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ELEMENTARY AND MIDDLE SCHOOL SCIENCE IMPROVEMENT PROJECT

NAS8-36277

Final Report Covering the Period

May 1986 - December 1988

Submitted by:

Saundra Y. McGuire
Department of Chemistry
Alabama A & M University
Normal, Alabama 35762

Pepared for George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

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The Alabama A & M Science Improvement Project: Getting Minority Students Involved in Science

Introduction

The Alabama A & M University Elementary and Middle School Science Improvement Project (Project SIP) was designed to improve elementary and middle school science in North Alabama by involving teachers in a two-week summer workshop as well as other follow-up activities. The purpose of the activities was to increase the science knowledge of the teachers and to provide them with materials and activities for hands-on science lessons. The summer workshops, conducted during the summers of 1986, 1987, and 1988, provided instruction and materials for activities in the areas of biology, chemistry, physics, and electricity and magnetism. The materials included equipment whose total value was over $400.00. Additionally, a manual containing 43 lessons which included background information, experiments and activities for classroom and home use was provided to each teacher. During the course of the project activities, the teachers interacted with fourteen scientists from Alabama A & M University, eight staff members from the NASA Marshall Space Flight Center, three staff members from the University of Alabama at Huntsville Johnson Environmental Education Center, two teachers who served as presenters, and one NASA Teacher in Space Finalist, Kathleen Beres. Although the Project was initially planned for two years, residual funds allowed a third workshop to be conducted during the summer of 1988. This report will thus detail activities during the period May 1986 - August 1988.

Teacher/Counselor/Administrator Training Project Summary

I. Administrative

A. Participant Recruitment and Selection

Project SIP sought teacher participants from elementary and middle school grades (targeting grades 3 - 8) for participation in the program. These grades were targeted because the science material content of the program was most congruent with material appearing in the science curriculum of those grades. However, applicants from other grades within the schools were not eliminated in the selection process because of the changes in grade assignments that often occur in the school system. (For example, a teacher may teach kindergarten one year and fourth grade the next.) Also, high school teachers who expressed a strong interest in the program were not eliminated because much of the content is applicable to high school physical sciences courses as well as elementary and middle school.

The number of workshop participants selected and agreeing to participate was thirty in 1986, twenty-four in 1987, and fourteen in 1988. (The 1988 workshop was designed for approximately 15 - 20 participants due to limited funds.) Of the sixty-eight total participants, forty-five were elementary

teachers, twenty were middle-school teachers, and three were high school teachers. Three of the teachers were Special Education teachers -- two for gifted education, and one for slow learners. All were currently teaching or planning to teach in North Alabama.

A number of different mechanisms were used to attract teachers. Notification of the workshop was sent to all inservice-education coordinators, all principals, and selected elementary and middle school teachers throughout the four county, ten school-district region served by the project. (The selected teachers were those who had previously participated in a workshop sponsored by the Alabama A & M -UAH Regional Inservice Education Center. In addition, an article about the workshop appeared in the local newspapers soliciting participants. One of the most effective recruiting techniques was the publicity provided by former participants in workshops coordinated by the Project Director. Teachers told other teachers in their schools about the workshop and encouraged them to attend. Finally, the Project Director contacted some teachers directly who had expressed an interest in and a need for participating in a science workshop. The least effective mechanism seemed to be the communications sent to principals and system inservice coordinators. There was a delay in getting the information to the teachers, and some participants reported that their principal provided the information only to those teachers that he or she personally wanted to participate in workshop activities. Thus, the majority of teachers at the school would not be aware of the workshop activities. The newspaper article and the direct contact with teachers were the most effective recruitment mechanisms.

Based on experience with this project, the preferred strategy for recruiting participants is to contact teachers directly via presentations at local inservice activities and direct mail contact. However, one problem with the selection of participants was that teachers would indicate that they were definitely coming to the workshop, but then not show up when the workshop actually started. It was necessary to write to teachers asking them to please let us know if they were not going to be able to participate so that others could use their spaces. This effort was marginally successful, but during the second and third workshop sessions, attendance was affected by the cancelling out at the last minute of several of the planned participants. It is nearly impossible for other teachers (from an alternates list, for example) to attend a two week workshop on very short notice. Those contacted either had problems arranging for child care or had made other plans for at least part of the two week period.

B. Scheduling

A workshop that provides teachers with instruction in the areas of biology, physics, chemistry, and electricity and magnetism, as well as allowing them to individually participate in a variety of hands-on activities requires approximately 35 - 40 hours of on-site instruction to teachers. A two-week block of time with four hours of instruction each day was used with Project SIP because teachers had indicated that a one week block with eight hours of instruction per day forced them to cram too much information, and that

committing more than two weeks of time to such a project was unfeasible for teachers who have only two months away from regular classroom duties. One common problem experienced by workshops that are longer than two to three days in length is absenteeism. However, the Project SIP participants were informed that they were expected to participate each day unless emergencies arose that made it impossible to attend. Most participants attended all ten days of the workshop.

Since the workshop assumed no prior existing science knowledge, the sequencing of workshop activities was designed to start teachers off with the familiar--biology. Physics was offered next to show them how exciting physics can be while the interest level in workshop activities was still at a peak, and their fear of physics would not overly dampen their enthusiasm. The electricity and magnetism activities were presented after they had been exposed to some physics. Finally, they were dazzled by the chemistry experiments that involved everyday materials readily available to them and their students. This sequence worked very well.

Since the project was designed to use readily available, low-cost materials, most of the materials were available and ordered in time to be provided to the participants when appropriate. Packaging the materials in the form to be given to the teachers was the most logistically taxing part of the project, but was successfully accomplished by using assistants from the Department of Chemistry at Alabama A & M University. The set of materials for each of the four units was boxed in a different "kit" and distributed to the teachers at the beginning of the appropriate unit. Thus, at the conclusion of the workshop the teachers had four sturdy boxes--each containing materials with which to do activities in biology, chemistry, physics, or electricity and magnetism. A list of the items in each kit is provided in the appendix. Additionally, teachers were provided with a list of everyday items that can be used to teach science concepts. This list also appears in the appendix.

C. Facilities

The workshop activities were held in one of the biology laboratories of Carter Hall, the science building at Alabama A & M University. The size of the room was quite adequate as were the facilities--running water, gas and electrical outlets, and a projection screen. However, the participants in the first workshop complained (justifiably) that the temperature of the room was uncomfortably warm and the air-conditioner extremely loud. In subsequent summers this problem was corrected.

The workshop accessibility to participants was excellent. There were no residential provisions made as all participants resided within commuting distance of the workshop activities. Transportation was provided by the participants themselves. No per diem or mileage allowance was provided since the participants were getting the workshop instruction and materials free of charge. The only incentive for attending the workshop was the $400.00 worth

of materials that teachers knew they would be receiving throughout the course of the two weeks.

The cooperation between members of the departments of chemistry, biology, physics, and electrical engineering technology at Alabama A & M, as well as representatives from the NASA Marshall Space Flight Center and the Johnson Environmental Center at the University of Alabama at Huntsville was crucial to the success of the project. The presence of so many scientists on campus and making presentations to participating teachers was a great advantage for the program. Additionally, the teachers were provided with resource persons whom they called upon during the school year to speak to their classes.

D. Program Staff and Administrators

The project was administered solely by the Project Director. Secretarial assistance was provided by the Department of Chemistry and the Alabama A & M -UAH Regional Inservice Education Center. The teaching staff of the Program was recruited from the science departments of Alabama A & M University, the NASA Marshall Space Flight Center, and the University of Alabama, Huntsville Johnson Environmental Center. The members of the teaching staff were from a variety of disciplines, in keeping with the nature of the workshop. A total of twenty-seven scientists and/or administrators worked with the teachers. Sixteen of these were from Alabama A & M, eight from the Marshall Space Flight Center, and three from the UAH Johnson Environmental Education Center.

The training for the teaching staff included an orientation session on the nature of the program and the characteristics of the teachers who would be participating in the project. The emphasis in the orientation session was on the "hands-on" aspects of the workshop sessions. Each instructor was admonished to talk for only 15 - 20 minutes before beginning the experimental activities so as not to frustrate the teachers. Although most of the teaching staff were faculty members, most had never taught a course to elementary teachers. After teaching, however, most indicated that they had enjoyed working with the teachers. All expressed a desire to work with teachers again in the future. The teachers rated most of the presenters very highly on their evaluation instruments, but some were viewed as being either too technical in the presentation or too "condescending" to the teachers. Follow-up sessions with these instructors helped them to improve for future sessions.

E. Collaboration

As stated earlier, the collaborative effort during the workshop presentation was primarily between Alabama A & M University, the NASA Marshall Space Flight Center, the A & M - UAH Regional Inservice Education Center, and the Johnson Environmental Center. However, the Lawrence Livermore National Laboratory, which developed the curriculum materials used in the program, participated in the effort by co-sponsoring the national conferences held in January of 1987 and 1988 to publicize the workshop and project activities to faculty members from other Historically Black Colleges and Universities

(HBCU's) around the nation.

Some local organizations also participated in the collaboration. The local hospitals donated old x-rays of human chest cavities and other areas (minus the patient identification information), local bottlers donated empty plastic 2-liter bottles, and Alabama A & M donated bricks.

With regard to services to other educator groups, the Project Director made a presentation to participants in the Summer Training Institute at the University of Buffalo in 1987. The Institute was conducted for teachers of students in the minority student programs sponsored by the Center for Urban Affairs at the University. There were approximately 65 teachers in attendance at the session. The day after the presentation to teachers the Project Director made a presentation as part of a panel to approximately 125 minority students participating in the summer programs at the University. The visit was arranged by Mr. Clyde Foster, who was then Director of the Office of Equal Opportunity at the Marshall Space Flight Center and technical monitor of this Project. Other presentations included a paper presented at the annual meeting of the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCChE) held in San Francisco, CA in April 1987. Additionally, a presentation was made in October, 1988 at the First Annual Symposium for Black Americans in Science, Engineering, and Technology, held at the NASA Johnson Space Center in Houston. Presentations were also made at the annual NASA/HBCU Conference held in 1986 and 1987 in Atlanta, Georgia; to the PTA of the Academy for Academics and Arts Elementary and Middle School in Huntsville; and a teacher workshop held in April 1988 in Hampton, Virginia.

The elementary and middle schools of the participating teachers were not intimately involved in the planning of this project. However, several participating teachers were referred to the program by their principals. No facilities were provided by the schools, but the participating teachers actually became part of the teaching staff on the final day when they made presentations to their fellow participants.

Other than the presentations by teachers, all workshop activities were planned by faculty from Alabama A & M University and the NASA Marshall Space Flight Center. The University provided the classroom facilities and some equipment (such as plant models) for use in the workshop.

F. Curriculum and Materials Planning

The curriculum for this project was taken from the Lawrence Livermore National Laboratory's Elementary Science Study of Nature (Project LESSON). The four basic science areas of physics, chemistry, biology, and electricity and magnetism were the topics of study. These topics are included in the workshop curriculum because these are the topics that are covered in elementary and middle school science. The curriculum materials stress the contributions of minority scientists; use low-cost, easily accessible materials; and are exciting

to students and teachers. Thus, they are especially useful to this population of teachers.

Other workshop materials were taken from other sources that stress experiential science learning activities. The "Sounds of Science" materials developed by Dr. Carole Hardeman at the University of Oklahoma are particularly effective in showing middle school students successful minority, female, and handicapped scientists at work. Some of these materials were used during the workshop. Additionally, books with science experiments for children were constantly used as reference materials.

G. Participant/Project Monitoring and Evaluation

The project activities were monitored daily by the Project Director, and informal teacher feedback sessions took place throughout the two week sessions. Additionally, a written evaluation form was completed by participants at the conclusion of each workshop. They indicated strengths and weaknesses of the workshop activities. (The appendix contains the completed evaluation forms from each of the three workshops.) The oral and written evaluations were quite helpful in making minor modifications in the workshop activities. However, since most of the comments were overwhelmingly positive, the teachers indicated that they say little need for changes.

The long-term evaluation plans were not nearly as successful as the short-term evaluations. The Project Director met with little success in obtaining responses to questionnaires distributed to teachers. Follow-up telephone calls also did not yield the promised completed questionnaires. More pressure should have been placed on the teachers to get this information submitted, but this was not applied in enough instances. Hence, the only long-term evaluation data is in the form of verbal reports from teachers (and principals) who continue to indicate that the workshop has had a tremendous impact on the science activities of their students (and teachers). In retrospect, it would probably have been useful to obtain signed contracts from teachers who participated, as well as kept in closer contact with them after the workshop activities were over.

The pre-test and post-test data indicate that teachers do make significant gains in science knowledge during the workshop. Follow-up post-testing on one sample of teachers demonstrated that there is no significant loss of these gains up to six-months after the workshop has ended.

H. Fiscal and Development Activities

The financial incentives for project participants were not direct in the sense that teachers did not receive a stipend or a travel allowance. However, teachers did receive approximately $400.00 worth of science equipment to use in their classrooms, and this was a great incentive for them to participate.

Activities to generate non-NASA support included a presentation to the Parent Teacher Association of one of the local schools, contacting the Army Missile Command's Office of University Relations, continuing the collaboration with the Lawrence Livermore National Laboratory, and utilizing State funds provided by the Regional Inservice Education Center. The resources provided by these agencies included loan of personnel, financial assistance to conduct the national conference, and assistance with the publicity activities of the workshop. Additionally, future workshop activities were included for funding in a 1988 proposal to the National Science Foundation for a Minority Resource Center of Excellence at Alabama A & M University. This proposal has been funded, and future workshop activities will not require funding from NASA. Hence, the Project goal to continue the activities after NASA funding ceased has been realized.

Service Delivery

The workshop activities were conducted almost entirely as planned. However, post-workshop activities deviated somewhat from the plan. First, the classroom visitations were more difficult to schedule than had been anticipated. Most of the teachers were hesitant to have an observer in the classroom, and the Project Director was not insistent enough that the visitations be made. However, the Project Director did visit the classrooms of approximately ten of the participants, and the responses of the students to the materials were quite enthusiastic.

A. Diagnostic

As for diagnostic testing of individual participants, a pre-post test of cognitive science knowledge was administered. No standardized tests were administered because it was necessary that the testing instrument reflect the special characteristics of the instruction provided by the Project.

B. Instructional

The formal instructional process included approximately four hours of instruction per day. The four hour period was divided into three or four approximately equal blocks of time to study three or four lessons within a given subject area. (See workshop outlines for each year in the appendix to this report.) As many as three or four different scientists would present information to the teachers on a particular day. The format was particularly effective in keeping the material interesting at all times. Mot of the time was spent with the teachers actually doing science rather than listening to persons talk about science. The cooperation and comraderie that developed among the participants was excellent. They did not appear to be at all inhibited from fully participating in any of the activities and helped each other considerably. A copy of some of the lessons covered during the workshop is attached to this report.

C. Counseling/Advising

There was no explicit counseling component to this project. However, the participants were given information on science careers and shown resource materials (e.g. "Sounds of Science") that were designed to motivate students to pursue technical careers. They were also given information on the scientific manpower needs of this country and our inevitable inability to meet these needs by the year 2000 if we do not interest more students in pursuing science as a career. The participants were provided with resource materials that would be especially effective in getting minority, female, and physically handicapped students interested in science.

D. Other Service Delivery

Follow-up visits have established that the project participants share the materials and philosophy of Project SIP with their peers in their home school. Although they rarely present formal workshops (most teachers are reluctant to do this after a two-week workshop) there is much informal assistance to other teachers in their schools. It is quite common that a teacher will indefinitely "loan" materials that are associated with curriculum topics that she/he does not teach to the appropriate teacher who covers those topics in her/his science classes. For example, a third grade science teacher may loan the materials on surface tension or electrical circuits to the fifth grade teacher who teaches those topics. In this way, one participant may influence the teaching of three or four other teachers in her/his school.

Participant Outcomes

This project was designed to enable teachers to effectively teach science concepts in an exciting way using a variety of hands-on materials, as well as devise their own hands-on activities based on their individual curricula for use in their classrooms. To this end, the teachers are encouraged to develop one hands-on activity for demonstration to the workshop participants at the end of the workshop. This particular workshop activity was very successful. Each teacher enjoyed sharing with the others, and there were a series additional activities that each teacher could add to her/his repertoire at the conclusion of the workshop.

Whereas this project did not address the application of math and science concepts to engineering, the project did stress the importance of integrating science throughout the curriculum. Teachers were shown ways in which science activities could be incorporated into the teaching of English, reading, writing, social studies, health, and writing. Thus, the instructional skills of the teachers improved in science as well as in other areas as a result of this project.

When the participants left the two-week workshop, they were quite eager to try out the new materials in their classrooms, and appeared motivated to incorporate the workshop philosophy and instructional techniques in their classroom to increase science interest on the part of their students. The few evaluation questionnaires returned further documented this result.

Project Dissemination

Information concerning the project was disseminated via presentations to the local, regional, and national groups mentioned earlier. A detailed description of the project and activities was published in The Proceedings of the Fourteenth Annual Meeting of the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers in 1987. The project description will also appear in the Proceedings of the First Annual Symposium for Black Americans in Science, Engineering, and Technology to be published by CASET, the Center for the Advancement of Science, Engineering, and Technology. In addition, the Project content and philosophy have been discussed in teacher education courses at both Alabama A & M University and the University of Alabama in Huntsville.

Conclusion

The Alabama A & M University Elementary and Middle School Science Improvement Project (Project SIP) successfully completed the work outlined in the "Statement of Work" as appears in attachment J-1 of NASA Contract NAS8-36277. A two week workshop was held for thirty North Alabama teachers in year one of the project, and for twenty-four and fourteen teachers during the second year of the project and the four months which were covered by the extension of the project, respectively. Thus a total of sixty-eight (68) teachers and approximately four thousand (4000) students have been impacted by the project to date. However, when one considers the mini-workshops conducted by the Project Director and the "teacher cooperation" effect, the numbers accelerate exponentially. Hence, the Project has had a significant impact on science teaching in North Alabama schools. Additionally, a variety of area scientists were involved in presenting information to the teachers and in performing activities with them. The NASA teacher astronaut finalist interacted with North Alabama elementary and middle school teachers and students to a limited extent. (The extent was limited due to the unfortunate Challenger tragedy.) The NASA Marshall Space Flight Center Public Affairs Office provided the participants with numerous resources, and the teachers were introduced to some of the exciting science activities that occur at Marshall.

The teaching of science in the classrooms and schools of the teachers participating in Project SIP has been positively affected by Project SIP activities, and area teachers have indicated that they are looking forward to future workshop activities of this type.

Acknowledgements

The Project Director wishes to express her sincere appreciation to Mr. Lewin Warren and the staff of the Office of Equal Opportunity at NASA Headquarters; Mr. Clyde Foster, Mr. James Rice, and Mr. Robert Walker, Jr. for serving as technical monitors of the Project; Mr. William Anderson, Public Affairs Director at NASA Marshall Space Flight Center; Dr. Annie Wells and the staff of the Regional Inservice Education Center; Mr. Anthony Onyeabo, materials manager for the Project; all of the participating scientists from NASA, Alabama A & M University, and the University of Alabama in Huntsville; and all of the teachers who participated so enthusiastically in Project SIP activities. Each one, in his or her own way, personally demonstrated a firm belief that

"If it is to be, it is up to me!"

The future of science education in America is brighter because of the efforts of each of them.

Appendix 1

Project SIP Recruitment Information

Alabama A & M - UAH Regional Inservice Center Announces Summer Workshops for Area Science Teachers

Six science workshops to be held during the summer have been announced by the Regional Inservice Education Center. The workshops are designed to upgrade the skills of area teachers in the knowledge of science concepts and in the ability to teach science effectively to students in grades K - 12. The 1986 summer workshops are:

1. Physics Demonstrations for High School Teachers to be held June 11th from 8:30 a.m. until 12:30 p.m. at Huntsville High School. The workshop presenter is Ms. Dottie Dale, physics teachers at Huntsville High School. Tested demonstrations and laboratory exercises in physics will be presented.

2. Project SIP (Formerly called Project LESSON) for teachers of grades 3 - 6 to be held June 16 - 27 from 8:30 a.m. until 12:30 p.m. on the campus of Alabama A & M University. Dr. Saundra McGuire is coordinating this workshop that provides basic instruction in the areas of biology, chemistry, physics, and simple electricity and magnetism. Teachers will receive materials to be used in their classrooms for the following year. The workshop is funded by NASA and will involve participation by NASA/MSFC personnel.

3. Hands-On Activities in Sounds of Science for middle school science teachers to be held June 25, 1986 from 1:00 - 5:00 p.m. on the campus of Alabama A & M. The workshop presenter will be Dr. Carole Hardeman of Oklahoma.

4. Activity Based Elementary Science to be held July 9th from 8:30 a.m. until 12:30 p.m. at Alabama A & M. The workshop will feature simple activities that can be used to peak student interest in science.

5. What Research Says to the Science Teacher to be held June 20th from 10:30 a.m. until 12:30 p.m. The workshop, to be conducted by Dr. Dorothy Gabel of Indiana University, will present research developments in K-12 science education, as well as show teachers what classroom techniques are effective in teaching science as demonstrated by research studies. Project SIP participants will participate in this workshop along with any other interested persons.

6. Chemistry for Elementary Students July 16, 1986 from 1:00 - 5:00 p.m. at Alabama A & M University. The presenters will be members of the Alabama A & M Chemistry Department. Topcis to be discussed will include acids and bases, atomic structure, chemical reactions, and states of matter.

Additional workshops may be planned if there is sufficient interest. Anyone interested in participating in any of the workshops listed above should contact Dr. Saundra McGuire, Department of Chemistry, Alabama A & M University at 859-7328 or 29, or The Regional Inservice Education Center at 859-7393 or 94.

MEMORANDUM

To: Teachers Who Will Participate in the Project SIP Workshop

From: Saundra McGuire, Project SIP Coordinator

Date: July 6, 1987

Re: Workshop Details

Congratulations on your selection as a participant in the second Alabama A & M University Department of Chemistry - NASA sponsored Project SIP summer science workshop for elementary and middle school teachers. I can promise you an exciting and productive two weeks!

In addition to confirming your participation in the workshop, this letter is to provide you with the following details about the activities.

1. The workshop will be held from 9:00 a.m. until 1:00 p.m. daily from July 13 - 24. The activities will be held in Room 302 Carter Hall on the campus of Alabama A & M University. The schedule of activities is as follows:

July 13	Introduction & Overview of Workshop
July 14 - 15	Biology Units
July 16 - 17	Physics Units
July 20 - 21	Electricity & Magnetism Units
July 22 - 23	Chemistry Units
July 24	Teacher Presentations and Closing Activities

There will be short break periods during the daily sessions. Feel free to bring a snack for the break periods. Coffee and tea bags will be provided each day.

2. You will receive approximately $400.00 worth of science equipment for use in your classroom. The items range from candles and compasses to microscopes and motors. These items will be available to take home during the workshop and will be kept in your classroom during the school year.

3. If you find it impossible to attend at least eight of the ten workshop sessions, please call me as soon as possible so that I can discuss the feasiblity of your taking the workshop. Past experience has shown that participants who miss more than one session are not able to gain maximum benefit from the SIP materials.

4. We will ask that you allow us to do some follow-up activities in your classrooms next year. Our NASA contract requires that we do some evaluation activities to see if the materials are useful to you in the classroom. We would like to visit your class at some time during the year when you are using the SIP materials. You may also be asked to informally evaluate some of the materials.

If you have any questions concerning the workshop please call me at 859-7328 or -7329 days or 852-4454 evenings. Since I am in and out of the office daily, please leave a message with the secretary if I am not in, and I will return the call as soon as possible.

I hope you are having a good summer, and I look forward to seeing you July 13th.

Appendix 2

Roster of Project SIP Participants

WORKSHOP PARTICIPANT LIST

Inservice Activity Project SIP Date 7/31/86

Area Coordinator Saundra McGuire Workshop Presentor Saundra McGuire et al

Name of Participant	Address	County	School System	Name of School	Subject Matter	Area Positi
Geraldine Miller	654 Baltimore Hill Rd. 852-8751 Huntsville, AL 35811			Chapman Middle	Science	Teacher
Peggy McDaniel	Rt. 3 Box 222 Fyffe, AL 35971	632-2492		Fyffe School	"	"
Gwendolyn Strong	2306 Bell Avenue Huntsville, AL	534-3413		Lincoln Elementary	"	"
Gwendolyn Foster	156 Wilkerson Dr. Huntsville, AL 35811	534-7054		Rolling Hills	"	"
Geraldine Richards	2702 Sanelle Circle Huntsville, AL	881-4596		Westlawn Middle	"	"
Dollie Bradley	1812 Forney Drive Huntsville, AL 35810	837-5708		Whitesburg Middle	"	"
Dorothy Oliver	116 Robin Lane Huntsville, AL	859-9171		Oakwood Elementary	"	"
Gwendolyn Baldwin	6410 Cedar Point Dr. Huntsville, AL	8593935		Rolling Hills Elem.	"	"
Andryna Kuzimic	11008 Vivian Drive Huntsville, AL	852-1788		Davis Hills Elem.	"	"
Vicki Roth	3613 Chasewood Dr. Apt. 6 Huntsville, AL 35805	881-6963		Holy Spirit	"	"
Patty Faust	4278 Brian Green Dr. Huntsville, Al 35802	881-0936		Holy Spirit	"	"
Paula Kephart	2005 Brookmanor Drive Decatur, AL 35601	353-6476		Brookhaven Middle	"	"
Dorothy Upton	2010 Willis Road Huntsville, AL 35801	534-5157		Blossonwood Elem.	"	"
Joe Hinesley	2800 Poplar Avenue Huntsville, AL	615-433-2912		A A A	"	"
Myrtle Binford	3321 Tucker Drive Huntsville, AL 35810	852-1967		Madison Middle	"	"
Billy Stevenson	2815 Ready Section Rd. Tony, AL 35773	423-2525		Madison Crossroads	"	"
Terry Davis	116 Thatch Lane Toney, AL	828-4366		Madison Academy	"	"
Bob Trammell	4300 Force Drive Huntsville, AL	852-5981		Madison Academy	"	"
Ann Fults	11017 Rockcliff Drive Huntsville, AL	852-4682		Madison Academy	"	"

WORKSHOP PARTICIPANT LIST

Inservice Activity Project SIP Date 7/31/86

Area Coordinator Saundra Y. M'Guire Workshop Presentor S. Y. M'Guire et al

Name of Participant	Address	County	School System	Name of School	Subject Matter	Area Posi
Jerome Foster	156 Wilkerson Dr. Huntsville, AL 3581	534-7054		Lakewood Elem.	Science	Teacher
Sandra Saunders	P.O. Box 379 Meridianville, AL 35759	828-0488		Sparkman High	"	"
Betty Vaughn	11001 Mt. Charron Dr. Huntsville, AL	852-3353		West Mastin Lake Elem.	"	"
Jan Renshaw	8315 Charleston Ave Huntsville, AL 35810	859-5893		West Mastin Lake Elem.	"	"
Joyce Tittsworth	7805 Mallard Dr. Huntsville, AL	828-0391		West Mastin Lake Elem.	"	"
Martha Mckenzie	Route 1 Box 30 Pisgah, AL 35765	228-6708		Pisgah High School	"	"
Bobby Jenkins	Route 2 Pisgah, AL 35765	451-7316		Flat Rock School	"	"
Marie Everett	Route 1, Box 208 Pisgah, AL 35765	451-3789		Pisgah High School	"	"
Betty Bailey	Route 1 Box 156 Section, AL 35771	228-6232		Macedonia School	"	"
Katie Jones	1406 Ascent Trail Apt. B Huntsville, AL 35816	830-6732			"	"
Caulyne Hayden	2525 Eton Road Huntsville, AL 35810	232-7780		Julian Newman	"	"

9.2 (cont'd)

A&M-UAH REGIONAL INSERVICE EDUCATION CENTER

WORKSHOP PARTICIPANT LIST

Inservice Activity SIP Science Improvement Project Date 7-13-87 7-23-87

Area Coordinator Dr. McGuire Workshop Consultant/Presentor

Name of Participant	Complete Address Street, City Zip Code	Phone Number	County	School System	Name of School	Subject Matter	Area Position
1. Judy Latham	Rt. One Box 291 Woodville 35776	776-3709	Jackson	Jackson Co.	Woodville	All elementary	5th grade 4th grade
2. Joe Ann Grayson	2225-A Jonathan Dr. Huntsville, Al	852-7866	Jackson	Jackson Co.	Woodville	All elementary	3rd grad
3. Sidney Mcdonald	602 Mtn. St Scottsboro, Al	574-2507	Jackson	Jackson Co.	Woodville	All Elementary	4th grade
4. Bonnie Ross	10121 Shades Rd. Huntsville, AL 35803	883-7085	Madison	Huntsville City	Weatherly	All Elementary	5th grade
5. Eva Geiger	10025 Willow Park Dr. Huntsville AL 35803	883-1504	Madison	Huntsville City	Weatherly	All Elementary	5th grade
6. Ann Willoughby	2607 Vista Dr Huntsville Al 35803	881-3657	Madison	Huntsville City	Weatherly	G/T.	3-4-5 grades
7. Betsy Woods	1300 Woodmont Ave Huntsville, Al 35801	539-3355	Madison	Madison Co.	Central	all elementary 3rd grade	3rd grade
8. Sue McDaniel	3220 Pecan Grove Huntsville Al 35810	859-2953	Madison	Madison Co	Madison Mid.	Life Science	7th grade
9. Robert C. Bullard	2128 Winchester Rd Huntsville, Al 35810	852-8593	Madison	Limestone Co.	Elkmont High	Earth Science Life Science	7th-8th Grad
10. Carolyn Trammell	4300 Farce Dr. Huntsville, Al 35801	852-5981	Madison	Madison Acad.	Madison Acad	Kindergarten	Kindergarten
11. Carole Weddell	2103 Roseberry Dr Scottsboro, Al	259-2463	Jackson	Scottsboro City	Page	All Elementary	6th Gr.
12. Virginia Witherspoon	712 Owens Dr Huntsville Al	536-6719	Madison	Huntsville	Chapman	upper Elementary	5th
13. Regina R. Dembo	828 Eldorado Ave Hartselle, Al 35640	773-2573	Madison	Huntsville	Weatherly	Elementary 4th grade	4th gr.
14. JEARLDINE T. HYTER	1804 Lydia DR NW. Huntsville Al 35805	837-2957	Madison	Huntsville	Huntsville High	Human Physiology Physical Science	10th Grade Science
15. Mildred Hereford	6108 Trent Drive Huntsville Al 35810	859-2605	Madison	Madison County	Madison Cross Roads	All Elementary	1st-5th Grade
16.							
17.							

A&M-UAH REGIONAL INSERVICE EDUCATION CENTER

WORKSHOP PARTICIPANT LIST

Inservice Activity SIP Science Improvement Project Date 7-13-87

Area Coordinator _____ Workshop Consultant/Presentor _____

	Name of Participant	Complete Address Street, City Zip Code	Phone Number	County	School System	Name of School	Subject Matter	Area Position
1.	Sue Viall	1307 Wind River Cir Huntsville - 35802	882-22-56	Madison	Madison Co.	Riverton	Science	6th grade
2.	Karen Hales	Rt 2, Box 431-B Boaz, AL 35957	593-8223	Marshall	Marshall Co	Boaz Elem	all subj. Third grd.	teach. classroom
3.	Jill Mitchell	Rt 1 Box 23 Taft, Tn. 38488	615-726-6403	Madison	Huntsville City	Butler High	Spec Ed Sci	LD Resource 9-12
4.	Thelma Evans	5150 Meridian St Huntsville AL 35810	852-2858	Madison	Madison Co-	Owens Cross Rds.	Third Gr.	Elem. Ed
5.	Pamela Dudley	4116 Newson Rd #109 Huntsville, AL. 35805	882-9623	Madison	Huntsville City	Chaffee Elem	all subj. Science	5th
6.	Edith Smith	RT. 5 Box 59 Scottsboro Al 35768	259-5199	Jackson	Scottsboro City	Page Elem.	All subj.	6th.
7.	Brenda Woosley	1003 Wildwood Dr Scottsboro Al 35768	259-0165	Jackson	Scottsboro City	Page	All	5th
8.	Maria Michel	712 Mira Vista Dr Huntsville, Al. 35802	881-0153	Madison	Private	Holy Spirit	Life & Earth Science	7th & 8th
9.	Joy Brantley	1923 Buckingham H'ville Al 35803	882-3195	Madison	H'ville City	Mt Gap Middle	So. Ed G/T	7th & 8th
10.								
11.								
12.								
13.								
14.								
15.								
16.								

10 doors @ $10 = 100 ea. 9.7 ✓

A&M-UAH REGIONAL INSERVICE EDUCATION CENTER

WORKSHOP PARTICIPANT LIST

Inservice Activity Project SIP - 1988 Date 7/25 - 8/5/88

Area Coordinator Saundra McGuire Workshop Consultant/Presentor Saundra McGuire

Name of Participant	Complete Address Street, City Zip Code	Phone Number	County	School System	Name of School	Subject Matter	Area Position
1. Nancy Pike	1714 Sun Valley Hville 35801	533-5774	Madison	Huntsville City Schools	Jones Valley	all	5th grade
2. Judy Watkins	425 Manor Dr. Scottsboro, AL 35768	574-6730	Jackson	Woodville School ↔ Jackson Co. Bd of Ed		all	5th grade
3. Deborah Coy	102 Madison Avenue Madison AL 35758	772-3364	Madison	Madison County	West Madison Elementary	all	3rd grade
4. Pat Gulick	295 Mohawk Rd. Brownsboro, AL 35741	881-6964	Madison	Madison County	Owens Cross Roads	all	5th Grade
5. Kenneth Bates	Rt. 3 Box 736 Union Grove, AL	753-6159	Marshall	Marshall Co.	Grassy Jr. High	Science-Math	6-9
6. Thomas Isbell	Star Rte. Box 42 Union Grove, AL 35175	753-6318	Marshall	Marshall Co.	Union Grove	All	5th Grade
7. Rita Davenport	2202 Naylor Rd Hville 35801	534-2075	Madison	Huntsville City	Jones Valley	all	3rd grade
8. Gary Mahon	3906 Nelson Dr. Hville 35816	859-1411	Madison	Holy Family-Diocese of B'ham	Holy Family	6-8th science	
9. Gillie Simmons	1702 Laverne Dr. Hville, AL 35816	852-4896	Jackson	Jackson Co.	Woodville	6th all	6th grade
10. [illegible]	[illegible]	[illegible]	[illegible]	Madison County	Owens Cross Rds	all	5/6 Comb
11. Sandra Montgomery	2107 Barrywood Rd Hsv AL 35810	852-9259	Madison	Huntsville City	Ridgecrest	all	3rd grade
12. Janice Nolin	10001 Willow Park Dr. S.E. Huntsville, AL 35803	880-8197	Madison	Huntsville City	substitute	all	K-8
13. CRAIG BLEVINS	1406 CAPRI DRIVE HUNTSVILLE AL 35811	533-6724	MADISON	HUNTSVILLE CITY	WESTLAKE MIDDLE	EARTH SCIENCE	8th GRADE
14. Kathy Cook	29 Ripley Dr RSA AL 35808	830-9084	Madison	Huntsville City	Highlands	ALL	3rd
15.							
16.							

Appendix 3

Schedule of Project SIP Activities

Alabama A & M University Department of Chemistry

Science Improvement Project

SIP Program

Workshop Goal and Objectives

PROGRAM GOAL

The goal of this program is to enhance the teaching of science at the elementary and middle school level to prepare and inspire more students to pursue careers in science, engineering, and technology.

Workshop Objectives

1. To teach teachers basic concepts in the areas of physics, biology, chemistry, and electricity and magnetism that can be taught to elementary and middle school students.

2. To demonstrate simple low-cost experiments that can be used to teach basic scientific principles to elementary and middle school students.

3. To improve teachers' confidence in their ability to effectively teach science by showing them that science *is* fun.

4. To provide teachers with the knowledge and materials necessary to improve the quantity and quality of science instruction in their classrooms.

5. To expose teachers to scientists at Alabama A & M University and local agencies who can serve as resource persons for their science classes.

Alabama A & M University Department of Chemistry

Science Improvement Project
(SIP Program)

Schedule of Activities
June 16, 1986

8:30 - 8:45	Registration
8:45 - 9:00	Welcome Dr. Bessie Jones, Dean School of Arts & Sciences
9:00 - 9:30	Overview of Workshop or *"Just What is SIP?"* Dr. Saundra McGuire, Workshop Coordinator
9:30 - 9:45	Introduction of Participants
9:45 - 10:30	Fun & Games
10:30 - 10:45	Break
10:45 - 11:30	The Scientific Method
11:30 - 12:30	Lesson 39 - Senses & Skills

Alabama A & M University Department of Chemistry

Science Improvement Project
(Project SIP)

Schedule of Activities

June 17- 27

June 17th - 18th — Biology

June 17th

Lesson 34	Characteristics of Living Things	Mr. Wiley Henderson
Lesson 37	Organs of Man	Dr. Charles McMillan
Lesson 38	Microorganisms	Dr. Rather Brown

June 18th

Lesson 35	Structure of Living Things	Mrs. Katie Jones
Lesson 40	Plants	Mr. Wiley Henderson
Lesson 36	Function of Cells	Dr. Charles McMillan
Lesson 41	Water & Life	Dr. Rather Brown

June 19th - 20th — Physics

June 19th

Lesson 2	Forces	Dr. Jeffrey Wang
Lesson 3	Moving Bodies	Dr. Jeffrey Wang
Lesson 4	Pressure	Dr. M. D. Aggarwal
Lesson 5	Surface Tension	Dr. M. D Aggarwal

June 20th

Lesson 7	Electric Force & Charge	Dr. Walter Watson
Lesson 13	Light	Dr. Saundra McGuire
Lesson 9	Temperature	Dr. Saundra McGuire
Lesson 10	Thermal Expansion	Mrs. Katie Jones

June 23rd - 24th — Electricity & Magnetism

June 23rd

Lesson 18	Electrical Circuits	Mr. J. B. Turner
Lesson 19	Magnets	Mr. J. B. Turner
Lesson 23	Computers	Dr. James Thompson

June 24th

Lesson 20	Generators & Motors	Mr. J. B. Turner
Lesson 21	Alternating Current	Mr. J. B. Turner
Lesson 22	Sending Messages	Mr. J. B. Turner

June 25th - 26th — Chemistry & Miscellaneous

June 25th

Lesson 24	Molecules	Dr. Libby Chou
Lesson 29	Compounds & Solutions	Dr. Saundra McGuire
Special Lesson	Alternate Energy Sources	Mr. Bernie Levine
Special Lesson	NASA's Teacher Center	Mr. Bill Anderson

June 26th

Lesson 30	Acids & Bases	Dr. Saundra McGuire
Lesson 31	Carbon Dioxide	Dr. Saundra McGuire
Lesson 33	Uses of Chemistry	Dr. Saundra McGuire
Special Lesson	Environmental Education	Mr. Bernie Levine

June 27th — Culminating Activities

Lesson 14	Astronomy	Dr. Saundra McGuire
Individual Presentations by Teachers		
Presentation of Certificates		Mr. Clyde Foster, NASA/MSFC

The 1986 SIP Program in Review

Alabama A & M University Department of Chemistry

Science Improvement Project
(SIP Program)

Schedule of Activities
July 13, 1987

9:00 - 9:15	Registration
9:30 - 9:35	Welcome Dr. Bessie Jones, Dean School of Arts & Sciences
9:35 - 9:50	Overview of Workshop or *"Just What is SIP?"* Dr. Saundra McGuire, Workshop Coordinator
9:50 - 10:00	Introduction of Participants
10:00 - 10:30	Fun & Games
10:30 - 10:45	Break
10:45 - 11:15	The Scientific Method
11:15 - 12:00	Lesson 39 - Senses & Skills
12:00 - 1:00	Science Education & NASA Mr. Bill Anderson, Director NASA Public Affairs Office

Alabama A & M University Department of Chemistry

Science Improvement Project
(Project SIP)

Schedule of Activities

July 14 - 23

July 14th - 15th — Biology

July 14th

Lesson 34	Characteristics of Living Things	Dr. Saundra McGuire
Supplement	Crystal Growth	Mr. Hal Tippins
Lesson 37	Organs of Man	Dr. Charles McMillan
Lesson 38	Microorganisms	Dr. Rather Brown

July 15th

Lesson 35	Structure of Living Things	Mrs. Katie Jones
Lesson 40	Plants	Mr. Wiley Henderson
Lesson 36	Function of Cells	Dr. Charles McMillan
Lesson 41	Water & Life	Dr. Rather Brown

July 16th - 17th — Physics

July 16th

Lesson 2	Forces	Dr. Walter Watson
Lesson 4	Pressure	Dr. M. D. Aggarwal
Lesson 5	Surface Tension	Dr. M. D Aggarwal
Lesson 7	Electric Force & Charge	Dr. Walter Watson

July 17th

Lessons 9	Temperature	Dr. Stephen C. McGuire
Lesson 10	Thermal Expansion	Dr. Stephen C. McGuire
Lesson 13	Light	Dr. Edwin Reichmann
Lesson 14	Photography	Dr. Allen Gary

July 20th - 21st — Electricity & Magnetism

July 20th

Lesson 18	Electrical Circuits	Mr. J. B. Turner
Lesson 19	Magnets	Mr. J. B. Turner
Lesson 23	Computers	Dr. James Thompson

July 21st

Lesson 20	Generators & Motors	Mr. J. B. Turner
Lesson 21	Alternating Current	Mr. J. B. Turner
Lesson 22	Sending Messages	Mr. J. B. Turner

July 22nd - 23rd — Chemistry & Miscellaneous

July 22nd

Lesson 24	Molecules	Dr. Libby Chou
Lesson 29	Compounds & Solutions	Dr. Saundra McGuire
Lesson 30	Acids & Bases	Dr. Don Frazer

July 23rd

Lesson 31	Carbon Dioxide	Dr. Saundra McGuire
Lesson 33	Uses of Chemistry	Dr. Saundra McGuire
Lesson 14	Astronomy	Dr. Edward Reichman

July 24th — Culminating Activities

Individual Presentations by Teachers

Presentation of Certificates — Mr. James Rice, NASA/MSFC

The 1987 SIP Program in Review

Alabama A & M University Department of Chemistry

Science Improvement Project
(SIP Program)

Schedule of Activities
July 25, 1988

9:00 - 9:15	Registration
9:30 - 9:35	Welcome Dr. Bessie Jones, Dean School of Arts & Sciences
9:35 - 9:50	Overview of Workshop or *"Just What is SIP?"* Dr. Saundra McGuire, Workshop Coordinator
9:50 - 10:00	Introduction of Participants
10:00 - 10:30	Fun & Games
10:30 - 10:45	Break
10:45 - 11:45	The Scientific Method
11:45 - 1:00	Lesson 39 - Senses & Skills

Alabama A & M University Department of Chemistry

Science Improvement Project
(Project SIP)

Schedule of Activities

July 26 - August 5

July 26th - 27th — Biology

July 26th

Lesson 34	Characteristics of Living Things	Mr. Wiley Henderson
Lesson 35	Structure of Living Things	Dr. B. Mangat
Lesson 36	Function of Cells	Dr. Charles McMillan
Lesson 37	Organs of Man	Dr. Charles McMillan

July 27th

Lesson 40	Plants	Mr. Wiley Henderson
Lesson 39	Microorganisms	Dr. Rather Brown
Lesson 41	Water and Life	Dr. Rather Brown

July 28th - 29th — Physics

July 28th

Lesson 2	Forces	Dr. Jeffrey Wang
Lesson 3	Moving Bodies	Dr. Jeffrey Wang
Lesson 4	Pressure	Dr. M. D. Aggarwal
Lesson 5	Surface Tension	Dr. M. D. Aggarwal
Lesson 7	Electric Force & Charge	Dr. Walter Watson

July 29th

Lessons 9	Temperature	Dr. Saundra McGuire
Lesson 10	Thermal Expansion	Dr. Saundra McGuire
Lesson 12	Sound	Dr. M. D. Aggarwal
Lesson 13	Light	Dr. Saundra McGuire

August 1st - 2nd — Electricity & Magnetism

August 1st

NASA Educational Resources		Mr. Will Robertson
Lesson 18	Electrical Circuits	Mr. J. B. Turner
Lesson 19	Magnets	Mr. J. B. Turner

August 2nd

Lesson 20	Generators and Motors	Mr. J. B. Turner
Lesson 21	Alternating Current	Mr. J. B. Turner
Lesson 22	Sending Messages	Mr. J. B. Turner

August 3rd - 4th — Chemistry & Miscellaneous

August 3rd

Lesson 24	Molecules	Dr. Libby Chou
Lesson 29	Compounds & Solutions	Dr. Saundra McGuire
Lesson 30	Acids & Bases	Dr. Saundra McGuire

August 4th

Lesson 31	Carbon Dioxide	Dr. Saundra McGuire
Lesson 33	Uses of Chemistry	Dr. Saundra McGuire
Lesson 14	Astronomy	Dr. Saundra McGuire
Lesson 23	Computers	Dr. James Thompson

August 5th — Culminating Activities

Individual Presentations by Teachers	
Presentation of Certificates	Mr. James Rice NASA/MSFC
The 1988 SIP Program in Review	

Alabama A & M University Department of Chemistry

Science Improvement Project
(SIP Program)

Schedule of Activities

August 5, 1988

9:00 - 10:00	Lesson 14 Astronomy
10:00 - 10:30	Post-test and Scoring
10:30 - 10:45	Break
10:45 - 11:45	Individual Teacher Presentations
11:45 - 12:00	Presentation of Certificates Mr. James Rice, NASA/MSFC
12:00 - 1:00	Workshop Evaulation

HAVE A PRODUCTIVE 1988 - 89 SCHOOL YEAR!

Appendix 4

Project SIP Workshop Evaluation Forms

A&M-UAH REGIONAL INSERVICE EDUCATION CENTER

INSERVICE ACTIVITY EVALUATION FORM

Name of Workshop SIP Workshop Presenter Dr. McGuire

Date 6-17 thru 6-27 Location Ala. A+M

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent 10 9 8 7 6 5 4 3 2 1 Poor

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor 1 2 3 4 5 6 7 8 9 10 Excellent

3. Handout materials were adequate and pertinent.

Excellent 10 9 8 7 6 5 4 3 2 1 Poor

4. Circle the number that represents your overall evaluation of the workshop.

Poor 1 2 3 4 5 6 7 8 9 10 Excellent

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain.

none (excellent)

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

air conditioning

A&M-UAH REGIONAL INSERVICE EDUCATION CENTER

INSERVICE ACTIVITY EVALUATION FORM

Name of Workshop SIP Workshop Presentor Dr. McGuire

Date June 26-27, 1986 Location Room 302 A&M Univ.

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent									Poor
(10)	9	8	7	6	5	4	3	2	1

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor									Excellent
1	2	3	4	5	6	7	8	(9)	10

3. Handout materials were adequate and pertinent.

Excellent									Poor
(10)	9	8	7	6	5	4	3	2	1

4. Circle the number that represents your overall evaluation of the workshop.

Poor									Excellent
1	2	3	4	5	6	7	8	9	(10)

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain.

None

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

Air conditioning needs to be fixed.

A&M-UAH REGIONAL INSERVICE EDUCATION CENTER

INSERVICE ACTIVITY EVALUATION FORM

Name of Workshop: Sci Improvement Projects Workshop Presenter Dr. McGuire

Date 6-27-86 Location Ala. A. & M. Univ.

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent
(10) 9 8 7 6 5 4 3 2 1 Poor

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor
1 2 3 4 5 6 7 8 9 (10) Excellent

3. Handout materials were adequate and pertinent.

Excellent
(10) 9 8 7 6 5 4 3 2 1 Poor

4. Circle the number that represents your overall evaluation of the workshop.

Poor
1 2 3 4 5 6 7 8 9 (10) Excellent

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain.

None

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

Needed more air conditioning - no weaknesses, otherwise.

Was a great workshop - fun, informative, and useful

A&M-UAH REGIONAL INSERVICE EDUCATION CENTER

INSERVICE ACTIVITY EVALUATION FORM

Name of Workshop Science Improvement Workshop Presentor Dr Sandra McGuire

Date June 16-27 Project Location AL A&M

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent 10 9 8 7 6 5 4 3 2 1 Poor

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor 1 2 3 4 5 6 7 8 (9) 10 Excellent

3. Handout materials were adequate and pertinent.

Excellent (10) 9 8 7 6 5 4 3 2 1 Poor

4. Circle the number that represents your overall evaluation of the workshop.

Poor 1 2 3 4 5 6 7 8 9 (10) Excellent

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain.

The hands-on activities were great. The outside speakers could have involved the class better.

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

The two speakers from Johnson were boring. It was beneficial for us as teachers to see how students drift away when they aren't involved.

Dr McGuire did such a good job on the part she presented in keeping everyone involved. It will be close.

A&M-UAH REGIONAL INSERVICE EDUCATION CENTER

INSERVICE ACTIVITY EVALUATION FORM

Name of Workshop SIP Science Workshop Workshop Presentor Sandra McGuire

Date June 16-27 Location A&M University

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent 10 9 8 7 6 5 4 3 2 1 Poor

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor 1 2 3 4 5 6 7 (8) 9 10 Excellent

3. Handout materials were adequate and pertinent.

Excellent (10) 9 8 7 6 5 4 3 2 1 Poor

4. Circle the number that represents your overall evaluation of the workshop.

Poor 1 2 3 4 5 6 7 8 9 (10) Excellent

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain.

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

This was a great workshop. It really makes me want to be more with my students and to make science more interesting. You did a fantastic job.

A&M-UAH REGIONAL INSERVICE EDUCATION CENTER

INSERVICE ACTIVITY EVALUATION FORM

Name of Workshop Science Improv. Workshop (PROJECT) Workshop Presentor Dr. McGuire

Date June 16 - 27 Location A&M

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent
(10) 9 8 7 6 5 4 3 2 1 Poor

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor
1 2 3 4 5 6 7 8 9 (10) Excellent

3. Handout materials were adequate and pertinent.

Excellent
(10) 9 8 7 6 5 4 3 2 1 Poor

4. Circle the number that represents your overall evaluation of the workshop.

Poor
1 2 3 4 5 6 7 8 9 (10) Excellent

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain.

Beef up the physics portion - everything else was super.

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

Physics portion

A&M-UAH REGIONAL INSERVICE EDUCATION CENTER

INSERVICE ACTIVITY EVALUATION FORM

Name of Workshop Science Improvement Program Workshop Presenter McGuire

Date 6-16-86 — 6-27-86 Location Ala. A+M University

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent 10 9 (8) 7 6 5 4 3 2 1 Poor

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor 1 2 3 4 5 6 7 (8) 9 10 Excellent

3. Handout materials were adequate and pertinent.

Excellent (10) 9 8 7 6 5 4 3 2 1 Poor

4. Circle the number that represents your overall evaluation of the workshop.

Poor 1 2 3 4 5 6 7 8 (9) 10 Excellent

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain. More experiments related to lower elementary level

b. In your opinion, what are the major weaknesses of the workshop? Please explain. Some lecturers were not interesting
Some areas were covered to quickly

I enjoyed the workshop. Mrs. McGuire did an excellent job!

A&M-UAH REGIONAL INSERVICE EDUCATION CENTER

INSERVICE ACTIVITY EVALUATION FORM

Name of Workshop Science Improvement Project Workshop Presenter Dr. McGuire

Date July 16 - July 27 Location Alabama A&M University

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent
10 (9) 8 7 6 5 4 3 2 Poor 1

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor
1 2 3 4 5 6 (7) 8 9 Excellent 10

3. Handout materials were adequate and pertinent.

Excellent
10 (9) 8 7 6 5 4 3 2 Poor 1

4. Circle the number that represents your overall evaluation of the workshop.

Poor
1 2 3 4 5 6 7 8 9 Excellent (10)

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain. More experiments and demonstrations for Biological science

b. In your opinion, what are the major weaknesses of the workshop? Please explain.
Cooler classroom temperature

I enjoyed it very much !!

A&M-UAH REGIONAL INSERVICE EDUCATION CENTER

INSERVICE ACTIVITY EVALUATION FORM

Name of Workshop Science Improvement Project Workshop Presenter Saundra McGuire

Date 6/27/86 Location A & M. University

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent									Poor
(10)	9	8	7	6	5	4	3	2	1

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor									Excellent
1	2	3	4	5	6	(7)	8	9	10

3. Handout materials were adequate and pertinent.

Excellent									Poor
(10)	9	8	7	6	5	4	3	2	1

4. Circle the number that represents your overall evaluation of the workshop.

Poor									Excellent
1	2	3	4	5	6	7	8	9	(10)

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain.

I could not understand some of the speakers. AC noise was a problem, as well as their not cooling adequately.

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

A&M-UAH REGIONAL INSERVICE EDUCATION CENTER

INSERVICE ACTIVITY EVALUATION FORM

Name of Workshop Science Improvement Workshop Presentor Dr. ~~Sanders~~ Saandra McQuire

Date June 27, 1986 Location A + M University

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent 10 9 8 7 6 5 4 3 2 1 Poor

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor 1 2 3 4 5 6 7 (8) 9 10 Excellent

3. Handout materials were adequate and pertinent.

Excellent 10 9 (8) 7 6 5 4 3 2 1 Poor

4. Circle the number that represents your overall evaluation of the workshop.

Poor 1 2 3 4 5 6 7 (8) 9 10 Excellent

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain.

- Kits should be more accurately prepared
- Room temperature uncomfortable
- Several speakers were difficult to understand

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

[redacted]

Strengths - Will be able to use materials in class this 1986-87 year. At least 1/2 the lessons are relevant to Units taught.

* Resource people available will be great + vital part of science program for next year (+ future years).

A&M-UAH REGIONAL INSERVICE EDUCATION CENTER

INSERVICE ACTIVITY EVALUATION FORM

Name of Workshop Science Improvement Project. Workshop Presentor Dr. McLaurin

Date 6/17 - 6/27 Location A&M

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent
(10) 9 8 7 6 5 4 3 2 1 Poor

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor
1 2 3 4 5 6 7 8 (9) 10 Excellent

3. Handout materials were adequate and pertinent.

Excellent
(10) 9 8 7 6 5 4 3 2 1 Poor

4. Circle the number that represents your overall evaluation of the workshop.

Poor
1 2 3 4 5 6 7 8 9 (10) Excellent

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain.

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

A&M-UAH REGIONAL INSERVICE EDUCATION CENTER

INSERVICE ACTIVITY EVALUATION FORM

Name of Workshop Science Improvement Project SIP Workshop Presentor Dr. McGuire

Date June 27, 1986 Location A+M University

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent (10) 9 8 7 6 5 4 3 2 1 Poor

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor 1 2 3 4 5 6 7 (8) 9 10 Excellent

3. Handout materials were adequate and pertinent.

Excellent (10) 9 8 7 6 5 4 3 2 1 Poor

4. Circle the number that represents your overall evaluation of the workshop.

Poor 1 2 3 4 5 6 7 8 (9) 10 Excellent

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain.

Dr. McGuire gave the most beneficial lessons. She was more interesting in presenting the lessons. She was very energetic!

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

A&M-UAH REGIONAL INSERVICE EDUCATION CENTER

INSERVICE ACTIVITY EVALUATION FORM

Name of Workshop S. I. P Workshop Presentor Dr. McGuire

Date 6-27-86 Location A+M University

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent
(10) 9 8 7 6 5 4 3 2 Poor 1

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor
1 2 3 4 5 6 (7) 8 9 Excellent 10

3. Handout materials were adequate and pertinent.

Excellent.
(10) 9 8 7 6 5 4 3 2 Poor 1

4. Circle the number that represents your overall evaluation of the workshop.

Poor
1 2 3 4 5 6 7 8 9 Excellent (10)

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain.

All area were not relevent to my teaching assignment, but the workshop served the purpose set forth - I think the workshop is excellent with the plan now being used.

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

None

A&M-UAH REGIONAL INSERVICE EDUCATION CENTER

INSERVICE ACTIVITY EVALUATION FORM

Name of Workshop Science Imp. Proj. Workshop Presentor D.S. Mcguire

Date 6-16 - 6-27 Location Okla. A&M U.

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent 10 9 8 7 6 5 4 3 2 1 Poor

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor 1 2 3 4 5 6 7 8 9 (10) Excellent

3. Handout materials were adequate and pertinent.

Excellent (10) 9 8 7 6 5 4 3 2 1 Poor

4. Circle the number that represents your overall evaluation of the workshop.

Poor 1 2 3 4 5 6 7 8 (9) 10 Excellent

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain. Some of the presenters were a little more technical that they should have been. Presenters (Professors) should introduce the lessons as a model for how we will present them to our students.

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

STATED ABOVE

A&M-UAH REGIONAL INSERVICE EDUCATION CENTER

INSERVICE ACTIVITY EVALUATION FORM

Name of Workshop Scientific Improv. Proj. Workshop Presentor Dr. S. McGuire

Date 7/30/87 Location A+M Univ.

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent
(10) 9 8 7 6 5 4 3 2 1 Poor

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor
1 2 3 4 5 6 7 8 9 (10) Excellent

3. Handout materials were adequate and pertinent.

Excellent
(10) 9 8 7 6 5 4 3 2 1 Poor

4. Circle the number that represents your overall evaluation of the workshop.

Poor
1 2 3 4 5 6 7 8 9 (10) Excellent

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain.

Everything was well planned and well organized. Nothing should be changed.

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

Fantastic workshop, no weakness.

10.

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop Project SIP *Date* 13-24 July 87

Workshop Presentor Dr. M'Guire *Location* A&M

1. *How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.*

Excellent — *Poor*

10 9 (8) 7 6 5 4 3 2 1

2. *Indicate the degree to which the content of this workshop is relevant to your work assignment.*

Poor — *Excellent*

1 2 3 4 5 6 (7) 8 9 10

3. *Handout materials were adequate and perinent.*

Excellent — *Poor*

10 9 (8) 7 6 5 4 3 2 1

4. *Circle the number that represents your overall evaluation of the workshop.*

poor — *Excellent*

1 2 3 4 5 6 7 (8) 9 10

5. *Briefly comment on the following:*

a. *What change(s) in the workshop would have made it more beneficial for you? Please explain.*

b. *In your opinion, what are the major weaknesses of the workshop? Please explain.*

Some speakers were not prepared, didn't say anything (as far as I could tell) or dull.

Dr. M'Guire is a wonderful teacher. Dr. Libby Chow was clear and understandable. Dr. Stephen M'Guire was a good speaker. 7.8

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop SIP Date 7/24/87

Workshop Presentor Dr. S. McGuire Location Admin

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent 10 9 8 7 6 5 4 3 2 1 Poor

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor 1 2 3 4 5 6 7 8 9 (10) Excellent

3. Handout materials were adequate and perinent.

Excellent (10) 9 8 7 6 5 4 3 2 1 Poor

4. Circle the number that represents your overall evaluation of the workshop.

poor 1 2 3 4 5 6 7 8 9 (10) Excellent

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain.

None - Dr. McGuire did an excellent job.

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

None

10.

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop Project SIP Date 7/24/87

Workshop Presentor Linda McGuire Location CU + MC University

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent									Poor
(10)	9	8	7	6	5	4	3	2	1

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor									Excellent
1	2	3	4	5	6	7	8	9	(10)

3. Handout materials were adequate and perinent.

Excellent									Poor
(10)	9	8	7	6	5	4	3	2	1

4. Circle the number that represents your overall evaluation of the workshop.

poor									Excellent
1	2	3	4	5	6	7	8	9	(10)

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain.

None

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

None

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop SIP *Date* 7.24.87

Workshop Presentor Dr. McGuire *Location* A+M Campus

1. *How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.*

Excellent (10) 9 8 7 6 5 4 3 2 1 *Poor*

2. *Indicate the degree to which the content of this workshop is relevant to your work assignment.*

Poor 1 2 3 4 5 6 7 8 9 (10) *Excellent*

3. *Handout materials were adequate and perinent.*

Excellent (10) 9 8 7 6 5 4 3 2 1 *Poor*

4. *Circle the number that represents your overall evaluation of the workshop.*

poor 1 2 3 4 5 6 7 8 9 (10) *Excellent*

5. *Briefly comment on the following:*

a. *What change(s) in the workshop would have made it more beneficial for you? Please explain.*

Begin at 8 AM and end at 10 PM

b. *In your opinion, what are the major weaknesses of the workshop? Please explain.*

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop Project SIP Date 7/24/87

Workshop Presentor Dr. Saundra McGuire Location Ala. A. & M University

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent — Poor

(10) 9 8 7 6 5 4 3 2 1

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor — Excellent

1 2 3 4 5 6 7 8 9 (10)

3. Handout materials were adequate and perinent.

Excellent — Poor

(10) 9 8 7 6 5 4 3 2 1

4. Circle the number that represents your overall evaluation of the workshop.

poor — Excellent

1 2 3 4 5 6 7 8 9 (10)

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain.

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop SIP *Date* July 24, 1987

Workshop Presentor Dr. Dawnella McGhee *Location* Ala. A & M Univ.

1. *How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.*

Excellent (10) 9 8 7 6 5 4 3 2 1 *Poor*

2. *Indicate the degree to which the content of this workshop is relevant to your work assignment.*

Poor 1 2 3 4 5 6 7 8 9 (10) *Excellent*

3. *Handout materials were adequate and perinent.*

Excellent (10) 9 8 7 6 5 4 3 2 1 *Poor*

4. *Circle the number that represents your overall evaluation of the workshop.*

poor 1 2 3 4 5 6 7 8 9 (10) *Excellent*

5. *Briefly comment on the following:*

a. *What change(s) in the workshop would have made it more beneficial for you? Please explain.*

I enjoyed the workshop and appreciate the materials and the refreshers of my memory on many science things I take had or the undergraduate level.

b. *In your opinion, what are the major weaknesses of the workshop? Please explain.*

I will use much of the material in my classroom. Thanks!

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop SIP *Date* 7-24-87

Workshop Presentor Dr. S. McGuire *Location* A&M University

1. *How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.*

Excellent									*Poor*
(10)	9	8	7	6	5	4	3	2	1

2. *Indicate the degree to which the content of this workshop is relevant to your work assignment.*

Poor									*Excellent*
1	2	3	4	5	6	7	8	9	(10)

3. *Handout materials were adequate and perinent.*

Excellent									*Poor*
(10)	9	8	7	6	5	4	3	2	1

4. *Circle the number that represents your overall evaluation of the workshop.*

poor									*Excellent*
1	2	3	4	5	6	7	8	9	(10)

5. *Briefly comment on the following:*

   a. *What change(s) in the workshop would have made it more beneficial for you? Please explain.*

   b. *In your opinion, what are the major weaknesses of the workshop? Please explain.*

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop S & P Date 7-24-87

Workshop Presentor Dr. Saundra McGuire Location A & M Carter Hall

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent (10) 9 8 7 6 5 4 3 2 1 Poor

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor 1 2 3 4 5 6 7 8 9 (10) Excellent

3. Handout materials were adequate and perinent.

Excellent (10) 9 8 7 6 5 4 3 2 1 Poor

4. Circle the number that represents your overall evaluation of the workshop.

poor 1 2 3 4 5 6 7 8 9 (10) Excellent

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain. A few presentors were a little over our heads.

b. In your opinion, what are the major weaknesses of the workshop? Please explain. No weaknesses

A super workshop! Thanks to Dr. McGuire for her super job in Coordinating!

10

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop SIP Date 7/24/87

Workshop Presentor Dr. Saunda McGuire Location A+M

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent 10 9 8 7 6 5 4 3 2 1 Poor

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor 1 2 3 4 5 6 7 8 9 10 Excellent

3. Handout materials were adequate and perinent.

Excellent 10 9 8 7 6 5 4 3 2 1 Poor

4. Circle the number that represents your overall evaluation of the workshop.

poor 1 2 3 4 5 6 7 8 9 10 Excellent

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain.

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop Project SSP *Date* 7/24/87 13-

Workshop Presentor Dr. Saundra McGuire *Location* Okla. A & M

1. *How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.*

Excellent (10) 9 8 7 6 5 4 3 2 1 *Poor*

2. *Indicate the degree to which the content of this workshop is relevant to your work assignment.*

Poor 1 2 3 4 5 6 7 8 9 (10) *Excellent*

3. *Handout materials were adequate and perinent.*

Excellent (10) 9 8 7 6 5 4 3 2 1 *Poor*

4. *Circle the number that represents your overall evaluation of the workshop.*

poor 1 2 3 4 5 6 7 8 (9) 10 *Excellent*

5. *Briefly comment on the following:*

a. *What change(s) in the workshop would have made it more beneficial for you? Please explain.* This was an outstanding workshop overall - An opportunity for a follow-up workshop would be helpful -

b. *In your opinion, what are the major weaknesses of the workshop? Please explain.*

A couple of the presentors came across as being weak or unable to present subject matter in an informative manner -

9.8

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop Project SIP *Date* July 13 - 24

Workshop Presentor Saundra McGuire *Location* A&M Univ

1. *How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.*

Excellent (10) 9 8 7 6 5 4 3 2 1 *Poor*

2. *Indicate the degree to which the content of this workshop is relevant to your work assignment.*

Poor 1 2 3 4 5 6 7 8 9 (10) *Excellent*

3. *Handout materials were adequate and perinent.*

Excellent (10) 9 8 7 6 5 4 3 2 1 *Poor*

4. *Circle the number that represents your overall evaluation of the workshop.*

poor 1 2 3 4 5 6 7 8 9 (10) *Excellent*

5. *Briefly comment on the following:*

   a. *What change(s) in the workshop would have made it more beneficial for you? Please explain.*

   b. *In your opinion, what are the major weaknesses of the workshop? Please explain.*

none

This was a wonderful workshop. Many things have been learned that I can take back to share with my students. Thank you for this opportunity.

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop Project SIP Date 7/24/87

Workshop Presentor Dr. McGuire Location A & M

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent (10) 9 8 7 6 5 4 3 2 1 Poor

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor 1 2 3 4 5 6 7 8 9 (10) Excellent

3. Handout materials were adequate and perinent.

Excellent (10) 9 8 7 6 5 4 3 2 1 Poor

4. Circle the number that represents your overall evaluation of the workshop.

poor 1 2 3 4 5 6 7 8 (9) 10 Excellent

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain.

I enjoyed the workshop a great deal. Most of the presenters were good, but some were not prepared.

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

Eliminate the persons who were not prepared this year and get better prepared ones for next year.

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop Science Improvement Project Date 5/24/87

Workshop Presentor Dr. Saundra McGuire Location Hilton A&M

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent — Poor

(10) 9 8 7 6 5 4 3 2 1

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor — Excellent

1 2 3 4 5 6 7 8 9 (10)

3. Handout materials were adequate and pertinent.

Excellent — Poor

(10) 9 8 7 6 5 4 3 2 1

4. Circle the number that represents your overall evaluation of the workshop.

poor — Excellent

1 2 3 4 5 6 7 8 9 (10)

5. Briefly comment on the following: I would like to recommend Dr. M. Guire for some Very special honor!

a. What change(s) in the workshop would have made it more beneficial for you? Please explain.

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

10.

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop Science Improvement Project *Date* July 13 - 24, 1987

Workshop Presentor Dr. S. McGuire *Location* A & M

1. *How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.*

   Excellent ... *Poor*

   (10) 9 8 7 6 5 4 3 2 1

2. *Indicate the degree to which the content of this workshop is relevant to your work assignment.*

   Poor ... *Excellent*

   1 2 3 4 5 6 7 8 9 (10)

3. *Handout materials were adequate and perinent.*

   Excellent ... *Poor*

   (10) 9 8 7 6 5 4 3 2 1

4. *Circle the number that represents your overall evaluation of the workshop.*

   poor ... *Excellent*

   1 2 3 4 5 6 7 8 9 (10)

5. *Briefly comment on the following:*

   a. *What change(s) in the workshop would have made it more beneficial for you? Please explain.*

   0

   b. *In your opinion, what are the major weaknesses of the workshop? Please explain.*

   0

10.

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop Project SIP *Date* July 13-24

Workshop Presentor Saundra McGuire *Location* A+M Univ

1. *How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.*

Excellent 10 (9) 8 7 6 5 4 3 2 1 *Poor*

2. *Indicate the degree to which the content of this workshop is relevant to your work assignment.*

Poor 1 2 3 4 5 6 (7) 8 9 10 *Excellent*

3. *Handout materials were adequate and perinent.*

Excellent 10 (9) 8 7 6 5 4 3 2 1 *Poor*

4. *Circle the number that represents your overall evaluation of the workshop.*

poor 1 2 3 4 5 6 7 8 (9) 10 *Excellent*

5. *Briefly comment on the following:*

a. *What change(s) in the workshop would have made it more beneficial for you? Please explain.*

Electricity + Magnets was difficult for me I didn't understand the lecture as well as I would like to have

b. *In your opinion, what are the major weaknesses of the workshop? Please explain.*

no real weaknesses
Every minute was filled

8.5

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop Project SIP Date 13-24-July

Workshop Presentor Dr. McQuire Location A 5/11

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent — Poor

(10) 9 8 7 6 5 4 3 2 1

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor — Excellent

1 2 3 4 5 6 7 8 9 (10)

3. Handout materials were adequate and perinent.

Excellent — Poor

(10) 9 8 7 6 5 4 3 2 1

4. Circle the number that represents your overall evaluation of the workshop.

poor — Excellent

1 2 3 4 5 6 7 8 9 (10)

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain.

Come back to another workshop would be beneficial.

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

Covered too much material in the 2 weeks. Some speaker were not prepared.

10.

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop Project SIP *Date* 7/13 - 7/24/87

Workshop Presentor Saundra McGuire *Location* A & M

1. *How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.*

   Excellent (10) 9 8 7 6 5 4 3 2 1 *Poor*

2. *Indicate the degree to which the content of this workshop is relevant to your work assignment.*

   Poor 1 2 3 4 5 6 7 8 9 (10) *Excellent*

   I plan to use 2 or 3 ideas soon after school starts!

3. *Handout materials were adequate and perinent.*

   Excellent (10) 9 8 7 6 5 4 3 2 1 *Poor*

4. *Circle the number that represents your overall evaluation of the workshop.*

   poor 1 2 3 4 5 6 7 8 9 (10) *Excellent*

   One best I've been to.

5. *Briefly comment on the following:*

   a. *What change(s) in the workshop would have made it more beneficial for you? Please explain.* The two weeks "flew" by so quickly because it was a really great experience. The guest speakers added a "change", however, the

   b. *In your opinion, what are the major weaknesses of the workshop? Please explain.*

I love microbiology. However, I was greatly disappointed with the speaker. Change speakers next year.

One asset to the program is the God given gift given to Saundra McGuire to teach! Lose her and your program will die. She's fabulous!!! I couldn't wait for the guest speakers to leave so she could explain to us "at our level" what it was all about! It was a great program. A+

A&M-UAH REGIONAL INSERVICE EDUCATION CENTER

INSERVICE ACTIVITY EVALUATION FORM

Name of Workshop Project SIP Workshop Presentor Sandra McGuire

Date 7/13 - 7/24 Location A&M University

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent
(10) 9 8 7 6 5 4 3 2 1 Poor

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor
1 2 3 4 5 6 (7) 8 9 10 Excellent

3. Handout materials were adequate and pertinent.

Excellent
(10) 9 8 7 6 5 4 3 2 1 Poor

4. Circle the number that represents your overall evaluation of the workshop.

Poor
1 2 3 4 5 6 7 8 (9) 10 Excellent

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain.

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

HUNTSVILLE CITY SCHOOLS

Huntsville, Alabama

EVALUATION OF IN-SERVICE PROGRAM

PROGRAM TOPIC: S I P Workshop

PLACE: Alabama A+M University DATE: 12-24-87

NOTE: PARTICIPANTS MAY ELECT TO RESPOND ONLY TO ITEM III

I: Program strengths including potential for beneficial carry-over to your work assignment: _____

II: Specific suggestion(s) which might improve future programs of this nature: _____

III: Circle the number which represents your evaluation of the program.

Poor			Below Average		Average		Good		Excellent	
0	1	2	3	4	5	6	7	8	9	(10)

IV: Comments: Very impressive.

HCS371-07 MAY79

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop Science Improvement Project Date 10

Workshop Presentor Dr. McGuire Location A & M

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent (10) 9 8 7 6 5 4 3 2 1 Poor

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor 1 2 3 4 5 6 7 8 9 (10) Excellent

3. Handout materials were adequate and pertinent.

Excellent (10) 9 8 7 6 5 4 3 2 1 Poor

4. Circle the number that represents your overall evaluation of the workshop.

poor 1 2 3 4 5 6 7 8 9 (10) Excellent

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain. none

b. In your opinion, what are the major weaknesses of the workshop? Please explain. none

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop Project SIP Date July 14-22,

Workshop Presentor Dr McGuire Location A & M University

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent 10 9 8 7 6 5 4 3 2 1 Poor

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor 1 2 3 4 5 6 7 8 9 (10) Excellent

3. Handout materials were adequate and pertinent.

Excellent (10) 9 8 7 6 5 4 3 2 1 Poor

4. Circle the number that represents your overall evaluation of the workshop.

poor 1 2 3 4 5 6 7 8 9 (10) Excellent

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain.

None

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

None

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop Project S.T.E.P. Date 8/5/88

Workshop Presentor Dr. Saundra McGuire Location Ala. A&M Univ.

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent (10) 9 8 7 6 5 4 3 2 1 Poor

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor 1 2 3 4 5 6 7 8 (9) 10 Excellent

3. Handout materials were adequate and pertinent.

Excellent (10) 9 8 7 6 5 4 3 2 1 Poor

4. Circle the number that represents your overall evaluation of the workshop.

poor 1 2 3 4 5 6 7 8 9 (10) Excellent

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain.

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

G.8

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop Science Improvement Date 8-5-88

Workshop Presentor Dr. Sandra McGuire Location A&M

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent — Poor

(10) 9 8 7 6 5 4 3 2 1

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor — Excellent

1 2 3 4 5 6 7 8 9 (10)

3. Handout materials were adequate and pertinent.

Excellent — Poor

(10) 9 8 7 6 5 4 3 2 1

4. Circle the number that represents your overall evaluation of the workshop.

poor — Excellent

1 2 3 4 5 6 7 8 9 (10)

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain.

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

This workshop is one of the best I have ever attended. The material was excellent & full of hands on ideas to use with children.

10

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop Project SIP Date July 25 - Aug. 5

Workshop Presentor Dr. S. McGuire Location Alabama A+M

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent — Poor

(10) 9 8 7 6 5 4 3 2 1

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor — Excellent

1 2 3 4 5 6 7 8 9 (10)

3. Handout materials were adequate and pertinent.

Excellent — Poor

(10) 9 8 7 6 5 4 3 2 1

4. Circle the number that represents your overall evaluation of the workshop.

poor — Excellent

1 2 3 4 5 6 7 8 9 (10)

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain.

Have Dr. McGuire do all the presentations

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

none

10.

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop Project SIP Date July 25 - Aug 5

Workshop Presentor Dr S. McGuire Location Alabama A&M

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent 10 9 8 7 6 5 4 3 2 1 Poor

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor 1 2 3 4 5 6 7 8 (9) Excellent 10

3. Handout materials were adequate and pertinent.

Excellent 10 (9) 8 7 6 5 4 3 2 1 Poor

4. Circle the number that represents your overall evaluation of the workshop.

poor 1 2 3 4 5 6 7 8 9 (10) Excellent

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain.

Increase time and do more experiment demonstrations

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

Most teachers return to their classroom without some of the materials shown. In other words, furnish more supplies.

9.5

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop Project SIP Date 8-5-88

Workshop Presentor Dr. Saundra McGuire Location Alabama A&M Univ.

1. *How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.*

Excellent 10 (9) 8 7 6 5 4 3 2 1 Poor

2. *Indicate the degree to which the content of this workshop is relevant to your work assignment.*

Poor 1 2 3 4 5 6 7 8 (9) 10 Excellent

3. *Handout materials were adequate and pertinent.*

Excellent (10) 9 8 7 6 5 4 3 2 1 Poor

4. *Circle the number that represents your overall evaluation of the workshop.*

poor 1 2 3 4 5 6 7 8 (9) 10 Excellent

5. *Briefly comment on the following:*

a. *What change(s) in the workshop would have made it more beneficial for you? Please explain.*

b. *In your opinion, what are the major weaknesses of the workshop? Please explain.*

Dr. Mc Guire did a very good job of organizing, coordinating, and collecting activities and materials.

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop Project SIP Date 8/5/88

Workshop Presentor Dr Saundra McGuire Location Alabama A&M

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent (10) 9 8 7 6 5 4 3 2 1 Poor

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor 1 2 3 4 5 6 7 8 9 (10) Excellent

3. Handout materials were adequate and pertinent.

Excellent (10) 9 8 7 6 5 4 3 2 1 Poor

4. Circle the number that represents your overall evaluation of the workshop.

poor 1 2 3 4 5 6 7 8 9 (10) Excellent

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain.

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

No major weaknesses

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop SIP *Date* 8/5/88

Workshop Presentor Dr. S McGuire *Location* Ala. A&M

1. *How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.*

   Excellent ... *Poor*

   (10) 9 8 7 6 5 4 3 2 1

2. *Indicate the degree to which the content of this workshop is relevant to your work assignment.*

   Poor ... *Excellent*

   1 2 3 4 5 6 7 8 9 (10)

3. *Handout materials were adequate and pertinent.*

   Excellent ... *Poor*

   (10) 9 8 7 6 5 4 3 2 1

4. *Circle the number that represents your overall evaluation of the workshop.*

   poor ... *Excellent*

   1 2 3 4 5 6 7 8 9 (10)

5. *Briefly comment on the following:*

   a. *What change(s) in the workshop would have made it more beneficial for you? Please explain.*

      none

   b. *In your opinion, what are the major weaknesses of the workshop? Please explain.*

      none

This workshop was great!

10

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop SIP Date 8-5-88

Workshop Presentor Dr McGuire Location A & M

1. How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.

Excellent — Poor

10 (9) 8 7 6 5 4 3 2 1

2. Indicate the degree to which the content of this workshop is relevant to your work assignment.

Poor — Excellent

1 2 3 4 5 6 7 (8) 9 10

3. Handout materials were adequate and pertinent.

Excellent — Poor

10 (9) 8 7 6 5 4 3 2 1

4. Circle the number that represents your overall evaluation of the workshop.

poor — Excellent

1 2 3 4 5 6 7 8 9 (10)

5. Briefly comment on the following:

a. What change(s) in the workshop would have made it more beneficial for you? Please explain. Have a workshop for the elementary & ~~secon~~ middle school aprate.

b. In your opinion, what are the major weaknesses of the workshop? Please explain.

Background information very beneficial but much content too difficult for primary.

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop Science Improvement Project *Date* 8-5-88

Workshop Presentor Dr. Saundra McGuire *Location* AL. A+M Univ

1. *How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.*

Excellent (10) 9 8 7 6 5 4 3 2 1 *Poor*

2. *Indicate the degree to which the content of this workshop is relevant to your work assignment.*

Poor 1 2 3 4 5 6 7 8 9 (10) *Excellent*

3. *Handout materials were adequate and pertinent.*

Excellent (10) 9 8 7 6 5 4 3 2 1 *Poor*

4. *Circle the number that represents your overall evaluation of the workshop.*

poor 1 2 3 4 5 6 7 8 9 (10) *Excellent*

5. *Briefly comment on the following:*

a. *What change(s) in the workshop would have made it more beneficial for you? Please explain.* Everything was wonderful. I only wish it would have continued longer. I could have stayed with this all summer

b. *In your opinion, what are the major weaknesses of the workshop? Please explain.*

A slight language problem with some presenters.

SUBJECT MATTER WORKSHOP EVALUATION FORM

Name of Workshop Project SIP *Date* 8-5-88

Workshop Presentor Dr. Saundra McGuire *Location* A & M Univ.

1. *How well did this workshop succeed in meeting the objectives set forth at the beginning of the workshop? Circle the number.*

   Excellent ... *Poor*

   (10) 9 8 7 6 5 4 3 2 1

2. *Indicate the degree to which the content of this workshop is relevant to your work assignment.*

   Poor ... *Excellent*

   1 2 3 4 5 6 7 **(8)** 9 10

3. *Handout materials were adequate and pertinent.*

   Excellent ... *Poor*

   10 **(9)** 8 7 6 5 4 3 2 1

4. *Circle the number that represents your overall evaluation of the workshop.*

   poor ... *Excellent*

   1 2 3 4 5 6 7 8 **(9)** 10

5. *Briefly comment on the following:*

   a. *What change(s) in the workshop would have made it more beneficial for you? Please explain.* Some of the guest presentors were "over our heads." Dr. McGuire is an excellent methods instructor!

   b. *In your opinion, what are the major weaknesses of the workshop? Please explain.*
   We had trouble hearing the guest presentors. This, coupled with language and dialect differences, was a problem

Overall, the workshop was the most helpful of any I have ever participated in. It was a great refresher course as well as an excellent methods seminar. I am very thankful that I had this opportunity and appreciate all the wonderful equipment!

Appendix 5

Project SIP Pre-Post Test Results

1986 Project SIP Pre and Post Test Scores

Teacher Number	Pre-Test	Post Test	Difference
1	11	28	+17
2	24	29	+5
3	25	20	-5
4	32	35	+3
5	18	32	+14
6	17	22	+5
7	25	25	0
8	20	29	+9
9	22	24	+2
10	23	38	+15
11	22	25	+3
12	26	31	+5
13	23	32	+9
14	13	28	+15
15	15	26	+11
16	24	32	+8
17	19	25	+6
18	23	32	+9
19	25	34	+9
20	20	29	+9
21	26	33	+7
22	31	36	+5
23	16	39	+23
24	12	26	+14
25	25	37	+12
26	20	30	+10
27	16	33	+17
28	31	37	+6
29		35	--
Average scores:	21.57	30.25	+8.86

After a t-test for significance of differences between related scores to determine whether the cognitive gains were significant, the t value obtained was 7.74. This figure is significant at the 0.001 level of significance for 27 degrees of freedom. Hence, the odds that the cognitive gains were due to chance rather than the workshop are less than one in 1000.

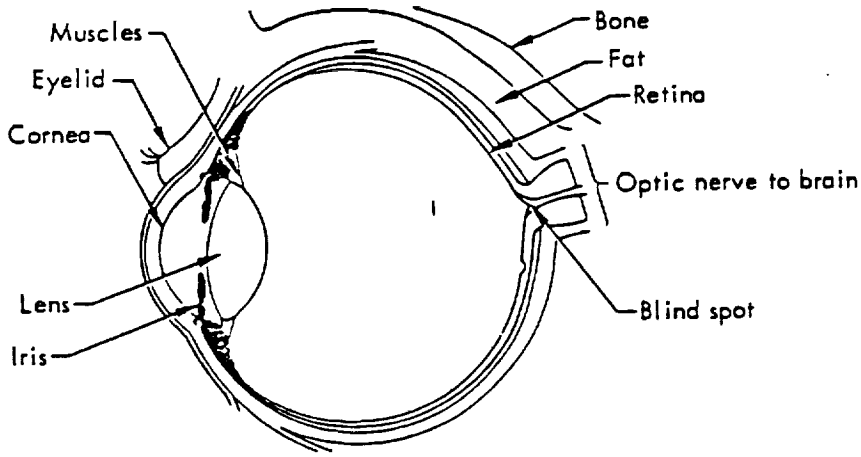
Pre-Post Scores from 1987 Project SIP

Teacher Number	Pre-Test	Post-Test	Change
1	19	26	+7
2	22	30	+8
3	19	28	+11
4	23	29	+6
5	17	28	+11
6	15	27	+12
7	12	23	+11
8	16	27	+11
9	14	22	+8
10	15	32	+17
11	13	23	+10
12	7	25	+18
13	28	37	+9
14	22	31	+9
15	19	31	+12
16	24	25	+1
17	11	24	+13
18	14	35	+21
19	15	19	+4
20	21	21	+0
21	13	26	+13
22	6	28	+22
Averages:	16.59	27.14	10.63

After a t-test for significance of differences between realted scores to determine whether the cognitive gains were significant, the t-value obtained was 6.15. This figure is significant at the 0.001 level of significance for 22 degrees of freedom. Hence, the odds that the cognitive gains were due to chance rather than the workshop are less than one in 1000.

Appendix 6

Representative Lessons Presented in Project SIP



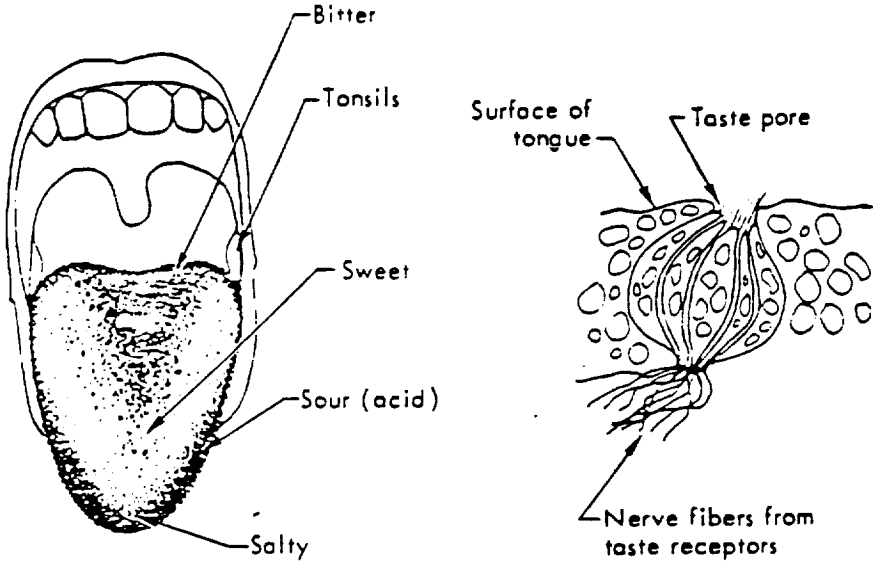
Your eyes are incessantly making fine movements to focus objects on this sensitive spot. If you look at an object that is clearly in focus, all else in your field of vision is blurred. The image is transmitted to the brain by the optic nerve to be interpreted. Myopia or nearsightedness is a result of the eyeball being longer (front to back) than it is wide. Hyperopia or farsightedness is a result of the eyeball being shorter than it is wide. Astigmatism results if the cornea which covers the lens, or the lens itself, or both, are distorted.

The brain does much of our visual work. Our vision is stereoscopic. Two slightly different images are transmitted to the brain, fused, and interpreted so that the result we see is objects that stand out from the background. We do not get this sense of depth when we look at a photograph because both eyes see the same image. Our judgment of the size of an object depends upon the size of the image produced and also its distance from our eyes. For instance, a church steeple a mile away looks no bigger than a needle a foot away. But the brain takes into account the different distances and concludes that the steeple is bigger.

The brain can be deceived by optical illusions with which we are all familiar. Optical illusions are created by imitating certain effects upon which the brain bases its judgment of size, shape, and color of objects.

gaseous must be carried by eddies from lower air currents upward to the top passage, which contains the receptors for smell. To get a better smell we purposely take short breaths or whiffs to increase the number and force of the upward currents.

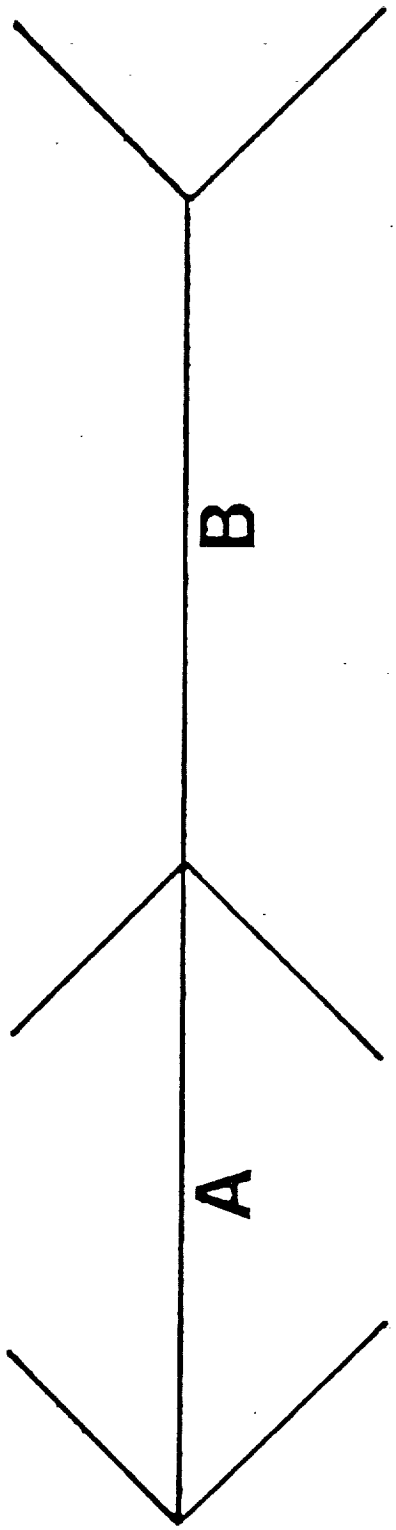
The sense of taste is stimulated only by dissolved substances. The organs of taste, called taste buds, are located chiefly on the upper surface of the tongue. The

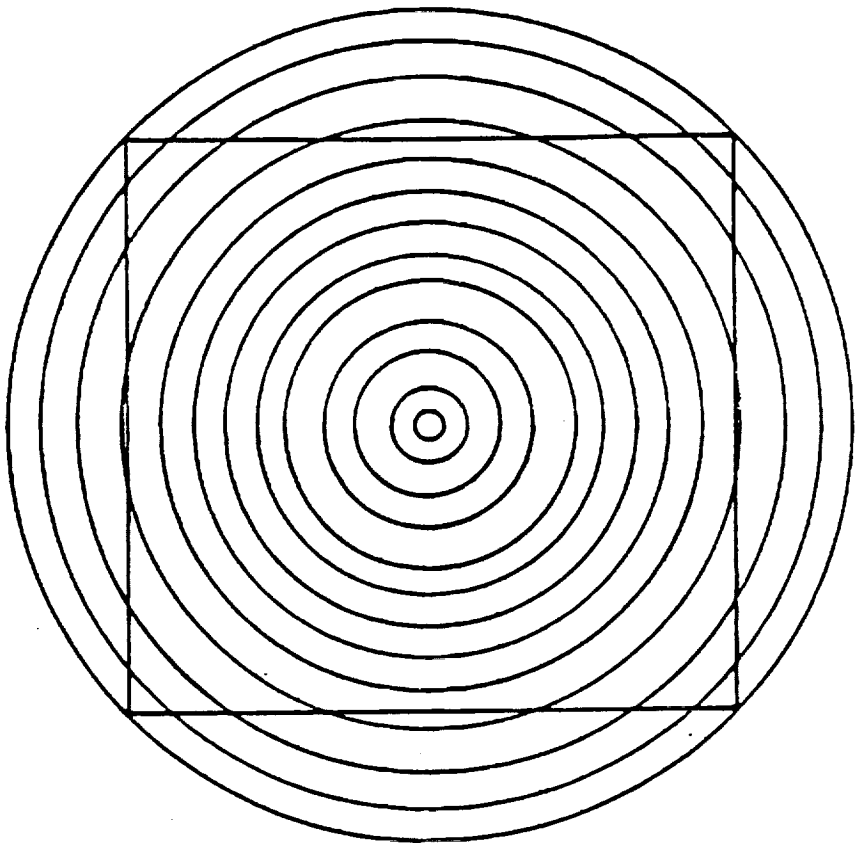


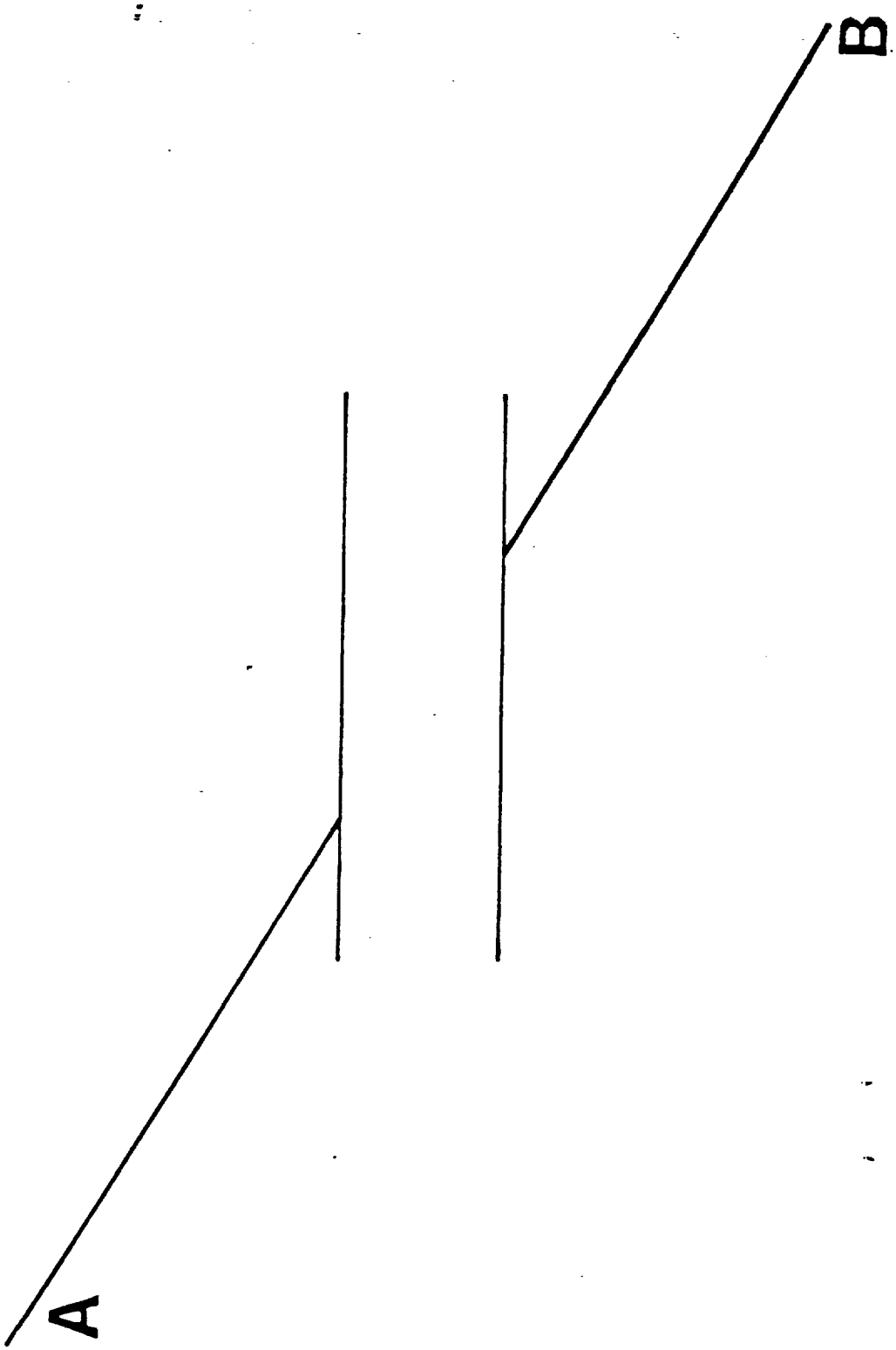
cells that make up the taste buds are supplied with fine branches of the taste nerves. There are five fundamental sensations of taste – sweet, bitter, sour, alkaline, and salty (although bitter and alkaline seem the same). Other tastes are a combination of these or a combination of taste with other sensations. Pepper produces a burning sensation, oils are often unpleasant because of how they feel, soda water "nips" the tongue, etc. Some tastes are combined with smell through the communication that exists between the mouth and the back of the nose. Note how different everything tastes when you have a cold. The fundamental taste sensations are not felt equally over all regions of the tongue, but are concentrated as follows:

Sweet – tip and front
Salt – tip
Sour – sides
Bitter – back

The central part of the tongue is not very sensitive to taste.


B
A




B
A

Show the students each of the optical illusions. Ask them to tell you what they see. After all the illusions have been shown, go back and discuss each one briefly, pointing out where the brain was led astray.

Set the illusions up where the students can see them. Allow them to reconstruct the lines for themselves, either on paper or on the blackboard. It would be fun for them to take home some of the optical illusions they make to show their families or friends.

Allow each student two pieces of construction paper of each color. Have them draw a circle 5 inches in diameter on one white and one black sheet of paper using the two pencils, the piece of string, and the ruler. Then tell them to cut out the circles, and paste the white circle in the center of the black paper and the black circle in the center of the white paper. Ask them to tell you what they see; explain that the white circle looks larger because of the spreading effect of the bright light on the retina.

Vocabulary

optical illusion
retina

Taste Experiments

Materials

Quart bottles of salty water, quinine water (bitter), diluted vinegar (acid), and sugar solution (sweet), labeled A, B, C, and D, respectively.
Small vials.
Swabs (Q-Tips, for example).

The four solutions represent the fundamental tastes. All other tastes are due to varying concentrations and combinations of these four tastes. Also, different parts of the tongue are sensitive to different tastes. The tip of the tongue is sensitive to sweet tastes, the sides to sour, the back to bitter. The salt-sensitive taste buds are more uniformly distributed, with some being strongly concentrated on the front edge. There seem to be different taste buds for each of these tastes.

Give each student a small vial containing one of the solutions. The contents are unknown to the students, but label each vial A, B, C, or D so that its contents can be identified later. Have each student dip a Q-Tip applicator in his solution and taste it only on the tip of the tongue. Then ask what was tasted and have the students write the results in their Worksheets. Some children will not be able to taste anything, so have these students redip and taste on the sides, back, or middle of the tongue to find the

fingers. So feeling an object with the opposite sides of the fingers gives one the impression of feeling two objects.

Experiment 3

All objects brought by students are placed in a sack (or a clean sock). Each student tries to pick, by touch alone, the object he brought. Then each student tries to identify other objects. The bags are exchanged between tables and then each student will try to identify one or two objects.

Our sense of touch can be trained and used to distinguish many objects that are of the same size but have different shapes or textures. Our sense of touch can be trained to "see."

Vocabulary

information	sensitive
message	stimulate
nerve ending	stimulus, stimuli

Maze Experiments

Materials

Blindfold
Bar of strong-smelling soap or some strong perfume

These experiments are games in which individual students try to negotiate simple mazes by relying on specific senses or combinations of senses.

The student selected as "it" leaves the room while the rest of the class, under the teacher's direction, forms a simple maze, holding hands to make the maze walls. The student who is "it" is then positioned at the start of the maze, and he tries to walk through the maze as quickly as he can under one of the conditions specified below. When he is finished, a new student is selected to be "it," a new maze is formed, and a new condition is imposed. Time each run.

The conditions:

1. All senses available and operating.
2. Blindfolded; hands behind back (no sight, touch, or hearing).
3. Blindfolded; hands used freely (touch emphasized).
4. Blindfolded; guiding sounds made by students (hearing emphasized).
5. Blindfolded; bar of scented soap at goal (smell emphasized).

TASTE EXPERIMENTS

	Part of tongue			
	Tip	Sides	Back	Middle
Solution A				
Solution B				
Solution C				
Solution D				

1. Sweet taste was in Bottle _____.
2. Sour taste was in Bottle _____.
3. Bitter taste was in Bottle _____.
4. Salty taste was in Bottle _____.

Fill in the blanks with sweet, sour, bitter, or salt:

5. The tip of your tongue is good for tasting _____.
6. The back of your tongue is good for tasting _____.
7. The sides of your tongue are good for tasting _____.
8. The taste you liked the most was _____.
9. The taste you disliked the most was _____.

MAZE EXPERIMENTS

Senses operating:	Time to reach goal
1. All senses	_____
2. No senses	_____
3. Touch only	_____
4. Hearing only	_____
5. Smell only	_____

Name the five senses in the order that they are most used, based on the results of the maze game.

1. _____
2. _____
3. _____
4. _____
5. _____

Lesson 10

Heat II: Thermal Expansion

Most materials expand (get bigger) when they are heated and contract (get smaller) when they are cooled. If we consider what happens to the molecules in a material when it is heated or cooled we can visualize what causes expansion or contraction. As heat is added to a material, its molecules start moving faster (vibrating in the case of a solid or moving randomly in the case of a gas or liquid), bumping into neighboring atoms and knocking them away. Thus, the average distance between the molecules increases and the material expands.

This might be easier to visualize if we consider the analogy of a row of people sitting next to each other on a long bench. If everyone is sitting still and as close together as is comfortable, let us assume that the occupied length of the bench is, say, 20 feet. But if we ask each person to sway in place from side to side (but not in time with his neighbors) and then ask the row of constantly swaying people to arrange themselves as close together as is comfortable, we would find a much longer portion of the bench is used: perhaps 25 or 30 ft. This "expansion" of the row of people is very much like the expansion that takes place in a heated wire.

Experiment 1. Solid Expansion

When the molecules in a solid vibrate more rapidly as temperature increases, the distance between them increases and the space they occupy expands. This expansion is easily seen by the expansion of a strand of copper wire when it is heated.

Materials

Copper wire
3 inches of 1/8 in. diameter solid solder wire
Meter stick
Disposable butane lighter
Clamp

Procedure

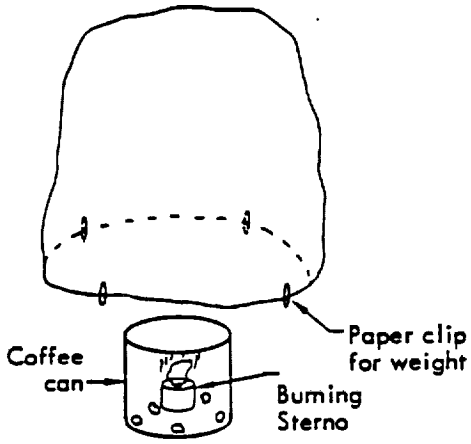
Fasten the solder wire to one end of the copper wire, and clamp the other end so that the wire hangs vertically. Hold the meter stick vertically next to the weight, with one end firmly on the floor. Have several students read the position of the bottom of the weight to the nearest millimeter. Then heat the length of copper wire with the flame of the lighter. Notice that the copper wire gets longer. Have several students watch the reading on the meter stick change while you heat the wire.

Materials

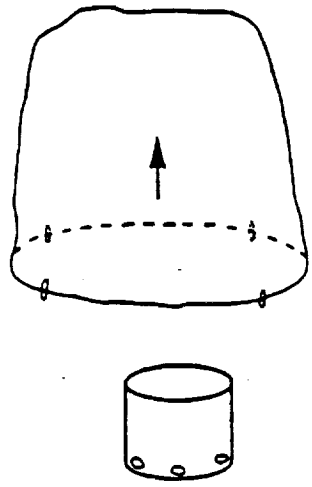
Dry-cleaning bag (plastic)
Paper clips
Coffee can
Can of Sterno

Procedure

First, remember to use caution so as not to ignite the plastic bag. Remove the top of the coffee can and punch about five holes around the side of the can as near to the bottom as possible. Center the Sterno in the bottom of the coffee can, and set the can on the floor, and light the Sterno. Place four paper clips evenly spaced around the open end of the dry-cleaning bag and hold the bag, open end down, over the coffee can so that it fills with hot air. (To do this requires a little practice.) The bag will fill with hot air and float away. As the air inside the bag cools, it will settle back down to the floor.



Heating air in a dry-cleaning bag



Warm air expands and makes bag rise

The bag floats when the air inside is heated, because the air expands when heated, and, therefore, less air is required to fill the bag when the air is hot than when it is cold. That is, a given volume of hot air has fewer molecules and weighs less than the same volume of cool air.

Lesson 24
Molecules

PURPOSE

ıts with the basic properties of molecules and how molecules

MATERIALS

/der, or steel wool.
.ble from a drug store or a nursery).
agnet will do).

mic dish or test tube (do not use plastic).
)ane torch, or stove.
ol, fine wire, or powder, the finer the better.

opper and the balance, are for Experiment 2, if time and

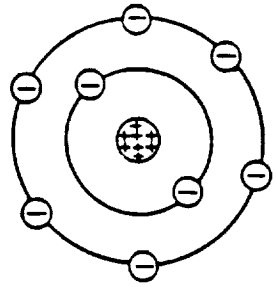
SAFETY

: experiments presented in this lesson. Be sure that torches,
:g else that's hot, are handled in a safe place with good
: is a fire extinguisher in the room.
ortant to do the iron-and-sulfur experiment with good ventila-
n smell bad. If you can stand the smell, the room is safely

BACKGROUND

? A molecule is a stable combination of two or more atoms.
son 8 that atoms are the basic building blocks of nature; each
s with one or more electrons orbiting around it.
rm? In general, molecules form because the atoms have less
- molecule than they do as separate atoms. For example,
bines with an oxygen (O) atom to form a carbon monoxide

C-2



Oxygen

let us look at a simpler
t. The "molecules" that we
n idea of how the real

V	VI
Y	Q
E	X
I	Z
U	

words. Not all combina-
kewise, with real elements,
nolecules. In general,
other in the periodic chart
: seen in our alphabet
form two-letter words
ave similar properties to
be formed from these two

les with other elements of
that no combination of T,

Columns III, IV, and V?

In the real world, it is possible to construct molecules with many thousands of atoms. Of course, in these large molecules there are a very large number of atoms of a relatively few elements.

DEMONSTRATIONS

You have some disks with bumps and some with slots. The ones with bumps are labelled H and Na, and the ones with slots are labeled O and F. These disks are models of simple atoms, like the "friends" and "enemies" pictured above.

Try fitting the disks together to form compounds. What compounds can you form? What compounds will not form?

Answer: H_2O, Na_2O, HF, and NaF will form; HNa, and OF will not.

Experiment 1

Materials

Matches
Pyrex or ceramic dish or test tube.
Iron powder (Fe) or steel wool.
Sulfur powder (available at drug store or nursery).
Magnet.

Procedure

1. Feel and smell the iron powder and sulfur. Test each material's response to to the magnet.

2. Mix the iron and sulfur together (about 2 to 5 cubic centimeters of each).

3. Use the magnet to separate some of the iron out of the mixture. Note that neither the iron nor the sulfur has been changed by the mixing or by the separating.

4. Take a small amount of the mixture (a few cubic centimeters, or a heaping teaspoon) and put it in a ceramic dish or test tube. Light this small sample of the mixture with a match, or heat it in a test tube over a stove.

NOTE: Step 4 should be done outdoors or in a well-ventilated area.

5. After the material stops "burning," let it cool down.

6. Test the new material's response to the magnet.

Further Exercise for Interested Students

Subtract the weight of the dish from the weight of the dish plus the copper before heating. This tells you how much copper you had.

Subtract the weight of the dish and the copper before heating from the weight of the dish and its contents after heating.

How much did the weight change?

This tells you how much oxygen combined with the copper. Look up the atomic weights of copper and oxygen on your periodic chart. Divide one by the other (find the weight ratio). How does this compare with the weight ratio of the amount of copper and the amount of oxygen used in your experiment?

This shows you that about one atom of oxygen combines with one atom of copper to form copper oxide.

Experiment 1 (iron and sulfur) will be more interesting also if everything is weighed before and after.

These experiments both will show that you can "burn" something – that is, you can produce a chemical reaction – and not lose much material; or, in fact, you can even gain some.

When you burn a piece of wood or paper, almost everything goes away. That is because the new compounds you make are steam (H_2O) and carbon dioxide (CO_2), which are both gases and which both mix with the air and disappear unless you take special trouble to catch them (as we did to catch the water made by heating sugar in Lesson 8).

Appendix 7

Project SIP Certificate of Achievement

THE ALABAMA A&M UNIVERSITY DEPARTMENT OF CHEMISTRY

and

THE A&M-UAH REGIONAL INSERVICE EDUCATION CENTER

present this

SIP Program

Certificate of Achievement

to

_____

in recognition of successful completion of the 40 hour **Science Improvement Project** workshop

Presented this _____ day of _____, _____ Huntsville, Alabama

Annie M. Wells

_____ _____

Regional Inservice Education Center Director SIP Program Director

Appendix 8

Abstract and Paper Presented at National NOBCChE Meeting

Abstract of Technical Presentation

Submitted for

The 14th Annual NOBCChE National Conference
April 13 - 18, 1987
Hotel Meridien, San Francisco, CA

Submitted by

Saundra Yancy McGuire
Department of Chemistry
Alabama A & M University
Normal, AL 35762

The Alabama A & M Science Improvement Project:

Getting Minority Students Involved in Science!

In view of the rapidly dwindling number of minority students enrolling in high school science and technology classes and the attendant decrease in minority students graduating with technical degrees from colleges and universities, there is an urgent need for Black scientists and educators to devise methods to reverse these trends. The Science Improvement Program (Project SIP), based on the Lawrence Livermore National Laboratory Elementary Science Study of Nature (Project LESSON) is coordinated by the Department of Chemistry at Alabama A & M University. The program assists teachers in school systems with a significant minority student population to bring science alive in their classrooms. Teachers are taught science principles and a variety of hands-on activities that are easy for elementary and middle school students to perform, but still demonstrate basic scientific principles. Evaluation efforts have demonstrated that the teachers use the materials effectively in the classrooom and students become excited about science. This presentation will provide information on Project SIP as well as information on how scientists and educators in other locations can work together to improve the science education available to pre-high school youngsters, thereby increasing the number of minority students possessing the motivation and aptitude to pursue a technological career.

Friday
9:00–12:00
COLOMBARD

Jones and Young (continued)

It is hoped that this presentation will elicit a greater response from the black constituents of the ACS and help provide constructive engagement between black chemists and chemical engineers and their white majority cohorts.

THE ALABAMA A&M SCIENCE IMPROVEMENT PROJECT (SIP): GETTING MINORITY STUDENTS INVOLVED IN SCIENCE

S. Y. McGuire, Department of Chemistry, Alabama A&M University, Normal, Alabama

In view of the rapidly dwindling number of minority students enrolling in high school science and technology classes and the attendant decrease in minority students graduating with technical degrees from colleges and universities, there is an urgent need for black scientists and educators to devise methods to reverse these trends. One such method is the Science Improvement Program (Project SIP), based on the Lawrence Livermore National Laboratory Elementary Science Study of Nature (Project LESSON). It is coordinated by the Department of Chemistry at Alabama A&M University.

Project SIP assists teachers in school systems with a significant minority student population to bring science alive in their classrooms. Teachers are taught science principles and a variety of hands-on activities that demonstrate basic scientific principles and are easy for elementary and middle school students to perform. Evaluation efforts have demonstrated that the teachers use the materials effectively in the classroom and students become excited about science.

This presentation will provide information on Project SIP as well as information on how scientists and educators in other locations can work together to improve the science education available to pre-high school youngsters. Hopefully, this information will result in other methods being devised to increase the number of minority students possessing the motivation and aptitude to pursue a technological career.

The Alabama A & M Science Improvement Project: Getting Minority Students Involved in Science!

A paper presented at

The 14th Annual NOBCChE National Conference

April 17, 1987

Hotel Meredien, San Francisco, CA

by

Saundra Yancy McGuire

Department of Chemistry

Alabama A & M University

Normal, AL 35762

Introduction and Statement of the Problem

Far too many students leave the Nation's elementary and middle schools with an inadequate foundation in mathematics and science(1). This lack of preparation translates directly into a deficiency in science and mathematics when these students emerge from high school. The problem of inadequate science and mathematics preparation is particularly acute for minority and disadvantaged members of the population who are located in large urban school systems. In 1980 only 28% of black high school seniors had taken a year of chemistry, as compared to 37% of white high school seniors.

Whereas a number of intervention programs exist that are designed to increase interest and proficiency in science for students at the high school level and beyond, few programs targeted at elementary and middle school teachers and students currently exist. However, in a November 1983 report published by the Rockefeller Foundation (2), Sue Berryman points out that the primary determinant of a desire or lack of desire for pursuing a scientific career for some students is their pre-high school interests. The pre-high school interests of some groups of students trigger an education sequence that will ultimately result in the group's underrepresentation among science and mathematics related doctorates.

In a September 1983 report to the National Science Board, the National Science Commission on Precollege Education in Mathematics, Science and Technology indicated that early and substantial exposure to mathematical and scientific concepts and processes is critical to later achievement (1). The Commission recommended that top priority be placed

on increasing effective science and mathematics instruction at the elementary level and on retraining present teachers and recruiting and retaining new teachers in order to insure that elementary and secondary science and mathematics teachers will be of high quality.

The problems addressed by this presentation are the lack of preparation of elementary and middle school science teachers in the basic sciences and the paucity of science materials that are available for use by these teachers. These problems lead to inadequate pre-high school science education and a subsequent decline in the number of the Nation's youth, especially minorities and females, who are prepared to pursue a technological career.

Approach to the Problem

A successful approach to improving science education at the high school and university levels has been the involvement of instructors in research activities with practicing scientists (3). The enthusiasm generated during the research project is carried back to the teachers' classrooms and they are able to make their subject matter more alive and interesting for all students in their classes. This approach is particularly cost effective because one classroom teacher may interact with 150 students during the course of a year. Student research programs, as effective as they are in motivating individual students, can never reach as many students as can programs aimed at teachers. Furthemore, it is somewhat counterproductive to send a student who has been successfully motivated by a summer research experience back to a

classroom in which the teacher is unprepared to continue the types of experiences which can make science an exciting discipline. The participation of a classroom teacher in the NASA astronaut program demonstrates the importance of involving classroom teachers in the scientific process. One of the ten finalists in the NASA teacher astronaut program was assigned to the Marshall Space Flight Center (MSFC) for a one year period and interacted with some of the teachers participating in this project. Whereas elementary and middle school science teachers do not have the background to perform scientific research, they can certainly benefit from a project that allows them to perform science activities in the presence of scientists who will serve as valuable resource persons for them and their students. However, few programs for pre-high school science teachers currently exist. Project SIP provided an opportunity for elementary and middle school teachers to interact with scientists and become as excited about science as their high school counterparts do as a result of similar experiences.

The Elementary and Middle School Science Improvement Program (Project SIP) represents an effective coalition between scientists and pre-high school educators to improve the elementary science curriculum. Project SIP involves an in-service workshop for teachers to provide instruction and materials for hands-on activities in the areas of biology, chemistry, physics, and electricity and magnetism. The Project SIP materials include approximately $400.00 worth of science equipment for use in the teachers' classrooms and a lesson plan manual that provides background information in the science areas covered as well as detailed information on how to use the materials provided for hands-on

activities in the classroom. Additionally, the manual contains suggestions for home experiments that the students can perform. The Project SIP concept and materials were created by scientists at the Lawrence Livermore National Laboratory in Livermore, California. The project, called LESSON by the Livermore Scientists, has been successfully operating in California since the early 1970's and has been introduced in a number of other states in the country. The workshop has been conducted for teachers in Alabama for the past three years with funding provided by the Lawrence Livermore National Laboratory for the first two years and by the National Aeronautics and Space Adminstration for the third year. It is anticipated that the Project will continue for the next two years with NASA funding.

GOALS

The goals of Project SIP are:

1. To increase the amount of hands-on experiences provided to science students in North Alabama elementary and middle schools,
2. To increase the interaction between North Alabama scientists and pre-high school science teachers, and
3. To increase the number of minority and female students who actively engage in science activities in the pre-high school classroom.

Objectives

The specific objectives of Project SIP are:

1. To conduct a two-week workshop for thirty North Alabama teachers of elementary and middle school science,

2. To involve at least fifteen different area scientists in presenting information to teachers and in performing science activities with them,
3. To provide a mechanism whereby the NASA teacher astronaut assigned to the Marshall Space Flight could interact with North Alabama elementary and middle school students and teachers in formal and informal settings,
3. To increase by a minimum of 50% the number of science activities that are demonstrated and performed in the classrooms of participating teachers, and
4. To increase by a minimum of 50% the cognitive skills in science of participating teachers as determined by pre-post-testing, and
5. To increase the number of minority and female students who are interested in science as a possible career.

Activities

The activities conducted to accomplish the objectives stated above are described below.

A two-week workshop for thirty teachers from North Alabama was conducted on the campus of Alabama A & M University during the weeks of June 16 - 27, 1986. The workshop involved forty hours of instruction in the basic concepts of biology, chemistry, physics, and electricity and magnetism. Personnel from the Marshall Space Flight Center were involved in the planning and implementation of the workshop, and a representative from the Johnson Environmental and Energy Center also

participated in the workshop activities. The teacher participants were selected on the basis of recommendations from principals and on self-referral. The workshop was coordinated by Dr. Saundra Y. McGuire, assistant professor of chemistry at Alabama A & M University.The workshop presenters included professors from the science departments at Alabama A & M University as well as scientists from the the North Alabama scientific community.

Since one of the ten finalists for the NASA teacher astronaut program was assigned to the MFSC for a one year period, she worked with the project to serve as a role model for local teachers as well as for students. However, due to the Challenger tragedy she was in such great demand as a speaker that she was only able to visit two schools. However, her visists to the schools was inspiring to the students as well as to the teachers.

In addition to the two week workshop, follow-up visits were conducted at some of the schools of participating teachers during the 1986-87 academic year to assist with science instruction and to provide scientists as role models for the students.

Teachers evaluated the effectiveness of the Project SIP materials in their classrooms and suggested some modifications for improvement of the program. Teachers were encouraged to share the information and materials with other teachers in their respective schools. One of the requirements for participation in the project was a willingness to share the philosophy and activities of the Project with other teachers at a participant's school.

To date the Project SIP philosophy and materials have been

presented to approximately 90 North Alabama teachers. The teachers continue to indicate that receiving the materials and the instruction in basic science concepts has transformed their classrooms into places where science is an exciting subject to study.

FUTURE ACTIVITIES

Now that the materials have been disseminated to a number of classrooms in North Alabama, it will be possible to do research to determine whether the materials are really making a difference in the test scores and science attitudes of the students. These types of research activities will be conducted in the near future. However, for the present the project has succeeded in turning science from (as one teacher put it) "the stepchild of the curriculum to the belle of the ball.

HOW OTHER SCIENTISTS CAN HELP

Although Project SIP is presented at considerable effort and significant cost, variations of these activities can be conducted by virtually any scientist who is interested in the improvement of pre-college education. Some activities that individuals or groups of scientists can perform are:

1. Visit pre-college classrooms to share information with students about science and scientists.

2. Become visible role models for students who have never had a chance to interact with a minority scientist.
3. Provide resources and ideas to local schools that seek assistance.
4. Encourage community groups of which you may be a part to present programs and discussions on science and the Black community.

If the activities suggested above are not performed, and scientists continue to ignore the condition of pre-college science, there will be no significant number of new scientists to replace those who are currently doing science. The technology needs of this Nation will require that all of our resources are developed to their full potential.

References

1. National Science Board Commission on Pre-College Education in Mathematics, Science and Technology. Educating Americans for the 21st Century. National Science Foundation. Washington, D. C., 1983.
2. Berryman, Sue. Who Will Do Science? The Rockefeller Foundation, New York, 1983.
3. Vivio, Frank M. A National Resource to Meet a National Need: The Role of National Laboratories in Pre-College Science Education. Proceedings of a Conference hosted by Argonne National Laboratory, February, 1985.

Appendix 9

Abstract from NASA-HBCU Forum 87

ALABAMA A&M UNIVERSITY

PRINCIPAL INVESTIGATOR: Dr. Saundra Y. McGuire

TECHNICAL MONITOR: Mr. James Rice (MSFC)

Elementary and Middle School Science Improvement Project - Second Year Activities in North Alabama

ABSTRACT

The Alabama A&M University Elementary and Middle School Science Improvement Project (Project SIP) completed its second summer workshop in July, 1987. Twenty-four teachers participated in the two-week workshop which included instruction in basic concepts of biology, chemistry, physics, and electricity and magnetism. The second year of the Project witnessed increased involvement by scientists at NASA's Marshall Space Flight Center. One of the primary objectives of the Project is the increased interest in science of elementary and middle school students so as to increase the number of students interested in pursuing quantitative careers. Because the capability to study science is primarily determined by the science background obtained in the pre-high school years, getting young students excited about science is crucial to increasing the scientific manpower outlook in the country. Particular emphasis in Project SIP is placed on interesting minority and female students in science.

REFERENCES:

1. American Assocation for the Advancement of Science, **Education in the Sciences, Equity and Excellence: Compatible Goals.** Office of Opportunities in Science, AAAS, Washington, D.C. 1984.
2. Berryman, Sue. **Who Will Do Science?** The Rockefeller Foundation, New York, 1983.
3. National Science Board Commission on Pre-College Education in Mathematics, Science and Technology. **Educating Americans for the 21st Century.** National Science Foundation. Washington, D.C. 1983.

Appendix 10

Project SIP Materials List

Project SIP Materials List

The following materials are needed for the kits in the areas of biology, chemistry, physics, and electricity and magnetism.

Biology

Milk carton, half-pint
Candies, hard
Gelatin, quick set
Food Coloring, red
Glove, latex surgical
Bottle, 2 liter plastic
Blue dextran, 1 vial
Dried beans and peas, 12
Diffusion bag strip, 1 foot
Cotton swabs, 6
Marbles, 4
Blindfold
Construction paper, white & black
Ice cream container, 1 pint
Methyl cellulose concentrate, 1 vial
Index cards, 3 x 5
Brown box with top, 3 X 8 X 2
Funnel, plastic
Filter paper
Brine shrimp eggs, 1 vial
Rubber bands, #16
Screw with nut
Tongue depressors, 12
Rubber stopper with hole, #3
Y tube, 1/4"
Tubing, soft gum, 6"
Test tubes, 2 large plastic
Tubing, flexible tygon, 10"
Tubing, plastic, 2 pieces, 6" & 2"
Vials, 6 small
Toothpicks, flat and round
Safety pin
Perfume, 1 vial
Vials, shell
Vials, 2 plastic
Paper cups, bathroom
String, 2 feet
Washers, 2 small
Vials, plastic
Petri dish, plastic
Straw, 1 bag

Physics

Brick
Erasers, 2 pink
Lumber, 6" piece of 2 X 4
Marbles, 10 small, 5 large
Meter stick
Milk cartons, half gallon, quart
Matches
Bell wire, 12" no. 16 or 18 gauge
Alcohol, rubbing
Detergent, liquid
Capillary tubes, long, thin, plastic
Food coloring
Candle
Aluminum foil
Aluminized mylar
Balloons
Evaporating dish
Beaker tongs
Copper wire
Flash light
Ice cream box, empty
Medical x-ray film
Slide-cassette set on Our Universe
Rope 20 feet
Twine, 10 ft
Prism
Waxed paper
Sandwich bag, plastic zip lock
Rope, 8 feet
Tape measure
Nails, 5
Rubber bands, 10
Ruler, flexible
Pencil, 6 sided
Paper clips, 10
Metal washers, 4 thick
Scissors
Screw eyes, 2
String, 6 feet
Scotch tape
Straw
Wire screen, 1" X 1"
Thread
Thermometer
Rods, plastic, rubber, metal
Silk, 1 sq. ft.
Wool, 1 sq. ft
Ping pong balls
Wire, bare #28 & # 14, bare
Rubber Stopper, 1 hole
Tape
Solid solder wire, 3" of 1/8" diam.
Slinky
Tuning Fork, A

Electricity and Magnetism

Batteries, 6 volt, 2
Clip leads, 6
Bulbs, 2 six volt (GE 40)
Light bulb sockets, 2
Four dble pole, dble throw switches
Compass
Diodes, 2
Microphone, carbon
Earphone, with jack
Lamp cord, 9 meters, #18 or # 20
File cards, 1 pack of 20 4 X 6

Resistor, one 30 ohm
Magnet, horshoe & keeper
Wire, enamel covered
Rod, small iron
Microampere meter, (0 - 100 microamps)
Motor kit
Power supply, 6 volt ac
Magnet wire, No. 26-30 gauge
solid enameled copper

Chemistry

Blackboard erasers, 2
Chalk
Iron Filings
Magnet, bar
Matches, 1 box
Copper filings, fine
Marbles, 20
Mothballs
Medicine droppers, 10 glass
Funnel, plastic with small bore
Balloons, 5
Beakers, 4 pyrex, assorted sizes
Ink, liquid, small vial
Aluminum Foil
Coat hanger
Kleenex, small box
Alum
Glue, white
File cards
Candle, small
Butane lighter, disposable
Flashlight, small
Copper sulfate crystals
Filter paper
Litmus paper, red, blue, neutral
Measuring spoons
Lemon juice
Diet coke
Alka Seltzer
Bromothymol blue indicator
Ammonia
Lime water
Milk of magnesia
Baking soda
Hydrochloric acid
Ex Lax tablets
Corks, 3
Charcoal briquet
Mirrors, 2 small
Dirt
Bleach
Charcoal, fine powdered

Test tubes, large pyrex, 2
Test tubes, small pyrex, 6
Test tube holder, wooden
Sterno, large can
Play doh, case of 4 cans
Wood, small blocks of walnut & balsa
Pinch clamps, 2
Oven cooking bags, 2
Plastic cups, clear
Nail polish remover, 1 bottle
Toothpicks, flat
Thread
Plastic bag, dry cleaning
Paper clips, 1 box
Tape, scotch
Silver nitrate solution
Sodium chloride
Water, distilled
Spatula, small
Test tube clamp
Vinegar
Sugar
Soap Powder
Spoons, plastic
Rolaids
Rubber tubing, 1 foot
Root beer syrup
Straws, plastic
Sand
Perfume

Science Materials from Common Materials

Item	Use
Olive Jars	Graduated Cylinder (calibrate using a measuring cup and magic marker)
Can of Sterno Heating Oil	Bunsen Burner
Red Cabbage Leaf Juice	Acid Base Indicator (pink in acid; green in base)
Ex-Lax Tablets	Phenolphthalein
Magnetic Can Opener	Bar Magnet
Medicine Droppers	Pipettes
Salad Dressing Bottle	Flask
Shoe Box with Flashlight fixed inside (One end has been removed to fit a cardboard with holes punched in the shape of constellations	Star Box
Drinking Straw with holes and end clipped and flattened	WInd Instrument
Very small cocktail straws	Capillary tubes
Clear glass marble	microscope
Cardboard tubes (toilet tissue, paper towel, etc)	Sound instruments (sound is made by blowing over the tope of different sized tubes)
Muriatic acid (used to clean swimming pools)	Hydrochloric acid
Vinegar, lemon juice	Common household acids
Ammonia, Milk of Magnesia, Antacids	Common household bases
Small condiment containers (for ketchup, mustard, etc)	Cups for Balances

Appendix 11

Workshop and Classroom Scenes