DOCUMENT RESUME

ED 380 276 SE 055 688

AUTHOR Walenta, Brian; James, Robert K.
TITLE Status Study of Mathematics and Science Education in Texas From 1979-1993.
INSTITUTION Texas Alliance for Science, Technology and Mathematics, Austin.
PUB DATE Sep 93
NOTE 65p.; Supported by the Texas Science and Mathematics Renaissance Project.
PUB TYPE Reports - Descriptive (141)

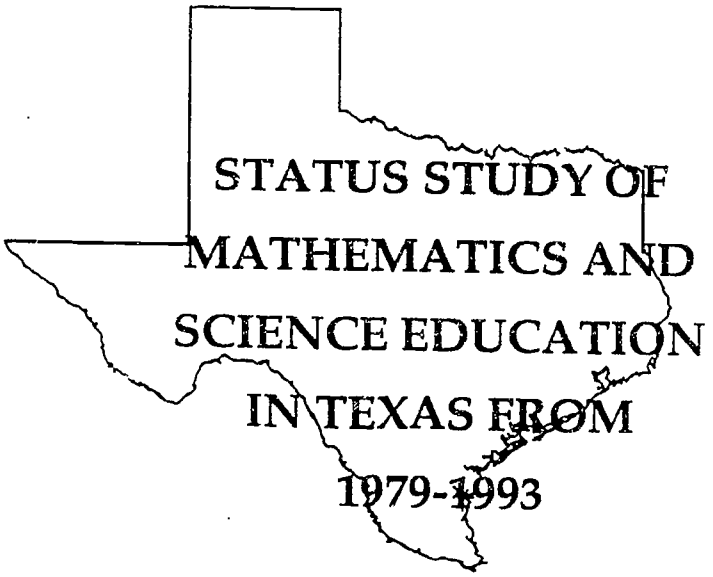
EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS Elementary Secondary Education; *Mathematics Education; Needs Assessment; *Partnerships in Education; School Community Programs; School Community Relationship; *Science Education; *Standardized Tests; *State Boards of Education; Student Evaluation
IDENTIFIERS *Reform Efforts; Texas

ABSTRACT

Texas required a curriculum review of all subjects in 1979. From this review came major changes in the state's educational system. This document reports on the status of the mathematics and science education reforms that took place in Texas from 1979 to 1993. The first section, "National Education Reform," includes a chronology of reform events and descriptions of the U.S. Department of Education and the National Science Foundation. The next section, "Texas Education Reform," discusses several levels of state government involved in education reform: Texas State Legislature, Texas State Board of Education, Texas Education Agency, and Texas Higher Education Coordinating Board. The third section, "Standardized Testing," discusses results from state basic skills tests and national standardized tests for Texas students. The next section, "Educational Outcomes on the Classroom/School Level," discusses class time spent on mathematics and science at the elementary level; average class size, course enrollment, and advanced courses at the secondary level; and teacher preparation. Next, "Partnership Programs," through which adults assist in the daily operation of local schools, are discussed. Finally, suggestions for resolving problems of assessment of educational programs are given: identify measurable educational goals; create assessment tests based on educational goals; provide minimal and measurable requirements for schools; and provide educational workshops for school and community leaders in the area of partnership building. An appendix includes a directory of 76 mathematics and science partnerships, programs, and projects in Texas. Contains 25 references. (MKR)

**********
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
**********

ED 380 276



# STATUS STUDY OF MATHEMATICS AND SCIENCE EDUCATION IN TEXAS FROM 1979-1993

PREPARED BY:
Brian Walenta, M.Ed. - TSMR Status Study Coordinator
Robert K. James. Ph.D. - TSMR/Alliance Project Director

Advisory Committee
Clarence Dockweiler, Ph.D.
Gerald Kulm, Ed.D.
Carol Stuessy, Ph.D.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
BT WALENTA

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)"

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it

☐ Minor changes have been made to improve reproduction quality

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy

BEST COPY AVAILABLE

## Acknowledgments

We wish to thank the following people and organizations for contributing to this status study. Without their help this task would have been overwhelming.

| | |
|---|---|
| James Collins | - Texas Education Agency |
| Bill Hopkins | - Texas Education Agency |
| Amy Lowery | - Texas Governors Office |
| Cathy Seeley | - Dana Center |
| Lu Anna Stephens | - Texas Education Agency |
| Terry Wyatt | - Texas Education Agency |
| Clarence Dockweiler | - Texas A&M University |
| Gerald Kulm | - Texas A&M University |
| Carol Stuessy | - Texas A&M University |

Southwest Educational Development Laboratory

And all those that contributed to the Directory

Prepared by the Texas Alliance for Science, Technology and Mathematics Education at Texas A & M University, September 1993, through a subcontract with the Texas Science and Mathematics Renaissance Project.

## TABLE OF CONTENTS

## EXECUTIVE SUMMARY

Education reform has been a major issue since the 1980's and Texas has been a major contributer in the educational reform movement. One of the major focuses has been in the areas of mathematics and science education. Since 1979, Texas has been working to improve not only mathematics and science education, but all areas of the educational system. This report is focused on the status of the mathematics and science educational reforms from the United States and Texas that took place from 1979 to 1993. This report includes the following:

- The United States has increased its involvement in education over the past ten years. Through the Department of Education and the National Science Foundation, mathematics and science education has become a major priority.
- This involvement in mathematics and science has created a partnership atmosphere between the United States and Texas.
- Texas required a curriculum review of all subjects in 1979.
- From this review came major changes in the state's educational system. Essential elements were created for each course along with a change in the laws governing the Texas educational system.
- Student testing in Texas has increased with the introduction of a series of testing beginning with the Texas Assessment of Basic Skills (TABS) test in 1980 to the present Texas Assessment of Academic Skills (TAAS) test and the Norm-Referenced Achievement Program for Texas (NAPT).
- Student achievement on these tests have increased in every or nearly every instance over the past ten years along with the achievement results on SAT and ACT tests.
- Time spent in class on mathematics and science in Texas, along with course enrollments in advanced courses have either been above the national average or very close to the national average and increasing.
- The rise in the public's concern over education has led to citizens and businesses becoming more involved through the use of partnership programs on the local, state and national level.
- A listing of 76 such programs is included with this report.

In A Nation At Risk, it states that, "When you give only the munimum to learning, you receive only the minimum in return. When you work to your full capacity, you can hope to attain the knowledge and skills that will enable you to create your future and control your destiny." With these reforms Texas hopes to achieve that goal for every student so that they can create and control their own destiny.

# INTRODUCTION

*ALL, regardless of race or class or economic status, are entitled to a fair chance and to the tools for developing their individual powers of mind and spirit to the utmost. This promise means that all children by virtue of their own efforts, competently guided, can hope to attain the mature and informed judgment needed to secure gainful employment, and to manage their own lives, thereby serving not only their own interests but also the progress of society itself.*

This statement was read by millions in the publication, A Nation At Risk, by The National Commission on Excellence in Education (1983). But what does it mean and what has happened since this report was written? What recommendations were made by the Commission? But more importantly, how has Texas met the challenge of reforming education for our children? These important questions and more will be addressed in this report on the status of mathematics and science education in the state of Texas from 1979 to the present.

The National Commission reported that secondary school curricula has "been homogenized, diluted, and diffused to the point that they no longer have a central purpose." (A Nation At Risk, 1983) So what were the implications of this statement for Texas? Their recommendation was that state and local high school graduation requirements be strengthened and that all students seeking a diploma be required to lay the appropriate educational foundation by taking the following high school courses, "(a) 4 years of English; (b) 3 years of mathematics; (c) 3 years of science; (d) 3 years of social studies; and (e) one-half year of computer science. For the college-bound students, 2 years of foreign language in high school." (A Nation At Risk,1983)

Did Texas listen? The answer was that Texas was already in the process of our own educational reform movement. During the 66th meeting of the Texas State Legislature, House Concurrent Resolution 90 was passed calling for a statewide curriculum review of all courses offered in the public schools.

*Texas House of Representatives*
*H. C. R. No. 90*

*RESOLVED by the House of Representatives, the Senate concurring, That the 66th Legislature of the State of Texas hereby direct the State Board of Education, in concert with appropriate interim committees of the 66th Legislature, to undertake a statewide study of curriculum for Texas public schools; and, be it further*

*RESOLVED, That the study should have as its major product a realistic and relevant statement of desired elements to be included in a well-balanced curriculum; and, be it further*

*RESOLVED, That this well-balanced curriculum should serve to describe a "basic" curriculum which could offer students the opportunity to make the fullest possible progress toward the Goals for Public School Education in Texas; and, be it further*

*RESOLVED, That the State Board of Education recommend to the 67th*

*Legislature the necessary changes in law to ensure that, through law and through State Board of Education policy, including accreditation standards, the desired elements would become state policy for Texas public schools.*

*Filed with the Secretary of State, May 31, 1979.*

With this single resolution, the educational reform movement started in the State of Texas. But what happened to the movement? What was the overall product that the State Board of Education and the Texas Legislature wanted? In this status study we will look at the factors that effected the role of education in Texas since 1980 in two subject areas: Science education and Mathematics education.

This study is divided into several sections with each containing several subsections. The major areas that will be reviewed are:

1. Overview of United States Educational Reform - components that contributed to the educational reform movement in the United States during the 1980's and their programs that effected mathematics and science education as a larger context in Texas.

2. Texas Educational Reform - a look at the major agencies that effected the educational reform movement in Texas and their inputs into that process.

3. Educational Outcomes on Standardized Tests - a look at several standardized tests and their summaries, that were administered in Texas schools during the 1980's to chart student achievement.

4. Educational Outcomes on the Classroom Level - a look at other indicators (such as class time, class size, course enrollment, etc.) that examines the result of the mathematics and science education reform in Texas.

5. Educational Partnership Programs - an evaluation of how partnership programs can have an influence on mathematics and science education.

6. Texas Educational Needs - the outcome studies will provide evidence of the current status of mathematics and science education.

7. Needs Summary - a general summary of the information presented in this status study.

8. Conclusion Summary - a general summary of the study.

9. Independent Mathematics and Science Program Listing - a listing of projects and programs in the area of mathematics and science on the Texas level and national level.

10. References - a list of works cited.

Several models have helped the authors in studying the data collection and in organizing this paper. They are:

1. C.I.P.P. Evaluation Model - used as an Accountability Summative Orientation Evaluation Model for processing the general information of the paper. The steps include:

A) Focusing the Evaluation
B) Collection of Information
C) Organization of Information
D) Analysis of Information
E) Reporting of Information
F) Administration of Information

(Worthem & Sanders, 1987)

2. Input - Output Model - used to focus this paper on the components and inputs of reform of Texas science and mathematics education. The model will use Inputs (steps used to change education) vs. Outputs (what happened with those changes). Outputs will reflect the current status of science and mathematics education in the State of Texas in the discrepancy model.

3. Discrepancy Model - used to setup the Ideal Outcomes minus the Current Status. This will give a needs assessment of Texas science and mathematics education. (Fox, 1983)

Before a needs summary can be generated, we must look back to what happened after House Concurrent Resolution 90 was passed in May 31, 1979.

## NATIONAL EDUCATIONAL REFORM

Over ten years ago, the National Commission on Excellence in Education concluded that we were "a nation at risk" because of the lackluster performance of our elementary and secondary schools. Although the effort to reform the schools predated the commission's report, the document quickened and intensified a period of self-examination and effort at renewal among our schools that few in 1983 ever dreamed would have lasted until this day.

Today we are still involved with the debate of educational reform and how we, as a nation or state, can go about the process that is productive and beneficial to our children, state, and nation.

Within this section we examine the components that contributed to the educational reform movement in the United States during the 1980's and their programs that affected mathematics and science education.

### A Chronology of Reform

What follows is a chronology of the school-reform movement that effected mathematics and science education, from the formation of the Excellence Commission to the present. The intent is to chart the reform movement's major milestones and try to convey the overall picture of the nations' educational reform.

**1981** - Secretary of Education Terrel H. Bell announced the establishment of the National Commission on Excellence in Education as per President Reagan's request. A main goal was not merely to diagnose the problems but to initiate reform on a grand scale: "We want to seek a vast renewal of the education establishment of this country and a turning more and more toward the pursuit of excellence, to the increasing of standards." (Holton, 1984) This was to be followed by hundreds of paralleled studies and reports by committees, agencies, and organizations.

**1982** - In December twenty-five bills were introduced in Congress to improve mathematics and science instruction. All died.

**1983** - In April of 1983 *A Nation at Risk* was released by the National Commission on Excellence in Education.

**1984** - In July Congress passes a two-year, $965 million bill to improve mathematics and science

instruction. This bill was named the Education for Economic Security Act.

**1985** - The American Association for the Advancement of Science launched Project 2061, a long-term effort to redesign precollegiate science and mathematics instruction.

**1987** - Secretary of Education William J. Bennett released "James Madison High School," a proposed core curriculum for all American schools.

**1989** - The American Association for the Advancement of Science unveils a blueprint of student-learning goals in science as part of Project 2061.

In September an educational summit of the nation's governors and President Bush meet to set performance goals for the nation's schools.

The National Council of Teachers of Mathematics (NCTM) release their *Curriculum and Evaluation Standards for School Mathematics* plan.

**1990** - President Bush announced six national education goals in his State of the Union Address. In February, President Bush and the nation's governors adopt six national education goals for the year 2000.

The Senate approves a $460 million education bill.

In March the National Science Foundation creates an $80 million grant program to help states make "systemic" school reforms in science and mathematics.

**1991** - In April, President Bush unveiled America 2000.

The National Science Teachers Association launches Scope, Sequence, and Coordination (SS&C), a project to reform elementary school science teaching to complement its ongoing initiative to revamp the secondary school curriculum.

In May, the National Science Foundation awarded $75 million to 10 states as part of its efforts in systemic reform to improve science education.

The NCTM releases their *Professional Standards for Teaching Mathematics*..

**1992** - Legislation to support state and local school reform efforts and to authorize national education standards died in Congress, but President Clinton vows to revive it in the 103rd Congress. ("Charting a course...", 1993)

Over the ten plus years, there has been a growing concern for education. Within those years there has been an effort by Congress and the national government to work with the state governments to help bring about educational reform. This process of creating an educational partnership provides for a better line of communication than does the mire handing down of standards by the national government to the state governments.

### National Executive Department Programs

While several departments within the executive branch of the federal government have education-related projects and programs, the Department of Education and the National Science Foundation have the major share of funds for science and mathematics education.

### The United States Department of Education

Originally created as a non-Cabinet level Department in 1867, it



ERIC

quickly changed to the Office of Education. In the late 1950s and 1960s, societal concerns with the quality of education in the U.S. led to the creation of a great number of programs to improve education, particularly focused on the disadvantaged. In the late 1970s, these programs expanded with national efforts to help racial minorities, women, individuals with disabilities, and non-English-speaking students gain equal access to education.

In October 1979, Congress passed Public Law 96-88, creating the present U.S. Department of Education. The Department of Education has four major responsibilities:

1. Establish policies relating to Federal financial aid for education, to administer distribution of those funds and to monitor their use;

2. Collect data and oversee research on America's schools and to disseminate this information to educators and the general public:

3. Identify the major issues and problems in education and to focus national attention on them; and

4. Enforce Federal statutes prohibiting discrimination in programs and activities receiving Federal funds to ensure equal access to education for every individual.

The Department of Education provides resources to increase opportunities for students to learn mathematics and science. They support research and assistance programs designed to improve the quality of mathematics and science education.

The Department of Education has been strengthening its efforts in mathematics and science education over the past several years. The Eisenhower Mathematics and Science Grant Program remains the cornerstone program in these subjects. Some of these programs are:

1. Eisenhower National Mathematics and Science Education Program. These cooperative agreements have such programs as Scope, Sequence and Coordination of secondary school science; Project 2061, a long-term science and mathematics teaching of American students; and The State Mathematics and Science Education Program.

2. Office of Special Education Programs. A K-8 mathematics and science curriculum for students with disabilities who are integrated into regular classrooms. ("By the year 2000", 1992)

The Eisenhower State Mathematics and Science Education Program is the largest single precollege math and science program supported by any Federal agency. This program serves the function of bringing together various elements of the educational system, from school districts to State agencies and institutions of higher education. In Texas, the administration of these grants are handled by the Texas Higher Education Coordinating Board.

## The National Science Foundation

The National Science Foundation is an independent Federal agency, established in 1950, to promote and advance scientific progress in the

United States. The Foundation has a legislative mandate to initiate and support basic science and engineering research with the dual objective of strengthening research potential and education programs at all levels. The education goals of NSF are to stimulate and provide direction for nationwide efforts that will:

1. strengthen and accelerate the transmission, adaptation, utilization of knowledge from science, engineering, and mathematical disciplines;

2. attract talented youth to careers in those fields and prepared them for sustained creative endeavor; and

3. provide students of every age, whether or not scientifically inclined, such background in the disciplines as will sustain their understanding and use of science and mathematics.

In order to achieve its wide-reaching education goals, the agency continues to place major emphasis on precollege science and mathematics, as well as improving the quality of instruction. The NSF is actively involved in the support of national education reform efforts in science and mathematics curricula that emphasizes comprehensive, integrated approaches to teaching throughout the precollege years (elementary, middle and high school).

At the undergraduate level, NSF is expanding newly established approaches to calculus and engineering curricula to all fields of science. Along with the expansion of curriculum efforts, improvements in laboratory equipment will be supported to enhance the quality of laboratory instruction.

Knowing the challenges ahead, the NSF has designed programs to enlist active involvement and collaboration of the education community. Two such programs, Career Access Opportunities for Women, Minorities, and the Disabled in Science and Engineering (ACCESS) and Alliances for Minority Participation (AMP) support development of regional alliances of K-12 schools districts, higher education institutions, and local industries to increase representation of minorities among science and engineering degree recipients. A third program, Statewide Systemic Initiative (SSI), seeks collaboration of State executive, legislative, education, business and public leadership for making changes in State education systems to support reform in the precollege education. In Texas, the Statewide Systemic Initiatives Program is entitled the Texas Science Mathematics Renaissance Program (TSMR). ("By the year 2000", 1992)

**Summary**

Since the early 1950s, the United States has focused on the idea that education is an important part of our society and national security. Because of this, the Department of Education and the National Science Foundation, along with other agencies, developed programs to promote educational reform in mathematics and science.

In the late 1970's NSF funded major studies to ascertain the status of science education.

And what did Texas do during the 1980s?

# TEXAS EDUCATIONAL REFORM

Comparisons of our education system with that of other nations has also provided a stimulus to the reform process. But what defines educational reform? Educational reform can be defined as a process by which the education system is evaluated and changed to meet new needs. Has the United States and Texas gone through this process of examination and evaluation? Texas has certainly invested much in the process of examination and evaluation.

Several levels of state government are involved in this process of evaluation and planning for education reform. Those levels are:

1) The Texas State Legislature
2) The Texas State Board of Education
3) The Texas Education Agency and
4) The Texas Higher Education Coordinating Board

Within this section, we review the actions and contributions of each level with respect to their authority in the educational system.

### The Texas State Legislature

As Senator Carl Parker of Texas stated, "education reform not only can be legislated, it must be legislated." (Parker, 1988) We examine the three major pieces of legislation passed during the 1980's, which effected the educational structure in Texas.

H.C.R. 90

The Texas educational reform process began with the passage of House Concurrent Resolution 90 during the Sixty-Sixth Texas Legislature in 1979. This resolution directed the State Board of Education to undertake a curriculum study of the Texas public schools and recommend necessary changes in law to ensure that desired elements would become state policy.

A Curriculum Study Panel was formed, the panel consisted of citizens from around the state, to review and make recommendations on changes to the educational system in Texas. The committee, Chaired by Mr. Joe Kelly Butler of Houston, recommended the following to the State Board and to the Texas Legislature:

1) Require all school districts to offer a well-balanced curriculum that includes . . . science and mathematics. The well-balanced curriculum should be available to all students, including those in special programs for meeting unique needs.

2) Direct the State Board of Education to designate the most essential parts of each of the subjects in the well-balanced curriculum. These constitute the basic elements that all students should be expected to master.

3) Direct the State Board of Education to ensure that virtually all students master these basic or essential elements.

4) Charge the State Board of Education, in conjunction with the education committees of the Texas House of Representatives and Senate, with responsibility for

instituting a system for the regular review and update of the curriculum.

5) Consider repealing present laws mandating courses, subjects, or elements to be included in the curriculum so that curriculum decisions may be made in a pedagogically sound manner. ("Recommendation to the state", 1980)

This cooperative effort resulted in the passage of House Bill 246 during the Sixty-Seventh Legislature.

H.B. 246

House Bill 246 was passed by the Sixty-Seventh Legislature in 1981 and it sometimes referred to as the curriculum reform bill. HB 246 revised Section 21.101 of the Texas Education Code (TEC) and established a systematic structure for the development and implementation of a sound curriculum for the state. HB 246 repealed 20 separate existing laws that had added numerous subjects and courses to the curriculum. It delegated to the State Board of Education the authority to establish a well-balanced curriculum by directing the State Board to designate essential elements of instruction for each of 12 subjects legislators felt should comprise such a curriculum. (Miller & McCabe, 1984)

Many of the educational reforms adopted by the Texas legislature in 1984 were building blocks cut from the bedrock of a massive year-long study of the 22-member Select Committee appointed by Governor Mark White. This committee would come to be known as the Perot Commission. From this commission came the outline of House Bill 72. (White, 1986)

H.B. 72

The last major piece of legislation passed was House Bill 72 of the Sixty-Eighth Legislature 1983. H.B. 72 introduced some curriculum-related requirements with respect to student grading practices, remedial programs, and testing. One of the major impacts of H.B. 72 was to end social promotion in Texas public schools. It stated that students who score less than 70 may not advance to the next grade level. This action was placed in Section 21.721 of the Texas Education Code (TEC).

House Bill 72 also increased statewide testing of students. The Texas Education Code (TEC) Section 21.551 required that student pass a statewide assessment exam. Today the Texas Assessment of Academic Skills (TAAS) be administered to students in grades 4, 8, and 10 (exit level). Students are required to pass the exit level exam to demonstrate mastery of basic skills in order to receive their diploma.

The most controversial section of H.B. 72 dealt with the no-pass-no-play rule by which a student who does not pass all courses during a six-week period may not participate in extracurricular activities for the next six-weeks. This section received the major part of the public debate; however, Section 21.920 of the Texas Education Code (TEC) upholds this action of H.B. 72. (Kemerer & Hairston, 1990)

These three major pieces of legislation comprise the legislative backbone of the educational reform in our state. The fact that these laws

were written to establish policy and not legislate actual courses and curriculum, has allowed Texas to create a changing educational system that will be flexible enough to meet the needs of our students in the future. The establishment of policy has been left to the Texas State Board of Education.

**Texas State Board of Education**

The Texas Legislature, acting under the Tenth Amendment of the U.S. Constitution and Article VII of the Texas Constitution, established school districts and the Central Education Agency, which today is called the Texas Education Agency.

The State Board of Education is the chief policy-making and directing body for the Texas public school system. This body underwent a major change with House Bill 72 reforms, the State Board was converted to a fifteen-member appointed board in 1984 and then reverted to elected status in 1988. Section 11.24(b) of the Texas Education Code (TEC) provides that the board shall have the responsibility of "adopting policies, enacting regulations, and establishing general rules" for carrying out its duties. Some of those duties include: preparing budgets, prescribing rules and regulations for certification, establishing regulations for accrediting schools, and operating the state's Regional Service Centers (Kemere & Hairston 1990).

As stated in the recommendations from H.C.R. 90 review committee, the state board shall designate the most essential parts of each subject, shall ensure that the students master those essential elements, and provide for a system of regular review and update of curriculum. This process was started with the passage of H.B. 246 in 1981.

In March 1983, the State Board authorized the distribution of documents containing essential elements for all 12 content areas for K-12 grades, along with recommendations for graduation, elementary school time allocations, and textbook adoption.

With this final adoption of the new curriculum rules, the State Board directed that portions of the new rules be implemented in the 1984-85 school year with all provisions to be fully implemented in 1985-86. With the final vote, member Mary Ann Leveridge of East Bernard said, "Texas is the only state that has gone through the process of making a major reform and a renewal of standards for curriculum across the entire state. It is a very important moment. However, the real work will come as teachers and administrators across this state begin implementation." (Miller & McCabe 1984)

Again, one of the most important actions of the State Board of Education was that they set general policy and guidelines but did not detail its day to day implementation of the policy. That they left to the Texas Education Agency (TEA).

**The Texas Education Agency**

The Texas Education Agency (TEA) is the policy implementor of the Texas State Board of Education. Within this area TEA has an ever

changing list of responsibilities on the state and local level.

One responsibility of TEA is to provide organizational and instructional materials to local school districts. These materials take on many different forms. Some include essential elements, curriculum guides, staff development, guidelines for textbooks, etc. along with the responsibility of the periodic evaluation of programs and revisions.

## Curriculum Frameworks

Course content coverage varied considerably from district to district, campus to campus, and classroom to classroom. Educators feared that wide variations in curriculum limited a highly mobile student population's access to a basic and consistent curriculum. In an attempt to improve student achievement, the 67th Legislature in 1981 amended the Texas Education Code through House Bill 246.

To help implement the changes of HB 246, the State Board of Education involved Texas educators, policy makers, and the public in regional groups that met throughout the state to identify the essential elements of the subject areas under HB 246. These essential elements were first implemented in the 1985-86 school year.

To help local school districts implement these changes, the Texas Education Agency created curriculum framework guides. Curriculum frameworks are composed of the essential elements of each course, suggestions for sequencing, placement criteria, philosophy of teaching strategies, and methodologies.

The curriculum frameworks for mathematics and science courses are designed to help school district educators implement the Chapter 75 science and mathematics programs in a way that is realistic in its aims, yet challenges students to strive for educational excellence. These changes have had an impact in the areas of mathematics and science curriculum reform in Texas.

## Mathematics

Schools have implemented revised essential elements for mathematics during the past two years (1991-1993). These reflect the recommendations of various reports and national recommendations, especially the National Council of Teachers of Mathematics' *Curriculum and Evaluation Standards for School Mathematics*..

Major changes for mathematics, Grades 1-8, which schools implemented in Fall 1991, include narrowing the spiral of the curriculum. That is, teachers are presenting some topics in the curriculum later than traditional and finishing some sooner which helps eliminate redundancy. Major changes include emphasizing the development of problem solving skills while other changes call for including calculators and computers throughout all grades as problem-solving tools.

In Fall 1990, schools implemented revised essential elements for Algebra I, Algebra II, Geometry, and Trigonometry. Schools began using revised essential elements for Informal Geometry, Pre-Algebra, and Mathematics of Money in Fall of

1992. Revised essential elements for Elementary Analysis, Analytic Geometry, and Precalculus will be implemented by schools no later than Fall 1994; revised essential elements for Calculus, Fall 1995; and revised essential elements for Computer Mathematics, Fall 1996.

All these revisions were based on input from mathematics teachers, supervisors, and teacher educators from across the state and from national experts (The Status Of the Curriculum In the Public Schools, 1993).

## Science

Since the Fall of 1990, the State Board has been implementing a plan under which science instruction in the state's secondary schools will be restructured beginning in the 1994-95 school year. Under the plan, the science curriculum will consist of a coordinated/thematic approach in which students receive instruction in several different areas of science.

The plan to restructure science education was developed by Agency staff and a statewide task force composed of individuals representing education, business, and industry. Increased participation of women and minorities in science and technology programs is a primary goal.

Revisions in essential elements were approved for Anatomy and Physiology, Aquatic Science, Physical Science, and Environmental Science. The revisions focus on laboratory skills and hands-on use of scientific tools and materials. Also, relating and applying technology and scientific information to daily life (The Status Of the Curriculum In the Public Schools, 1993).

These changes in curriculum reflect the statewide commitment to education reform by various sectors of the society. Today's curriculum is designed to equip students with the literacy and conceptual skills that are essential to a healthy lifestyle.

In principle, the science curriculum has reached a high degree of quality; however, that depends on a number of extrinsic factors. These include the quality of instruction that teachers across the state are able to deliver to students and the availability of textbooks and other instructional materials.

## Staff Development

In its role as support for local school districts, the Texas Education Agency provides training and resources to the state's educators. Relevant staff development is particularly important today in light of the restructuring of science, the phase out of low-level courses, and the emergence of new components of the curriculum.

TEA is working with the regional education service centers to provide programs at the local level. In addition, standards for inservice training of professional educators are being continually refined to reflect current school practices.

State-level staff development activities for mathematics and science include the following.

## Mathematics

A federally funded Mathematics Staff Development Project consists of 30 modules that provide training for teachers, pre kindergarten-Grade 12.

The modules are presented by trainers in education service centers and school districts around the state. They are designed to provide a basic foundation for teaching the mathematics essential elements using a variety of strategies such as manipulative materials, concept-development techniques, and problem-solving applications. Funding is provided by the Education for Economic Security Act and Title II of the Eisenhower Mathematics and Science Act (The Status Of the Curriculum In the Public Schools, 1993).

Science

A two-part plan is being implemented to help prepare educators to teach newly restructured science courses. First, colleges and universities are being funded through Eisenhower Mathematics and Science Act, Title II, funds to offer courses to science teachers which will strengthen skills needed to teach Science I. Secondly, 10 teaching modules for Science I have been developed through The University of Texas at El Paso and El Paso ISD. Trainers are available in each education service center to assist teachers with the modules. In addition, the Texas Environmental Education Advisory Committee is establishing a network of environmental education teacher inservice sites throughout the state (The Status Of the Curriculum In the Public Schools, 1993).

Graduation Requirements

Under the present graduation system, students are required to take and pass 3 credits of mathematics and 2 credits of science. In a move toward preparing students for success, Commissioner Lionel Meno has outlined a recommended high school program that would increase the number of credits needed in mathematics and science. These changes are in the core courses are to leave mathematics at 3 credits and increase science to 3 credits. The proposed plan also recommends a choice after the core courses. One direction includes another credit each in mathematics and science, for a grand total of 4 credits in mathematics and 4 in science. If this plan is approved by the State Board of Education it would start with the incoming eighth grade of that year (TASSP Vol.33, Aug. 1993).

**Texas Higher Education Coordinating Board**

The Texas Higher Education Coordinating Board was created by the Texas Legislature in 1965 for the purpose of achieving "excellence for college education" through "efficient and effective utilization and concentration of all available resources and the elimination of costly duplication in program offerings, faculties, and physical plants." (Funkhouser, 1986) Additional duties are assigned by the Legislature from time to time. The Board reports biennially to the Governor and Legislature on statewide needs in higher education.

In 1984, the U.S. Congress passed the Education for Economic Security Act. The idea behind the statute was to educate the American people in science and mathematics in order to build our national economy and successfully maintain our

competitive position in the world economy.

In 1988, Congress advanced these objectives by authorizing the Dwight D. Eisenhower Mathematics and Science Education Act. This federal funding for Texas is administered through the Texas Higher Education Coordinating Board. ("The Eisenhower Mathematics", 1990)

The statute requires that each funded project develop and operate under formal partnership agreements between a higher education institution and participating public and private schools in the nation's school district.

Since 1984, the Texas Eisenhower Grants Program has provided millions of federal dollars each year to Texas colleges and universities, which in turn use these grant funds to improve local mathematics and science teaching in kindergarten through high school.

Through the 1992 school year the Coordinating Board has provided more than 13 million dollars of federal grant funds to public and private universities and colleges. During this period, the Texas Eisenhower Grants Program has supported statewide more than 300 projects advancing model teacher enhancement programs in public and private schools.

To secure that underrepresented students are benefiting from these programs, all Eisenhower funded projects are required to actively secure the participation of teachers of underrepresented students (African Americans, Mexican Americans, Native Americans, and recent Southeast Asian immigrants) at a level commensurate with their proportional representation in the service area. ( "Eisenhower Mathematics", 1992)

Summary

Within Texas there has been an effort since 1979 to reform our education system. Through a combined effort of the Texas Legislature, the State Board of Education, and the Texas Education Agency, Texas has moved forward in its educational reform movement. It is important to remember that educational reform is not a one time process, but an ongoing action that will always by changing.

How do we measure this change and evaluate our progress? In order to do this Texas has used a number of different standards of evaluation.

## STANDARADIZED TESTING IN TEXAS

Standardized testing has been used as an evaluation method since the early 1900's when Edward Lee Thorndike persuaded educators that measuring human change was worthwhile. By 1918 the testing movement was in full swing and based mainly on criterion-referenced tests. During the 1920's the norm-referenced tests were developed to measure individual performance levels (Worthen and Sanders, 1987). Since that time schools and states have used standardized testing to evaluate student performance and measure those results against each other.

Standardized testing will also be used as an evaluation indicator for this status study. Within this section we report on three different types of

standardized tests that were used in Texas during the 1980s and 90s.. They will include the following types:

1. State Basic Minimal Skill Tests
2. College Board Tests
3. National Achievement Tests

**State Basic Minimal Skill Tests**

In 1979, the 66th Texas Legislature passed Senate Bill 350 which amended Section 16.176 of the Texas Education Code to provide compensatory instructional services for educationally disadvantaged children. The Texas Education Agency was directed to adopt and administer criterion-referenced assessment exams designed to assess basic skills in mathematics, reading, and writing. This was later changed to test higher thinking and problem-solving skills.

This report will review the mathematics results from these assessment tests.

Throughout the history of these Texas assessment exams there have been three phases. The first came with the creation of the Texas Assessment of Basic Skills Program (TABS), which lasted from 1980 to 1985. The second phase was the Texas Educational Assessment of Minimum Skills (TEAMS), which lasted from 1986 to 1989. The present phase of assessment exams are called the Texas Assessment of Academic Skills (TAAS). Within each phase the major area to be examined will be the mathematics assessment of those exams.

**Texas Assessment of Basic Skills**

The Texas Assessment of Basic Skills (TABS), a criterion-referenced assessment instrument, began with the 1979-1980 school year. This instrument was designed to measure minimum basic skills at the third and fifth grades and an exit level ninth grade in the areas of mathematics, reading, and writing skills. Assessment testing for the fifth and ninth grade began in 1980 while the third grade testing began in 1981.

At the third and fifth grade levels tested, a mastery level was set for each mathematics objective. To master the objective the students were required to correctly answer three of the four items testing the objective. At the ninth grade level, students met the standard mastery if they could answer correctly at least 30 of the 44 items on each exam.

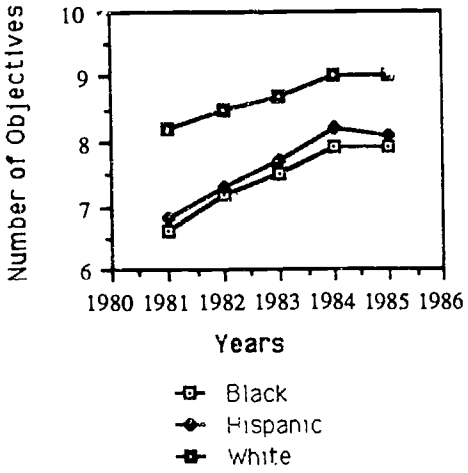
Within the grade level reports we will examine the mathematics test results and compare them throughout the history of the test.

**Grade Level Results**

Grade 3 (Figure 1) - The performance of all three ethnic groups showed marked improvements since third grade testing for the TABS program started in 1981. Improvement was consistent from year to year until 1985. For 1985, the mathematics performance of Black and white students remained at the 1984 level while Hispanic performance in 1985 dropped slightly below that of 1984.

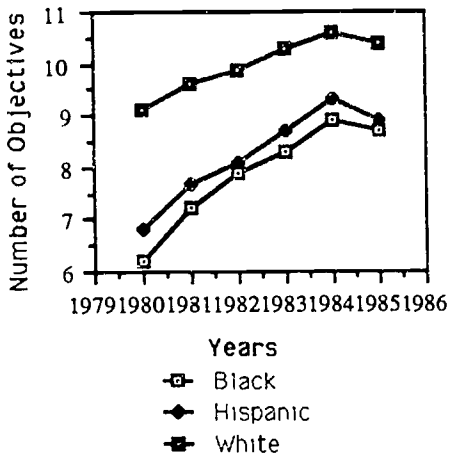
(Figure 1)

3rd Grade TABS
Mathematics Objectives
Mastered By Ethnic Group




(Figure 2)

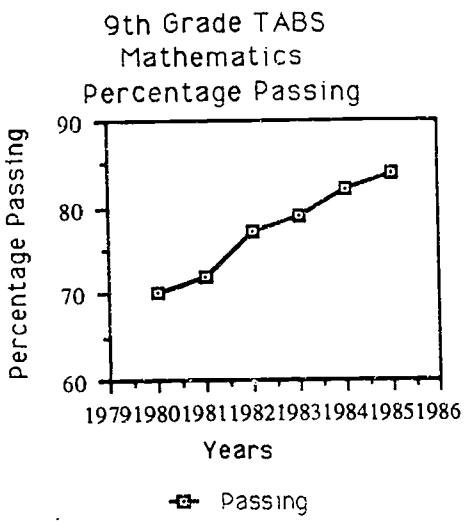
5th Grade TABS
Mathematics Objectives
Mastered By Ethnic Group

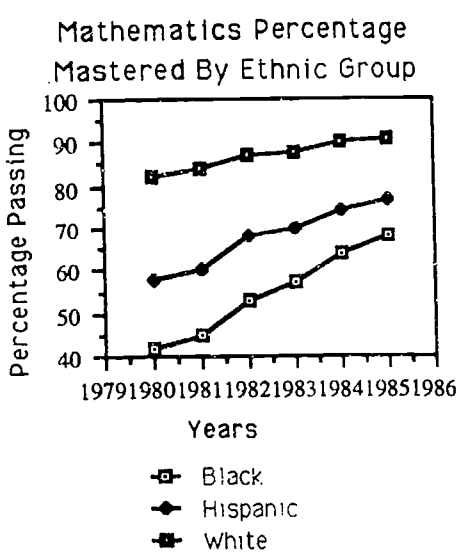



Grade 5 (Figure 2) - The performance of fifth grade students shows an upward trend that is similar to the third grade but more pronounced. Improvement for all three ethnic groups was consistent from year to year until 1985 with Black and Hispanic student performance improving at a faster rate than that of white students. However, performance of all three ethnic groups in 1985 fell below that of 1984 with Hispanic students showing the steepest drop.

Grade 9 (Figure 3) - Total mathematics percentage passing showed a steady and upward climb from 1980 to 1985. Not only did the overall percentage increase, but all three ethnic groups showed an improvement since 1980. The performance of Black and Hispanic students improved at a higher rate than that of white students and differences in performance levels have narrowed since 1980. ("Texas Assessment", 1985)

(Figure 3)




## Texas Educational Assessment of Minimum Skills

The Texas Educational Assessment of Minimum Skills (TEAMS) measures basic skills in grades 1,3,5,7,9,11/12. The testing program related test questions to specific learning objectives and levels of proficiency in skills which students have been taught and as with the TABS test, the areas of testing were: mathematics, reading, and writing skills.

The 1985-86 school year marked the beginning of the TEAMS program with the passage of House Bill 72. One of the major changes in assessment testing came with the eleventh and twelfth graders in that they were required to pass both the mathematics and English sections of the test in order to be eligible to receive a Texas high school diploma.

With the introduction of the TEAMS a new era of data was also provided, that being the scaled scores. The TEAMS scaled score is a statistical conversion of the number of items correct (raw score). The scaled score reveals the entire range of student performance both above and below the mastery level. The total test mastery for each subject area represented a scale score of 700.

## Grade Level Results

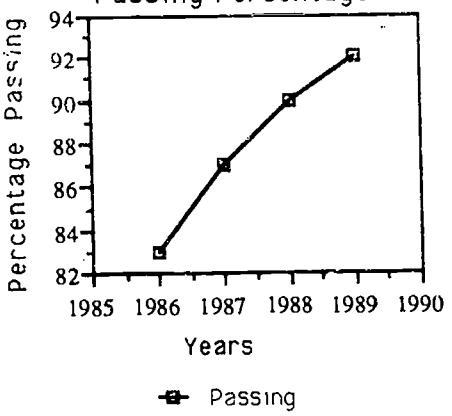
Grade 1 (Figure 4) - The overall passing percentage has shown a steady and rapid increase from 83% in 1986 to 92% in 1989. The scaled scores for each year have also been of the rise for grade 1. In 1986 the scaled score was 819 for mathematics and in 1989 it was 860, the same as for 1984. That marked an overall increase of forty-one scaled score points in three years. The scores of ethnic students increased over the same time period.

(Figure 4)

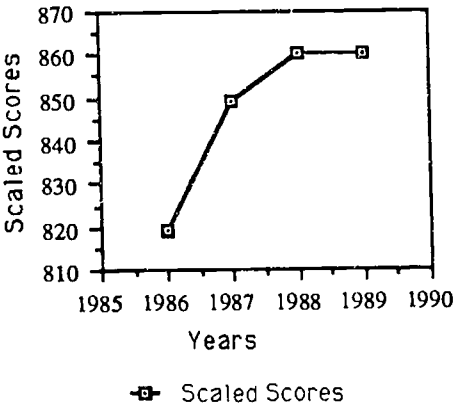
1st Grade TEAMS

Mathematics

Passing Percentage

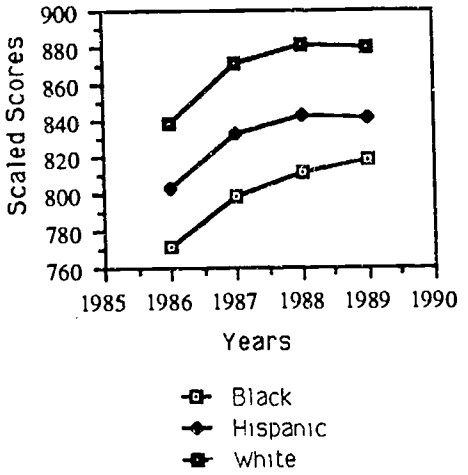



Overall Scaled Scores




Scaled Scores

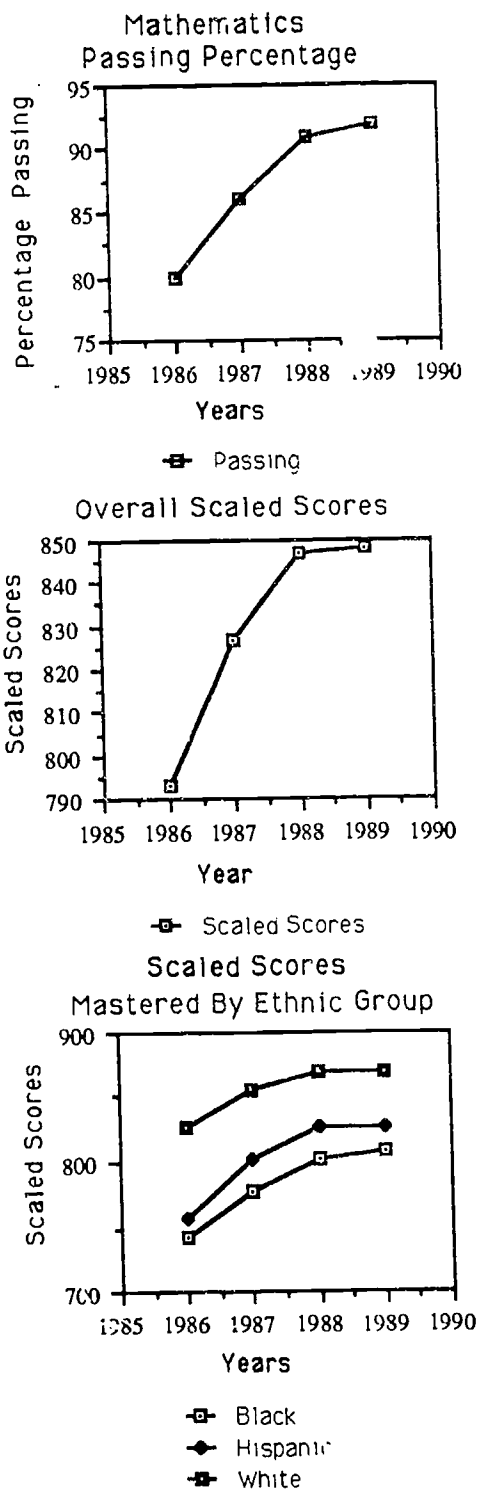
Mastered By Ethnic Group



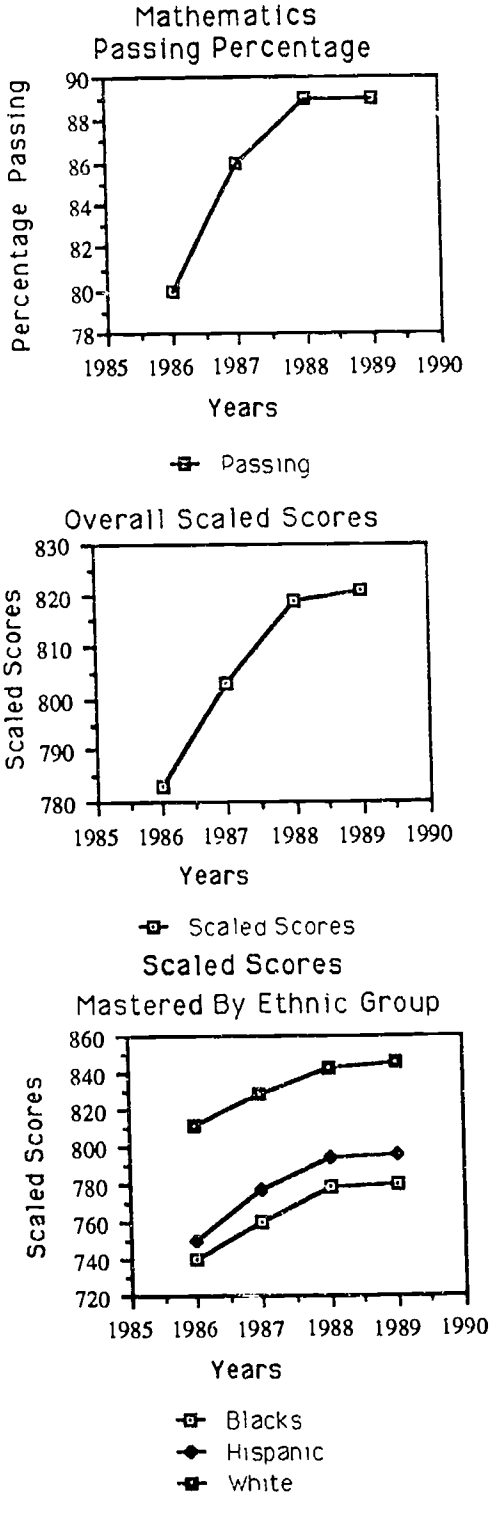

Grade 3 (Figure 5) - The overall passing rate for the third grade showed an increase of 12% from 1986 to 1989. In that time period the passing percentage rose from 80% to 92% of all third graders passing the mathematics test. The scaled scores showed a 55 point increase during this time, from 793 in 1986 to 848 in 1989. The scaled scores for all ethnic students rose from 1986 to 1988, but then leveled off for all groups in 1989. In 1986 there was an 83 point difference between Black and white scaled scores; however, by 1989 the gap was now at 61 points. Hispanic students also narrowed the gap between white students from 68 points in 1986 to only 43 points in 1989.

Grade 5 (Figure 6) - The fifth grade overall passing percentage increased from 80% in 1986 to 89% in 1989. This percentage did not increase from 1988 to 1989 but remained at 89%. The scaled scores leveled off between 1988 to 1989; however, scores did increase from 783 in 1986 to 821 in 1989 for an overall increase of 38 points. The scores for ethnic students showed that the gap between students closing with a 5 points increase of Black vs. white and a 12 point increase for Hispanic students.

(Figure 5)



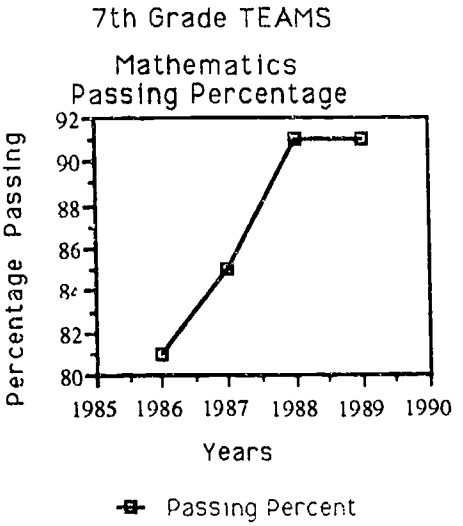

(Figure 6)

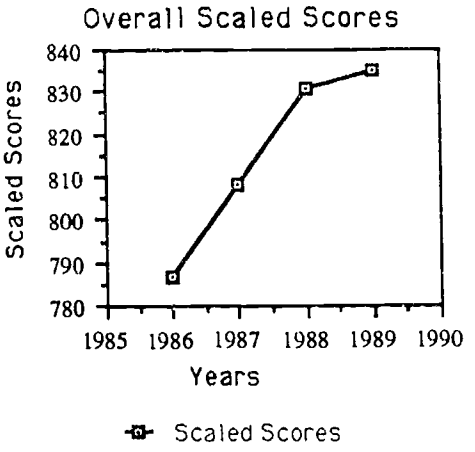


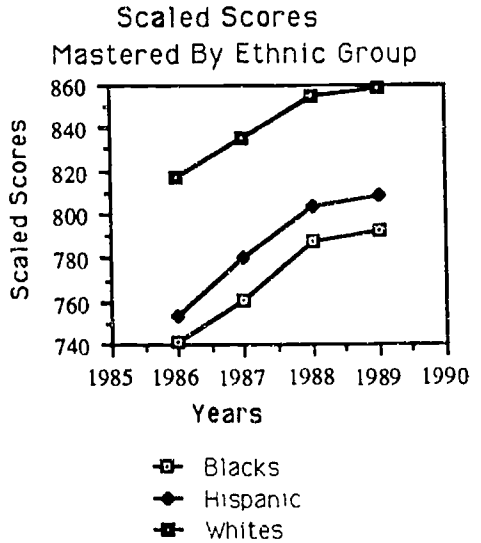
Grade 7 (Figure 7) - 1988 to 1989 showed a leveling off for the seventh grade in all areas. The passing percentage rate from 1986 to 1989 rose from 81% to 91%, for an overall increase of 10%. The scaled scores also rose from 787 in 1986 to 835 in 1989 for an overall increase of 48 points. The scaled scores of ethnic students closed with the gap between Black and white students decreasing from 76 points to only 66 points. Hispanic student also decreased the gap from 64 points to only 50 points difference.

Grade 9 (Figure 8) - The ninth grade students showed a leveling off early in the testing years with only a 2% increase from 1986 to 1989. In 1986 the passing percentage was 81% and for years 1987-89 the percentage remained at 83%. The scaled scores did not fair much better from 1986-1989 with only a 17 point increase. The ethnic score gap between white and Black students increased from 77 points in 1986 to 78 points in 1989. Hispanic students also widened the gap with white students from a 57 point difference in 1986 to a 62 point difference in 1989.

(Figure 7)



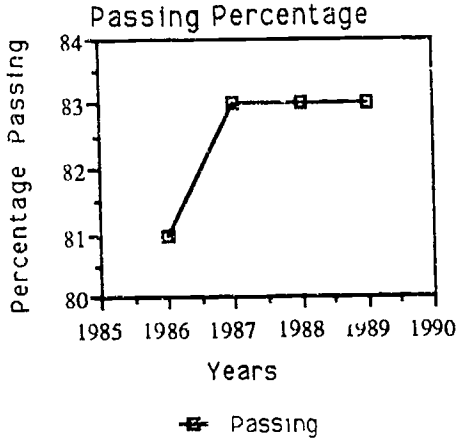



(Figure 8)

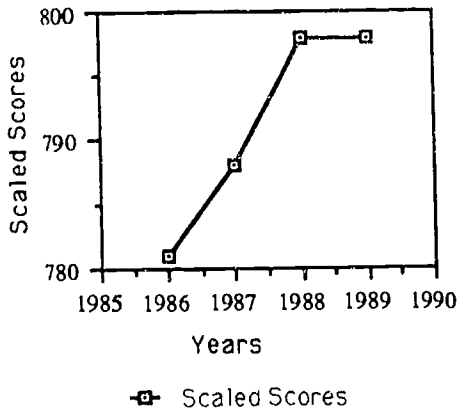
9th Grade TEAMS

Mathematics

Passing Percentage

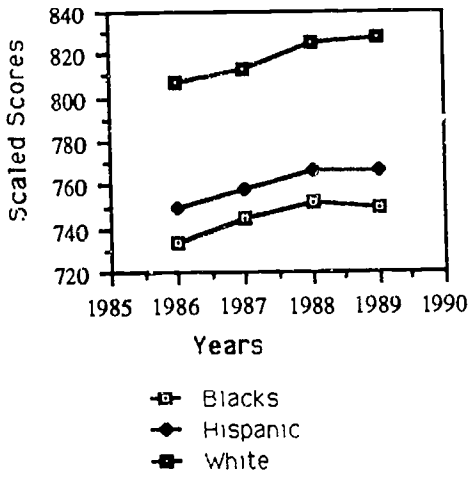



Overall Scaled Scores




Scaled Scores

Mastered By Ethnic Group




Grade 11 Exit (Figure 9) - The overall passing percentage for the eleventh grade took a downward turn between 1985 to 1988. In 1985, 88% passed the exit level mathematics test whereas by 1988 that percentage had decreased to only 78%. In mathematics, the passing standard significantly increased between 1986 and 1987, contributing to the decline in percent passing. The passing standard did not change between 1987 and 1988; so the three percent gain in 1988 reflects a real improvement. However, the overall scaled scores increased from 740 in 1985 to 774 in 1988 for a 34 point increase. ("Texas educational", 1989)

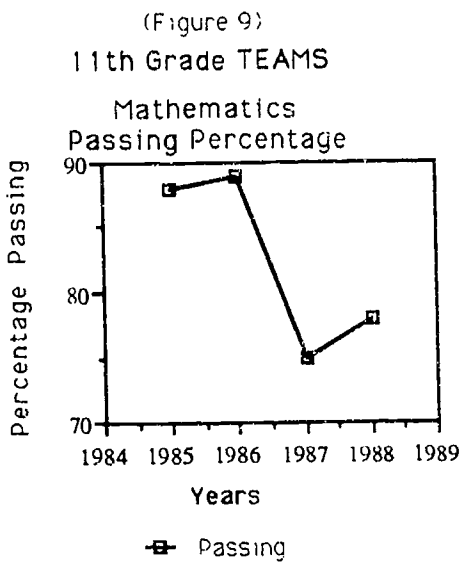
In general, students taking the TEAMS exam made large strides. There can be several reasons for this increase. The first being that the program related test questions to specific learning objectives and levels of proficiency in skills which students have been taught.

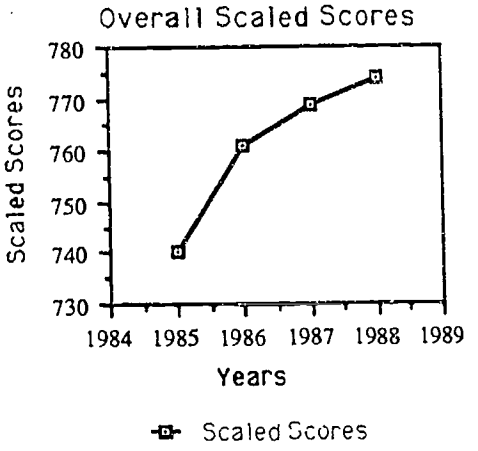
The second being that in 1987 a Spanish version was created for grades 1 and 3; thereby providing a test that Spanish speaking students could understand and achieve.

A third could be that students and teachers have been dealing with testing and teat taking, so that students can be better prepared to take these standardized tests.

25

(Figure 9)




## Texas Assessment of Academic Skills

The Texas Assessment of Basic Skills (TABS) testing program implemented in 1980 was followed by the Texas Educational Assessment of Minimum Skills (TEAMS) in 1985 which measured minimum basic skills by subject area. In October 1990, the Texas Assessment of Academic Skills (TAAS) testing program was administered for the first time at grades 3,5,7,9, and 11 exit level. As with previous tests, the TAAS tested in the areas of mathematics, reading, and writing.

The TAAS focuses on the assessment of higher order thinking and problem-solving skills rather than minimum basic skills of TEAMS. The TAAS broadened its scope of content to provide a more comprehensive assessment of the instructional targets in the essential elements.

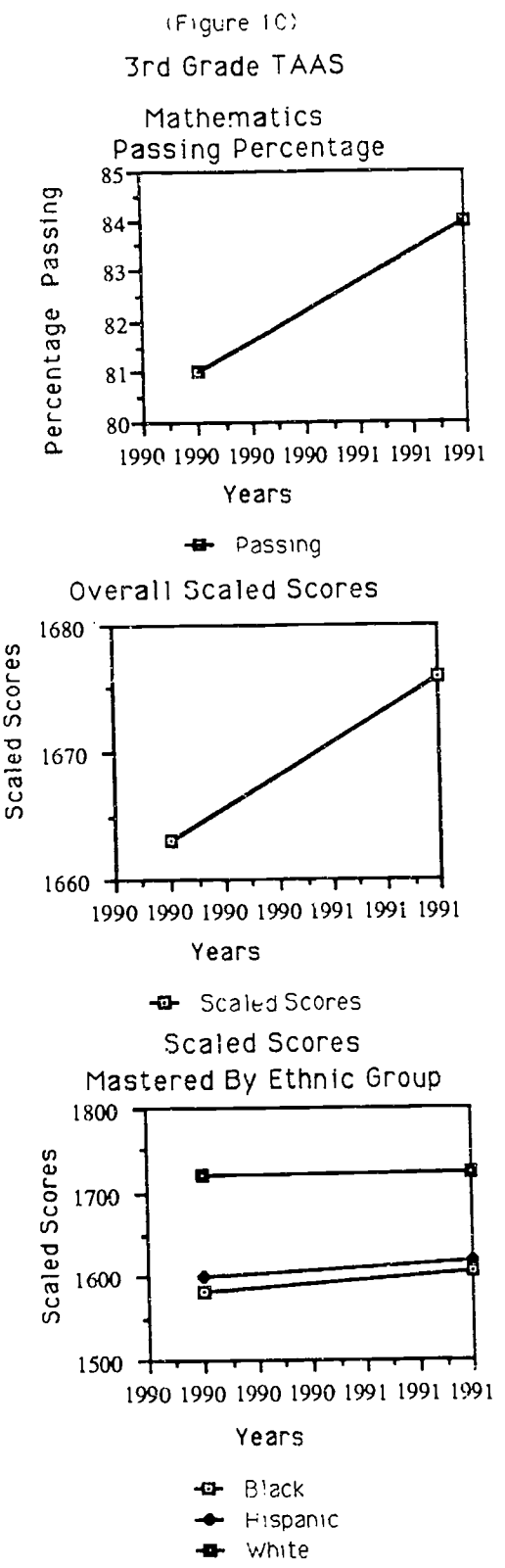
Texas law mandates that high school students must pass the TAAS exit level exam in order to be eligible for graduation. The passing standards were phased in during the first year and were set for a passing grade to be 65. Beginning in the 1991-1992 school year the passing grade was raised to 70. Therefore, all comparisons of TAAS results will be based upon the seventy percent standard.

The TAAS scaled scores also changed to reflect the new exam. The new scores range from below 1000 to above 2000. A scale score of 1500 would equal the 70% passing score need to achieve a passing grade.

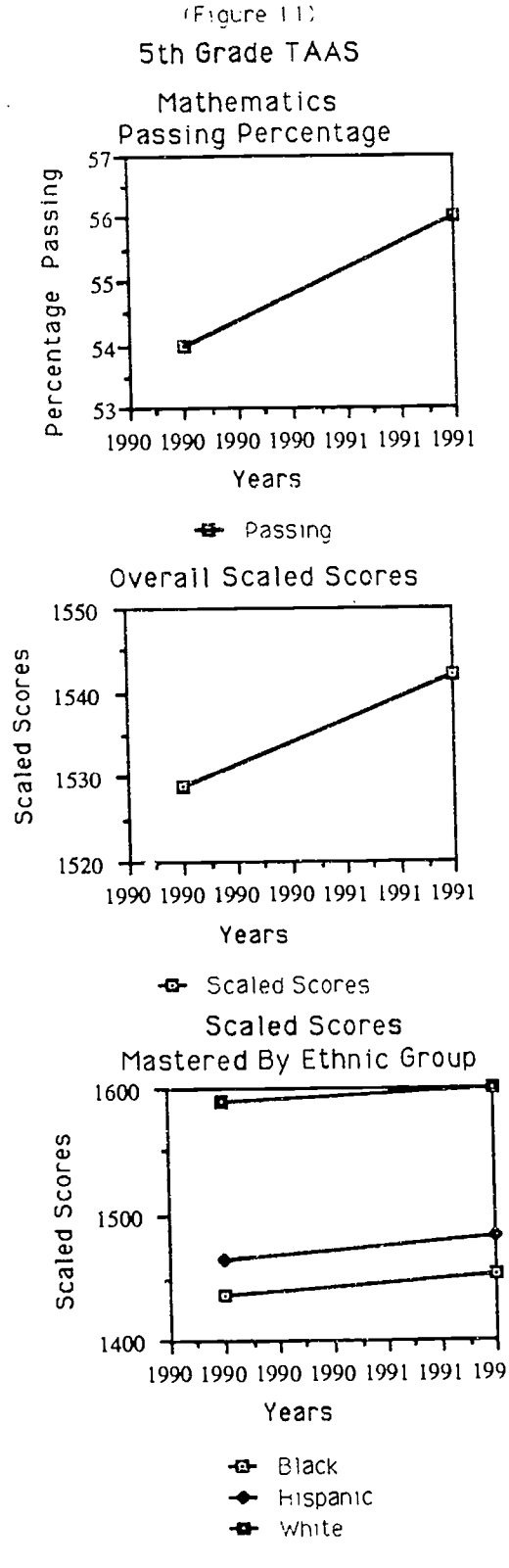
### Grade Level Results

Grade 3 (Figure 10) - In 1990, 81% of all third graders passed the TAAS whereas in 1991, 84% passed. The overall scaled scores rose 13 points, from 1663 to 1676, in this one year period. The scaled scores of ethnic students showed a small increase in the one year period. A 20 point spread was shown between Black and white students, whereas there was a 16 point spread for Hispanics.

(Figure 10)




(Figure 11)

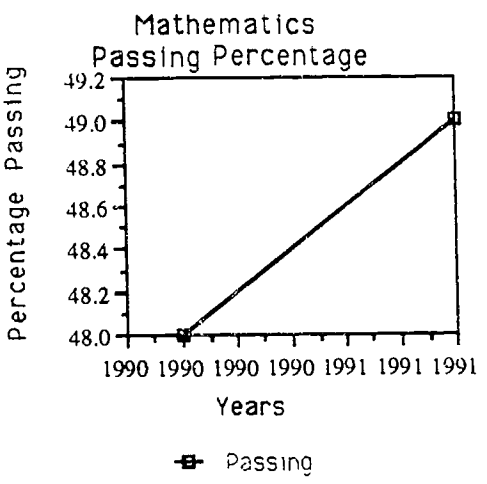


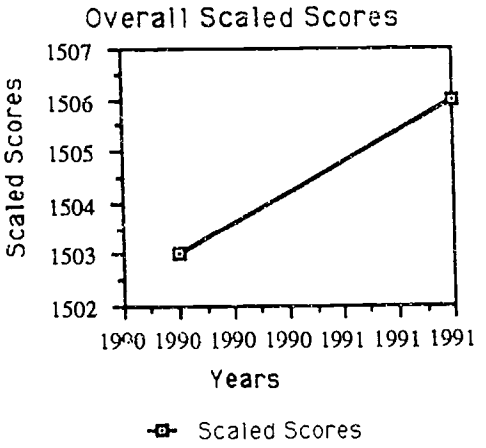
Grade 5 (Figure 11) - Passing percentage increased 2% from 1990 to 1991 for the fifth grade. There was a 13 point gain in scaled scores plus another gain in the scaled scores of ethnic students. Black students gained 8 points where the Hispanic students had a 9 point gain.

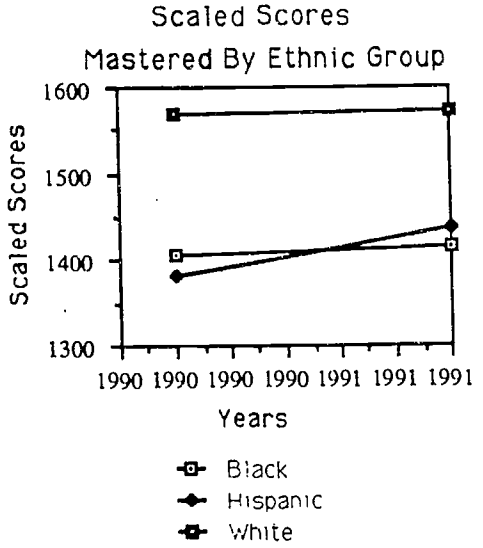
Grade 7 (Figure 12) - The seventh grade mathematics TAAS results did not show a very large change from 1990 to 1991. The passing percentage increased only 1% and the scaled scores increased 3 points. However, there was a 53 point gain by the Hispanic students in the scores for ethnic students and a 4 point gain by Black students.

Grade 9 (Figure 13) - The ninth grade TAAS results showed little or no change from 1990 to 1991. The passing percentage went from 43% to 42% for an overall drop of 1%. The scaled scores had no change from 1990 to 1991 remaining at 1474. Black students gained 12 points whereas Hispanic students gained 10 points in the scaled scores of ethnic students to narrow the gap between students.

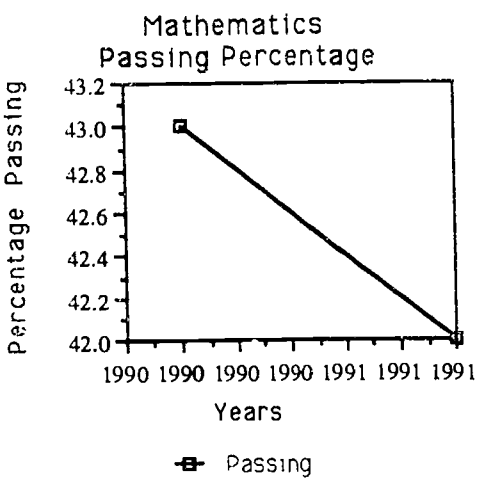
(Figure 12)

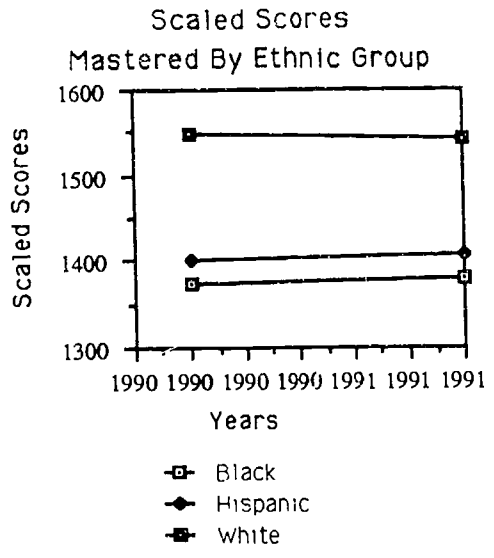


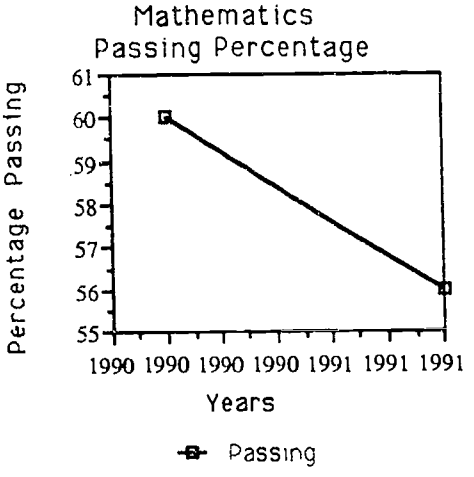
(Figure 13)
9th Grade TAAS

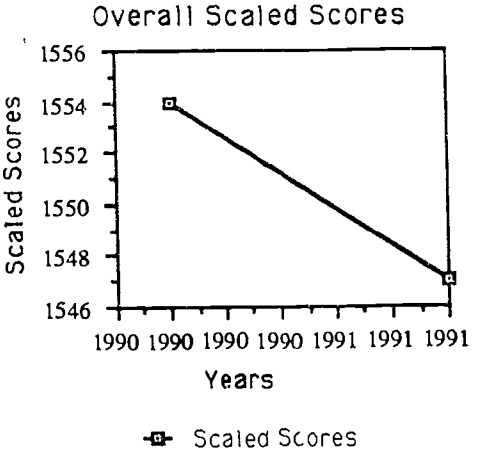


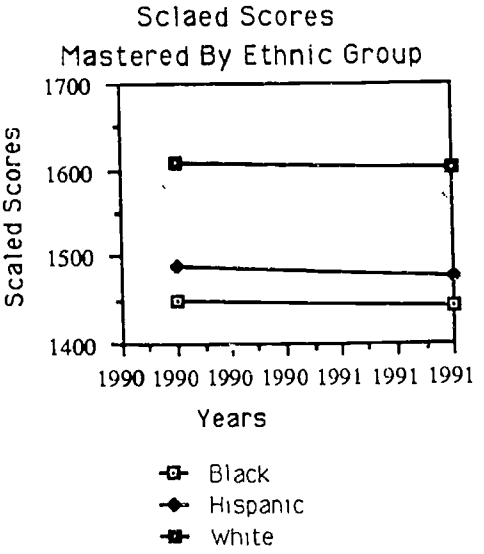




Grade 11 (Figure 14) - The TAAS exit level exams also fell from 1990 to 1991 with the passing percentage loosing 4% from 60% to 56%. Scaled scores also fell 7 points from 1554 to 1547. The gap in the scaled scores for ethnic students changed for Hispanic students, to become a negative 7 points, where Black students did not change at all. ("Texas Assessment of Academic", 1992)

(Figure 14)
11th Grade TAAS



In accordance with changes in Section 21.721 of the Texas Education Code, grades 4, 8, and 10 will be tested beginning in 1993. The 1993 TAAS still tested the three main areas of reading, writing, and mathematics. The mathematics test passing results for the 4th, 8th, and 10th grade are as follows:

| | | |
|---|---|---|
| 4th | - | 59% |
| 8th | - | 43% |
| 10th | - | 55% |

## Future Assessment Programs in Texas

The 1992-1993 school year began a transition for the TAAS assessment program, in which TAAS will measure a broader range of the curriculum and essential elements. In addition to the present content of reading, writing, and mathematics, the future assessment program, when fully in place, will include science, social studies, computer literacy, oral proficiency in a foreign language and physical fitness/health. These exams will take place at the end of Grades 4,8,and 10 (exit level).

Another assessment test will come in the form of end of course tests. Students taking courses will need to pass these tests, created by the state, in order to receive credit for the course. The two courses that have the tests written, but not implemented, are: Biology I and Algebra I. ("TAAS test results", 1993)

## College Board Tests

It is important to note that not all students take college board tests. These tests measure the students' academic abilities and are most valuable when used with other variables such as high school grades and courses taken. The college board tests include the Scholastic Aptitude Test (SAT) and the ACT component of the American College Testing Program and are reported for public high school graduating seniors. Test scores are presented at the national, state, and district level; however, here we present the national vs. state scores.

The SAT scores are the sum of the Math and Verbal scores, ranging from 400 to 1600; and the ACT scores are based on the sum of averages of English, Math, Social Studies, and Natural Sciences test scores ranging from 1 to 36. For our purpose we will use the SAT math scores and the ACT math and natural science scores. It is very important to note that the ACT scores (starting in 1990) were reported in original and enhanced ACT scores and therefore are not comparable with scores from previous years. Enhanced ACT scores are of students who have taken a curriculum based upon higher level courses, this school program can also be titled as a college bound program.

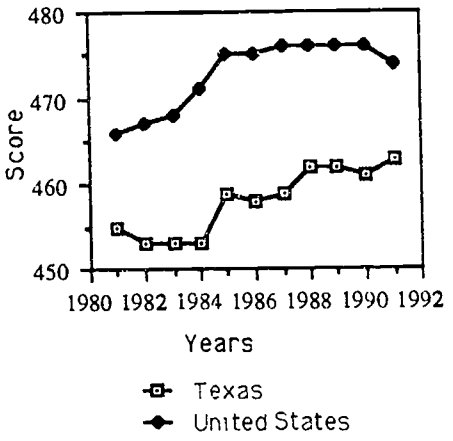
The SAT and ACT are best used as measures of developed academic abilities important for success in college rather than as measures of student ability or achievement in public school. When examined over time, they can also provide a means of assessing changes in how well institutions are preparing students for college.

Figure 15 show results of the SAT mathematics scores for the years 1981-1991. In 1981 the difference between the United States and Texas was 11 points in mathematics, and in

1991 the difference was still 11 points; however, during the ten years the gap had reached a maximum of 19 points difference in 1984. ("Results of College", 1992)

(Figure 15)

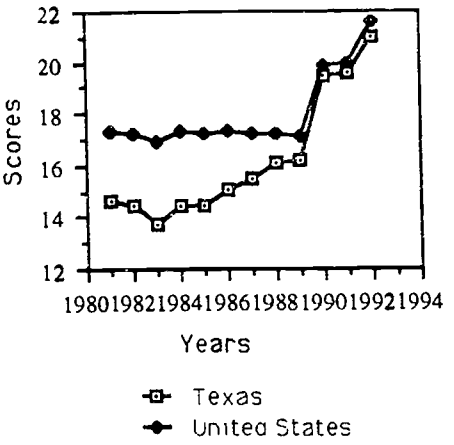
SAT Mathematics Scores for 1981-1991




In Figures 16 and 17, the ACT scores for mathematics and science are shown for the years 1981-1992. It is important to remember that starting in 1990, scores were reported in original and enhanced scores; therefore, starting with 1990, enhanced scores have been reported, so that a comparison of pre-1990 and post-1990 scores is not possible. In both areas, Texas scores were on the rise during the 1980's and early 90's to narrow the gap between Texas and the United States. ("ACT Assessment Results", 1992)

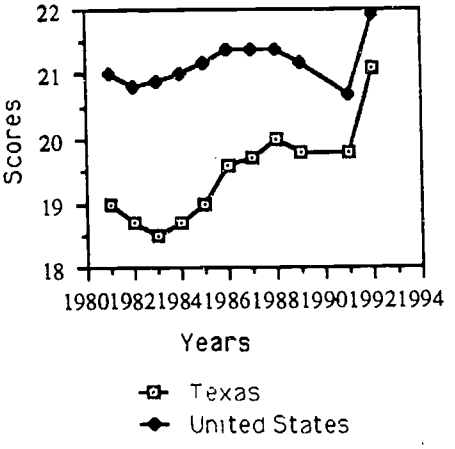
(Figure 16)

ACT Mathematics Scores for 1981-1992




(Figure 17)

ACT Science Scores for 1981-1992




**National Achievement Tests**

Recent trends in education have been to compare national achievement test scores with other states and nations. Texas has also followed this idea. In past years each school district was allowed to pick the type of national achievement test that they wanted to use, like the Iowa Achievement or California Achievement Tests. In 1990, the state of Texas chose to limit the test to one, so that each district would use the

same test. This would allow the comparison of students on a statewide level and on a national level. The Norm-Referenced Achievement Program for Texas or NAPT was the exam chosen for this statewide assessment. Each grade is tested in April (the eighth month of the school year) of that year to check students progress. Scores are then reported in grade standings, for example, if a student is in the third grade and tested at 3.8 in mathematics, they would then be ranked at third grade eighth month or on grade level for that student. If a fifth grade student tested at 6.1 in science, then they would be ranked on the sixth grade one month level or ahead of grade level (grade level would be 5.8). The same holds true if a fourth grade student tests at 4.5 in mathematics, then they are at fourth grade fifth month which is below grade level for mathematics (grade level being 4.8).

The first year's results of the NAPT testing information, for April of 1992, in Texas can be seen in Table 1.

**TABLE 1**
**TEXAS/NAPT RESULTS**
**April (8th month)1992**

| Grade Level | Math | Science |
|---|---|---|
| 3 | 3.9 | 4.2 |
| 4 | 5.0 | 5.1 |
| 5 | 5.8 | 6.5 |
| 6 | 6.7 | 7.4 |
| 7 | 7.6 | 7.8 |
| 8 | 8.4 | 8.5 |
| 9 | 9.6 | 10.9 |
| 10 | 10.9 | 12.1 |
| 11 | 11.1 | 12.4 |

To be ranked at grade level, a student must place at X.8 for their grade (the grade being X). In the field of science, according to NAPT, the only grade that was below level was the eighth grade and the seventh was on level. The rest of the grades were above grade level.

In the field of mathematics, grades three, four and ten were above grade level. Grade five was on level. The grades below level were grades six, seven, eight, nine, and eleven. ("Norm-referenced assessment", 1992)

The 1993 NAPT results were not available for comparison. It is unknown if the NAPT will be continued because the Texas Legislature indicated a shift away from norm-referenced testing and has allowed the State Board of Education to decide whether to use norm-referenced (those tests where a student is compared to another student) or criterion-referenced tests (those tests where a student is tested for mastery of a set of objectives).

## Summary

Since 1980 when the first state wide standardized test was used there has been an overall increase in the scores of Texas students. The problem with the type of testing that Texas used was that each new test could not be compared to the previous test. With the introduction of the TAAS and the future use of this test, that problem will be taken care of.

# EDUCATIONAL OUTCOMES ON THE CLASSROOM/SCHOOL LEVEL

Current trends toward outcomes based education, alternative grading methods, and other methods of evaluating students, we are reminded that not all educational outcomes are assessed appropriately via standardized tests. There are many other indicators that can and will be used to plot the status of the schools in Texas. The following information will focus at the classroom level in Texas and compare this information to the United States. The areas of examination are:

1. Elementary Level
2. Secondary Level
3. Teacher Preparation

In 1988, Congress passed new legislation for the National Assessment of Educational Progress (NAEP) which included a provision authorizing voluntary state-by-state assessments on a trial basis. The federal government arranged for a special grant from the National Science Foundation and the Department of Education to the Council of Chief State School Officers (CCSSO) in mid-1987.

The information being reported for Texas and the United States has come from the Council of Chief State School Officers (CCSSO) and their organization. The CCSSO is a nationwide non-profit organization who head departments of public education in every state, the District of Columbia and, the Department of Defense Dependent Schools. The Council represents the chief administrators and has access to the educational and governmental establishment in each state thus they can provide leadership for a variety of policy concerns that affect education.

All data listed for Texas was reported by the Texas Education Agency to the Council of Chief State School Officers.

### Elementary Level

The structure of elementary schools is set up so that a general and balanced curriculum is taught to the students. Because of this structure, the actual courses being taught can not be listed as on the secondary level. The information that can be measured is the time spent in the classroom on mathematics and science each week. The results are listed below in Table 2.

**TABLE 2**
**ELEMENTARY CLASS TIME SPENT ON MATHEMATICS AND SCIENCE**
**(In Hours)**

Mathematics

| | Grades 1-3 | | Grades 4-6 | |
|---|---|---|---|---|
| | 1990 | 1992 | 1990 | 1992 |
| Texas | 5.1 | 5.1 | 5.1 | 4.1 |
| US | 4.8 | 4.9 | 4.9 | 4.8 |

Science

| | Grades 1-3 | | Grades 4-6 | |
|---|---|---|---|---|
| | 1990 | 1992 | 1990 | 1992 |
| Texas | 3.5 | 2.6 | 4.0 | 3.8 |
| US | 2.3 | 2.6 | 3.0 | 3.1 |

CCSSO 1988/1991

Over the two year period, the national average has been increasing while Texas has been decreasing.

In 1990, it is reported that in the area of mathematics and science, Texas was above the national average in time spent on these subjects. However, in 1992 these gains have started to slip away from us. In the area of mathematics, grades 1-3 still receive 5.1 hours of instruction a week but now the national average has closed the gap to be 4.9 hours a week, for grades 4-6 the results are not as good in 1992. Grades 4-6 spent 4.1 hours of instruction, this is down from 5.1 hours in 1990, and the national average is now 4.8 hours a week. This is an area where Texas needs to increase mathematics instruction time to at least the national average.

In science Texas is still ahead of the national average; however, we did loose ground from 1990 to 1992. For grades 1-3, 1990 saw 3.5 hours a week spent on science but in 1992 that had dropped to 2.6 hours a week (the national average). For grades 4-6, 1990 saw 4.0 hours a week spent on science but in 1992 there was a drop to 3.8 hours a week with the national average being 3.1 hours a week.

These elementary grades are very important to building the foundation of later courses and we cannot afford to short these children.

### Secondary Level

Information on the secondary level has always been easier to track because secondary level education has been based on individual subjects and not general education.

This type of information allows us to examine what type of courses students are taking and if they are taking the higher mathematics and science courses over the lower courses.

In this section we will examine the following topics:

1. Average Class Size in Mathematics and Science
2. Secondary Students in Mathematics and Science
3. Course Enrollments in Mathematics 9-12
4. Course Enrollments in Science 9-12
5. Students taking Advanced/Second Year Mathematics and Science Grades 9-12

### Average Class Size

One indictor of a state's value of education is class size. This can show the state's willingness to reduce the number of students in a classroom so that the teacher has more time to work with individual students. Table 3 shows average class size of Texas and the United States for 1990 and 1992.

**TABLE 3**
**AVERAGE CLASS SIZE**

| | Math | | Science | |
|---|---|---|---|---|
| | 1990 | 1992 | 1990 | 1992 |
| Texas | 21 | 20 | 22 | 22 |
| US | 21 | 21 | 22 | 23 |

CCSSO 1988/1991

In Texas the average class size in mathematics has decreased by 1 so that we are below the national average. The average class size in science did not change; however, the

national average increased by 1 so Texas is still below the national average.

## Secondary Students Enrolled in Mathematics and Science

Table 4 shows the proportion of high school students that are estimated to take mathematics and science courses by their graduation.

**TABLE 4**
**ESTIMATED PERCENT OF STUDENTS TAKING MATHEMATICS AND SCIENCE BY GRADUATION**

| | 1990 | | 1992 | |
|---|---|---|---|---|
| | TX | US | TX | US |
| Algebra 1 | 82% | 81% | 87% | 91% |
| Algebra 2 | 54% | 49% | 67% | 55% |
| Calculus | 5% | 9% | 7% | 11% |
| Biology 1 | 95+% | 95+% | 95+% | 95+% |
| Chemistry | 40% | 45% | 46% | 49% |
| Physics | 12% | 20% | 15% | 21% |

CCSSO 1988/1991

Since 1990 Texas has made strides in the areas of mathematics and science courses taken on the secondary level. In the past students could have taken lower level courses, such as Fundamentals of Mathematics, Introduction of Physical Science, etc., to complete their requirements for graduation; however, Table 4 shows that students are not taking this easier route to graduation and are enrolling in higher level courses. In Algebra 1, 5% more Texas students are enrolled than in 1990; however, the national average increased by 10% for the same period of time. Algebra 2 saw the largest increase in mathematics with a 13% increase compared to 6% on the national level, while Calculus remained at 4% below the national average.

In science Texas stayed equal with the national average at 95+% of all students taking Biology 1. There was an overall increase of 2% in Texas students taking Chemistry and a 2% increase in Texas students taking Physics from 1990 to 1992. However, Texas is still significantly below the nation in Chemistry and Physics enrollments.

There can be many reasons for the increase of students taking higher mathematics and science courses. The more likely explanation can be that lower mathematics and science courses are either being phased out or not being allowed to count toward graduation credits. Another can be that more students wish to go to college and these courses will help in the admission process.

## Course Enrollments in Mathematics 9-12

For the purpose of state-by-state comparisons, high school mathematics courses were divided into three categories, (review, informal, and formal mathematics), and each category has from one to five levels for classifying courses. Under formal mathematics algebra I is listed as a level 1 course with algebra II as a level 3 course and calculus a level 5 course. Table 5 shows the change of course enrollments in mathematics from 1990 to 1992.

**TABLE 5**
**COURSE ENROLLMENTS IN MATHEMATICS AS A PERCENT OF STUDENTS IN GRADES 9-12**

| | 1990 | | 1992 | |
|---|---|---|---|---|
| | TX | US | TX | US |
| Review & Informal | 32% | 27% | 31% | 27% |
| Formal 1 | 23% | 21% | 25% | 22% |
| Formal 2-5 | 35% | 34% | 38% | 36% |
| Total | 90% | 82% | 94% | 85% |

CCSSO 1988/1991

From 1990 to 1992, Texas has made some strides in the enrollment of students in mathematics courses on the 9-12 grade level. In the area of Review & Informal mathematics, these include courses like: applied math, consumer math, general math, and pre algebra, Texas enrollment declined 1% from 1990 to 1992. This is good news for it shows that students are starting to take higher level mathematics instead of the lower mathematics. This could be explained because that Texas, beginning in 1993, will phase out Fundamentals of Mathematics and Consumer Mathematics as classes that will count toward graduation requirements, plus by 1995 Pre-Algebra will also be phased out. So the decrease in this category is a good sign that the educational system is thinking about the future graduates and their graduation requirements.

In the area of Formal Mathematics Texas has stayed ahead of the national average in the course enrollments for the higher level courses. Overall Texas is up 3% over the national average in Formal Mathematics and as stated before about the phase out, this trend should continue in the future.

Course Enrollments in Science 9-12

In the area of science, the reporting data on science included four course levels in biology, chemistry, physics, and earth science: basic/applied, general, second year/advanced, and advanced placement. Table 6 shows a listing of those courses in Texas vs. the national average.

**TABLE 6**
**COURSE ENROLLMENTS IN SCIENCE AS A PERCENTOF STUDENTS IN GRADES 9-12**

| | 1990 | | 1992 | |
|---|---|---|---|---|
| | TX | US | TX | US |
| Intro. | 23% | 23% | 24% | 23% |
| Biology | 27% | 25% | 28% | 26% |
| Chem. & Physics & Advanced | 17% | 21% | 20% | 24% |
| Total | 67% | 69% | 72% | 73% |

CCSSO 1988/1991

The results show that Texas has increased student enrollments in all areas from 1990 to 1992. There was a 1% increase in both Introductory and Biology course enrollment and a 3% increase in Advanced courses. Overall there was a 5% increase in the number of students taking science courses, while there was only a 4% increase in the national average.

As with the mathematics courses, Texas will be phasing out some science courses which include: 1992- Introductory Physical Science and 1993- Applied Biology. These courses can be offered but they will not count toward the graduation requirements.

## Students Taking Advanced/Second Year Courses

State data on student enrollments in advanced mathematics and science courses provide an indicator of the proportion of students preparing for college majors in their fields. Table 7 shows this information.

In advanced level mathematics and science courses, only advanced Biology showed a significant increase over that two year period. This trend was similar to national trends.

**TABLE 7**
**STUDENTS TAKING ADVANCED/SECOND-YEAR MATHEMATICS AND SCIENCE COURSES: ENROLLMENTS PER 1,000 GRADE 12 STUDENTS**

| | 1990 | | 1992 | |
|---|---|---|---|---|
| | TX | US | TX | US |
| Calculus | 7% | 7% | 7% | 7% |
| Biology | 12% | 16% | 21% | 24% |
| Chemistry | 2% | 3% | 3% | 3% |
| Physics | 1% | 1% | 1% | 1% |

CCSSO 1988/1991

### Teacher Preparation

The subject area preparation of teachers in science and mathematics has been used as an indicator of teacher quality. The proportion of teachers in science and mathematics who hold college majors in their field of teaching, provides an indicator of preparation that sets a higher standard than an indicator based on state certification. Table 8 compares Texas with the United States in this area.

**TABLE 8**
**PERCENTAGE OF MATHEMATICS AND SCIENCE TEACHERS WITH COLLEGE MAJORS IN FIELD**

| | 1990 | | 1992 | |
|---|---|---|---|---|
| | TX | US | TX | US |
| Math w/ Math Major | 46% | 47% | 59% | 69% |
| Science w/ Science Major | 62% | 66% | 64% | 79% |

CCSSO 1988/1991

As an indicator, Texas is behind the national average and is loosing ground. This is a major area that needs attention for the future of Texas Education. (Blank & Dalkilic, 1990; Blank & Gruebel, 1993)

## PARTNERSHIP PROGRAMS

Citizen involvement in the development of public policy regarding education as well as other areas of public concern is one of the hallmarks of a democratic society. Local control of public schools is a fundamental principle of the American education system, and communities have always been involved to some degree in the operation of their schools. In the past, most of that involvement took the form of unorganized volunteer efforts of parents and other citizens who had some amount of time available However, social and economic changes since the 1970's limited that resource, and the schools became more and more isolated from the adult community.

Reports on the status of education in the 1980's revealed that American schools were having problems providing students with the knowledge and skills needed to

succeed. Individual citizens and the business community were awakened to the problems in American education resulting in a renewed awareness of the importance of citizen involvement in the work of schools.

A major response to our educational needs has been the formation of organized volunteer and partnership programs through which millions of adults have invested their time and effort to assist in the daily operation of their local schools.

The decade of the 1980's witnessed a tremendous increase in cooperation between public education and the private sector. The primary motivation behind this increased cooperation has been the concern for our economic growth as we shift to high-technology in an attempt to survive in a competitive global market. With the increased growth in the quality and quantity of collaborative, partnership programs throughout the United States, program leaders have been working to convert policy into practice.

According to the National Association of Partners in Education there are four categories into which most partnerships fall. These categories are:

1. Sponsorship = a short-term or one-time involvement between business and a school.

2. Adopt-a-school = occurs when a particular school is "adopted" by a business. The partnership usually has a broad purpose to enrich school programs through educational projects, such as mentoring, tutoring, executives-on-loan, donation of equipment, or other resources.

3. A Limited Collaboration = is a collection of community agencies, schools and business organized to work together to improve education in the community.

4. A Planned, Shared Intervention = is a collaboration designed and implemented among schools, business and community agencies that have formed a formal cooperative agreement to jointly define goals and objectives to improve specific outcomes for selected groups of students or individuals.

How do partnerships tie in with educational reform and the role of mathematics and science education. In 1989, President Bush along with the nation's Governors established the America 2000 goals. In October, 1991, the National Education Goals Panel issued its first report on progress toward those goals. Survey results indicate that the activities of partnership programs are closely related to the needs identified in the national goals. According to the report it is reasonable to conclude that partnership program activities are contributing to the improvements cited in the report.

The survey reveals a very heavy emphasis in partnership programs in the areas of mathematics/science and literacy achievement through programs in reading and language arts. Of all schools that had partnership programs, mathematics and science objectives were addressed in 48% of the programs at the elementary level, and 29% at the middle and high school level.(NAPE, November 1991)

One of the most important outcomes of collaboration has been that people outside the schools are coming to better understand the strengths and problems of the schools. They are recognizing first-hand how important the schools and those who serve them are to the well-being of their local communities. As Governor Roy Romer, Chair of the National Education Goals Panel for 1990-91, said that, "Achieving these Goals requires a sustained partnership of government policy and individual and community commitment. Such a partnership requires that we make education the most important business in the nation, in our states, and in our individual lives." (NAPE, November 1991)

In Texas, the role of partnerships have been increasing on all levels. From the local business/school partnership programs to major corporation/school partnership programs. Another area of partnership programs is on the college/university level. More and more colleges and universities are involved with local schools to help develop a working relationship so that all benefit from the interactions.

An example of a college/university level partnership would be the Texas Alliance for Science, Technology and Mathematics Education at Texas A&M University. This Alliance is a statewide, nonprofit consortium made up of businesses, industries, schools, school districts, institutions of higher education, professional organizations, research laboratories, governmental agencies, community groups, and individuals who are dedicated to the reform of science and mathematics education in Texas. Some of the types of partnership activities include:

1. The Governor's Conference on Science, Technology and Mathematics Education which brings together leaders drom business, education, and government to focus on improving science and mathematics education.

2. Texas Teacher Internship Program which provides that teachers work with industry during the summer and return to their classrooms with practical applications of science and mathematics.

3. The Science, Technology and YOUth Symposium allows high school students and teachers in interface with scientists and engineers on the college/university level.

The Texas Alliance for Science, Technology and Mathematics Education is not the only organization in Texas that deals with partnership programs. A general listing of some of these partnership programs and projects are attached to this report.

## NEEDS SUMMARY

The overall purpose for this study was to provide an overview of the status of mathematics and science education in Texas from 1979 to 1993. It is not within the realm of this study to provide a detailed list of objectives and plans for the future. This action should be addressed by educators, citizens, and state agencies. However, there are some problem areas that based upon their historical record must be discussed.

The first problem area deals with the outcomes that Texas wanted from the reform movement. The Descrepancy Model (Fox, 1983) suggests that change processes should focus on determining the difference between the "ideal" state and the current state, with the result being "discrepancy." Thus, the process focuses on identifying those objectives that need attention. In order to use a discrepancy model to develop a list of needed improvements, this would involve knowing what the ideal outcomes were when the educational reform movement started. In 1979 there was no list of ideal outcomes generated for Texas. However, if we use the essential elements, that were developed later, as the ideal outcomes, this can provide us with a general list to start. One problem with using essential elements, they go through a review process every five years for updating so the list of outcomes is ever changing.

The second problem area is in the use of assessment tests to provide evaluation information. Here again, the major problem has been that the test is completely changed every five years. There is nothing wrong with change except these assessments tests have been changed so that the results of one series cannot be compared with previous series of tests.

A third problem area is on the classroom/school level. With site-based management being used in Texas schools, the ability to plan statewide curriculum can be hampered. With each school district and campus being allowed to change curriculum it can become difficult to achieve an overall goal for mathematics and science education reform.

And last, the area of school and community partnerships. This area provides the problem of communication. With the rise of partnerships there comes the need to communicate the educational goals of schools to the community and create the partnerships needed to bring about change. The schools have the ability to build partnerships but they lack the knowledge of partnership building.

In order to resolve these problems for the future assessment of any educational programs, including mathematics and science, in Texas, some changes must take place. Some suggestions for change would be:

1. To create a list of educational goals or objectives that can be measurable for future reference.
2. To create assessment tests that can be updated but are based upon educational goals that are comparable to previous assessment tests.
3. Provide minimal and measurable requirements for schools to follow in mathematics and science education on the elementary and secondary level. This will help in site-based planning on the school district and campus level. and
4. Provide educational workshops for school district/campus leaders and community leaders in the area of partnership building.

These are general ideas that can provide for all areas of education, including mathematics and science.

If these suggestions are used, it should provide for the ability to better measure the educational outcomes in the future and provide for a better understanding and the ability to communicate among the academic and private sector, thereby creating a statewide educational partnership for the betterment of our students and future citizens.

## CONCLUSION SUMMARY

The status of mathematics and science education in Texas shows overall improvement since the early 1980's. Many factors contributed to this, from the increase of involvement on the national level, to the involvement of citizens on the state level. All have had a share in the change of their educational system.

On the national level, federally sponsored grants played a significate role in the Texas education reform movement. The Department of Education along with the National Science Foundation made mathematics and science education a priority and a cornerstone of educational reform. The Eisenhower Program has benefited school disrticts with programs ranging from teacher in-service, to long term projects like Project 2061.

In Texas the reform movement started in 1979 with the passage of House Concurrent Resolution 90 which called for a curriculum review of the entire educational curriculum. From this review came several pieces of legislation that helped change the educational system in Texas, they include HB246 and HB 72.. From these the Texas State Board of Education, the Texas Education Agency, and the Texas Higher Education Coordinating Board were involved with creating the overall system of education that we have today.

In order to assess the impact of these changes, several types of critera were selected. Achievement tests, including TABS, TEAMS, and TAAS show improvements in student achievement on these tests in every or nearly every instance over the past ten years. ACT and SAT scores also showed an increase over the same time period. However, testing was not the only critera for evaluation.

Other indicators showed: a decrease in of class time spent on mathematics and science on the elemenetary school level in Texas; decrease in student enrollment in lower level mathematics and science classes for graduation; increases in student enrollments in advanced courses in mathematics and science courses toward graduation; and increases in the number of teachers certified to teach advanced level mathematics and science courses.

One last area of change is the public's involvement and concern for education. This has led to the creation of numerous partnerships on the local, state, and national level. To preserve these achievements in educational reform, we must continue to evaluate progress and make the neccessary changes.

# Mathematics and Science Directory

Within this Directory are listed Partnerships, Programs, and Projects from around Texas; however, this is not a complete listing. Listings were recieved from a general mailing around the state and from previous listings of mathematics and science partnerships, programs, and projects. They are divided into three general sections according to the descriptions provided by the contact person. For futher listings, contact the Southwest Educational Development Lab (SEDL) in Austin, Texas.

## Partnerships

*PARTNERS IN EDUCATION (P.I.E.) - Our goal is to utilize local scientists, engineers, teachers, and technicians, to achieve improve student performance, provide a clear picture of scientists and engineers and attract underrepresented groups to the study of science. Our objectives are: 1) increase student interest and performance in math and science, 2) correct misconceptions and break stereotypes students have about scientists and engineers, and 3) encourage females and minorities to pursue technical careers.

Contact: Dr. Kathy Juneau
P.I.E. Coordinator
South Texas Section ACS
P.O. Box 9077
Corpus Christi, Texas 78469

*SHELL WESTHOLLOW RESEARCH CENTER AND REES ELEMENTARY BUSINESS AND SCHOOL PARTNERS - Our goal is to improve and expand science and mathematics instruction, and stimulate community interest and involvement. Our objectives include to involve students, teachers, and parents in meaningful hands-on application of science and math.

Contact: Nancy Dobbs
Science Specialist
Rees Elementary School
16305 Kensley
Houston, Texas 77082

*PARTNERSHIP EMPOWER STUDENTS TO EXCEL - Our goal is to create a collaborative partnership to address science, mathematics and technology education as it relates to advanced technology.

Contact: Pat Wingo Macune
Judson ISD
P.O. Box 249
C verse, Texas 78109

*MINORITY MATHEMATICS/SCIENCE EDUCATION COOPERATIVE - Our goal is to bring together a partnership of 8 universities, 16 minority elementary schools and 11 school districts to effect an intensive, four year program in teacher enhancement. Our objectives are: 1) increase teachers' knowledge of fundamental mathematics and science concepts, 2) improve teaching practices and understanding of culturally diverse students, and 3) integrate content and affective strands to foster improvements in the performance and classroom achievements of minority children.

Contact: Ramon Alaniz
MMSEC Site Coordinator
#1 West End Washington St.
Laredo, Texas 78040

*EDUCATION FOR TOMORROW ALLIANCE - Our goal is to form alliances between the community and education to enhance individual academic growth. Our objectives are: 1) to obtain the commitment of individuals, business and other institutions to become active participants lending fiscal and other support to local schools, 2) involve regional post-secondary institutions through the establishment of a forum to develop creative educational input and enrichment, 3) use combined community resources to further science, mathematics and technology education, and 4) maximize the involvement of parents in the educational process.

Contact: Kathy Pettit
Coordinator
ETA
4800 Research Forest Dr.
The Woodlands, Texas 77381

*SCIENCE PARTNERS FOR HOUSTON (pH): MODERN SCIENCE LABORATORY PROJECT - Our goal is to establish an on-going support system for science teachers in an urban setting to enhance science education for all middle school students. Our objectives are: 1) intensive professional development for eight Resident Teachers each year, 2) long-term monthly workshops for all middle school science teachers, 3) interaction with local scientists and engineers from universities and industries to up-date science content and provide access to community resources, 4) on-going communication network connecting all middle school science teachers and the community, and 5) development and construction of a model science classroom designed by teachers and used as a training and teaching headquarters.

Contact: Dr. Elnora Harcombe
Project Director
Rice University Education Department
P.O. Box 1892
Houston, Texas 77251

*EXXON CHEMICAL/PAUL REVERE MIDDLE SCHOOL SCIENCE EDUCATION PARTNERSHIP - Our goal is to improve middle school science education by increasing student interest in science, enhancing teaching capabilities and displaying the important relationship between science education and everyday life. Our objectives are: 1) use a quality approach in jointly designing initiatives that require measurable "customer oriented" goals and provide a means for continuously improving the science education process, 2) augment and enhance teaching capability at the middle school level to provide personal insights into modern science and its importance to our society, 3) increase interest and relevance of science education for students of all capabilities, 4) assist company volunteers to become involved in local initiatives which engage students, teachers, parents and the community, and 5) leverage our efforts by learning from business, educational and community organizations and enlisting their help in forming partnerships.

Contact: Dawn M. Miller
Systems Analyst
Exxon Chemical Co.
13501 Katy Freeway
Houston, Texas 77079-1398

*PARTNERSHIP TO ENCOURAGE TEACHING OF ELEMENTARY SCHOOL SCIENCE IN SOUTH TEXAS - Our goal is to broaden the interest of students in science and mathematics and to encourage the teaching of science and mathematics in South Texas.

Contact: Dr. F. Michael Speed, Director
Blucher Institute
Texas A & M University at Corpus Christi
6300 Ocean Drive
Corpus Christi, Texas 78412

*PARTNER S H I P: PARTNERS OF STUDENTS, HIGHER EDUCATION, INDUSTRY AND PARENTS WORKING TOGETHER - Our goal is to encourage and motivate students so they will enroll and excel in science and math courses and make Austin ISD the best school system in science and math. Our objectives are: 1) a career fair for 7th grade students to excite and encourage young people to explore mathematics, science, and engineering applications, and 2) an engineering mentorship program during engineering week for middle and high school students in the Austin area.

Contact: Harold R. Grubb
IBM Corporation
11400 Burnet Road
Austin, Texas 78758

*TEXAS A&M UNIVERSITY OUTREACH PARTNERSHIP - Our goal is to provide educationally disadvantaged students with the academic skills, counseling, guidance, encouragement, and support that will allow them to break the economic cycle of poverty or low-income status. Our objectives are: 1) provide tutoring in science, math, and communication skills, 2) provide counseling and guidance to prepare students for post-secondary educational opportunities, 3) provide counseling and guidance to improve post-secondary employment, and 4) provide tutoring, counseling, and guidance for at-risk students.

Contact: Linda Vasquez
University Outreach - TAMU
410 So. Padre Island Dr. #102
Corpus Christi, Texas 78405

*VIDEODISC PARTNERSHIP PROGRAM - Our goals are to make scientific literacy attainable by all Texas children through the Windows on Science courseware, approved by the Texas State Board of Education for the statewide adoption as a "textbook" and to assist schools with the hardware costs of adopting Windows on Science videodisc-based science program. Our objective is to provide opportunities for organizations and individuals to support the commitment to improvement and innovation of better science instruction and materials.

Contact: Deborah Harrison
Texas Director of Curriculum & Instruction
Optical Data
100 Congress, Suite 2100
Austin, Texas 78701

*TOWARD THE YEAR 2000 - A SCHOOL DISTRICT'S VISION - Our goal is to have a School/Business Partnership that is a joint effort of the Beaumont ISD and local companies and organizations. This special partnership is designed to enhance the educational experiences for the students and improve achievement.

Contact: Darylann Hansen
Director, Computer Services
Beaumont ISD
3395 Harrison
Beaumont, Texas 77706

*PROJECT OCEAN - A cooperative effort between Port Aransas ISD and the University of Texas Marine Science Institute (UTMSI) to provide all K-8 students a coordinated marine science curriculum.

Contact: Dale Pitts
Port Aransas ISD
Port Aransas, Texas 78373

*LOCKHEED'S AMERICAN ENTERPRISE PARTNERSHIP - The purpose of the program is to promote interaction with the schools and to increase student understanding of the business word. The program includes speakers, video material, mini-courses, etc. Students may also "shadow" an employee to understand the importance of their education in preparing for the business world.

Contact: David Shea
Clear Creek ISD
Community Partnership Program
Box 799
League City, Texas 77574

*PASO PARTNERS PROJECT - a partnership of three public school districts, two institutions of higher education, and staff mount a coordinated assault on the problems of poor mathematics and science achievement among limited-English-proficient Hispanic students in K-3. The Paso partners will combine the best strategies and materials for teaching mathematics and science and will train teachers and provide technical assistance to help them.

Contact: Preston Kronkosky
Southwest Educational Development Laboratory
211 East Seventh Street
Austin, Texas 78701

*MULTISTATE CONSORTIUM FOR INTEGRATED BIOLOGY/CHEMISTRY CURRICULUM - 35 State Education Agencies formed a consortium to design, develop, and disseminate high quality, instructional materials, teaching methods, and assessment tools that will encourage the effective implementation of a new science curriculum. The goals are: 1) to increase the number of students mastering science, 2) equip teachers to different learning styles, 3) increase student interest in science and technical careers, and 4) create and enthusiasm for learning within those students.

Contact: Daniel Hull
Center for Occupational Research and Development
601 C Lake Air Drive
Waco, Texas 76710

*AN EXTENSION OF THE SS&C WORKING PARADIGM - a continuing partnership between the National Science Teachers Association, Baylor College of Medicine, and Houston I.S.D. for the purpose of demonstrating the effectiveness of the "Scope. Sequence and Coordination" (SS&C) model of science reform for a major urban school district. The objectives are: 1) expand SS&C science instruction to all 33 middle schools in Houston I.S.D., 2) refine the SS&C curriculum materials developed as "thematic blocks", and 3) provide systematic dissemination through conference and training designed to share the lesson learned.

Contact: Linda Crow
One Baylor Plaza, Room 633 E
Houston, Texas 77030

*P.A.T.H. (PARTNERSHIP FOR ACCESS TO HIGHER MATHEMATICS) MATHEMATICS - a partnership funded by the U.S. Department of Education to conduct research in mathematics teaching and learning and in social services601. The goal of PATH is to form a partnership among Southwest Texas State University (SWT), San Marcos I.S.D., San Marcos Telephone Company (SMT), and the community. Their objectives are: 1) to develop a new Pre-Algebra curriculum, 2) develop a systematic tutoring program, and 3) develop and implement a support program through social work interns from SWT.

Contact: Dr. Nancy Chavkin
PATH Mathematics
Southwest Texas State University
601 University Drive
San Marcos, Texas 78666-4616

## Programs

*MAJOR RIVERS: TEXAS' FOURTH GRADE WATER EDUCATION PROGRAM- Our goal is to increase awareness of the need to protect and conserve water as well as to teach the location of rivers in Texas. Our objective is to focus on five aspects of water: the water cycle, water supply, water distribution, water use, and water conservation.

Contact: Donna Darling
Education Coordinator
Texas Water Development Board
P.O. Box 13087
Austin, Texas 78711-3231

*EARTHCARE IN LAFTERSCHOOL: NEW CURRICULUM FOR EXTENDED SCHOOL PROGRAMS - Our goal is to develop a non-traditional environmental curriculum which can be used in the after school programs being developed across the state. Our objective is to develop a program from university and community resource opportunities which will provide "hands-on" scientific exploration of the environment and the living organisms with which man shares our earth.

Contact: Mrs. Jana Turner
Director, Extended Day
Bryan I.S.D.
2200 Villa Maria Blvd.
Bryan, Texas 77801

*SCOPE, SEQUENCE AND COORDINATION OF SECONDARY SCHOOL SCIENCE - Our goal is to provide appropriate integrated science instruction for all students in secondary schools by taking advantage of the efficacy of spaced learning; providing students with experience with science phenomena; and building concepts of science on repeated experiences in different contexts. Our objectives are: 1) intensive professional development, 2) on-site visits to the classroom of teachers, 3) production of teaching blocks using concepts identified by the National Science Teachers Association, 4) teacher interaction with local and national consultants to up-date science content, and 5) production of experience-based activities that are student centered.

Contact: Barbara Foots
Science Director
Houston I.S.D.
3830 Richmond Ave.
Houston, Texas 77027

*TANDY SCHOLARS PROGRAM - FORT WORTH I.S.D. - Our goal is to improve educational opportunity for students in the Fort Worth ISD through a program that recognizes and rewards outstanding students and teachers. Our objectives are 1) to increase the number of National Merit Scholars in the Fort Worth ISD, 2) to honor students who achieve academically, and 3) to honor teachers who excel in teaching math and science technology.

Contact: John Burnam
Vice President
Tandy Corporation
1800 One Tandy Ctr.
Fort Worth, Texas 76102

*ALAMO TECH PREP CONSORTIUM'S ELECTRONICS TECH PREP PROGRAM - Our goal is to: 1) implement the new tech prep electronics program through the Alamo region, 2) promote higher level math, science, communication, and technology skills for secondary and post-secondary students, and 3) provide the U.S. with trained technicians. Our Objectives are: 1) implement the program in 9 ISDs and three community colleges of the Alamo Community College District, and 2) begin with Algebra 1, then proceed with a new course: Principles of Technology.

Contact: Dr. Dave Stamper
Alamo Tech Prep Consort.
SAC, 1300 San Pedro
San Antonio, Texas 78212-4299

*MOVE IT! (MATHEMATIC OPPORTUNITY, VALUABLE EXPERIENCES, INNOVATIVE TEACHING) COMAL ISD - Our goal is to implement the NCTM (National Council of Teachers of Mathematics) "Standard" in grades K-6. Our objectives are: 1) basing instruction on learner outcomes rather than pages covered, 2) having educators, rather than textbooks, decide on suitable educational experiences for children, and 3) acknowledging achievement and making room in the curriculum for topics other than computation.

Contact: Paul Shoecraft
University of Houston - Victoria
2506 East Red River
Victoria, Texas 77901

*E-SYSTEMS/GREENVILLE ISD MATH AND SCIENCE SCHOLARSHIP AWARDS PROGRAM - Our goals is to encourage students who demonstrate ability and interest in math and science to continue that interest throughout their school careers and after graduation by the rewarding of savings bonds to help them with their college funds. The program also rewards one outstanding teacher in math and science with a $2000 savings bond each. Our objective is to provide nineteen student awards per semester of $200 each. In the seventh grade from life science, pre-algebra and regular math; high school from physical science, biology chemistry, physics, advanced placement biology and advanced placement chemistry, algebra 1, algebra 2, geometry, computer math, pre calculus/trigonometry, and calculus.

Contact: John Sutton
Manager of Public Relations and Personnel Services
E-Systems Greenville Division
P.O. Box 6056
Greenville, Texas 75403-6056

*TEXAS SCHOLARS - Our goals is to encourage students to complete high school courses that provide a fundamentally sound academic (math. science, social studies, language arts, and computer sciences). Our objectives is to increase the percent of students of both sexes and all races that are themselves academically with skills that business/industry needs in its work force, and consequently, to ensure that more students are able to find meaningful work after graduation.

Contact: Joe Randolph
Manager-Training Department
Texas Eastman
P.O. Box 7444
Longview, Texas 75607

*EXPERIENCING HANDS-ON MUSEUMS - Our goal is to de-mystify science and technology, make it accessible and understandable to teachers and students, to educate and empower teachers using "hands-on" or participatory techniques. Our objectives are: 1) to use the science center as a forum for student and teacher education, 2) to explore the applications of science and technology to everyday life, 3) to provide experiences with hands-on science education, and 4) to inform teachers, students and parents of community resources in science education.

Contact: Deborah Borse
Director of School Programs
The Science Place
P.O. Box 151469
Dallas, Texas 75315

*TEXAS ACADEMY OF MATHEMATICS AND SCIENCE - Our goal is to foster high ability students with interest in and commitment to math and science with early college opportunities. Our objectives are: 1) to provide concurrent enrollment in high school and university classes, 2) summer internships and mentorships with active researchers at the University of North Texas and the University of Houston, and 3) summer math programs for junior high minority students.

Contact: Dr. Richard W. Stream
Director of Admissions
Texas Academy of Math & Science
P.O. box 5307
Denton, Texas 76203

*THE PALACIOS MARINE EDUCATION CENTER - The program services students in grades K-12 by providing instruction in general marine education as well as related occupations and aqua culture.

Contact: William Reaves
Palacios ISD
1209 Twelfth Street
Palacios, Texas 77465

*GLOBAL EDGE - Our goal is in support of a comprehensive program designed to develop a world class workplace for north Texas, GLOBAL EDGE will implement tech prep programs across the consortium. Our objectives are: 1) upgrade/implement career awareness/exploration programs K-8, 2) career decision making process in 8th, 3) pre-tech prep curriculum in grades 9-10, 4) implement tech prep Competency Block 1 course in 11-12, 5) implement tech prep Competency Block 2 courses leading to intermediate certificates at the college, 6) Competency Block 3 courses leading to certificates at the college, 7) Competency Block 4 courses leading to Tech Prep AAS degrees, 8) expand articulation programs facilitating transfer of tech prep graduates to baccalaureate colleges, 9) develop bridge/transition programs for adults into tech prep programs, 10) upgrade the academic rigor of curriculum K-14, and 11) integrate essential work place skills identified by the SCANS and other reports, throughout the curriculum K-14.

Contact: John Hart
Collin County Community College
2200 West University
McKinney, Texas 75070

*BUSINESS AND EDUCATION - WORKING TOGETHER TO MEET THE CHALLENGE - Our goal is to enable an increase in the availability of technology-trained workforce in the future through an increased level of understanding of mathematics and science.

Contact: Joann Conoley
Rockdale ISD
P.O. Box 632
Rockdale, Texas

*FORT BEND ISD'S ELEMENTARY HANDS-ON SCIENCE PROGRAM DEVELOPING A SCIENCE COMMUNITY - Our goal is for all Fort Bend ISD's elementary students to participate in a hands-on science program which engages their natural curiosity, enhances their problem solving skills, broadens their perceptual awareness and conceptual understanding of the world around them, and foster the development of scientific attitudes. Our objectives are: 1) provide teacher training, background information, and all materials necessary for successfully guiding students in scientific exploration about the world around them, 2) foster a positive attitude towards science both in the classroom and in the community, and 3) develop critical thinking and problem solving skills in Fort Bend ISD's students.

Contact: Joyce Dutcher
Fort Bend ISD
P.O. Box 1004
Sugar Land, Texas 77487-1004

*SENIOR MENTORSHIPS AT SAINT MARY'S HALL - Our goal is to provide first-hand experience in a possible career field of the student's choice. Our objectives are: 1) to give students assignments which evolve from their interests in fields of study, 2) to suggest particular aspects of work of the sponsoring organization which might be suited to the student's interest and involvement, 3) to plan assignments so they can be completed within the semester prior to graduation, and 4) to deal with potential safety problems which may influence the performance of an assignment.

Contact: Brian Kaestner
Mentorship Coordinator
Saint Mary's Hall High School
9401 Starcrest Dr.
San Antonio, Texas 78217

*CHRISTOPHER COLUMBUS CONSORTIUM - Our goals are to develop a relationship among a college of education, a school district and a corporation to support increased use of technology for instruction and to infuse a high teacher/computer ratio into a K-2 school to study the effects it has upon primary education.

Contact(s): Dr. William Lasher
Univ. of Texas at Austin
EDB 210
Austin, Texas 78712

Dr. Hope Erickson
Eanes ISD
601 Camp Craft Road
Austin, Texas 78746

*SCIENCE FOR THE FUTURE SCIENTIST - Our goal is to increase the relevance of science via on-site association with the successful scientist and provide a meaningful work experience to attract and retain scientists and engineers for the future.

Contact: Dr. M. Akram Rana
District Coordinator for Math & Science
Box 266 Administration Building WISD
Weslaco, Texas 78596

*TECHNOLOGY EDUCATION IN THE RICHARDSON ISD - A program has been implemented to promote problem-solving, creativity and research and development in the high tech labs. The lab also provides the opportunity for science, mathematics and other academic areas.

Contact: Dave Pullias
Richardson ISD
400 South Greenville Ave.
Richardson, Texas 75081

*STEPPING INTO SUCCESSFUL SCIENCE TEACHING - The goal is to model effective teaching strategies in elementary science. The objectives are: 1) define and use basic and higher level skills, 2) organize cooperative tasks, 3) use questioning strategies, and 4) make science relevant by using examples.

Contact: Dr. Glenn Longley
Southwest Texas State University
San Marcus, Texas

*TEXAS ELEMENTARY SCIENCE INSERVICE PROGRAM - Was developed to improve the teaching and learning of science in grades 1-6 in Texas. Provides motivational "hands-on, minds-on" model science lessons from the life, earth, and physical sciences.

Contact: James P. Barufaldi
T.E.S.I.P. Project
Science Education Center, EDB 340
The University of Texas at Austin
Austin, Texas 78712

*SCIENCE IN THE MIDDLE SCHOOL TEACHER INSERVICE PROGRAM (SIMSTIP) - This statewide program was developed by The Univ. of Texas at El Paso with El Paso ISD. The major thrust is experiential learning through hands-on, minds-on activities. The program includes a Grade 7 Science I course and a Grade 8 Science II course.

Contact: Dr. Carol Stuessy
EDCI, College of Education
Texas A & M University
College Station, Texas 77843-4232

*MIDDLE SCHOOL POSTER CONTEST - The Texas Alliance for Minorities in Engineering (TAME) Middle School Poster Contest is designed to increase the interest in mathematics and science among female and minority students in grades seven and eight. The emphasis is to promote career interests in engineering and science early in the students' education development and to guide them into a college-bound curriculum in high school.

Contact: Texas Alliance for Minorities in Engineering
University of Texas at Austin
Austin, Texas

*MINORITY INTRODUCTION TO ENGINEERING (MITE) - The MITE Program's objectives are to motivate and better prepare high school minority students to pursue a career in engineering.

Contact: MITE Project Coordinator
College of Engineering and Architecture
Praire View A&M University
Praire View, Texas

*TEXAS PREFRESHMAN ENGINEERING PROGRAM (TexPREP) - The eleven programs of Tex PREP provide education enrichment opportunities for high ability middle school and high school students interested in pursuing careers in science and engineering fields. The emphasis of these programs will be on study and research in mathematics, physics, engineering, computer science, and technical writing.

Contact: Dr. Mannel P. Berrioza'bal
Tex PREP Office
The University of Texas at San Antonio
6900 N. Loop 1604 West
San Antonio, Texas 78249-0661

*SUMMER HIGH SCHOOL APPRENTICESHIP RESEARCH PROGRAM (SHARP) - The program offers the students an opportunity to learn and earn. After participating in an orientation process, they are assigned to work with a NASA/Johnson Space Center mentor in a specific technical area. During this apprenticeship, the students carry out assignments, prepare written reports, make oral presentations, and participates in a variety of enrichment activities, such as career counseling and tours, under the supervision of the SHARP program staff.

Contact: SHARP Program Coordinator at NASA
NASA / Johnson Space Center
Houston, Texas

*TLTG CHEMISTRY I - The goals of TLTG Chemistry are to improve student's understanding of chemical principles, increase student's awareness of chemical process, and develop the critical thinking skills necessary for chemical problem solving. Also TLTG wants to encourage deep conceptual understanding in students and they are invited to observe phenomena, pose explanations, contrast their ideas with those of scientists, and use newly learned chemical principles in different contexts.

Contact: Elliot Richmond
TLTG
P.O. Box 400
Austin, Texas 78767-8582

*TLTG PHYSICAL SCIENCE - The goals are to increase student's understanding of physical science, illustrate the relevance of science to daily life, and prepare students for academic and professional advancement in the sciences. The interactive vediodisc-based course includes an introductory unit, seven chemistry units, six physics units, and a unit energy resources.

Contact: Elliot Richmond
TLTG
P.O. Box 400
Austin, Texas 78767-8582

*TLTG MATH FOR SCIENCE - the goals are to improve student's understanding of the relationship between math and science. Each activity includes instructions, math aids, graphical illustrations of direct and inverse relationships and a powerful, multipurpose graphing package that allows data input, specification of variables, setting parameters, and several different curve fitting techniques.

Contact: Elliot Richmond
TLTG
P.O. Box 400
Austin, Texas 78767-8582

*TECHOLOGY-BASED SCIENCE INSTRUCTION - the goal is to combine an established technology-based physical science programs with others to recognize motivational programs, content and pedagogical training. The objects are: 1) increase student mastery, 2) increase teacher confidence, 3) address special learning needed, 4) increase student interest in science, and 5) increase teacher usage of questioning techniques.

Contact: Greg Veal
P.O. Box 217
Lewisville, Texas 75067

*JETS CHAPTERS - Junior Engineering Technical Society Chapters are open to students grades 7-12. Chapters provide guidance in an effort to maintain interest in mathematics and science. Chapters receive a list of guest speakers, reference and enrichment materials, competition information, and three issues of the "JETS of Texas" newsletter. Chapter members are eligible for JETS Scholarships and sponsors for Outstanding Sponsor Awards.

Contact: Margaret McKinney or Sylvia Griffith
TSPE
1-800-580-8973

*TESTS OF ENGINEERING APTITUDE, MATHEMATICS AND SCIENCE (TEAMS) - Teams competition is a team-format, open book, open-discussion, interdisciplinary test for high school students. Students may bring any and all reference books and notes, and are encouraged to collaborate on solutions to the problems. State division winners are ranked against schools from all 50 states in determining national champions.

Contact: Margaret McKinney or Sylvia Griffith
TSPE
1-800-580-8973

*NATIONAL ENGINEERING DESIGN CHALLENGE (NEDC) - is a national-level design competition. Each team receives an "annual problem" and the criteria for their solution. Because of the criteria, teams consult speech, science, math, and technology departments to prepare for their demonstrations. The top state team advances to the national contest in Washington, D.C. in late spring.

Contact: Margaret McKinney or Sylvia Griffith
TSPE
1-800-580-8973

*TEXAS ENGINEERING SKILLS COMPETITION (TESC) - is a state-level competition comprised of exams in biology, chemistry, computer fundamentals, English, math, and physics. Student choose two subjects and compete individually. Top-scoring individuals and teams receive awards plus advance to the state competition at Texas A&M in April.

Contact: Margaret McKinney or Sylvia Griffith
TSPE
1-800-580-8973

*TEA MATHEMATICS STAFF DEVELOPMENT PROGRAM (MATH MODULES) - Our goal is to work together to develop and implement a series of 30 training modules for teachers of mathematics and have those teachers use these modules in their classrooms. The modules are designed to provide a basic foundation for teaching the mathematics essential elements using manipulative material, concept-development techniques, and problem-solving applications. Participants receive a certificate from the Texas Education Agency.

Contact: Bonnie McNemar
Texas Mathematics Staff Development Program
Harris County Dept. of Education
6300 Irvington Blvd.
Houston, Texas 77022-5618

## Projects

*UTSA/ALLIANCE FOR EDUCATION/SOUTHWEST RESEARCH INSTITUTE AND OTHERS - Our goal is to transfer science rich resources from the private sector to the public schools. Our objectives are: 1) to increase teacher professional development, 2) science teacher/scientist partnership, 3) mini-grants for teachers, 4) student internships, 5) Project 2061, 6) America 2000 New generation of Schools, and 7) a comprehensive regional science center for minorities.

Contact: Dave Sugg
Associate Director
UTSA/Alliance for Education
310 S. St. Mary's Street, Suite #1416
San Antonio, Texas 78205-3108

*PROJECT SEED & TAX INSTRUMENTS, INC: YOUNG INNER-CITY STUDENTS SUCCEED IN ADVANCED MATHEMATICS - Our goal of Project SEED is to increase the self-esteem, math and critical thinking skills of inner-city students thereby increasing the number of students able to pursue the serious study of high school and college. Our objectives are 1) direct mathematics instruction to inner-city students, 2) teacher training of regular classroom teachers in Project SEED techniques & methodology, 3) weekly workshops & training of mathematicians and scientists to optimize their effect in the classroom, and 4) combination of corporate & other resources to provide the support necessary to make the program successful & far-reaching.

Contact: Hamid Ebrahimi
National Director
Project SEED
3453 Flair Dr., Suite 123
Dallas, Texas 75229

*TEXAS ENERGY EDUCATION DEVELOPMENT (TEED) COMMUNITY HOME WEATHERIZATION PROJECT - Our goal is to increase energy education in American schools by involving Texas high school students in a community service project that educates them about energy conservation and provides long lasting benefits to low income elderly/handicapped members of the community. Our objective are: 1) to have students teach themselves, each other, and the community about energy resources and issues, 2) to have student learn how to organize a weatherization project, to be trained in weatherization techniques, and to weatherize houses, 3) find houses to weatherize and solicit contributions for materials, 4) have students arrange for training in weatherization, and 5) design energy conservation posters, locker hangers, and teach elementary students about energy conservation.

Contact: Monica Walden
TEED Project Administrator
1714 Nash #101
Austin, Texas 78704

*ST. PHILIP'S COLLEGE MATH/SCIENCE CAMP AND CHEMISTRY CAMP - Our goals are: 1) to provide a summer math/science and chemistry camp to 480 elementary and middle school students who are inner-city, lower socio-economic background, 2) set up a class for the hearing/deaf impaired, and 3) target populations of students who are both underrepresented in higher education and more specifically in the fields of math and science. Our objective is to allow students to conduct experiments and provide classes that involve estimation, probability, histograms and problem solving.

Contact: Ms. Patricia P. Candia
Mgr., Student Academic Support
1801 Martin Luther King
San Antonio, Texas 78203

*EDS AND THE JASON PROJECT - Our goal is to stimulate students' interest in science and technology. Our objectives are: 1) to provide hands-on learning opportunities for students in grades 4-12, and 2) to enable students to experience the thrill of scientific discovery using state-of-the-art-technology.

Contact: Diane Spradlin
Director, EDS Special Projects
7171 Forest Lane, A740
Dallas, Texas 75230

*MCKINNEY ISD/TLTG CHEMISTRY - Our goals are: 1) to provide an engaging presentation of chemical concepts that will increase student's knowledge and conceptual understanding of chemistry and chemical processes in the world around them and 2) to set content, skill level, and delivery to target a broader student population than traditional chemistry courses. Our objectives are: 1) to use a conceptual, inquiry based approach, 2) to accommodate a variety of learning styles through interactive computer-videodisk instruction and activities, laboratory experiments, print based material and teacher presentations, and 3) to treat essential content and skills in depth.

Contact: Kathy Arno
McKinney ISD
1400 Wilson Creek Pkwy.
McKinney, Texas 75069

*FORT WORTH: PROJECT C3 - Our goals are to transform the Fort Worth ISD into a system of high performance schools that motivate and prepare students for success in school, in the workplace and their life, plus build the school of the future in Fort Worth. Our objective is for employers and employees in Fort Worth identify those skills needed in the workplace for all job levels; an assessment of educational resources and needs; skills needed and skills taught are being integrated into classroom instruction, teacher training, equipment used and; performance standards are being established for graduates that are going to higher education or going directly into the workplace.

Contact: Donna R. Parker
Vice President
Fort Worth Chamber
777 Taylor; Suite 900
Fort Worth, Texas 76102

*SCIENCE ACADEMY OF AUSTIN/PROJECT A+ - Our goal is to create a magnet program for students interested in math, science, and computer science, and to make Austin ISD a "World Class" school system.

Contact: Suzanne Sinkin-Morris
7309 Lazy Creek
Austin, Texas 78724-3299

*THE RICE UNIVERSITY SCHOOL MATHEMATICS PROJECT - The Rice University School Mathematics Project (RUSMP) is a partnership between Rice University and Houston area (K-12) mathematics and teaching programs. RUSMP offers summer programs on the Rice campus and at three satellite campuses. RUSMP joined with Baylor College of Medicine to provide a program in mathematics and science for elementary teachers who are in the Alternative Certification Program developed by Houston I.S.D. During the year RUSMP hosts two workshops at which distinguished educators speak and former participants present workshops.

Contact: Dr. Anne Papakonstantinou Coordinator, RUSMP
205 Biology
Rice University
P.O. Box 1892
Houston, Texas 77251-1892

*BIRMINGHAM BRANCH...AMERICAN NATIONAL BANK - Our goal is to encourage all students to experience the real world through a didactic environment which emphasizes science, math, and technology. Our objectives are: 1) to have a joint-venture were K-5 students have the opportunity to learn hands-on banking operations, 2) have fifth grade observe the operations of the local bank, 3) open a branch bank on the school grounds where the students become the employees and operating officers, and 4) have students deposit funds into their account to see how their money works for all.

Contact: Joy Russell
Birmingham Elementary School
700 W. Brown Street
Wylie, Texas 75098

*TECH PREP NET: A GULF COAST TECH PREP CONSORTIUM - Our goal is to create a consortium of secondary and post secondary education, local business/industry, government training agencies combining their diverse backgrounds, interests, and goals to design and implement Tech Prep programs jointly in secondary and post secondary institutions within the gulf coast region that will produce employees with high skills in math, science, and technology. Our objectives are listed in our five year evolutionary plan that has been developed to reflect the objectives and activities of consortium members in developing tech prep programs. As a result of a survey of consortium members a three developmental phase plan was written.

Contact: Dr. Kenne Turner
Project Director
NHMCCD 250 N. Sam Houston Pkwy.
Houston, Texas 77060

*CENTS: CONTEL TELEPHONE AND WHITEHOUSE ISD - Our goal is to create a joint project called "CENTS" (Contel's Educational Network and Tutorial System). This will link four or five campuses with the central office and with Contel's mainframe in their Central Switching Office. The mainframe is loaded with some 70 educational software programs for mathematics and science education.

Contact: Marshall Neill
Whitehouse ISD
P.O. Box 458
Whitehouse, Texas 75791

*TEXAS TEACHER INTERNSHIP PROJECT (TTIP) - Our goal for TTIP is a competitive program for secondary science and math teachers who serve summer internships in industry and university laboratories to experience "real world" applications of the subjects they teach. Each teacher is required to design classroom implementation plan which incorporates some portion of the summer experience into their classroom teaching.

Contact: Dr. Robert James
Texas Alliance for Science, Technology and Mathematics
EDCI, College of Education
Texas A&M University
College Station, Texas 77843-4232

*EDS AND THE JASON PROJECT - Our goal is to stimulate students' interest in science and technology. Our objectives are: 1) to provide hands-on learning opportunities for students in grades 4-12, and 2) to enable students to experience the thrill of scientific discovery using state-of-the-art-technology.

Contact: Diane Spradlin
Director, EDS Special Projects
7171 Forest Lane, A740
Dallas, Texas 75230

*MATH/SCIENCE VOLUNTEER PROJECT (MSVP) - The MSVP brings science, math and engineering professional together with teachers and principals to strengthen the existing math and science programs.

Contact: Dr. Robert James
Texas Alliance for Science, Technology and Mathematics
EDCI, College of Education
Texas A&M University
College Station, Texas 77843-4232

*SCIENCE TEACHING AFTER REGULAR SCHOOL (STARS) - The purpose of STARS is to provide an after-school science enrichment program for students who are highly motivated in science. STARS enables these students to develop science interest and skills beyond those of the regular classroom.

Contact: Dr. Robert James
Texas Alliance for Science, Technology and Mathematics
EDCI, College of Education
Texas A&M University
College Station, Texas 77843-4232

*INVESTIGATING AND EVALUATING ENVIRONMENTAL ISSUES AND ACTIONS - An interdisciplinary environmental issues and action curriculum focused on enhancing students' responsible behavior through the examination and evaluation of real life community-based environmental problems and issues, for grades 7 and 8.

Contact: John M. Ramsey
University of Houston
Houston, Texas 77204

*SCIENCE, TECHNOLOGY AND YOUTH SYMPOSIUM - Acquaints Texas high school students with current and evolving developments in science and technology. Scientists and other professionals present sessions, workshops and tours that relate their work to the roles of science and technology.

Contact: Dr. Robert James
Texas Alliance for Science, Technology and Mathematics
EDCI, College of Education
Texas A&M University
College Station, Texas 77843-4232

*MECHANICAL UNIVERSE: HIGH SCHOOL ADAPTATION - A series of 28 high school-level study modules for teachers and students to reinforce the major topics and concepts covered in most physics textbooks. This is done through the use of audio-visuals with computer animation that makes complex principles understandable, and includes reenactment of historical milestones.

Contact: Richard P. Olenick
Department of Physics
University of Dallas
1845 East Northgate Dr.
Irving, Texas 75062-4799

*STRENGTHENING THE EFFECTIVENESS OF ELEMENTARY SCIENCE TEACHING - The goal of this project is to improve the qualifications of elementary science teachers (grades 4-6) and their delivery of instruction resulting in improved student learning. The five phases are: 1) improve teacher qualifications and instructional units, 2) evaluate classroom instruction and student learning, 3) enhance teachers' knowledge, 4) evaluate instructional units, and 5) disseminating project results. Women and minority teachers from inner city, rural, urban, and suburban schools are targeted for inclusion in the project.

Contact: Ruth Caswell
Office of Academic Affairs
Research and Grants Administration
Texas Woman's University
Denton, Texas 76204

*EQUITY 2000 - The purpose of the project is to close the gap between the college-going and success rates of minority and/or disadvantaged students and rates of traditional students. The project also seeks to increase the rates of college entrance and college success for minority and/or disadvantaged students by restructuring mathematics programs to eliminate tracking. In addition to restructuring course requirements, the program utilizes in-service training for both mathematics teachers and guidance counselors.

Contact: Dr. Vinetta Jones
National Director
The College Board
45 Columbus Ave.
New York, New York 10023-6992

Martha Salmon
Fort Worth I.S.D.
Fort Worth, Texas

*SCIENCE PARTNERS FOR HOUSTON - is a base for changing how Houston school children gain scientific knowledge and experience. This project of Rice University and Houston ISD joins university scientists and community scientists with middle school teachers. It was created to close the information gap between the "textbook science" and exciting new developments in the natural sciences.

Contact: Elnora Harcombe
The Center For Education
Rice University
P.O. Box 1892
Houston, Texas 77251

*MATHCOUNTS - This nation-wide coaching and competition programs relies on the *MATHCOUNTS School Handbook*, provided free to all middle school math teachers in Texas. The Texas Society of Professional Engineers sponsor 26 contests throughout the state. Prizes at the state contest include; scholarships, computers, calculators, and stipends for coaches of the top six teams. The top four students will represent Texas at the National MATHCOUNTS Competition in Washington, D.C.

Contact: Margaret McKinney or Sylvia Griffith
TSPE
1-800-580-8973

*TEXAS ASSOCIATION FOR SUPERVISION AND CURRICULUM DEVELOPMENT PROJECT ABCD - The components of Project ABCD (Alternative Blueprint for Curriculum Development) include student outcomes; clusters of objectives for each grade level based on the Essential Elements; alternative assessment, teaching activities; correlation's to TAAS, the NAPT, the End of Course for Algebra I and Biology I, the SAT and ACT; and correlation's to Texas-adopted textbooks. Curriculum has been developed for PreK-12 mathematics and science. To use the curriculum, schools must become members of the ABCD project consortium.

Contact: Bonnie Walker
Director of Special Projects
Texas ASCD
16007 Laurelfield
Houston, Texas 77059

## Works Cited


American College Testing Program. (1992). ACT assessment results summary report for texas. Austin, Texas

Blank,R., Dalkilic,M. (1990). State indicators of science and mathematics education 1990. Washington, DC.: Council of Chief State School Officers.

Blank,R.,Gruebel,D. (1993). State indicators of science and mathematics education 1993. Washington, DC.: Council of Chief State School Officers.

Editors. (1993, February 10). Charting a course of reform: A chronology. Education Week, S1-S20.

Fox,R.D. (1983). Discrepancy analysis in continuing medical education: A conceptual model. Mobius,3,37-44.

FCCSET Committee on Education and Human Resources. (1992). By the year 2000: First in the world. (pp.111-124, 273-287). Washington, DC.: U.S. Government Printing Office.

Funkhouser,C. (1986). Education in texas: Policies, practices, and perspectives (4th ed.). Gorsuch Scarisbrick, Publishers, Scottsdale, AR.

Kemerer,F., Hairston,J. (1990). The educator's guide to texas school law (2nd ed.). University of Texas Press, Austin, TX.

McDonald,N. (Ed.). (1991). How to organize and manage partnership programs. Virgina: National Association of Partners in Education.

Miller,J., McCabe,M. (1984). Curriculum revision: Mandates and processes implications of HB 246 for texas schools. Texas Association for Supervision and Curriculum Development,7, 7-12.

National Commission on Excellence in Education. (April 1983). A nation at risk: The imperative for educational reform. Washington, DC.: U.S. Government Printing Office.

Parker,C. (1988). Legislating reform: The texas experience. National Education Association,1, 70-73.

Staff. (1993, May 23). TAAS test results. The Bryan Eagle, pp.1,12.

Staff. (1993, August 1). Meno outlines core proficiencies for texas graduates. Texas Association of Secondary School Principals News Highlights, p.9.

Texas Education Agency. (1980). Recommendations to the state board of education from the curriculum study panel: HCR 90. Austin, TX.

Texas Education Agency. (1985). Texas assessment of basic skills report. Austin, TX.

Texas Education Agency. (1989). Texas educational assessment of minimum skills report 1985-1989. Austin, TX.

Texas Education Agency. (1992). Texas assessment of academic skills report 1990-1992. Austin, TX.

Texas Education Agency. (1992). Norm-referenced assessment program for texas summary report. Austin, TX.

Texas Education Agency. (1992, December). Results of college admissions testing in texas for 1990/1991 graduating seniors. Austin,TX.

Texas Education Agency. (1993). The status of the curriculum in the public schools. Austin, TX.

Texas Higher Education Coordinating Board. (1990). The eisenhower mathematics & science higher education grants program. Austin, TX.

Texas Higher Education Coordinating Board. (1992). Eisenhower mathematics and science grants program project abstracts 1989-92. Austin, TX.

White,M. (1986). In texas ... an educational opportunity act. Nation Association of Secondary School Principals Bulletin,9, 54-57.

Worthem,B., Sanders,J. (1987). Educational evaluation: Alternative approaches and practical guidelines. Longhorn Press.