



Fall & Winter Newsletter, 2005-06

From the Project Director

I want to take this opportunity on behalf of the Executive Committee of the Management Team to thank all of the partners and supporters within the Appalachian Mathematics and Science Partnership for your respective roles in the significant accomplishments during the third year of this ambitious project. Many of the specific accomplishments are described in detail within the articles of this newsletter. These provide an excellent overview of how the AMSP activities in which you are involved relate to the mathematics and science education reform needs in both central Appalachia and the nation.

Nationally, we have recently witnessed a greatly increased focus in the need for substantial improvement in mathematics and science education to create the teacher and citizen workforces needed for our country to remain secure, innovative and competitive in the global marketplace. Reports from the Council on Competitiveness, the Business

Roundtable and National Academies of Science provide now familiar data to support this critical need. This need is directly related to AMSP's two overarching goals of reducing the mathematics and science achievement gap and producing a quality teacher workforce to address our mathematics and science education reform efforts.

The National Science Foundation (NSF) has contributed to this issue by emphasizing the need for sustainability of those activities within all of the Mathematics and Science Partnership (MSPs) that have been found to be most effective in mathematics and science educational reform.

The AMSP management has considered the evaluations and recommendations of this year's NSF Site Visit Team, its National Advisory Board, the Research Advisory Committee, and its external evaluator, Inverness Research Associates, concerning the effectiveness of its

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partnership activities (now over 280). In response, AMSP has hired a Research Data Analyst; proactively encouraged focused research projects of which six are now funded; increased the number and scope of PEP awards through a new NSF Supplemental grant (\$250,000); promoted the institutionalization of the pre-service courses by working with the deans of the Colleges of Education and Arts and Sciences and the 2+2 teacher education program between the community and technical college system and the IHEs; re-fashioned the parent involvement activities; enhanced the professional development and leadership initiatives; significantly increased the distance learning opportunities; and held two meetings of the Management Team and four regional Fall Academies. The agendas for these meetings and academies were partially designed to obtain feedback regarding which activities in pre-service and in-service teacher enhancement and school improvement that should be conducted in Years 4 and 5 of the project and those that should be sustained.

The decision to hold regional Academies in Wise, VA (October 12), Grayson, KY (October 14), Cove Lake, TN (October 18) and Lexington, KY (October 26), rather than one summer academy for all regions, was also prompted by the finding that not all districts were participating in the Partnership Enhancement Projects (PEPs) and other AMSP activities to the same extent. A well received workshop was given in each academy on proposal writing for the PEP program by UK's Office of Sponsored Program Development to provide this assistance and to adopt a more proactive approach.

The most recent (December 7) Management Team meeting was facilitated by Inverness Research Associates and devoted exclusively to the identification of those activities that would constitute AMSP's legacy and should be sustained. One recommendation from this meeting was that AMSP should create a fifth line of investment: the "development" strand. A team of partners representing each educational role in the three states would consider the recommendations for activities to be sustained and determine the human and financial resource needs required. A business plan for securing these resources would be one outcome of the development activity. Look forward to being asked to contribute your expertise and recommendations to this effort in the coming months of 2006.

The NSF spent considerable effort during the year, in several conferences, to better understand the nature of those relationships called partnerships that most contribute to sustainability. It appears true that all of us (school districts, superintendents, principals, counselors, teachers, IHEs, faculty) function in an educational ecosystem in which our non-linear roles (niches) are interdependent and essential for the continual adaptation to the changing environmental demands on mathematics and science education. It has been a pleasure to be a part of these partnerships and to work with you during my first year as your Project Director.

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THE PARTNERSHIP ENHANCEMENT PROJECT CONTINUES TO STRENGTHEN

NSF approves additional funding for PEPs.

Due to the many ongoing reports from Partnership Enhancement Project (PEP) awardees and external evaluation findings of significant K-16 partnership development supporting effective math and science education reform, the AMSP management proposed and the National Science Foundation (NSF) approved a supplemental award of \$250,000 to significantly enhance the PEP. With the addition of this

new support from NSF, the AMSP has added two types of award opportunities and is budgeting more than six hundred thousand dollars for this current round of award administration.

PEP ROUND 3 APPLICATION DEADLINE EXTENDED - Applications for Round 3 are now due on February 28, 2006.

As many are aware, the AMSP recently conducted four regional academies wherein PEP program and application information was disseminated to K-12 and higher education partners. In addition, the AMSP has committed significant human resources to assist prospective applicants with the development of projects and the preparation of proposals.

The AMSP website, www.appalmsp.org, provides the PEP request for proposals and other important information. To access the RFP, on the site select the link on the left titled "PEP Round 3".

Donald Long, AMSP Associate Director, is available to provide additional information - don.long@uky.edu or 859/257-3273.

NURTURING PARTNERSHIPS within the IHE Community

AMSP leaders have led several other efforts in nurturing partnerships over the past year. Included among these were meetings held by Wimberly Royster with Deans of the Colleges of Education and Arts and Sciences. What has been learned in these meetings is that a number of our higher education partners have implemented K-16 activities that complement AMSP initiatives, or to turn it around, AMSP complements their activities. These include additional outreach professors at Eastern Kentucky University (EKU) and Morehead State University (MSU), working with nearby school districts to meet state and NCLB requirements and looking for ways for more IHE faculty to support school districts.

In addition, meetings were held with the new Chancellor at the University of Virginia's College at Wise to discuss its continuing involvement in the AMSP. The Chancellor is a scientist and expressed extensive interest in AMSP initiatives. Further, he has approved a new Local Principal Investigator, Dean Amelia Harris. AMSP is looking forward to working with her.

Another partnership nurturing effort in which AMSP is involved is the 2+2 teacher education program between the Kentucky Community and Technical College System (KCTCS) and the four year institutions in Kentucky. In January, the Kentucky Council on Postsecondary Education is holding a one-day conference to discuss the utilization of AMSP or AMSP-like pre-service mathematics and science courses in the two year colleges. It is hoped that the four year colleges will accept these types of courses taught in the two year institutions as satisfying their pre-service mathematics and science education requirements.

Further joint activity utilizing expertise from the IHE and school district partners is a team of faculty from UT, EKU, MSU, UK, Radford and principals from each of the states preparing modules for a principal leadership course being taught at these IHEs. The committee has met several times and is preparing a proposal for AMSP's review and support. Additional information may be obtained from Wimberly Royster (royster@uky.edu).

BASELINE IMPROVEMENT SITES that serve all AMSP districts

Baseline Improvement Sites (BIS) have been identified across the AMSP Region. Fifty schools were identified during year three and are in the process of implementing Leadership Development Plans in science and/or mathematics. An additional 51 sites have been identified for year four and will receive extended services through the AMSP project focusing on science or mathematics program improvement. Baseline Improvement Sites receive a Program Improvement Review (PIR) in either mathematics or science, priority opportunities for involvement in AMSP activities and limited funds for developing and implementing a plan (Leadership Development Plan) for improving their science and/or mathematics

program. Baseline Improvement Sites provide the AMSP with data concerning the impact of AMSP activities crucial to continued development of the project.

SCIENCE AND MATHEMATICS NEEDS SURVEY - to guide planning for what the partners need

The AMSP has developed a comprehensive Needs Assessment which has been sent to all partner school districts. The purpose of the needs assessment is two-fold: (1) to gather information regarding school and district professional needs which can be addressed by AMSP during the final two years of the project; and, (2) to identify overall district and school program improvement needs which can be used to lay the groundwork for future projects. The data collected will be made available to all partner school districts to assist them in their efforts to obtain additional funding to support mathematics and science program improvement efforts. AMSP is hoping for a 100% return of the questionnaires to provide a sound data base for both immediate and long-range program development.

SCIENCE EDUCATION CONFERENCES - to use what we find

Twenty-one people participated in a science conference held at Natural Bridge State Park, December 2-3. Following an update on recent AMSP activities, small groups analyzed pre/post data obtained during years 1-3 for elementary and middle school preservice science courses and in-service institutes. Suggestions for modifications of instructional activities and assessment tasks were the major product of the conference. Additional meetings will be needed to make the modifications. The biological science group will expand institute offerings into a preservice course, as well as refine institute offerings.

A second science conference focusing on the use of data for formative purposes has been scheduled for January 6-7 at the Cumberland Inn in Williamsburg, KY. More information and registration are available on the AMSP website.

SCIENCE EDUCATION PROFESSIONAL DEVELOPMENT – using the AMSP capacity

We hope to use the expertise developed in twenty-six two-week summer science institutes in years 1-3 of the AMSP to offer professional development (PD) that is more closely connected to groups of school district partners. Specifically, we need help from small groups of adjacent school districts in recruiting teachers to participate in more locally focused PD and then to support the follow-up implementation. Within the next few weeks we hope to match “needs” data being obtained from school district partners with “availability” data we are obtaining from IHE faculty and teacher-leaders who have served as instructors in previous institutes. At the request of school district leaders we expect to offer more PD options, including one-week summer institutes and summer/academic year combinations. A schedule of summer institute offerings should be available by late January.

NEW SCIENCE EXCEL PROGRAM – to join Mathematics

Five high schools have Science Excel initiatives up and running this fall semester. Information on Science Excel may be found on the AMSP web site. Dr. Kim Lott (Kimberly.lott@uky.edu), science education faculty member, is coordinating the effort.

SCIENCE RESEARCH PRESENTATIONS – to our peers and supporters

Five refereed papers that utilize AMSP data will be presented at national science education meetings next semester. Four papers were presented at the regional meeting of the

Association of Science Teacher Education (ASTE) this fall at Breaks of the Sandy. Three presentations were made at the MSP/DOE meeting in Washington D.C (September 15-16, 2005) to highlight and explain the PEP and other AMSP programs to national leaders and one presentation was made at the NSTA conference (December 2-3, 2005) in a session chaired by Terry Lashley.

MATHEMATICS INSTITUTES continue to grow

Several districts have scheduled time during the academic year for AMSP courses and institutes. Middle school teachers in Anderson County, TN under the direction of Denise Wilburn and Kathy Strunk, are finishing the first of a sequence of four courses, based on the Connected Mathematics material, by distance learning format. The instructors are Drs. JoAnn Cady and Mark Taylor of the University of Tennessee Education area, and Dr. Jerzy Dydak is participating from the Department of Mathematics.

Through a Partnership Enhancement Project (PEP), Letcher County teachers are working through mathematics for elementary teachers with David Hawkins and Drs. Jennifer Wilson, Todd Abel, and Michael Potter of the University of Virginia's College at Wise.

Middle School teachers are meeting at Pikeville High School to study the Algebra strand of Connected Mathematics with Terry Parkey, Ann Booth, and Dr. John Cade of Pikeville College—this group also includes two pre-service teachers from Pikeville College.

The Catsbusters Project is using distance communication to work with groups of middle and high school teachers in the general region around Morgan County, KY on algebra—this project started in summer 2005 and continues through the academic year.

If your district is interested in scheduling academic year professional development, you may wish to explore the possibility of proposing to do this through a PEP. See www.appalmsp.org and click on "PEP Round 3", or contact Carl Lee, lee@ms.uky.edu, 859/257-1405, for assistance.

We are still in the planning stage for summer institutes. We intend to bring in TERC to provide several one week trainings in the elementary school Investigations curriculum—level one, level two geometry, and leadership training. These will take place in or near Clark County, Kentucky. Also, depending upon demand and human resources, we hope to offer repeat sessions of some of our institutes in elementary school mathematics, geometry, probability/statistics, and algebra. We have been reviewing the various suggestions from the series of regional fall academies to advise us on optimal methods for professional development.

DISTANCE COMMUNICATION OPPORTUNITIES to build communications

AMSP's Centra communication system offers a way for groups of K-16 faculty and students to communicate online—a teacher or a student can sit at their computer with a simple headset for speaking and listening (and video camera, if you wish) for meetings, discussions, problem-solving, and project planning and tutoring. Are you interested in trying this out? Do you have an idea of a project that could benefit from such a system? Contact Carl Lee, lee@ms.uky.edu, 859/257-1405.

SCHOOL MATHEMATICS PROGRAMS

The Math Excel program continues with about 100 high school students in various districts. If you are interested in learning more about Math Excel, go to www.appalmsp.org and click "Excel 2005-06." If you would like to submit a proposal to do have an Excel program in the 2006-2007 academic year, please watch the website for new proposal instructions or contact Paul Eakin, paul@ms.uky.edu, 859/257-6798.

We also plan to offer our Delayed Credit exams for college algebra and for calculus in the spring. This is one opportunity for students to obtain college credit or a course grade upon entering some of our AMSP partner colleges. Watch the website, www.appalmsp.org, for details, or contact Paul Eakin, paul@ms.uky.edu, 859/257-6798.

APPALACHIAN ASSOCIATION OF MATHEMATICS TEACHER EDUCATORS

The AMSP wishes to bring everyone's attention to the recently created AAMTE—The Appalachian Association of Mathematics Teacher Educators, formed through the auspices of the ACCLAIM project. Edna Schack at Morehead State University has just been elected its first President. For more information on its programs and activities, contact her at e.schack@morehead-st.edu.

MATHEMATICS PRE-SERVICE COURSES

We are continuing to revise and adapt our pre-service courses, and intend to pilot a new capstone course for secondary mathematics education majors in Spring 2006.

LEADERSHIP ACADEMY FOR PRINCIPALS AND OTHER INSTRUCTIONAL LEADERS

The 2nd Annual Leadership Academy, sponsored by the Appalachian Mathematics and Science Partnership, Coalfields Rural Systemic Initiative, Center for Teaching Excellence at UVA's College at Wise, and Southwest Virginia Public Education Consortium, was held at the Meadowview Conference Center in Kingsport, Tennessee on November 1st and 2nd. One hundred seventy-five principals, instructional supervisors, superintendents and other instructional leaders from the Appalachian region participated in the event. Keynote addresses were delivered by Dr. Chris Corallo, the Director of Staff Development for the Henrico County, Virginia Schools and Dr. Michael Norton, Professor of Chemistry at Marshall University. Dr. Corallo involved the participants in an informative session titled "School Culture and Improving Mathematics and Science Achievement" and Dr. Norton provided a look into the future of education with an address titled "Nanotechnology and its Implications for Education." Concurrent sessions included an overview of current technology for enhancing mathematics and science instruction, integrating science and mathematics investigations, securing grants and partnerships with businesses, using the QUILT program to improve questioning, monitoring classroom instruction using technology, and an overview of the Program Improvement Reviews. Participant feedback was exceptionally positive and planning has begun for the 3rd annual leadership conference to be held at the Meadowview on the corresponding date in 2007.

LEADERSHIP BY DESIGN – Web-based Classroom Monitoring System

AMSP is finishing the developmental phase of Leadership by Design and has provided training for all principals in five school districts. Although technical issues remain related to full implementation, the system has been modified and is ready for full implementation in all districts in the AMSP region. Training will be held during the spring semester this year with the dates and regional sites identified in late December or January. Leadership by Design is a mechanism for collecting and analyzing large amounts of school data which can provide the basis for both program improvements and identification of professional development needs. In addition, a research project is being planned to determine the relationship between "patterns of instruction" and student achievement in science and mathematics. Districts that wish to have training for their principals should contact Stephen Henderson at 859/255-3511, ext. 231 or shenderson@arsi.org.

PARENT ENGAGEMENT ACTIVITIES to engage the most important stakeholder

Parents and Teachers Talking Together (PT3) are facilitated conversations for up to 30 parents and school staff (teachers, counselors, etc.) that lead to the identification of school priorities pertaining to mathematics and science. The outcomes from the meeting include better parent/school personnel

relationships and an action plan for both parents and teachers for enhancing science and mathematics instruction in the school.

Nine PT3 sessions were held at AMSP schools during the fall, 2005. More than 150 teachers and parents participated in discussion sessions focusing on improving science and mathematics program improvement. In addition, 45 instructional leaders from AMSP partner school districts have now been trained to conduct these “facilitated sessions” in schools across the region. The feedback from these sessions has been exceptionally positive and AMSP is now ready to provide this service to additional schools.

The AMSP sponsored **Powerful Alliance Trainings** at regional sites during the spring, 2004. These one-day workshops for educators provided ways to link the school's parent involvement activities to improving student achievement, ways to assess the school's attitudes and practices related to parent involvement, and ways for schools to develop productive personal relationships with families. Particular emphasis was placed on strategies to address cultural and socio-economic differences and ways to build each family's capacity to be involved with their child's education. A second series of Powerful Alliance Trainings are being scheduled for January and February, 2005. The dates and locations for the Powerful Alliance Trainings are as follows:

- January 20 - Kentucky Artisan Center, Berea, Kentucky
- January 24 - Regional Technology Center, West Liberty, Kentucky
- January 26 - Norris Dam State Park, Lake City, Tennessee
- March 1 - Pine Mountain Grill, Whitesburg, Kentucky

Planning is proceeding for **College Reality Stores** which are being held at the University of Kentucky, Morehead State University, and The University of Virginia's College at Wise. The College Reality Stores provide in depth information regarding college majors in science and mathematics including course and curricular information, type of high school program needed to be successful in these majors, financial aide possibilities, and general information regarding the university hosting the program. Financial support for student and parent travel to the College Reality Stores will be made available to all AMSP high schools. Information regarding the College Reality Stores will be sent to high schools in early January and will be posted on the AMSP website as well. The dates and locations for the College Reality Stores are as follows:

- February 11 – University of Virginia's College at Wise, Wise, Virginia
- February 25 – Morehead State University, Morehead, Kentucky
- April 22 – University of Kentucky, Lexington, KY

For Information regarding these programs, please contact your Regional Program Coordinator:

- University of Tennessee Region – Kathy Strunk - 865/974-7898 or kstrunk@utk.edu
- UVA's College at Wise Region – Judy Compton – 276/328-0294 or jcc8m@uvawise.edu
- Morehead State Region – Robin McDonald – 606/783-2329 or r.mcdonald@morehead-state.edu
- University of Kentucky Region – Debbie Owens – 859/257-2522 or debbie.owens@uky.edu

EXTERNAL RESEARCH PROJECTS to directly serve AMSP K-12 partner needs

AMSP, as an NSF-funded project, is required to support research that advances the understanding of education reform in rural school environments. Peer-reviewed research projects are to provide AMSP partners with models, strategies, and activities that are effective for sustainable use in the school districts and the Institutions of Higher Education. Six research projects, as summarized below, are currently active.

Edith Aubrey and Eugenia Toma, University of Kentucky, employ the Kentucky CATS (Commonwealth Accountability Test System) assessment data, along with data from AMSP, to evaluate whether participation by schools in the partnership raises student performance and whether participation eliminates the achievement gap.

Kimberly Lott, University of Kentucky, is studying in-service elementary teachers' conceptual needs in physical science, specifically their conceptual understanding of the properties of objects and materials before and after professional development instruction.

Meg Moss, University of Tennessee at Knoxville, focuses her research on the areas of strengths and weaknesses in the mathematics knowledge for teaching of preservice teachers, the learning opportunities in mathematics content courses, and the growth of mathematics knowledge for teaching as preservice teachers take their methods course.

Jane Jensen, University of Kentucky, is exploring post-secondary aspirations to study mathematics or science of seniors graduating from two Central Appalachian high schools.

Robert Lorch, Jr. and colleagues, University of Kentucky, compares two methods of teaching scientific inquiry skills in the fourth grade, with a focus on the effects of student participation levels on student learning outcomes.

Mark Taylor and JoAnn Cady, University of Tennessee at Knoxville, are looking at the efficacy of the implementation of four on-line mathematics courses to enhance middle grades teachers' mathematical knowledge and evaluating the effectiveness of these courses.

We are in the process of negotiating a few more projects in the areas of cultural and policy influences on mathematics and science education reform. For further information about the AMSP research effort contact John Yopp (jyopp@email.uky.edu, 859/257-2756) or Xin Ma (Xin.Ma@uky.edu, 859/257-2432).