

History of AMSTI

In 1999, State Superintendent of Education Dr. Ed Richardson, and Deputy State Superintendent of Education, Dr. Joseph B. Morton, decided that there was a serious need to improve math and science instruction across Alabama. This awareness was largely the result of a meeting of a group of individuals that had attended a NASA funded Linking Leaders Program (National Alliance of State Mathematics and Science Coalitions, i.e. NASSMC). Many of this group went on to found the state coalition, the Alabama Mathematics, Science, and Technology Education Coalition or AMSTEC.

Dr. Richardson and Dr. Morton realized that math and science were the gateways for Alabama students to make major gains in education and the workforce. As a result, a full time project director, Mr. Steve Ricks, a former Alabama State Teacher of the Year and Presidential Awardee in Science, was hired to develop and lead what was hoped would be a world-class math, science, and technology initiative. Mr. Ricks was instructed to model the development of the math, science, and technology initiative after the Alabama Reading Initiative (ARI), whenever possible, as ARI was currently recognized as a highly successful initiative. Much of the ARI's success was credited to it being designed upon a strong research base.

In January 2000, the State Department of Education (SDE) appointed a Blue Ribbon committee composed of some of the state's best Grade K-12 teachers and administrators, university faculty and administrators, and leaders from business and industry to begin the process. The Blue Ribbon committee pursued every step possible to design the most effective statewide initiative for improving math and science teaching. Steps included a) examining international, national and state assessment data, programs already being implemented in Alabama, and the needs of business and industry; b) investigating national standards, their implications, and the needs of Alabama teachers through a statewide survey; and c) reviewing initiatives in other states, the Alabama courses of study and certification requirements, as well as an extensive review of the literature. Every effort was taken to ensure that this new Alabama initiative was research-based and incorporated best teaching practices. The Review of the Literature and Summary of the Statewide Survey can be found online at www.amsti.org.

The SDE worked closely with AMSTEC to ensure that there was acceptance for the new initiative, as it was being planned. Eighteen of the committee members were also members of AMSTEC, including Dr. Charles Nash, executive director of AMSTEC and vice-chancellor of the University of Alabama System, and Mr. Ricks. This partnership helped encourage AMSTI's acceptance among local math and science leaders, including higher education leaders. A number of other SDE specialists also participated on the committee, including Bob Davis, SDE science specialist; Martha Donaldson, SDE math specialist; and Deann Stone, SDE technology specialist.

The committee worked for a year creating recommendations for the initiative. The State Board of Education unanimously adopted the recommendations on December 14, 2000. (Recommendations for AMSTI can also be found at www.amsti.org.) The name Alabama Math, Science, and Technology Initiative (AMSTI) was selected as the official name for

the initiative. The last recommendation provided a plan for implementing AMSTI. The plan called for establishing initiative support sites across the state, called AMSTI sites, to implement the state's initiative within the states 11 geographical Regional Inservice Center areas. Each AMSTI site would work under the direction of the State Department of Education (SDE).

Following the adoption of the recommendations, the SDE began appointing committees to help turn the recommendations into a viable program. One committee worked on selecting the science curricula (grade and subject specific) and materials what would be furnished to teachers during the first year of their training. All science modules considered had a research base and were developed with support from the National Science Foundation (NSF). Another committee worked on selecting the math curricula and materials (also grade and subject specific). Math modules incorporated "exemplary" curriculum from the U.S. Department of Education's Expert Panel on Exemplary and Promising Mathematics Programs. Once this had been accomplished, many writers were hired, under the guidance of the SDE to develop grade and subject specific modules, and write detailed implementation guides, utilizing the committees' recommendations and research. In addition, a committee began working to develop the administrator component of AMSTI. Work with GLOBE (Global Learning and Observation to Benefit the Environment) in Alabama was also begun to incorporate this program into the initiative. GLOBE is an international research-based environmental program that utilizes student-collected data in scientific research projects performed by students and scientists. Once modules and implementation guides were developed, trainers were hired to conduct presenter certification sessions. This training focused on building a pool of individuals capable of teaching the modules at AMSTI Summer Institutes. The initial presenter certification training was most difficult. As teachers were unfamiliar with any of the modules and materials, each person being trained had to receive all of these materials so he/she would have the experience of having actually taught the modules with their own students. Following the work of these year one committees, other committees, module writers, and trainers were appointed to complete this entire process again for the second year of training that is required by AMSTI. (AMSTI Schools agree to send their entire math and science teaching staff and their administrators to a two-week long AMSTI Summer Institute for two consecutive summers. Training involves essentially the entire faculty in schools where classes are self-contained.) This process occurred from 2001 through 2003.

In Spring 2001, Request for Proposals (RFPs) were distributed to select the first AMSTI site; however, the request was cancelled shortly after submission due to lack of funding. During this time, Dr. Ed Richardson, Dr. Joe Morton, Mr. Steve Ricks, Dr. Mary Jane Caylor, and Dr. Charles Nash visited both NSF and Congressman "Bud" Cramer's office to discuss the need for funding. The SDE and AMSTEC, attempted to obtain funding by several means, but without success. As part of this effort to obtain funding, the SDE held a number of partnership meetings with higher education entities. Dr. Charles Nash, a member of the Blue Ribbon Committee and executive director of AMSTEC, was asked by the SDE to facilitate the meetings. While funding did not result from these efforts, the meetings did establish strong links with a number of higher education entities, many

which wanted to see AMSTI sites established in their regions. During 2002 and 2003 the SDE submitted two major grant proposals to NSF, neither of which were funded. NSF refused to fund the materials and equipment that AMSTI saw as essential to the success of the project. Fortunately, in spring of 2002, as a result of work from Congressman “Bud” Cramer, AMSTI received a three million dollar grant from NASA to fund the first AMSTI site. RFPs were again issued and the University of Alabama at Huntsville was chosen to pilot the first AMSTI site. As UAH had prior experience running the Hands-on Activity Science Program (HASP) and had a functional science materials center, UAH was able to conduct its first Summer Institute during the summer of 2002. In addition, a small planning grant was awarded to the University of North Alabama (UNA). The grant allowed UNA to begin setting up a materials center and conducting teacher leader training in schools that hoped to one day become AMSTI Schools. (AMSTI requires each of its schools to designate a teacher leader in science and a teacher leader in math).

Twenty schools attended the first Summer Institute on the campus of UAH during the summer of 2002 and were designated the first official “AMSTI Schools.” External evaluators closely monitored the Summer Institute and subsequent implementation of AMSTI in these schools. Results from the external evaluation were extremely positive; yet, the SDE worked to improve any areas that showed deficiencies or difficulties. As a result, a few modules were redesigned. GLOBE, in particular, had been evaluated as difficult to implement in the classroom; hence, a major revision to this program was undertaken.

During the summer of 2003, AMSTI Schools at UAH returned for their second year of training, while a new cadre of schools in the UAH region also attended year-one AMSTI training. The year-one and year-two trainings ran simultaneously at UAH. This model was deemed so successful that it was adopted for all future sites. In addition, UNA conducted its first Summer Institute for its region.

One lesson learned from the first year of training at UAH was that trying to conduct the institute on a university campus posed many problems. In an effort to help teachers learn in the same setting in which they teach, Liberty Middle School was chosen as the training facility for the 2003 Summer Institute. The 2003 Institute confirmed that a school setting was the best location for conducting the institutes. As a result, AMSTI continues to conduct its Summer Institutes in schools within its training regions. External evaluators carefully monitored both Summer Institutes, including year one and year two training at UAH. Deficiencies were addressed in modifications to the AMSTI program. In particular, the GLOBE program again required revisions.

Each year, presenter certification sessions were conducted for all AMSTI math, science, GLOBE, and administrator modules for years one and two. Whenever modifications to modules were made, it was important to communicate the changes not only to the pool of presenters being currently certified, but to all those certified as presenters in previous years. When changes were substantial, it was important that those previously certified as presenters not only were aware of the changes, but also received retraining so they were capable of presenting the revised training.

During the winter of 2003-2004, the University of South Alabama was awarded an AMSTI site, following scoring of another release of RFP's from across the state. Funding was provided by the U. S. Department of Education's Math, Science, Partnership grant that flows to the State Department of Education. USA conducted its first Summer Institute of approximately 350 teachers and administrators during the summer of 2004. During this time, funding was also provided by the SDE to fund a third discipline of the Alabama Science In Motion program in the new USA AMSTI site region.

The first evaluation results of student achievement as measured by standardized test scores were made available during the spring of 2004. The study found that AMSTI School scores were greatly higher in math and science on all tests analyzed than in nonAMSTI schools. In addition, AMSTI appeared to be increasing scores for reading and writing. AMSTI had purposefully incorporated various reading and writing practices into its modules. Evaluation results continued to show that, though considerably improved, many teachers still had concerns implementing the GLOBE portion of AMSTI. A major revision of AMSTI GLOBE modules was undertaken, with permission for the change coming from both the national and state levels at GLOBE. Retraining an adequate supply of certified trainers was a major concern and presented some minor difficulties for scheduling during the summer of 2005.

During the winter of 2004-2005, the *Alabama Course of Study: Science* (the state standards for science) was revised. The revision brought major changes at many levels, but especially in the middle schools, where curriculum changed from an integrated approach to each discipline being assigned to a specific grade. As AMSTI was designed to support state standards, this meant that many grades would require partial or complete revisions to the modules and materials being used by AMSTI. Committees and module writers, under the guidance of the SDE, worked diligently to accomplish in a few months what had previously taken two years to accomplish. The modules and presenter guides had to be completed in time for presenter certification training to be conducted before the Summer Institutes. AMSTI GLOBE was also forced to make minor revisions to meet the new standards. These changes also had to be in place in time for presenter certification sessions.

Funding for AMSTI looked bleak during the fall of 2004 and winter of 2005, as the original and a second 2.7 million dollar NASA grant were about exhausted. Future grants from NASA were not expected. Fortunately, during the spring of 2005 Governor Riley adopted AMSTI as one of his major goals for funding in the upcoming legislative session. After visiting two AMSTI schools and holding press conferences to highlight the success of AMSTI, Governor Riley began sharing with legislators, "I am totally convinced that AMSTI works." The state legislative budget passed during spring 2005 and contained 15 million dollars to continue and expand AMSTI for the Fiscal Year 2006 budget.

To determine if AMSTI was capable of conducting simultaneous Summer Institutes at multiple sites (something that must occur if AMSTI continued to add new sites), each of

the three AMSTI sites overlapped another with its institute for one week during the summer of 2005. This confirmed that AMSTI was capable of operating numerous institutes within different regions simultaneously. It also highlighted the need to greatly increase the pool of certified presenters. UNA also piloted conducting two institutes simultaneously in different locations. A large institute conducted at Muscle Shoals and a smaller, more grade restrictive institute was held in Jasper. This greatly reduced the distance that some teachers had to travel should only one institute have been offered.

During the Summer Institutes of 2005, Dr. Charles Nash was presented with the first *Friend of AMSTI* award for all he has done in support of the project since his original involvement as a member of the Blue Ribbon committee and for his work with AMSTEC. Dr. Mary Jane Caylor, a state board member who worked diligently to secure the NASA funding for the first AMSTI site at UAH was also presented a *Friend of AMSTI* Award. A third award was made to Mr. Paul Johnson, who helped secure the free use of a multimillion-dollar ALCOA building for the UNA site.

Requests for Proposals for new site locations were distributed, as well as Guidelines for AMSTI Site Operations, in the spring of 2005. By September, new sites were announced at the University of Montevallo (UM), Troy University (Troy U), The University of Alabama (UA), Wallace Community College-Selma (WCCS) partnering with Alabama State University (ASU), and Jacksonville State University (JSU). The UM, UA, and Troy University were funded at a level that allowed them to be fully operational; hence they conducted Summer Institutes for their regions during the summer of 2006. WCCS, partnering with ASU, and JSU, with more limited funding, received the honor of piloting a new AMSTI Lead Teacher program in schools hoping to become AMSTI schools during the summer of 2007, and conducting a Grades K-12 Leadership Academy for Math, Science, and Technology (LAMST) during the summer of 2006. AMSTI Schools in the WCCS/ASU and JSU regions for 2007 will be selected from those that participated in LAMST in 2006. In 2006 AMSTI sites at USA and UNA each conducted two separate institutes because of the large number of teachers attending in their regions and to better reach teachers that were not centrally located in their regions. Dr. John Wright, former president of UAH and founder of the Hands On Science Program (HASP) that pioneered hands-on science such as used by AMSTI was presented a *Friend of AMSTI* Award during the summer of 2006.

The FY 2006 funding also restored Alabama Science In Motion (ASIM) to its original funding level per discipline prior to several years of cuts caused by proration. AMSTI funding also added a third discipline to each of the states 10 regions that still lacked a third ASIM discipline. ASIM was a program already in existence when the Blue Ribbon Committee designed AMSTI. The committee had recommended that ASIM become part of AMSTI and serve as the high school science component of the initiative.

FY 2007 funding of \$22 million by the Alabama legislature allowed all eight AMSTI sites to continue to support all schools previously trained while also adding new schools. In addition, two new AMSTI sites were created to support schools in their regions. These sites were at Auburn University (AU) and the University of Alabama at Birmingham

(UAB). Because of limited funding, these sites restricted the grade levels that were eligible for becoming AMSTI Schools in 2007. AMSTI-UAB offered a Summer Institute for teachers of Grades K-5 and AMSTI-AU targeted Grades 5-8. Governor Riley visited the AMSTI-UAB institute. After participating in a number of AMSTI activities with teachers, he shared with teachers and media, “AMSTI works! We know it works....My goal is to see AMSTI in every school in Alabama.”

Summer of 2007 broke all records for AMSTI participation. Over 5,000 teachers attended a Summer Institute at one of the state’s 10 sites. 168 new AMSTI Schools were added, bringing the total of schools served statewide to 364 or one-fourth of all public schools. Institutes were so large that three hosting schools were needed by AMSTI-UAH, and two hosting schools by AMSTI-UNA, AMSTI-USA, and AMSTI JSU to have room for all participants.

Dr. Richard (Hugh) Comfort was awarded a *Friend of AMSTI* award for his pioneering work with science education, including starting MG HASP and managing the HASP program. Dr. Comfort also served as principal investigator for the award of the first AMSTI site.

During FY 07, work began to better align the Alabama Science In Motion program (which serves as the high school science program for AMSTI) into AMSTI. While the two programs were already very similar, the goal is to have ASIM seamless with AMSTI. Major progress was made toward providing a more unified set of lab activities for instruction across the state. Collaborative work also began with the Alabama Reading Initiative (ARI) to address concerns that there was not enough time in the school day to implement ARI and AMSTI. Scheduling training workshops were developed and made available to administrators of Grades K-5.

FY 2008 brought funding of \$41 million from the Alabama legislature. Restructuring at the State Department of Education moved AMSTI to its own section within the State Department. A new AMSTI site was added to serve the Athens Regional Inservice Center service area, allowing for the first time, AMSTI services to be offered statewide. The AMSTI-UAB and AMSI-AU sites also increased grade ranges served to include all Grades K-12.

AMSTI formed a major partnership with the Hudson Alpha Institute of Biotechnology (HAIB). HAIB worked closely with AMSTI staff and trainers to develop cutting edge instructional labs for seventh grade. The labs were highlighted during a visit to HAIB by Governor Riley, Congressman Cramer, and other dignitaries. HAIB has also developed *Biotechnology Discoveries and Applications* for incorporation in high school science curriculum. Current work is underway to develop cutting edge biotechnology labs for use with AMSTI Science In Motion.

AMSTI also formed a partnership with PASCO Inc. PASCO, working closely with AMSTI, is developing specialized labs and software tailored specifically for AMSTI, for use with the newly developed SPARK –a hand held probeware driven computer that

collects and analyzes scientific data. Such development will put AMSTI at the top of list in utilizing the latest scientific technology.

A partnership has been established with *Laying the Foundations* through A+ College Ready to help further the goals of a national Advanced Placement (AP) grant award. AMSTI is working closely with this endeavor and incorporating specific activities to help better prepare students for success in AP courses.

Alabama Public Television (APT) and AMSTI formed a partnership to develop and distribute original online middle school mathematics content to educators throughout Alabama. The program will be piloted in select AMSTI classrooms in January 2009.

To accomplish its objectives, APT, created a task force of AMSTI-trained math and science educators from around the state, who will serve as content developers for the project. They will work with APT's education department to create original, online content that can be accessed by teachers, parents and students through APTPLUS™, the network's free multi-media online resource. The math content developed will focus on proportional reasoning for Grade 8 students and may include video clips, flash animations, lesson plans and interactive elements.

The partnership is made possible by a grant to APT from the Corporation for Public Broadcasting (CPB). The two-year grant focuses on math, but with local support could be extended to develop into a long-term initiative that can later address the science, technology and engineering needs of Alabama students. While CPB's grant allows APT to determine strategies and begin addressing needs specific to Alabama, it also allows collaboration and sharing of content across the education departments of public broadcasting networks in Alabama, Arkansas, Kentucky and Maryland.

AMSTI also developed a partnership with the Office of School Readiness (OSR), the McWane Science Center, and Carolina Biological Supply Company of Burlington, NC to develop and pilot the first Pre-K program in the state, and possibly the nation, that places a strong emphasis on the math and science content areas. The AMSTI Pre-K Pilot trained approximately 30 teachers from across the state, and is serving students in local public schools, Jefferson County Committee for Economic Opportunity (JCCEO) Head Start, YWCA, and LaPetite Pre-School Academy. Early childhood instructors from Athens State University, The University of Alabama, University of West Alabama, University of Montevallo (UM), and the McWane Center participated in the training, and are served as resources for program improvements. Gov. Bob Riley has stated "First Class Pre-K and AMSTI are both national models. This partnership will provide Alabama's four-year-olds with the strongest math. and science foundation in the nation."

A new component to AMSTI was added through the AMSTI Affiliates program. The program is designed to identify high quality programs that support the AMSTI philosophy of instruction and help make teachers aware of these programs so they can continue their professional development in years three and beyond. AMSTI encourages teachers who have completed the first two years of AMSTI to participate in these

outstanding workshops that have been identified as AMSTI Affiliates and to receive additional AMSTI credit for doing so. Participation in any of the AMSTI Affiliate programs is strictly voluntary. Current AMSTI Affiliates include the following: Alabama Department of Conservation and Natural Resources, Alabama Energy Education Program, Alabama Forestry Association, Alabama Water Watch, Alabama Wildlife Federation, ALAHASP (Alabama Hands-On Science Program), Children's Hands-On Museum of Tuscaloosa, Dauphin Island Sea Lab, Discovering Alabama, Alabama Aquatic Education Consortium, Dragonfly Environmental Education Programs, Legacy, McDowell Environmental Center, Winnataska, Wiregrass Math and Science Consortium, Science By Design, and the McWane Science Center.

In 2008 AMSTI was honored by being highlighted as the only state initiative at *Science Generation: A National Imperative* summit held at the American Museum of Natural History (AMNH) and addressing "What Works and Why." Speakers at the event looked like a "Who's Who" from academia, policy, and media. Speakers included Tom Brokaw and Frank Luntz of NBC, Former Speaker of the House Newt Gingrich, Ellen V. Futter, President, American Museum of Natural History, Tim Geithner, President, New York Federal Reserve, Dr. Michael Novacek, Senior Vice President and Provost of Science, AMNH, Dr. Vartan Gregorian, President, Carnegie Corporation of New York, Dr. Neil DeGrasse Tyson, American Museum of Natural History, Governor James B. Hunt, Chairman, James B. Hunt Jr. Institute for Educational Leadership and Policy, Miles O'Brien, Chief Technology and Environment Correspondent, CNN, Charles Phillips, President, Oracle, Nicholas Negroponte, Chairman Emeritus, MIT Media Lab; Founder and Chairman, One Laptop per Child, Dr. Robert D. Hormats, Vice Chairman, Goldman Sachs, and others. AMSTI also participated at the Baltimore Maryland conference *Success in Title I Schools: Lessons Learned from the National Math Panel*.

Dr. Neil Lamb of the Hudson Alpha Institute for Biotechnology, Ms. Brenda Terry, executive director of the Alabama Mathematics, Science, and Technology Education Coalition (AMSTEC), and Mr. Chris Erwin of the Forestry Association were presented with *Friend of AMSTI* awards as a result of Alabama their significant contributions.

With an SDE staff of 20, several hundred site staff, and serving a total of 573 schools in 2008, AMSTYI was separated from Classroom Improvement and made its own SDE section in May of 2008. Mr. Steve Ricks was appointed Director of the section (having lead development of the initiative from its first day). Ms. Robin Nelson was promoted to AMSTI Science Coordinator and Mr. Tod Beers was made AMSTI math Coordinator. Dr. Sandy Ledwell and Ms. Sheila Patterson were promoted to Education Administrators with AMSTI.

Following 2008 Summer Institutes, major revisions began with AMSTI math, as a result of the new *Alabama Course of Study: Mathematics*. Additional pullout units were added to AMSTI, along with other activities so that close to 100 percent of the new *Course of Study* would be addressed..

FY 2009 brought a line item of \$41,000,000 for AMSTI. However, with a national economy in recession, proration was declared twice: first for 9 percent, then being raised

to 11 percent. This resulted in only 60 new schools being added to AMSTI. However Summer Institutes were still extremely large, with 219 schools from 2008 returning for their second year of training.

During the year, AMSTI was highlighted at the National Conference of State Legislators and at the National Science Resource Center at the Smithsonian/National Academies of Science.

Governor Riley made trips to Pine Level Elementary School in Autauga County and attended Summer Institutes at AMSTI-USA and AMSTI WCCS-ASU. AMSTI was also filmed for spotlighting on the *National Education Report with Hugh Downs*. The camera crew spent two days in the AMSTI-USA region, taping AMSTI in five schools and at the AMSTI site. AMSTI received a glowing review in Great Britain's Teacher Resource Bank, being described as an "ambitious and exciting initiative...with substantial empirical data." AMSTI was also featured in four *Education Week* articles with one of the journals reporters spending several days visiting AMSTI Schools. In addition, AMSTI was identified as one of only "35 Programs that Work" (and the only math and science initiative) by Fortune 500 CEO's.

ABC 33/40 produced a second Weather video CD for distribution through AMSTI. Mr. James Spann and Mr. Jason Simpson from the television station provided opening talks at a number of the Summer Institute opening sessions, as they had the previous year.

During the year, any states looked to AMSTI for ideas in designing or improving their own initiatives and programs. Such states included Ohio, Indiana, Illinois, Washington, Florida, and others.

The FY 2010 state budget was \$29,000,000 for the AMSTI line item. Whereas AMSTI's emphasis from its inception had been on expansion across the state, following the 2009 Summer Institutes, the focus moved to improving sustainability. Knowing that few schools would be added in 2010 due to financial constraints, the initiative was able to put more effort into ensuring that schools were effectively implementing the initiative and establishing structures that would ensure sustainability. Part of this plan involved what was named the AMSTI Sustainability Action Plan (ASAP). The model was developed and piloted under the leadership of Ms. Shelly Rider, AMSTI-USA site director.

. Additional information about AMSTI can be found at www.amsti.org.