No. 87.* Montgomery: Alabama State Department of Education.

South Alabama Research and Inservice Center. 1989. *3-5 Computer Activities.*

- Computer Education Curriculum Guide; Bulletin 1989, No. 88. Montgomery: Alabama State Department of Education.
- South Alabama Research and Inservice Center. 1989. *6-8 Computer Activities*. Computer Education Curriculum Guide; Bulletin 1989, No. 89. Montgomery: Alabama State Department of Education.
- South Alabama Research and Inservice Center. 1989. *Middle Grades Instructional Units*. Computer Education Curriculum Guide; Bulletin 1989, No. 80. Montgomery: Alabama State Department of Education.
- South Alabama Research and Inservice Center. 1989. *Computer Applications and Computer Science*. Computer Education High School Course Outlines; Bulletin 1989, No. 91. Montgomery: Alabama State Department of Education.

+ + + + +

II. Dwight D. Eisenhower Mathematics and Science Program {PL 100-377}

- Abbott, Gypsy. 1991. *Longitudinal Assessment of Mathematics and Science Teaching Project: Grades K-3. Evaluation Report*. Birmingham: University of Alabama at Birmingham.
- Center for Rehabilitation Resources. 1990. *Teaching Math and Science to Secondary Students with Learning Disabilities. A Series of Three Regional Conferences: Birmingham, Huntsville, Mobile*. Montgomery: Auburn University at Montgomery.
- Division of Student Instructional Services. 1990. *Cooperative Learning*. Training Manual. Montgomery: Alabama State Department of Education.
- Division of Student Instructional Services. 1990. *Learning Styles*. Training Manual. Montgomery: Alabama State Department of Education.
- Leduc, John ed. 1992. *Instructional Activities for Alabama Mathematics Manipulative Kit: 9-12*. First Edition. Mobile: University of South Alabama.
- Rountree, Barbara S., ed. 1991. *"Doing Science": 1991 Lesson Plans for Grades K-3 (selected topics)*. Plans for hands-on teaching developed by participating teachers. Tuscaloosa: The University of Alabama.

School of Education, Alabama A&M University. 1990. *Alternative Instructional Strategies in Mathematics*. Project ASSET (Achieving Successful School Experiences Together), Phase II Component B. Curriculum Guide. Montgomery: Division of Student Instructional Services, Alabama State Department of Education.

School of Education. 1989. Handbook: *Project ASSET Phase II, Component B*. Demonstration Project. Normal: Alabama A&M University.

School of Education, Alabama A&M University. 1990. *Alternative Instructional Strategies in Mathematics*. Project ASSET (Achieving Successful School Experiences Together). Curriculum Guide. Bulletin No. 48. Montgomery: Division of Student Instructional Services, Alabama State Department of Education.

South Alabama Research and Inservice Center. 1991. *Using Videodisc Technology to Enhance the Teaching of Elementary Mathematics for Beginning Teachers*. Instructional Manual March 1, 1991-March 31, 1992. Mobile: University of South Alabama.

Sunal, Dennis, et al., eds. 1992. *Alabama Science Teaching and Learning Center Professional Development Project*. Test and Resource Manual. Tuscaloosa: University of Alabama.

University of Alabama in Huntsville. *Alabama Supercomputing Program: Fortran and Parallel Processing*. Summer Institute 1994. Huntsville: The University of Alabama in Huntsville.

University of Alabama in Huntsville. 1994. *Alabama Supercomputing Program: Internet Resources and UNIX*. Summer Institute 1994. Huntsville. The University of Alabama in Huntsville.

University of Alabama in Huntsville. 1994. *Alabama Supercomputing Program: Introduction to the Alabama Precollege Supercomputing Program*. Summer Institute 1994. Huntsville: The University of Alabama in Huntsville.

University of Alabama in Huntsville. 1994. *Alabama Supercomputing Program: Project Development, Sample Projects, and Macintosh Basics*. Summer Institute 1994. Huntsville: The University of Alabama in Huntsville.

Bibliography of Print Materials

Title II (EESA) and Eisenhower (DDEA) Program

Page 4

Troy State Regional Inservice Education Center. 1990. *Discover Alabama: Getting a Hand on Mathematics and Science*. Program description, schedule, and supporting documents. Troy: Troy State University.

Troy State Regional Inservice Education Center. 1991. *Discover Alabama II: Activities Booklet Correlated to the Alabama Courses of Study for Mathematics and Science*. Lesson plans and learning activities developed by participating teachers. Troy: Troy State University.

Van Devender, Evelyn, ed. 1991. *Instructional Activities for Alabama Mathematics Manipulative Kit: K-6*. First Edition. Mobile: University of South Alabama.

Van Devender, Evelyn, ed. 1992. *Instructional Activities for Alabama Mathematics Manipulative Kit: K-3*. First Edition. Mobile: University of South Alabama.

Zeibarth, John, ed. 1990. *High Performance Computational Methods in Mathematics and Science*. A Training Course for High School Teachers. Huntsville: The University of Alabama in Huntsville.

II. Listing by Title

- Alabama Computer Competency Program* (Abbott, Gypsy). 1986. Evaluation Report. Birmingham: University of Alabama at Birmingham.
- Alabama Science Teaching and Learning Center Professional Development Project.* (Sunal, Dennis, et al., eds.). 1992. Text and Resource Manual. Tuscaloosa: University of Alabama.
- Alabama Supercomputing Program: Fortran and Parallel Processing.* Summer Institute 1994. Huntsville: The University of Alabama in Huntsville.
- Alabama Supercomputing Program: Internet Resources and UNIX.* Summer Institute 1994. Huntsville: The University of Alabama in Huntsville.
- Alabama Supercomputing Program: Introduction to the Alabama Precollege Supercomputing Program.* Summer Institute 1994. Huntsville: The University of Alabama in Huntsville.
- Alabama Supercomputing Program: Project Development, Sample Projects, and Macintosh Basics.* Summer Institute 1994. Huntsville: The University of Alabama in Huntsville.
- Alternative Instructional Strategies in Mathematics* (School of Education, Alabama A&M University). 1990. Project ASSET (Achieving Successful School Experiences Together), Phase II Component B. Curriculum Guide. Montgomery: Division of Student Instructional Services, Alabama State Department of Education.
- Alternative Instructional Strategies in Mathematics* (School of Education, Alabama A&M University). 1990. Project ASSET (Achieving Successful School Experiences Together). Curriculum Guide; Bulletin No. 48. Montgomery: Division of Student Instructional Services, Alabama State Department of Education.
- Computer Activities, K-2* (South Alabama Research and Inservice Center). 1989. Computer Education Curriculum Guide; Bulletin 1989 No. 87. Montgomery: Alabama State Department of Education.

Bibliography of Print Materials

Title II (EESA) and Eisenhower (DDEA) Program

Page 6

- Computer Activities, 3-5* (South Alabama Research and Inservice Center). 1989. Computer Education Curriculum Guide; Bulletin 1989 No. 88. Montgomery: Alabama State Department of Education.
- Computer Activities, 6-8* (South Alabama Research and Inservice Center). 1989. Computer Education Curriculum Guide; Bulletin 1989 No. 89. Montgomery: Alabama State Department of Education.
- Computer Applications and Computer Science* (South Alabama Research and Inservice Center). 1989. Computer Education High School Course Outlines; Bulletin 1989, No. 91. Montgomery: Alabama State Department of Education.
- Cooperative Learning* (Division of Student Instructional Services). 1990. Training Manual. Montgomery: Alabama State Department of Education.
- Discover Alabama: Getting a Hand on Mathematics and Science* (Troy State Regional Inservice Education Center). 1990. Program description, schedule, and supporting documents. Troy: Troy State University.
- Discover Alabama II: Activities Booklet Correlated to the Alabama Course of Study for Mathematics and Science* (Troy State Regional Inservice Education Center). 1991. Lesson plans and learning activities developed by participating teachers. Troy: Troy State University.
- "Doing Science"; Summer 1989 Science Laboratory Program for Teachers of Grades K-3* (Rountree, Barbara S., ed.). 1989. Lesson plans for hands-on teaching developed by participating teachers. Tuscaloosa: The University of Alabama.
- "Doing Science": 1991 Lesson Plans for Grades K-3* (Selected Topics) (Rountree, Barbara S., ed.). 1991. Plans for hands-on teaching developed by participating teachers. Tuscaloosa: The University of Alabama.
- Four-Year Report: Alabama Higher Education Projects for K-12 Computer Learning, Foreign Languages, Mathematics, and Science 1985-1989*. 1989. Montgomery: Alabama Commission on Higher Education.
- Handbook: Project ASSET Phase II, Component B* (School of Education). 1989. Demonstration Project. Normal: Alabama A&M University.
- High Performance Computational Methods in Mathematics and Science* (Zeibarth, John,

ed.). 1990. A Training Course for High School Teachers. Huntsville:
The University of Alabama in Huntsville.

Instructional Activities for Alabama Mathematics Manipulative Kit: K-6 (Van Devender,
Evelyn, ed.). 1991. First Edition. Mobile: University of South Alabama.

Instructional Activities for Alabama Mathematics Manipulative Kit: K-3. (Van Devender,
Evelyn, ed.). 1992. First Edition. Mobile: University of South Alabama.

Instructional Activities for Alabama Mathematics Manipulative Kit: K-3.
(Leduc, John, ed.). 1992. First Edition. Mobile: University of South Alabama.

Learning Styles (Division of Student Instructional Services). 1990. Training Manual.
Montgomery: Alabama State Department of Education.

Longitudinal Assessment of Mathematics and Science Teaching Project: Grades K-3
(Abbott, Gypsy). 1991. Evaluation Report. Birmingham: University of
Alabama at Birmingham.

Middle Grades Instructional Units (South Alabama Research and Inservice Center).
1989. Computer Education Curriculum Guide; Bulletin 1989, No. 90.
Montgomery: Alabama State Department of Education.

Resources Directory for Foreign Language Teachers in Alabama (Lomangino, Heide R).
1989. Revised Edition. Mobile: University of South Alabama.

*Strategies for Teaching and Testing Students with Learning Differences in Math and
Science Grades K-12* (Center for Rehabilitation Resources). 1988. Four
regional symposia: Montgomery, Huntsville, Mobile, Birmingham.
Montgomery: Auburn University at Montgomery.

Teaching Math and Science to Secondary Students with Learning Disabilities (Center for
Rehabilitation Resources). 1990. A Series of Three Regional
Conferences: Birmingham, Huntsville, Mobile. Montgomery: Auburn
University at Montgomery.

*A Training Manual for Computer Education Coordinators: Data Base Management,
Word Processing, Spreadsheets Copyright, LOGO* (Northwest Alabama
Regional Inservice Education Center). 1987. Florence: University of North

Bibliography of Print Materials

Title II (EESA) and Eisenhower (DDEA) Program

Page 8

Alabama.

Undergraduate Outreach Institutes: Innovative Delivery of University Foreign Language Training for High School Teacher Certification in Alabama (Institute for Social Science Research). 1989. A Cost-Effectiveness Analysis. Tuscaloosa: The University of Alabama.

Using Videodisc Technology to Enhance the Teaching of Elementary Mathematics for Beginning Teachers (South Alabama Research and Inservice Center). 1991. Instructional Manual March 1, 1991 - March 31, 1992. Mobile: University of South Alabama.

Manipulatives in Algebra and Geometry Workshop. 1994. *Manipulatives Activities Guide*. Montgomery: Auburn University at Montgomery.

Smith, Tommy, project director. 1995. *Strengthening Algebra and Geometry Achievement*. Birmingham: University of Alabama at Birmingham.

University of Alabama in Huntsville. 1994. *Alabama Supercomputing Program: Project Development, Sample Projects, and Macintosh Basics*. Summer Institute 1994. Huntsville: The University of Alabama in Huntsville.

University of Alabama in Huntsville. 1994. *Alabama Supercomputing Program: Fortran and Parallel Processing*. Summer Institute 1994. Huntsville: The University of Alabama in Huntsville.

University of Alabama in Huntsville. 1994. *Alabama Supercomputing Program: Internet Resources and UNIX*. Summer Institute 1994. Huntsville: The University of Alabama in Huntsville.

University of Alabama in Huntsville. 1994. *Alabama Supercomputing Program: Introduction to the Alabama Precollege Supercomputing Program*.

Summer Institute 1994. Huntsville: The University of Alabama in Huntsville.

University of Alabama in Huntsville. 1995. *Introduction to the ASPIRE Program*. Book 1 of 5. Huntsville: The University of Alabama in Huntsville.

University of Alabama in Huntsville. 1995. *Internet Resources & UNIX*. Book 2 of 5. Huntsville: The University of Alabama in Huntsville.

Bibliography of Print Materials

Title II (EESA) and Eisenhower (DDEA) Program

Page 9

University of Alabama in Huntsville. 1995. *FORTRAN & Parallel Processing*. Book 3 of 5. Huntsville: The University of Alabama in Huntsville.

University of Alabama in Huntsville. 1995. *Project Development*. Book 4 of 5. Huntsville: The University of Alabama in Huntsville.

University of Alabama in Huntsville. 1995. *Macintosh Basics and Applications Software*. Book 5 of 5. Huntsville: The University of Alabama in Huntsville.

Zee, Ralph and Temesa Morris. 1995. *Report for the 1995 Integrated Science/Mathematics Enhancement Program Based on Materials Technology*. Auburn: Auburn University.