

## **Partnership Enhancement Projects (PEPs)**

One essential element of the PEP concept is the recognition that the specific programs best suited to address priority mathematics and science educational reform needs in the AMSP's 51 school districts in three states vary considerably, due in part to significant differences in degree of development and support of the programs in these two disciplines. A second and related element is that these needs are more effectively identified by the teachers and administrators at the local school and district level than by more generic national studies or the literature on mathematics and science education reform. The third element is that in order for the partnership to be viable, the school and the IHE partner(s) have to both meaningfully and effectively contribute to the design, implementation and evaluation of the mathematics and/or science reform activity. This latter characteristic is viewed by AMSP's external evaluators as providing "empowerment" in the form of a voice and role for the preK-12 teacher partner(s) that is often lacking in the U.S. primary, middle and secondary school system.

While it is logistically easier to implement certain well-established standards-based curricula and programs to improve science and mathematics education, the PEPs often select or create through the two partners, very different curricula or programs to meet the local needs in the diverse and isolated districts of central Appalachia.

The final element of the PEP concept involves a role (among many others) of the Outreach Professors and the Regional Program Coordinators (RPCs). The RPCs (described in detail below) assist the district or school teachers in articulating their educational reform needs and their respective roles and responsibilities as partners. The Outreach Professors from the University of Kentucky (described in detail below) either serve as the IHE partner or assist the local Principal Investigators in each of the AMSP's IHEs in identifying a local IHE partner for the proposed PEP. Subsequent negotiations (described in PEP Evaluation Section) lead to the final PEP proposal that is submitted, in response to a Request for Proposals (RFP), for external peer review.

The PEPs, in the first two years (rounds 1 and 2), were offered as a mini-grant (up to \$30,000) program in recognition that smaller "micro-investments" were a very effective way to both establish and empower partners in the schools to initiate partnerships with the IHEs and other school districts. This recognition came as a result of consistent feedback from the members of AMSP's Management Team, the Regional Program Coordinators, the Superintendents of participating districts and the program's external reviewers, Inverness Research Associates.

Moreover, this feedback and subsequent analysis by AMSP's Executive Committee revealed three principal needs if the PEPs were to fully meet the partnership aspirations of the AMSP. They were:

1. an expansion of the PEPs to other school districts either not successful in competing or not applying for these grants;
2. to fully understand the reasons for the lack of participation of certain AMSP districts in the PEP grant activity; and

3. to evaluate, using qualitative and quantitative assessments, the efficacy of the PEPs in creating both effective partnerships and in achieving their stated goals of mathematics and science education reform, including increasing student achievement.

In order to meet these three needs, the AMSP submitted a supplemental proposal to the National Science Foundation (September 30, 2005) for \$250,000 to convert its PEP grants activity into a more organized PEP program. The proposal was approved for full funding on December 19, 2005.

The proposed goals for the comprehensive PEP Program were:

1. to increase the number of PEPs developed and implemented within the underserved areas of the AMSP project;
2. to build sustainable capacity for successful project and proposal development related to math and science education reform in central Appalachia;
3. to increase the number of well prepared preK-12 mathematics and science teachers delivering high-quality instruction in standards-based content and curricular alignment;
4. to disseminate effective project models to the MSP community through outreach activities and
5. to link the more successful PEP models to reduction of the student achievement gap.

Consequently, the PEP Program now has three, interrelated phases, i.e. a planning or development phase (I); a funded project implementation phase (II); and a proposal-based phase for continued support following achievement of the initial PEP project objectives (III). The objective of the planning/development grant (up to \$5,000) is to assist teachers and school administrators, through the involvement of the RPCs, IHE faculty and school teachers and administrators, in writing viable PEP proposals for full implementation. These projects would be identified by external and internal reviewers as in previous years and would have to meet peer-review criteria for funding after the period of development. The other two phases correspond to reviewer-acceptable proposals for full funding identical to those in Years 2 and 3 and proposals (up to \$20,000) for continuation from previous years. Feedback from partner districts to Inverness Research Associates in the field had strongly indicated increased benefits for partnership building and enhanced success in mathematics or science education reform for some of the PEPs through another year of funding. The PEP Program is fully described in the Round 3 RFP.

In order to more fully involve the districts and to understand their needs, as well as to inform faculty and Outreach Professors involved as IHE partners, the Supplemental NSF Proposal detailed five initiatives to facilitate conversion of the PEPs to Program status.

These were:

1. Regional fall academies in 2005 in the four AMSP regions to provide information on the PEP Program and other AMSP activities to representatives from underserved school districts;
2. An increased responsibility for the AMSP Outreach Professors in coordinating partner IHE/faculty involvement in the PEPs;
3. Additional professional development of the RPCs and district personnel in the area of PEP and proposal development;
4. Increased involvement of the RPCs in underserved school districts; and

5. Assignment of responsibility for administration of the PEP Program to the AMSP Associate Project Director and increased involvement of the Project Director and past Project Director with the deans of the colleges of education and arts and sciences to secure additional faculty support and outreach for the proposed Program.

All of these initiatives have been implemented in Year 4.

The organization of the Regional Fall Academies is described in detail in the Supplemental PEP Proposal submitted to NSF (September 30, 2005). In summary, these academies pro-actively recruited teachers and administrators from districts previously underserved by the PEPs due to either inability to compete successfully or lack of response to the RFP. Teachers with successful PEP projects from the first round made presentations to the academy participants, followed by group discussion. The Office of Sponsored Projects from the University of Kentucky then provided targeted proposal development assistance in an interactive session tailored to inform the participants of the key features of a competitive PEP proposal. The participants in all four regional academies were asked to complete a survey of what they believed was working well within the AMSP; what needed to be changed and how; and what needed to be continued into Years 4 and 5 in a facilitated afternoon session. Survey results were collected and analyzed by staff from AMSP's external evaluator. These data provided information needed for the final development of the PEP activity into a program and the planning process for Year 5 AMSP activities.

The decisions that informed the organization of the PEP program made from consideration of these survey data and follow up interviews of other AMSP partners not present at the academies included:

- The Outreach Professors, RPCs and Project and Associate Project Directors must greatly increase the communication and district/recruitment involvement concerning the PEP Program; this would include recruitment of more faculty as PEP partners from AMSP's partner IHEs.
- The very well received assistance from UK's Office of Sponsored Projects given at the regional fall academies must be offered as continuing development assistance to district teachers and other personnel; this would provide not only individual professional development to increase the quality of the PEP proposals but would, more importantly, produce a sustainable capacity within the districts for proposal writing and submission to other programs for grants supporting future educational reform efforts (including state MSPs).
- Much more pre-proposal development assistance must be provided to the teachers and administrators in the previously underserved districts. The participants in the regional fall academies frequently expressed concerns that they were too distant (or too reluctant) to effectively communicate with faculty from the AMSP partner IHEs to obtain the needed partnerships needed for a PEP activity. Therefore, it was decided to hire a PEP Program Coordinator to work with the Outreach Professors and the RPCs to facilitate these key relationships.
- A stronger and more comprehensive evaluative component would be created for all phases of the PEP program. This was deemed necessary for formative purposes, as there is an inherent, on-going relationship between IHE faculty and

school teachers, and for summative purposes in that some of the PEPs would be designated to other districts as models for mathematics and science reform.

The PEP evaluation process has three interrelated components. All three types of assistance have been pro-actively provided during the first half of Year 4. The evaluation process is currently being implemented in phases. The first is evaluation of the overall PEP program's effectiveness. In other words, is this program design and approach effective in creating strong, effective and sustainable partnerships between preK-12 school teachers, administrators and their districts and the IHE faculty involved in the PEP projects? Additionally, what are the characteristics or evidence of strong and sustainable partnerships?

The second component evaluation is of the common elements of the PEPs per se and how they serve to address the overall AMSP goals and benchmarks.

The third type of evaluation, and the most labor intensive, is the assessment of the success of the individual PEPs in meeting their specific goals. Each PEP has an evaluation methodology that will form the basis of its assessment. These are described for all 42 PEPs in Appendix 2.

The specifics of the evaluation of the individual PEPs and the PEP program are described in detail in the Response to Reviewers' Questions Regarding the PEP Supplemental Proposal submitted to NSF November 17, 2005. Dr. Jim Dorward, Interim Associate Dean for Research for Utah State University, is the overall evaluator, coordinating the qualitative evaluation of Inverness Research Associates and the quantitative internal evaluation by the AMSP team headed by the Research Data Analyst.

### **Current Status of the Evaluation of the Overall PEP Program**

Goal 1: To increase the number of PEPs developed and implemented within the underserved areas (i.e. not served in Rounds 1 and 2) of the AMSP region.

This program goal was achieved in Year 4. The first two rounds of PEPs resulted in nine awards out of 21 proposals submitted (43%) and ten awards out of 18 submitted (55%), respectively. Following the conversion of the PEP grants activity to the PEP Program, 22 awards were made from 25 proposals submitted (89%). Thirteen of the 22 primary partners in the PEPs of Round 3 are new districts, and six of the 12 secondary partners have not been previously involved. Nineteen of these PEPs involved schools in a district without a partner IHE and three of these were in districts not even bordering one with an IHE.

Goal 2: *The program goal of involving the UK Office of Sponsored Projects and/or Outreach Professors in providing professional development to first-time or previously unsuccessful PEP proposal writers was also met. The UK development officer worked directly with six districts and the Outreach Professors with eight districts in this assistance. This development activity has certainly contributed to the second program goal, i.e. "to build sustainable capacity for successful project and proposal development."*

There is firm evidence of the effect of continuous and consistent professional development assistance to the PEP applicants in Years 2, 3, and 4 of the AMSP. Some samples include:

1. Dickenson County, VA which had involvement as a secondary partner in 2004 and 2005, and was successful in becoming a primary partner (leader) in 2006 (Round 3).
2. Russell County, VA, whose proposal was rejected in the first round, was funded as a secondary partner in the second round and as a primary partner in the third round.
3. Casey, Clay, Johnson, Martin, Paris Independent, Rowan and Wayne Counties in Kentucky had not applied in Rounds 1 and 2 and received awards as primary partners in Round 3. This was principally a function of AMSP's proactive recruitment and development assistance to produce competitive PEP proposals.

At this time, all of the AMSP districts, except Cumberland and Johnson counties in Tennessee; Garrard, Harlan, Lee, Morgan and Whitley Counties in Kentucky; and Jackson Independent in Kentucky have been awarded PEPs. Of these, only Lee County and Jackson Independent have actually applied.

As noted for Goal 1, the pro-active developmental assistance has led to an increase in award rate after the external peer review from 55% (Rounds 1 and 2) to 89% (Round 3).

**Goal 3:** *To increase the number of well prepared preK-12 mathematics and science teachers delivering high quality instruction in standards-based content and curricular alignment.*

This goal has also been given a good start. In Round 1 of the PEPs (2004), nine PEPs were awarded to provide professional development and curricular alignment programs to 535 elementary, middle and high school teachers in partnerships with 14 IHE faculty. The students instructed by these teachers were 14,543 in number (Appendix 11).

Ten PEPs were awarded in 2005 (Round 2) that provided professional development and curricular alignment programs to 246 elementary (including special needs) and 170 middle and high school in-science teachers in partnerships with 13 IHE faculty. The number of students instructed by these teachers was 14,700. These data were reported to NSF on January 13, 2006 as "Golden Nuggets."

The PEP Program (Round 3) significantly increased the numbers of teachers in most of these categories through 22 awards to 19 **new** districts. There are 261 elementary and special needs teachers, 344 middle and high school teachers, 63 pre-service teachers and 95 principals and other administrators involved in partnerships with 46 IHE faculty. The number of students instructed by the teachers in the Round 3 PEPs is 41,054.

**Goal 4:** Dissemination of successful models. This is a major initiative proposed for Year 5. It is described in the Year 5 Implementation Plan Section.

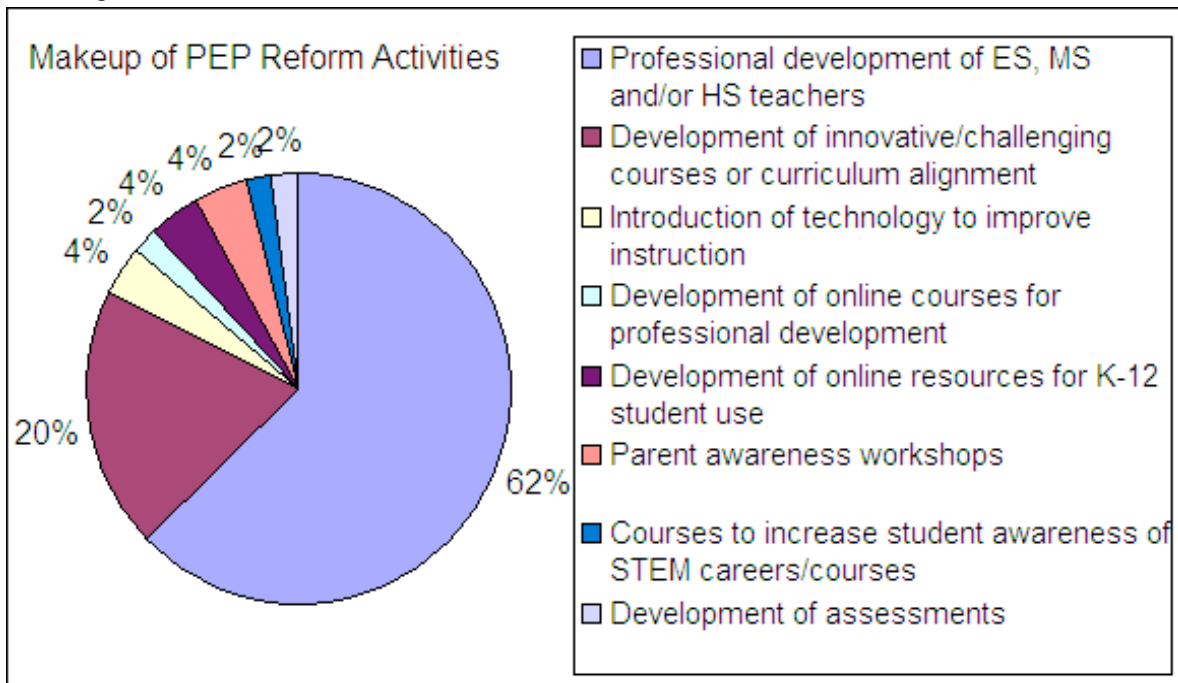
**Goal 5:** To eliminate the "achievement gap" in science and mathematics for preK-12 students in central Appalachia. This, like building a quality teacher workforce, is the overarching goal of AMSP and its partnerships, including the PEPs. The specific goals of each PEP that are to be accomplished through the eight types of activities described in

Appendix \_\_, all linked to on or both of these overarching goals. No fewer than 27 of the 42 PEPs have as their stated overarching goal the tracking of student achievement. The summative state assessments for KY, VA and TN will be one means of this tracking.

Equally important to this goal is to build sustainable capacity in the IHE side of the partnerships. One of the five initiatives proposed for the Supplemental grant for the PEP program was “an increased responsibility for the AMSP Outreach Professors in coordinating partner IHE faculty involvement.” This has been successful in that more than 46 IHE faculty from seven AMSP partner institutions are now involved in the PEP program.

**Nature of the Reform Activities Provided to the Schools and IHEs by the PEPs.**  
**There are eight categories of PEP activities, all of which address two or more of the AMSP’s strategic goals and/or benchmarks.** The categories of PEP reform activities and the percentage of the 42 PEPs awarded in the three rounds that employ one of eight principal program activities are as follows:

Makeup of PEP Reform Activities	
Professional development of ES, MS and/or HS teachers	63
Development of innovative/challenging courses or curriculum alignment	20
Introduction of technology to improve instruction	4
Development of online courses for professional development	2
Development of online resources for K-12 student use	4
Parent awareness workshops	4
Courses to increase student awareness of STEM careers/courses	2
Development of assessments	2



Professional development using curriculum programs

However, many of the PEPs involved one or more additional activities in concert with the principal one. It is also noted that the diversity of activities was much greater in Round 1 PEPs and the use of technology greatly increased in the Round 3 projects.

**Nature of curricular Programs used or created in the PEPs with this objective.**

Many of the PEPs in the “curriculum alignment category” used well established and professionally evaluated curricula in mathematics and science developed through NSF funding or other national programs. For example, the NSF Connected Mathematics alone was (or is being) utilized by seven of the PEPs. Others include the use of One-to-One Math, Math Trailblazers, Fostering Geometric Thinking, Investigations Math, Every Day Math, and Science Content in Literacy Curriculum in Elementary Schools. These were employed to guide alignment with national and state content standards. The few that are developing new, inquiry-based curricula are research-based and derive direction from the published literature on mathematics and science reform. An external evaluation will be conducted on these “new” curricula and courses in late Year 4 or early Year 5. Overall quality assurance is also ensured by the expertise of the Outreach Professors, PEP Coordinator, RPCs, AMSP co-PIs in mathematics and science, and the IHE faculty partners in the PEPs.

**District Commitment to the PEP Program:** One of the major indicators of the commitment of the school districts to their PEPs is in their in-kind contributions to the projects. The estimated figure for the first two rounds (19 PEPs) was \$160,000.

The in-kind contributions from the districts for Round 3 total \$272,792. Clearly, there is district commitment to these partnerships. Many of the district personnel interviewed (see Pre-service section) stated that they intended to fund the PEP activities in succeeding years from their budgets (e.g. Pike County).

Superintendent and school principal support is also evident by their approval and encouragement of the proposed applicants and the release of so many teachers for the required time to achieve the goals of the PEPs.

**Preliminary Qualitative Assessment by the AMSP External Evaluator**

Inverness Research Associates is currently conducting a round of in-depth interviews with the principal participants in the 19 PEP projects of the first two rounds (2003, 2004). Their evaluation instrument and preliminary findings are found in the Supplemental Proposal for a PEP program and the Response to the Reviewers of the proposal September 30 and November 17, 2005 respectively previously mentioned. Their major initial findings were:

- “PEPs facilitate stronger connections between local school districts and the larger AMSP effort; it follows that counties that participating in PEPs indicates a more thorough understanding of the overall AMSP initiative and the opportunities available to them as AMSP partners.
- The process of putting together a PEP proposal, even if it is not funded, serves as an opportunity for districts to forge connections with other counties and/or local IHEs in a way that they have not done before.

“During our interviews, district leaders often told us about the extent to which AMSP is serving a means for districts to collaborate in ways that they have not managed to do in the past. They also expressed much gratitude for the opportunity to interact with IHE faculty in Summer Institutes and other programs. The PEPs are a mechanism for those connections to become stronger, deeper, and more meaningful. “

- “PEPs provide a mechanism for local districts to make the work of the AMSP their own.

While district leaders speak very positively about the various professional development and school improvement opportunities made available through AMSP, they are also quite clear that the PEPs are a motivator to become much more involved and committed to improving their own local mathematics and science education programs. The grants are an opportunity for districts to think much more carefully and concretely about what they truly need to move schools, teachers, and students forward – and to find other like-minded districts and/or IHE faculty to work with so that they are not alone in their efforts. Without the PEPs, districts participate in AMSP offerings and activities, but there would not be the incentive for districts to take authentic ownership of the improvement effort. Finally, PEPs also allow districts to create mechanisms for locally implementing some of the ideas promoted in AMSP institutes, courses, and workshops.”

- “PEPs recipients express confidence that the local partnerships they are building, particularly between counties, will last well beyond the grant.

In all aspects of our AMSP work, we encountered educators who tell us that they are making new professional connections the likes of which they have never made before. And, among the PEP recipients specifically, we hear that these are working relationships that people see as lasting. With the PEPs, participating teachers and administrators have done much more than attend professional development together. They have articulated common goals, designed shared work, and carried out a plan together. Such collaboration much for a much stronger and enduring local partnership.”

- “All indications are that the recipients of the PEPs are engaged in real and valuable work, designed to address local needs and build local capacity, all the while contributing to the attainment of AMSP benchmarks and goals.

This is one of the primary goals and defining features of the PEP line of investment. From what we have seen this far, the PEP vision appears to be coming to fruition. Valuable local work is happening that would not be occurring without the additional funds of a PEP and the process of designing and carrying out the work is contributing to local capacity with respect to leadership development, increased knowledge, and in all likelihood, improved instruction.”

- “The 19 PEP grants that have been award to date are not evenly distributed across the counties and districts served by the AMSP – those near IHEs appear to be over-represented, particularly those near the University of Kentucky – with the AMSP’s most poor and remote counties severely underrepresented.

Because the PEPs are relatively new, it makes sense that the first few rounds of grants have gone to districts best-positioned to take advantage of them. Due to the design of the PEP initiative, it also follows that those counties near IHEs might be more likely to cultivate a relationship with

faculty members that would lead to work readily funded by a PEP. Unfortunately, this situation appears to have disadvantage the very counties that AMSP would like most to serve.

An analysis of the distribution of PEP awards across the regions served by the Regional Coordinators indicates that while the majority of awards have indeed gone to districts near the University of Kentucky, the Round 2 recipients were more equally spread across the Regional Coordinators. (Note: The change in distribution is also a function of the creation of a fourth Regional Coordinator position.)”

- “One year is enough time to get something started, but not enough time to engage in work that will be self-sustaining or long-lasting.

Some of the Round 1 PEP recipients expressed frustration at the lack of funds available for continuing the work they had begun with their grant. They believed that they had started something of value that had real potential to have far greater impact with further funding. “

The concerns and criticisms found in the last two findings by the external reviewer were addressed in the conversion of the PEPs from a grant activity to a program in the Supplemental Proposal submitted on September 30, 2005.

### **Qualitative Evaluation of Completed PEPs from Rounds 1 and 2**

This ongoing evaluation was conducted by the internal PEP evaluation team and, therefore, should be considered preliminary. The evaluation instrument was designed by the AMSP Research Data Analyst to obtain data for the more extensive and refined assessment later in the year as more of the Round 2 PEPs formally conclude. The teacher leaders of the PEPs were surveyed. All believed that they had strong evidence of the success of their project activities. A sample of responses from the PEP leaders by district are as follows:

From Anderson County, TN:

- *It has reduced the isolation between math and science teachers and allows them to share their excitement, skills, and ideas for reform.*
- *An increased use of questioning strategies has been observed by the PEP leaders. This has spilled over into their respective classrooms.*
- *The inquiry approach has created a different classroom environment. They have seen an upsurge in the introduction of mathematics into scientific investigations. They are no longer "separate disciplines.*
- *"When the math teachers do experiments with the science teachers it is as cool as it gets."*
- *They are starting to grasp the connections between mathematics and science.*
- *I think one of the things happening to us from an attitude standpoint is that teachers from both disciplines are much more comfortable with working with each other across subject matter.*

From Powell County, KY:

- *Biggest impact was to motivate teachers to teaching content utilizing tested pedagogical methods ("Trailblazers").*
- *Teachers have much better knowledge of math. Knowledge base increased, i.e. standards-based math.*

From Letcher County, KY:

- *Brought them together to work as a team that otherwise they would still have been working as individuals, both at school and district-wide*
- *From observing classrooms there is less traditional-style teaching and more inquiry/investigational style teaching.*
- *We also invited student teachers from UVA Wise and ECU in during the PEP and this was a new aspect we had not had before. Forming a network between districts as well as within the district was important. District-to-District it was useful to get the perspective of an outside district. It really helped tie districts together.*
- *Teachers are more aware of the mathematics content and method of instruction that students need in order to learn mathematics.*

#### From Pike County, KY:

- *Most of the teacher participants who attended the Elementary Math Academy took back the hands-on activities and implemented them in their classrooms. It helped many of them realize that children really do learn better by “doing” and will remember and make connections through hands-on, real-life actions.*
- *The district funded a second Elementary Math Academy based on the same format as the one sponsored by the PEP.*
- *The PEP was the beginning of a major math focus in Pike County. Our math scores are moving, but not at the rate we would like.*

#### From Jessamine County, KY:

- *This PEP has impacted teachers in a number of positive ways and has a long evolution that continues even now after the PEP funds are exhausted. First, the high standards expected in the PEP proposal pushed the curriculum leaders to such an extent that successful implementation was highly probable. Second, the Jessamine and Woodford County secondary math and science teachers worked closely together to develop authentic assessments and differentiated instructional strategies in math and science.*
- *As a result of the work done in the summer academies all secondary math and science students are being assessed for their learning styles using the Silver and Strong learning styles inventories.*
- *One dynamic that we are seeing now are more and more teachers developing their abilities to build assessments that are both reliable and valid, and that are relevant for student learning and achievement. This growing capacity is having a positive impact in our classrooms.*
- *Out of the initial work in science an additional partnership developed between Jessamine and Lewis County, another AMSP partner county. This has been a very fruitful relationship that has led to a great deal of collaboration around science instruction, inquiry curriculum growth, and assessment.*
- *A critical approach, which again took some time to get to, is the forming of discipline cluster groups across schools and partnering districts (Jessamine and Lewis counties) to conduct assessments of student achievement data.*
- *The initial effort to develop the PEP proposal raised our level of confidence and ability to seek outside funds.*

A more complete compilation of the survey responses is found in Appendix \_\_\_\_.

Special recognition of a Virginia PEP. The Virginia School Board Association (VSBA) gave special recognition to a Wise County, VA, Round 2 PEP; “The PETAL Project,” in its publication 2006 Showcase for Success. This is a PEP designed to increase teacher recruitment into mathematics and science education through year-long mentoring activities that pair highly qualified teachers with undergraduate students in classroom instruction, collaborative development activities and field experience.