FG03-92ER75833

P116B11969

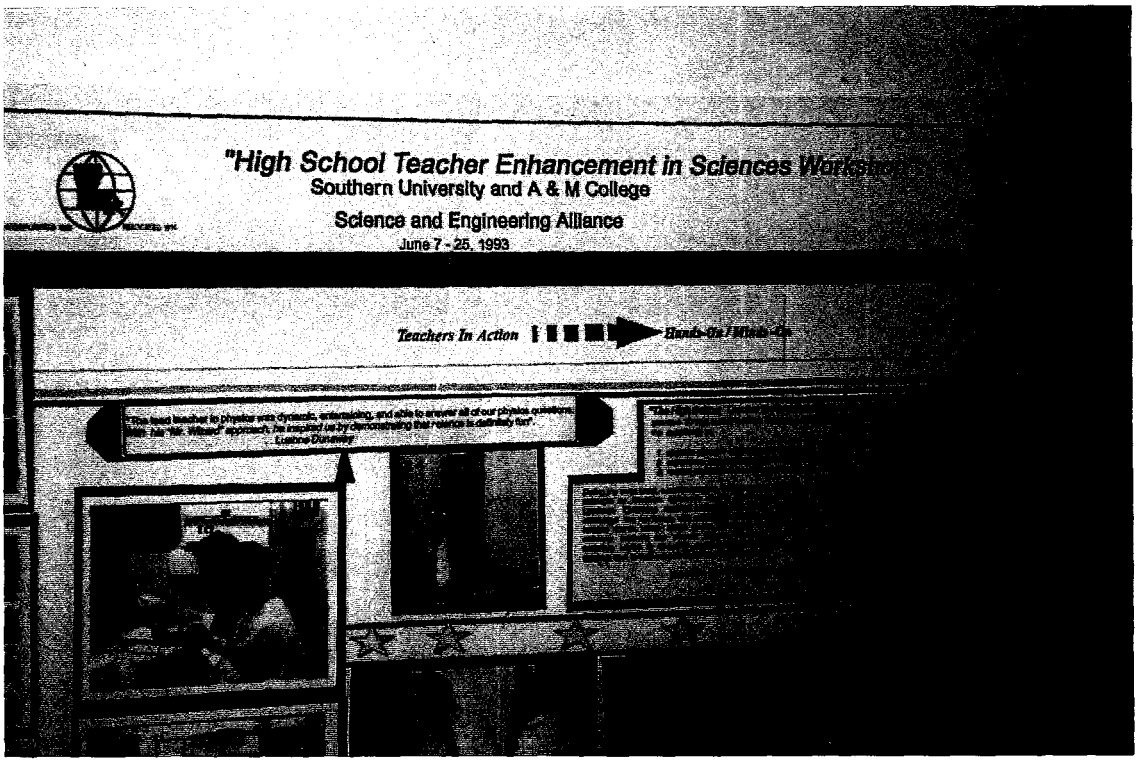
DOE/ER/75833--T5-Pt.2

# SCIENCE AND ENGINEERING ALLIANCE (SEA)

*High School Teacher Enhancement in the Sciences*

## Final Report

**Fund for the Improvement of Postsecondary Education (FIPSE)**
**Department of Energy's (DOE) Office of Science Education**






March 1997

# Cover Sheet

**Grantee Organizations:**

Jackson State University (FIPSE)
School of Science and Technology
1400 Lynch Street
Jackson, MS 39217

Prairie View A&M (DOE)
Research Foundation
Anderson Hall, Rm. 104
Prairie View, TX 77446

**FIPSE Grant Number:** P116B11969

**DOE Grant Number:** DE-FG03-92ER75833 RF1956

**FIPSE Project Dates:**
Starting Date: September 1, 1991
Ending Date: August 31, 1994
Number of Months: 36

**DOE Project Dates:**
June 15, 1992-June 14, 1995
Number of Months: 36

**Project Director(s):**

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Jackson, MS 39217
601/ 968-2153

Dr. Robert L. Shepard
Science and Engineering Alliance (SEA)
1522 K Street, N.W.
Suite 210
Washington, D.C. 20005
202/ 842-0388

**FIPSE Porgram Officer(s):** Joan Stranmanis and Chip Story

**DOE Program Officer:** Donna Prokop

**FIPSE Grant Award:**

| | |
|---|---|
| Year 1 | $119,426 |
| Year 2 | $113,033 |
| Year 3 | $111,953 |
| Total | $344,412 |

**DOE Grant Award:**

| | |
|---|---|
| Year 1 | $101,779 |
| Year 2 | $101,779 |
| Year 3 | $101,779 |
| Total | $305,337 |

**Total Support for SEA Teacher Enhancement Project:** $649,749

P116B11969

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### DISCLAIMER

P116B11969

# HIGH SCHOOL TEACHER ENHANCEMENT IN THE SCIENCES

Science and Engineering Alliance, Inc.
1522 K Street, N.W.
Suite 210
Washington, DC 20005

Robert L. Shepard, Ph.D.
202/842-0388

## EXECUTIVE SUMMARY

### Project Overview

As part of an effort to improve the teaching of science in a four-State region (Alabama, Mississippi, Louisiana, and Texas), the Science and Engineering Alliance (SEA) initiated a series of teacher enhancement workshops in science. The workshops focus on teaching problem solving through experience gained in laboratory, field work, classroom discussions and interactions/debates, critical analysis of the literature, obtaining a greater appreciation of the application of mathematics in science, and interactions with experts in various fields of science.

Fund for the Improvement of Postsecondary Education (FIPSE) funded the workshops. The U.S. Department of Energy's (DOE) Office of Science and University Education supplied some funds to augment the FIPSE support.

The SEA member institutions hosting the workshops were Alabama A&M University (Normal, AL), Jackson State University (Jackson, MS), Prairie View A&M University (Prairie View, TX), and Southern University and A&M College (Baton Rouge, LA).

### Background, Origin, and Purpose

The general belief is that the U.S. educational system needs to be strengthened. To remain competitive requires an educated public that is aware of the basic concepts upon which technology is built. The system must also be capable of producing scientists and engineers that can contribute to the technological competitiveness of the nation.

According to studies reported on by the National Science Foundation (NSF), the teachers' educational background, specifically whether they have an undergraduate or a graduate major in the field of

instruction, is the most widely used indicator of a teachers' understanding of and expertise in their field (NSF, Science & Engineering Indicators -- 1996). Thus, it is widely accepted that teacher competence is related to subject matter knowledge.

The SEA supports these conclusions, and thus, developed a series of summer science enhancement workshops to strengthen high school teachers that are teaching science and mathematics in high schools in the four-State region.

Therefore, the impetus for the workshops was:

- The charged environment that surrounds the issues pertaining to the serious deficiency in the U.S. educational system in all academic disciplines; and

- A natural extension of the partnership that exist between the SEA institutions and the K-12 school districts in various regions within the four-State region.

The workshops focused on teaching problem solving through a variety of means. This included experience gained in laboratory, field work, classroom discussions and interactions/debates, critical analysis of the literature, gaining a greater appreciation of the application of mathematics in science, and interaction with experts in various fields of science.

**Project Description**

The workshops covered physical, biological, and earth sciences. To assess the impact of the workshops, the same 80+ teachers that participated in the initial sessions were involved throughout the program.

The workshops used SEA faculty from the departments of biology, physics, mathematics, chemistry, environmental science, earth science and physical science. The SEA faculty members worked directly with the high school science and mathematics teachers. In addition, technical experts from Lawrence Livermore National Laboratory (LLNL) conducted several of the workshops, lectures, and demonstrations for the high school teachers.

The workshop format included lecture/discussions and exploration/laboratory demonstrations, and were coordinated by an SEA faculty member and two workshop participants designated as lead teachers. Lead teachers were identified for each of the three areas, i.e., a lead teacher for physical science, one for biological science, and another for earth science. Lead teachers assisted in facilitating and coordinating workshop activities.

Also, lead teachers were tasked with holding mini-discussions for

their fellow teachers who did not participate in the workshops. The lead teachers were selected based on the relative strengths of their application and recommen-dations. Additional lead teachers were chosen over the next two years based on the outstanding leadership ability these teachers displayed in the initial workshops.

**Evaluation: What Worked and Did not Work**

The SEA used an evaluation team comprised of experts from SEA institutions' Department of Education. The evaluation team assessed the impact of the workshops at the campus level and the collective impact of the total SEA workshop project on a regional basis. The collective responses to the evaluations were overwhelmingly high, ranging from an average of 88% - 100% for each instrument.

Following the 1994 workshops, administrators from the four-State region were asked to do a qualitative assessment of the science and mathematics activities at their school. Principals and counselors indicated that while it was too early to assess the full impact on student test scores, they all witnessed greater enthusiasm toward science and mathematics on the part of both the students and teachers. This was an indication the Workshops were of some value.

**Impact or Changes from Grant Activities**

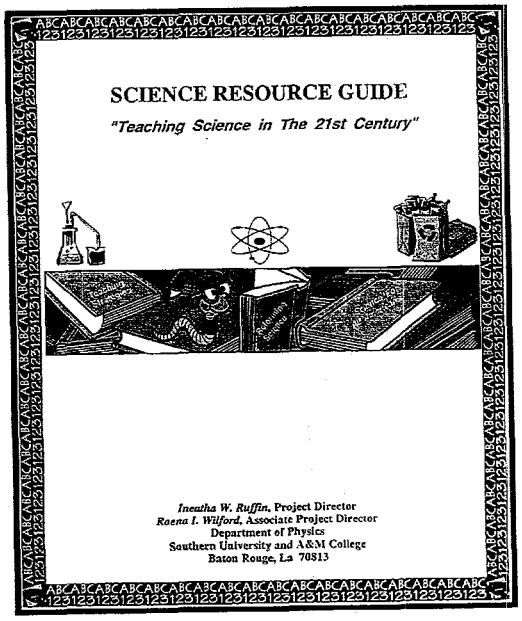
Five years following the initial funding by FIPSE and DOE, the SEA continues to seek additional support to continue and institutionalize the summer workshops. According to the studies on teacher qualifications, it appears that the workshops are still necessary. The workshops are a good investment.

**Progress Since the Grant Ended**

This project lead to the development of the "**Science Resource Guide - Teaching Science In the 21st Century**." This reference was developed to assist the novice, reassigned and experienced instructor of high school science with practical applications of contemporary science education re-

form and strategies. The Guide was prepared under the direction of the Southern University's Project Director for the SEA FIPSE project, with input from participants in our workshops and other high school science teachers.

**HIGH SCHOOL TEACHERS ENHANCEMENT IN SCIENCES**




The Guide was reviewed by education specialists from Southern University and Louisiana State University. The Resource Guide is "***teacher friendly.***" A complimentary copy of the Resource Guide was provided to each of the participants of the High School Teachers Enhancements in Science Workshops (1992-1995) and to selected schools located in the rural parishes of the State of Louisiana.

The schools selected to received a copy of the Resource Guide was based on an article that appeared in the Baton Rouge Newspaper (Morning Advocate) on July 30, 1995, listing each parish and the number of faculty not certified. Eleven parishes with the highest percent uncertified teachers were sent serveral copies of the Guide. Written permission was given to them to make copies of the guide for their use. High school science teachers outside of the 11 parishes have seen the Guide and have requested and received a copy.

The teachers have indicated that the Guide is very informative, the activities included in the Guide have been useful in the classroom, and have given them ideas about additional activities.

The other SEA locations in the other three States are expected to use the Resource Guide to produce a similar resource for their region. Copies of the Resource Guide may be requested from:

Ineatha W. Ruffin
Department of Physics
Southern University and A&M College
Baton Rouge, LA 70813
504/771-4130

P116B11969

# HIGH SCHOOL TEACHER ENHANCEMENT IN THE SCIENCES

**Science and Engineering Alliance, Inc.**
**1522 K Street, N.W.**
**Suite 210**
**Washington, DC 20005**

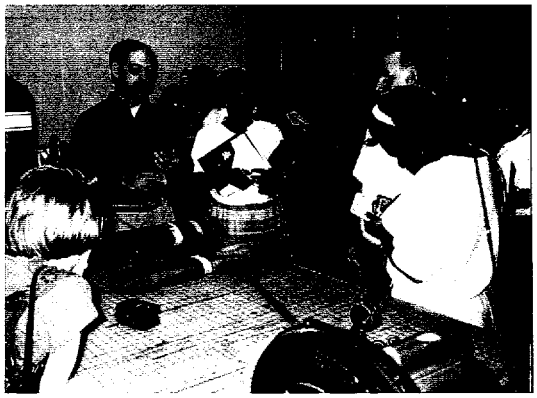
**Robert L. Shepard, Ph.D.**
**202/842-0388**

## FINAL REPORT

### Purpose of Project

As part of an ongoing effort to improve the teaching of science in a four-State region (Alabama, Mississippi, Louisiana, and Texas), the Science and Engineering Alliance (SEA), a consortium of four Historical Black Colleges and Universities (HBCUs) initiated a series of teacher enhancement workshops in science. The focus of the workshops was on teaching problem solving through experience gained in laboratory, field work, classroom discussions and interactions/debates, critical analysis of the literature, obtaining a greater appreciation of the application of mathematics in science, and interaction with experts in various fields of science.

The SEA member institutions hosting the workshops were Alabama A&M University (Normal, AL), Jackson State University (Jackson, MS), Prairie View A&M University (Prairie View, TX), and Southern University and A&M College



(Baton Rouge, LA). Fund for the Improvement of Postsecondary Education (FIPSE) provided financial support for the workshops.

Additionally, SEA received support from the U.S. Department of Energy's Office of Science and University Education to augment the FIPSE support. Also, Houston Lighting & Power Company and Entergy Corporation joined FIPSE and DOE in sponsoring teachers to participate in SEA's enhancement workshops.

## Background, Origin, and Purpose

The general belief among society is that the U.S. educational system needs to be strengthened in order to produce an educated public that is aware of the basic concepts upon which technology is built, and to produce scientists and engineers that can contribute to the technological competitiveness of the nation.

Relative to science, the prevailing notion among the education community is that the quality of science instruction students receive is largely determined by the qualifications of their science teachers. Although there is no consensus on what qualifications are most important for effective teaching--or even what constitutes good teaching--it is widely assumed that teacher competence is related to subject matter knowledge.

The SEA supports this notion, and thus, developed a series of summer science enhancement workshops for the purpose of strengthening high school teachers that are teaching science and mathematics in high schools in the SEA geographical region.

Therefore, the impetus for the workshops was:

- The charged environment that surrounds the issues pertaining to the serious deficiency in the U.S. educational system in all academic disciplines; and

- A natural extension of the partnership that exist between the SEA institutions and the K-12 school districts in various regions within the four States.

The focus of the workshops was on teaching problem solving through experience gained in laboratory, field work, classroom discussions and interactions/debates, critical analysis of the literature, obtaining a greater appreciation of the application of mathematics in science, and interaction with experts in various fields of science.

## Project Description

Starting in 1992, the Science and Engineering Alliance (SEA) begin its enhancement workshops for high school science and mathematics teachers. The workshops covered some basic and advanced principles of five science subject areas: Biology, Chemistry, Physics, Earth Science, and Environmental Science. Lawrence Livermore Nation-

al Laboratory (LLNL) augmented SEA's efforts by supplying the following kits to the workshops: (1) HOPES (Helping Our Partners Enrich Science); (2) LESSON (Lawrence Livermore School Science Study of Nature); and (3) Global Climate Change. The kits assisted in bringing state-of-the-art science to the teachers. FIPSE funding for the workshops ended following the 1994 summer workshops.

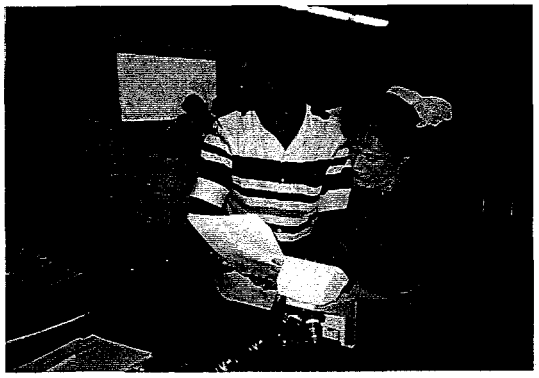
The workshops ran for three weeks during the months of June or July at the following historically black colleges and universities (HBCUs): (1) Alabama A&M University in Huntsville, AL; (2) Jackson State University in Jackson, MS; (3) Prairie View A&M University in Prairie View, TX; and (4) Southern University and A&M College in Baton Rouge, LA.

SEA faculty members, with expertise in the subject area, conducted the workshops. Three (3) lead teachers (one for biological science, one for physical science, and one for earth science) provided assistance to the faculty member at each workshop site. The lead teachers were selected based on their leadership skills, as reflected in the application, and a personal interview. Additional lead teachers emerged into the second and third years of the project. Their emergence stemmed from a strong desire to improve and strengthen their ability to be effective in the classroom.

A combined total of over 250 high school teachers from the SEA geographical region participated in the workshops over the three-year period. Collectively, these teachers interact directly or indirectly with over 13,000 high school students, of which roughly 65% are minorities and women.

The workshops typically consisted of six (6) hours, five (5) days per week. This results in a total of 30 hours per week for class activities involving lectures, hands-on laboratory exercises, and demonstrations. Each participant was exposed to a common body of material during the initial phase of the workshop.

This material consisted of basic principles in the subject areas. The later phase focused on specific aspects of the subject. The participants were grouped in teacher-related subject areas to concentrate on their respective teaching assignments. This arrangement allowed the participants to obtain a knowledge-base that could be used in their classroom. Additionally, this grouping provided a way of building a network of teachers that could continue to interact during the academic year and beyond.



The four SEA institutions had autonomy in their implementation strategy, but all had to follow the "common" thread of the objectives as stated below:

1. Provide a 3-week "Enhancement" workshop for 100% of the high school science and mathematics teachers participating in the workshops.

2. Provide an expanded knowledge base in biological, physical, and computer sciences, with 90% of the participants completing all modules.

3. Promote creative thinking by involving the participants in "hands-on" laboratory activities with an 80% transfer rate to their regular classroom.

4. Provide each participant's home school with instructional materials that replicate those used in the workshops with 80% of the participants using the material in varying degrees.

5. Follow the workshops with a minimum of three (3) Saturday in-service activities with 95% of the participants present at each meeting.

6. Develop a "network" of interacting peers to share ideas with 100% of the participants serving as resource persons to continue, during the academic year, the activities begun during the workshops.

7. Evaluate the workshops by administering the appropriate instruments to 100% of the participants and monitor at least 80% of the work sites (surveys and verbal feedback) during the academic year.

**Evaluation: What Worked and Did not Work**

To measure the extent to which the objectives were accomplished, participants rated the effectiveness of the workshops using four instruments (See Appendix for evaluation instruments). Formative Evaluation for Teacher Effectiveness -- E-3; Formative Evaluation of Workshop Content -- E-4; Summative Evaluation of Participant's Opinion of Teacher Effectiveness -- E-5; and Evaluation for Future Planning -- E-6. The Participant Monitoring Form -- E-7 was used by the Site Coordinator at some of the SEA schools. For the

schools that did not use the monitoring form, did make visits to the participant's schools.

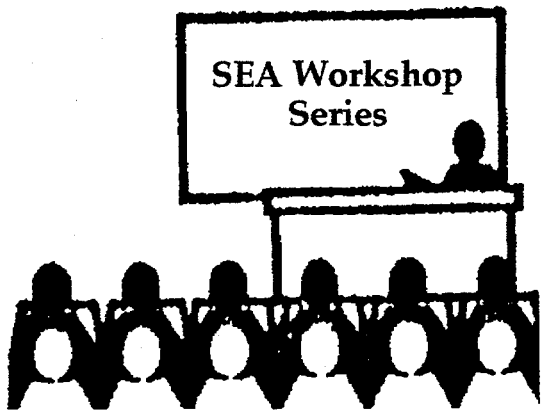
The Evaluation of Instructional Content, E-4, showed the value of the workshops. They represented:

- Some very enlightening observations;
- Identified strengths and weaknesses; and
- Validated the quality of instruction received from professors who were carefully screened for the program.

The most encouraging aspect of the comments focused on future use in the participant's respective schools. The practicality and elements of making science interesting were key points in the comments.

Participants completed an evaluation of teacher effectiveness questionnaire at the end of each week. The overall rating for the four schools would indicate that teachers were effective in the organization and presentation of the lesson. A variety of instructional strategies and resources were utilized in the workshops by all of the participating institutions. For all institutions, over 90 per cent of the participants indicated that the objectives were met and also agreeing that the content was valuable. The highest rating was given to teacher-knowledge ability for all institutions. This was consistent with the rating conducted after the initial workshop.

An assessment of the overall opinion of the participants toward teacher effectiveness was measured at the end of the entire workshop session. This was necessary to determine if participants were consistent in their evaluation from a weekly and total workshop perspective. Participants rated the total workshop experience very high. Weekly workshop evaluations were also high. Teacher preparation for class, organization and faculty interest in the subject matter received high ratings among three of the institutions as evidenced by data obtained on Form E-3. Data for only one instrument was presented by Prairie View, therefore, some pertinent information was unavailable for this summary. For an example of details on ratings, refer to the Evaluation Report attached.




The participating institutions attempted to provide the most effective teaching and worthwhile learning experiences for the participants. In this respect, revisions were constant as dictated by evalua-

tion data. The Evaluation for Planning Instrument -- E-6, attempted to collect data that would help to continually improve the workshop sessions. Overall, the responses were good on all items which included:

- Degree to which the participants felt the workshops benefited them;
- Printed and audiovisual materials used;
- Workshop teacher;
- Group sessions;
- Physical facilities;
- Housing arrangements; and
- Consultants.

Cooperative learning as an instructional strategy was indicated as an important experience during the workshops. Opinions regarding material covered as being suitable for utilization in their respective schools and objectives of the workshop being covered was important to the participants. In the comments included in institutional reports, these facts were brought out repeatedly.

Following the first workshops, it was apparent that limited monitoring was exercised by each SEA Site Coordinator to determine the extent to which information and teaching strategies were used in the respective schools of the participants. To assist the Site Coordinator and to facilitate data for evaluations, several additional instruments were developed. This lead to the creation of three additional Evaluation Forms, i.e., Site Observation Form -- E-8; Student Evaluation Questionnaire -- E-9; and Evaluation of the Teaching Professor's Perception of the Teacher Enrichment Project -- E-10.

Student Evaluation Questionnaire -- Form E-9 was very useful. It allowed the SEA to measure the impact of instruction on student motivation and perception. This was crucial to the accomplishment of the objectives of the FIPSE project. This Form assisted with determining the extent to which teaching was believed to effect the student's career choice and opinion toward science and engineering.

To meet the objectives for the workshops a structural Saturday Program was essential. The Saturday sessions were used to collect data using instruments E-3, E-4, and E-5. Additionally, SEA students assisted Site Coordinators with collection of data for instruments E-6 - E-10. This time also was used for making sure participating teachers had all student questionnaires, and allow for participating teachers to design an experiment to be included in a manual that can be used by participants in their respective school.

Detailed Evaluation Reports are available from each of SEA's participating institutions.

**Impact or Changes from Grant Activities**

The responses to the evaluations were overwhelmingly high, rang-

ing from an average of 88% - 100% for each instrument. The participants believe that the SEA faculty members are well-prepared and knowledgeable in presenting the subject matter. They also highlighted how they benefited tremendously from the workshop experiences. Participants rated the accommodations such as physical facilities, laboratory experiences, instructional materials, and consultants as very adequate. The assessment results showed that the teachers covered material that was of value and most suitable for utilization in the participants' respective schools, and, that the workshops covered the objectives and meet their expectation to the highest degree.

The SEA is addressing a national problem on a regional basis, and expects that its workshop results will have national utility for groups in similar regions seeking to strengthen the teaching of science and mathematics at the high school level.

Further steps toward institutionalizing the SEA teacher enhancement workshops and disseminating the results to regions external to the SEA is continuing. As the SEA has continued the workshops through the summer of 1996, we continue to look for ways to strengthen the teaching of science, mathematics and related subjects in schools in the SEA region.

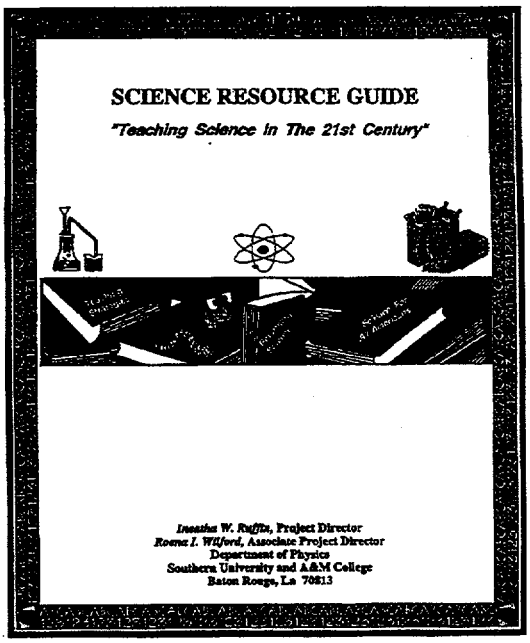
The workshops continues to receive high marks from the participants. For example, since the first summer workshop, one of the lead teachers who teaches mathematics in a high school in Baton Rouge, Louisiana, continues to spent the summers working as a researcher at Battelle Pacific Northwest Laboratory in Richland, Washington. The teacher attributes her "*new found interest in science*" to the refreshing experience she gained as a participant in the SEA teacher enhancement program.

Following the 1994 workshops, administrators were asked to conduct a qualitative assessment of the science and mathematics activities at their school. Principals believed that while it was too early to assess the full impact on student test scores, they witnessed greater enthusiasm toward science and mathematics on the part of both the students and teachers. We will continue this kind of interaction with the K-12 school districts served by the SEA schools.

**Progress Since Grant Ended**

The project lead to development of the "**Science Resource Guide - Teaching Science In the 21st Century.**" This reference was developed to assist the novice, reassigned and experienced instructor of high school science with practical applications of contemporary science education reform and strategies. The Guide was prepared under the direction of the Southern University's Project Director for the SEA FIPSE project, with input from participants in our workshops and other high school science teachers.

**HIGH SCHOOL TEACHERS ENHANCEMENT IN SCIENCES**




The Guide was reviewed by education specialists from Southern University and Louisiana State University. The Resource Guide is "***teacher friendly.***" A complimentary copy of the Resource Guide was provided to each of the participants of the High School Teachers Enhancements in Science Workshops and to selected schools located in the rural parishes of the State of Louisiana. The other SEA locations in the other three States are expected to use the Resource Guide to produce a similar resource for their region. Copies of the Resource Guide may be requested from:

Ineatha W. Ruffin
Department of Physics
Southern University and A&M College
Baton Rouge, LA 70813
504/771-4130

# APPENDIX

## Science Education Program Participant Information for FY1992-1994

Please provide information for all programs regardless of funding source

| | |
|---|---|
| Reporting Facility Name: | Science and Engineering Alliance |
| Contact Name and Phone Number: | Dr. Robert L. Shepard (202) 842-0388 |
| E-mail Address and Fax No.: | rshepsea@aol.com (202) 842-0403 |
| Internet Address | http://www.llnl.gov/sea/ |

Program Name: ***Teacher Enhancement (Composite)***

Sponsor(s): Dept. of Education (FIPSE)
(If DOE, give sponsoring office within DOE)

Program Rank: (check one*)

( ) College Facility
( ) Postgraduate Appointees
( ) Graduate Students
( ) Undergraduate Students at 4-year institutions
( ) Undergraduate Students at 2-year institutions
(X) Pre-college Teachers
( ) Pre-college Students
( ) Staff at Nonacademic Organizations
( ) General Public

(* For program with more than one participant rank, please provide a separate reporting form for each rank.)

Direct contact time, per participant, in laboratory and education experience: Number of [ 9 ] Weeks or if less than one week Number of [ ] hours

Enter the number of Participants in each Category

| | Totals | U.S. Citizens and Permanent Residents: African American | Asian/ Pac. Island American | Caucasian American | Hispanic American | Native American/ Alaskan | Foreign Nationals (visitors and temp. visas) | Ethnicity/ Citizenship Not Reported |
|---|---|---|---|---|---|---|---|---|
| Males | 54 | 34 | | 20 | | | | |
| Females | 195 | 158 | | 37 | | | | |
| Gender Not Reported | | | | | | | | |

Program Total: 249

## Science Education Program Participant Information for FY1992

Please provide information for all programs regardless of funding source

| | |
|---|---|
| Reporting Facility Name: | Science and Engineering Alliance |
| Contact Name and Phone Number: | Dr. Robert L. Shepard (202) 842-0388 |
| E-mail Address and Fax No.: | rshepsea@aol.com (202) 842-0403 |
| Internet Address | http://www.llnl.gov/sea/ |

| | |
|---|---|
| Program Name: | ***Teacher Enhancement*** |
| Sponsor(s):<br>(If others, list office) | Dept. of Education (FIPSE)<br>Dept. of Energy (DOE) |
| Program Rank:<br>(check one*) | ( ) College Facility<br>( ) Postgraduate Appointees<br>( ) Graduate Students<br>( ) Undergraduate Students at 4-year institutions<br>( ) Undergraduate Students at 2-year institutions<br>(X) Pre-college Teachers<br>( ) Pre-college Students<br>( ) Staff at Nonacademic Organizations<br>( ) General Public |

(* For program with more than one participant rank, please provide a separate reporting form for each rank.)

Direct contact time, per participant, in laboratory and education experience: Number of [ 3 ] Weeks or if less than one week Number of [ ] hours

### Enter the number of Participants in each Category

| | Totals | U.S. Citizens and Permanent Residents: African American | Asian/ Pac. Island American | Caucasian American | Hispanic American | Native American/ Alaskan | Foreign Nationals (visitors and temp. visas) | Ethnicity/ Citizenship Not Reported |
|---|---|---|---|---|---|---|---|---|
| Males | 21 | 13 | | 8 | | | | |
| Females | 60 | 48 | | 12 | | | | |
| Gender Not Reported | | | | | | | | |
| Program Total | 81 | | | | | | | |

## Science Education Program Participant Information for FY1993

Please provide information for all programs regardless of funding source

| | |
|---|---|
| Reporting Facility Name: | Science and Engineering Alliance |
| Contact Name and Phone Number: | Dr. Robert L. Shepard (202) 842-0388 |
| E-mail Address and Fax No.: | rshepsea@aol.com (202) 842-0403 |
| Internet Address | http://www.llnl.gov/sea/ |

Program Name: ***Teacher Enhancement***

Sponsor(s): Dept. of Education (FIPSE)
(If others, list office) Dept. of Energy (DOE)

Program Rank: (check one*)

( ) College Facility
( ) Postgraduate Appointees
( ) Graduate Students
( ) Undergraduate Students at 4-year institutions
( ) Undergraduate Students at 2-year institutions
(X) Pre-college Teachers
( ) Pre-college Students
( ) Staff at Nonacademic Organizations
( ) General Public

(* For program with more than one participant rank, please provide a separate reporting form for each rank.)

Direct contact time, per participant, in laboratory and education experience: Number of [ 3 ] Weeks or if less than one week Number of [ ] hours

Enter the number of Participants in each Category

| | Totals | U.S. Citizens and Permanent Residents: African American | Asian/ Pac. Island American | Caucasian American | Hispanic American | Native American/ Alaskan | Foreign Nationals (visitors and temp. visas) | Ethnicity/ Citizenship Not Reported |
|---|---|---|---|---|---|---|---|---|
| Males | 19 | 13 | | 6 | | | | |
| Females | 64 | 51 | | 13 | | | | |
| Gender Not Reported | | | | | | | | |

Program Total: 83

## Science Education Program Participant Information for FY1994

Please provide information for all programs regardless of funding source

| | |
|---|---|
| Reporting Facility Name: | Science and Engineering Alliance |
| Contact Name and Phone Number: | Dr. Robert L. Shepard (202) 842-0388 |
| E-mail Address and Fax No.: | rshepsea@aol.com (202) 842-0403 |
| Internet Address | http://www.llnl.gov/sea/ |

| | |
|---|---|
| Program Name: | ***Teacher Enhancement*** |
| Sponsor(s): (If others, list office) | Dept. of Education (FIPSE)<br>Dept. of Energy (DOE) |
| Program Rank: (check one*) | ( ) College Facility<br>( ) Postgraduate Appointees<br>( ) Graduate Students<br>( ) Undergraduate Students at 4-year institutions<br>( ) Undergraduate Students at 2-year institutions<br>(X) Pre-college Teachers<br>( ) Pre-college Students<br>( ) Staff at Nonacademic Organizations<br>( ) General Public |

(* For program with more than one participant rank, please provide a separate reporting form for each rank.)

Direct contact time, per participant, in laboratory and education experience: Number of [ 3 ] Weeks or if less than one week Number of [ ] hours

Enter the number of Participants in each Category

| | Totals | U.S. Citizens and Permanent Residents: African American | Asian/ Pac. Island American | Caucasian American | Hispanic American | Native American/ Alaskan | Foreign Nationals (visitors and temp. visas) | Ethnicity/ Citizenship Not Reported |
|---|---|---|---|---|---|---|---|---|
| Males | 14 | 8 | | 6 | | | | |
| Females | 71 | 59 | | 12 | | | | |
| Gender Not Reported | | | | | | | | |

Program Total: 85

**Note: This evaluation should be completed daily at the end of each workshop session.**

_____
Name of Institution

**Participant's Name (Optional)**_____

**Teacher's Name**_____

**Date**_____ **Subject Matter Area**_____

**Directions: Rate the teacher on each skill area. Code: 5 or 4, mastery of skill demonstrated; 3 or 2 some skill refinement needed; and 1 or 0, much skill refinement needed.**

**Organization of Lesson**

| | | | | | |
|---|---|---|---|---|---|
| 5 | 4 | 3 | 2 | 1 | Lesson Preparation |
| 5 | 4 | 3 | 2 | 1 | Lesson Introduction |
| 5 | 4 | 3 | 2 | 1 | Subject-Matter knowledge |
| 5 | 4 | 3 | 2 | 1 | Closure |

**Comments**_____

_____

_____

_____

**Lesson Presentation**

| | | | | | |
|---|---|---|---|---|---|
| 5 | 4 | 3 | 2 | 1 | Audience Contact |
| 5 | 4 | 3 | 2 | 1 | Enthusiasm |
| 5 | 4 | 3 | 2 | 1 | Speech Quality and Delivery |
| 5 | 4 | 3 | 2 | 1 | Involvement of Participants |
| 5 | 4 | 3 | 2 | 1 | Use of Nonverbal Communication |
| 5 | 4 | 3 | 2 | 1 | Use of Questions |
| 5 | 4 | 3 | 2 | 1 | Directions and Refocusing |

5 4 3 2 1 Use of Reinforcement

5 4 3 2 1 Use of Instructional Materials

Comments_____

**Note: This evaluation should be completed at the end of each week of the workshop. You are focusing on the content and information received in the workshop.**

_____
Name of Institution

Participant's Name (Optional)_____

Teacher's Name_____

Date_____Subject Matter Area_____

Rating: 5=strongly agree; 4=agree; 3=undecided; 2=disagree; 1=strongly disagree

| | | | | | |
|---|---|---|---|---|---|
| 1. The stated objectives were met. | 5 | 4 | 3 | 2 | 1 |
| 2. The content of the presentation was valuable | 5 | 4 | 3 | 2 | 1 |
| 3. The teacher was knowledgeable | 5 | 4 | 3 | 2 | 1 |
| 4. I benefitted professionally from the information | 5 | 4 | 3 | 2 | 1 |
| 5. The consultant(s) used was/were well prepared and presented useful and worthwhile material | 5 | 4 | 3 | 2 | 1 |
| 6. The level of information presented was appropriate | 5 | 4 | 3 | 2 | 1 |
| 7. The teacher provided useful resource material | 5 | 4 | 3 | 2 | 1 |

8. How will the information presented in the workshop be used to enhance your teaching?

_____

_____

_____

9. What teaching strategy, if any, was used that can improve your teaching

effectiveness?

10. What do you see as the greatest benefit of the teaching packets?

Summative Evaluation of Participant's Opinion of Teacher Effectiveness E-5

_____
Name of Institution

_____

Participant's Name(optional)_____

Teacher's Name_____

Date(s)_____Subject Matter Area_____

| | Negative | | | | Positive |
|---|---|---|---|---|---|
| 1. The teacher outlined the objectives and the requirements<br>Comments_____ | 1 | 2 | 3 | 4 | 5 |
| 2. The teacher was well prepared for class.<br>Comments_____ | 1 | 2 | 3 | 4 | 5 |
| 3. The teacher presented material in a well organized manner.<br>Comments_____ | 1 | 2 | 3 | 4 | 5 |
| 4. The teacher seemed interested in the subject matter.<br>Comments_____ | 1 | 2 | 3 | 4 | 5 |
| 5. The teacher made the participants feel free to ask questions, disagree and express their ideas.<br>Comments_____ | 1 | 2 | 3 | 4 | 5 |
| 6. The teacher was helpful when participants had difficulty.<br>Comments_____ | 1 | 2 | 3 | 4 | 5 |
| 7. The method of evaluation in the workshop was appropriate.<br>Comments_____ | 1 | 2 | 3 | 4 | 5 |
| 8. The teacher was fair and impartial in his/her dealing with participants.<br>Comments_____ | 1 | 2 | 3 | 4 | 5 |
| **9. The teacher was accessible to students outside of the workshop.** | 1 | 2 | 3 | 4 | 5 |

10. The textbook/reading materials made a valuable contribution to the workshop. 1 2 3 4 5
Comments_____
_____

11. The teacher would like to know if there is something you believe he/she has done in an exceptional manner in teaching during the workshop

_____

_____

_____

12. The teacher would like to know if there is something you believe he/she might do to improve his/her teaching this workshop.

_____

_____

_____

_____
Name of Institution

Participant's Name_____
Participant's School_____

**Directions:** To help in future planning, will you please indicate your reactions to each item below. Please add any suggestions and comments you wish below each item. You input is vital to reassessing our objectives and the effectiveness of the workshops.

| | | |
|---|---|---|
| 1. Over-all reaction to the workshops | Excellent 5 4 3 2 1 Poor | |
| 2. Degree to which you feel you profited from the workshop | Profited 5 4 3 2 1 Did Not Profit | |
| 3. Printed and audiovisual material used | Most helpful 5 4 3 2 1 Of Little Help | |
| 4. Workshop Teacher | Most helpful 5 4 3 2 1 Of Little Help | |
| 5. Consultant | Most helpful 5 4 3 2 1 Of Little Help | |
| 6. Group Sessions | Productive 5 4 3 2 1 Unproductive | |
| 7. Physical Facilities | Adequate 5 4 3 2 1 Inadequate | |
| 8. Housing and Eating Arrangements | Adequate 5 4 3 2 1 Inadequate | |

Comments_____

_____

_____

_____

_____

_____

# SITE INTERVIEW OF TEACHER PARTICIPANTS IN FIPSE SUMMER ENHANCEMENT PROGRAM

Interviewer: _____

Interviewee: _____

Date: _____ School: _____

I. QUESTIONS

1. What course(s) do you teach?

2. How many students?

3. What techniques and strategies have you used that were learned in the Summer Program?

4. How useful have they been? Explain.

5. What materials have been helpful?

6. What is the student's level of motivation?

7. Has student's performance changed? How?

8. Do you feel that one summer session is sufficient to achieve your goal for continued professional development?

9. List three techniques you have used to motivate students, i.e. field trips, science fair participation, etc.

10. List three areas where your skills have been strengthened as a result of this program.

11. Have you administered the FIPSE Student Evaluation in the science classes you teach?
( ) Yes ( ) No

Name: _____ Evaluator _____Date: _____ E-8

SITE OBSERVATION FORM

PURPOSE: To assess the effectiveness of the lesson

Enter a check mark for each of the following features that was included effectively in the presentation, and a 0 for each feature that was omitted or handled ineffectively. Add your comments below, emphasizing constructive suggestions for improvement.

CHECKLIST

INTRODUCTION

1.___ States purpose of objectives
2.___ Gives overview or advance organizer
3.___ Distributes a study guide or instructs the students concerning how they are expected to respond (what notes to take, etc.)

BODY OF PRESENTATION

4.___Is well prepared; speaks fluently without hesitation or confusion
5.___Projects enthusiasm for the material
6.___Maintains eye contact with the students
7.___Speaks at an appropriate pace (neither too fast nor too slow)
8.___Speaks with appropriate voice modulation (rather than a monotone)
9.___Uses appropriate expressions, movements, and gestures
10.___Content is well structured and sequenced
11.___New terms are clearly defined
12.___Key concepts or terms are emphasized (preferable not only verbally but by holding up or point to examples, writing or underlining on the board or overhead projector).
13.___Includes appropriate analogies or examples that are effective in enabling students to relate the new to the familiar and the abstract to the concrete
14.___Where appropriate, facts are distinguished from opinions
15.___Where appropriate, lengthy presentations are divided into recognizable segments, with clear transitions between segments and mini-summaries concluding each segment.
16.___Where necessary, questions the students following each major segment of a lengthy presentation (rather than waiting until the end)
17.___Monitors student response; is encouraging and responsive regarding student questions and comments on the material

CONCLUSION

18.___Concludes with summary or integration of the presentation
19.___Invites student questions or comments
20.___Follows up on the presentation by making a transition into a recitation activity, a follow-up assignment, or some other activity that will allow the students an opportunity to practice or apply the material

Source: Good, T. L., and Brophy, J. 1991). Looking Into Classrooms. New York: Harper Colling Publications.

SCIENCE ENGINEERING ALLIANCE (SEA)
FIPSE PROJECT
High School Enhancement
Student evaluation Questionnaire

Directions: Please respond to each question with your best possible answers.

1. What is your classification? (Circle One)

(a) Freshman (c) Junior (e) Middle School
(b) Sophomore (d) Senior

2. Which of the following courses have you taken? (Circle all that apply)

a. Biology c. Chemistry (e) General Science
b. Ecology d. Physics (f) Other

3. Which of the following Math courses have you taken? (Check all that apply)

__ a. Pre-Algebra __ c. Trigonometry __ f. Other
__ b. Algebra __ d. Pre-Calculus _____
__ c. Geometry __ e. Calculus

4. Have you considered a vocational choice in the sciences? ( ) Yes ( ) No
If yes, please indicate by checking your career choice.

__ a. Scientist __ c. Nurse __ e. Engineer
__ b. Doctor __ d. Dentist __ f. Other

5. If you have selected a Science related vocation, who had the most influence on your selection? (Check the appropriate persons)

__ a. Teacher __ c. Coach __ e. Classmate
__ b. Parent __ d. Principal __ f. Other ____
___ c. Minister

6. What one factor influenced your selection of a career in Science? (Check all that apply)

__ a. Science classes taken in school
__ b. Math Classes taken in school
__ c. Books and printed materials read
__ d. Visit to the doctor
__ e. Money or prestige
__ f. Others

| | | Yes | No |
|---|---|---|---|
| 7. | Have you ever participated in a Science Fair? | ( ) | ( ) |
| 8. | Have you taken a Science field trip? | ( ) | ( ) |
| 9. | Do you like to be challenged by your science teacher? | ( ) | ( ) |
| 10. | Do you allocate sufficient time to do your homework? | ( ) | ( ) |
| 11. | Do you prepare and submit assignments on time? | ( ) | ( ) |
| 12. | Do you currently hold and office position in a school club or your class? | ( ) | ( ) |
| 13. | Do you plan to attend college after graduation from high school? | ( ) | ( ) |

EVALUATION OF THE TEACHING PROFESSOR'S PERCEPTION OF THE SUMMER TEACHER ENRICHMENT PROJECT



Name of Institution

Name (Teaching Professor) _____

Date _____

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I. Indicate the strengths of the High School Teacher Enhancement Program.

II. Indicate the weaknesses of the High School Teacher Enhancement Program.

III. What are your perceptions of the overall performance of participant in the Summer Program?

IV. What skills would you identify as being enhanced as a result of the program?

V. Recommendations.

OFFICE OF THE PRINCIPAL

1000 NORTH 29RD STREET
BATON ROUGE, LOUISIANA 70802

October 27, 1994

Ms. Ineatha W. Ruffin, Director
High School Teacher Enhancement Program
P. O. Box 9983
Southern University
Baton Rouge, Louisiana 70813

Dear Ms. Ruffin:

This letter is in support of the High School Teacher Enhancement Program in which several of our teachers have participated.

I am pleased to report that the teaching of science at Capitol High School has been enhanced because our teachers have been impacted by the thrust of the enhancement program. Because the program has provided opportunities for teachers to interact with other professionals, our students continue to benefit greatly.

The knowledge our teachers have gained directly or indirectly from the Livermore Laboratory in Livermore, California is reflected in our classroom on a daily basis. In addition, Livermore Laboratory fosters hands-on experiences that help youngsters become active learners.

I was fortunate to have the experience of participating in a three-day workshop at Southern University during the Summer of 1994. It was a productive workshop that gave me an opportunity to participate with several of our teachers.

I appeal to you to continue to provide this program for our teachers who impact our students.

It is without reservation that I strongly support the High School Teacher Enhancement Program.

Sincerely,

Josie M. Williams
Principal

JMW/a

RECEIVED 10/31/94

Waller
HIGH SCHOOL

EDNA EATON, Ed. D., Principal
HOWARD HAWKINS, Ed. D., Associate Principal
JIM POWELL, Ed. D., Assistant Principal
CHARLES VAN WRIGHT, Assistant Principal

October 24, 1994

Dr. Robert L. Shephard
Executive Director
Science & Engineering Alliance, Inc.
1522 K Street, NW, Suite 210
Washington, DC 20005

Dear Dr. Shepard:

The workshop at Prairie View A&M University has served as a catalyst for infusion of new ideas and direction for me and other teachers from my district who participated. I returned to Waller High School this year with an eagerness to implement all that I had learned.

Our Science Department has been positively influenced. I, as Science Department Chairperson, and two other science teachers at my school, were fortunate to be a part of this program. The ideas presented for integrating science with mathematics, and using multimedia as a tool of instruction have given me a new direction and focus for our Science Department. I hope SEA will continue to work in partnership with neighboring high schools to provide future workshops that address the needs of students here at Waller High School and other districts.

I can't say, at this point, how participation in the workshop has impacted our students, but motivated and enthusiastic teachers usually help to motivate students. It is our belief that when a student is motivated he or she will learn and perform better. This belief supports our committment to excellence in the Waller I.S.D..

The SEA program has been very important to me and to Waller I.S.D. in helping us toward our vision that all students will be successful learners and possess the skills necessary to function in the 21st century.

Sincerely,

Mary L. Roberts

Mary L. Roberts
Science Department Chairperson

RECEIVED 10/31/94

Waller Independent School District

Waller High School

January 20, 1995

Dr. Robert Shepard
Science and Engineering Alliance
1522 K. Street N.W. Suite 210
Washington, D.C. 20005

Dear Dr. Shepard:

For the past three years, three of my teachers have participated in the Secondary Science Enhancement Program at Prairie View A&M University. During this time the Science Department has worked to make science more relevant and exciting for the students. Subsequently, I have noticed a new enthusiasm among both teachers and students.

It is too soon to predict the long term impact this program will have on our students. However, I firmly believe that when students are excited about a subject, learning will take place.

I hope it will be possible for Prairie View to continue working in partnership with Waller High School and its teachers. Together, our goal of preparing students to be productive citizens in an ever changing technological society can be realized.

Sincerely,
Howard Hawkins
Howard Hawkins
Principal
Waller High School

RECEIVED 1/26/95

PROVINE HIGH SCHOOL
2400 ROBINSON STREET
JACKSON, MISSISSIPPI 39209-7099
TELEPHONE (601) 960-5393

JACKSON PUBLIC SCHOOL DISTRICT

April 5, 1995

Dr. Abdul Mohamed
Dean of Science and Technology
Jackson State University
Jackson, MS 39217

Dear Dean Mohamed:

It is with much gratitude and congratulations that I write this letter because five (5) of Provine's teachers reaped the benefits of the workshops the science department at Jackson State University sponsored. I would like to take this time to commend you for strenghening these teachers. Their performances in the classroom have improved as a direct result of your summer enrichment Biology, Chemistry and Physic Workshops.

These teachers serve as role models, presenters, and most of all using techniques in the classrooms to reach all their students by making science interesting and exciting. The Science Fair was a great success. We had 10 regional winners and are looking forward to the State.

Thanks for all your help. Please consider and include us in any other summer enrichment programs.

Sincerely,

Emanuel Reeves
Principal

EM:csp

DR. DELORES HOPKINS
PRINCIPAL

MRS. BARBARA HILLIARD
IB COORDINATOR

MR. ED HARDEN
ASSISTANT PRINCIPAL

MR. ROY DALE
ASSISTANT PRINCIPAL

INTERNATIONAL BACCALAUREATE (IB)
JIM HILL HIGH SCHOOL
2185 FORTUNE STREET
JACKSON, MISSISSIPPI 39204
TELEPHONE: 601-960-5354 / FACSIMILE: 601-360-2625 / IB 601-360-2635

October 26, 1994

Dr. Robert Sheppard
Science & Engineering Alliance, Inc.
1522 K Street, NW, Suite 210
Washington, DC 20005

Dear Dr. Sheppard:

Since the completion of the workshop at Jackson State University, I have observed a new spark of excitement in Jim Hill's science and math International Baccalaureate (IB) teachers.

All of the department teachers have been influenced by the participation of some of our teachers in the SEA sponsored workshops. It is too early to assess the impact all of this is having on student performance in science and mathematics, but we all believe that test scores are improving. Nevertheless, we do know that our science students are expressing a greater interest in the classroom.

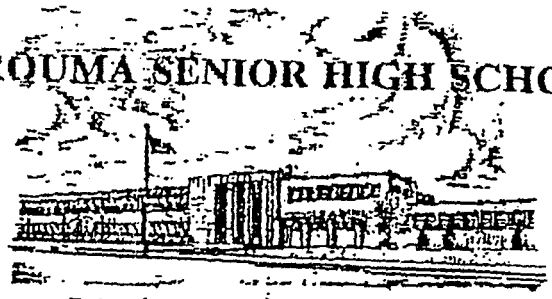
Again, I wanted you to know how important the SEA program has been to helping us meet the goals and objectives we have set for all of our students at Jim Hill.

Sincerely,

Delores W. Hopkins
Principal

DWH/rc

RECEIVED 10/31/94



# ISTROUMA SENIOR HIGH SCHOOL

3730 Winbourne Avenue
Baton Rouge, Louisiana 70805-5999
Telephone: 355-7701

PRINCIPAL
Elisha Jackson

ASSISTANT PRINCIPALS
Darrell McClung
John McCann

October 26, 1994

Science & Engineering Alliance, Inc.
1522 K Street, NW, Suite 210
Washington, DC 20005

Dear Dr. Shepard:

As a result of my teachers participation in the SEA workshops at Southern University, I have noticed a positive change in the students at Istrouma High School. They are more enthusiastic about science and mathematics.

The entire science and math department has benefited from the participation in the workshops sponsored by SEA. Our science students are sharing a greater interest in the various fields of science and test scores are improving.

The faculty members that participated have nothing but positive comments to make about their experiences. I do hope that we can continue to work close with SEA for we do have additional needs at Istrouma Senior High. Again, please know that the SEA program has meant a lot to us in helping meet the needs of our students.

Sincerely,

Elisha Jackson

Elisha Jackson
Principal

RECEIVED 10/27/94

JACKSON PUBLIC SCHOOL DISTRICT

LANIER HIGH SCHOOL
833 WEST MAPLE STREET
JACKSON, MISSISSIPPI 39203-3899
TELEPHONE (601) 960-5369

THOMAS JOHNSON
PRINCIPAL

KAREN WILSON
ASSISTANT PRINCIPAL

JOHNNY HUGHES
ASSISTANT PRINCIPAL

DARLENE BOLTON
OFFICE MANAGER

October 26, 1994

Dr. Robert Shepard
Science & Engineering Alliance, Inc.
1522 K Street, NW, Suite 210
Washington, DC 20005

Dear Dr Shepard:

Since the completion of the workshop at Jackson State/Southern University/Prairie View /Alabama A&M, I have witness a new spark of excitement about science and mathematics at Lanier High School.

All of the department teachers have been influence by the participation of some of our teachers in the SEA sponsored workshops. It is too early to assess the impact all of this is having on student performance in science and mathematics, but we all believe that test scores are improving. Nevertheless, we do know that our science students are expressing a greater interest in the classroom.

The teachers that have participated in the workshops obviously had a wonderful experience; however, I would hope that we could work closer with SEA to discuss some additional needs that we have here at Lanier High School. I do not believe that our needs are that much different from the direction of your program.

Again, I wanted you to know how important the SEA program has been to helping us meet the goals and objectives we have set for all of our students.

Sincerely,

Thomas Johnson

Thomas Johnson
Principal

RECEIVED 10/31/94