

# Florida PROMiSE Partnership to Rejuvenate & Optimize Mathematics and Science Education

## 1. Project Summary

**PROMiSE** addresses the need to improve the mathematics and science (M/S) achievement of students through teacher professional development (PD). Florida PROMiSE is a partnership among the three Florida Public Research – Flagship Universities (**USF, FSU, & UF**), four large school districts (**Miami-Dade, Hillsborough, Duval & Seminole**), educational consortia (Heartland Educational Consortium (**HEC**), Northeast Florida Educational Consortium (**NEFEC**) & Panhandle Area Educational Consortium (**PAEC**), **Florida Virtual School**, and **Horizon Research Inc.** PROMiSE lays the foundation and leads development and implementation of large-scale, systemic PD and teacher education programs to significantly improve learning in M/S of *all* students by working collaboratively with a statewide network of stakeholders to implement the Next Generation Sunshine State Standards (NGSSS) for M/S.

**PROMiSE** utilizes a **3-Tier approach** to its work that will span the 3-year development and implementation period. **Tier 1**, the focus of Year 1, addressed the need to increase teachers' understanding of the NGSSS for mathematics and science and their implications for instruction, and raised teacher awareness and use of available curriculum resources for planning standards-based M/S instruction. Tier 1 activities provide resources to Florida school districts to raise awareness about the standards and enhance the ability of schools, districts, and communities to provide a supportive context for teachers to implement high-quality, standards-based M/S instruction.

**Tier 2**, the focus of years 2 and 3, will build capacity in the system to implement the NGSSS for M/S. Instructional leaders, both teachers and administrators, will engage in in-depth content-based PD using a variety of research-based PD programs to enhance their mathematics and/or science content knowledge so that they are well prepared to teach and support the teaching of the mathematics and science standards. Content specialists from Colleges of Arts and Sciences, Colleges of Education, and school districts will collaborate on the development and delivery of the Florida PROMiSE Professional Development program. Teachers of mathematics and science will participate in 2-week summer institutes and 4-days of follow up training that will address key concepts in mathematics and science to support the implementation of the NGSSS. Finally, **Tier 3** activities will lay the groundwork for the development of university-based teacher education programs for M/S teacher leaders that can occur after the funding period and with other funding streams.

Florida PROMiSE has the following goals that have been updated to reflect its current and ongoing mission:

1. Increase familiarity with the NGSSS for M/S and the implications of the Standards for M/S instruction and achievement.
2. Enhance the content-specific knowledge and skills of teachers of M/S to effectively deliver the NGSSS.
3. Build capacity of schools and districts to support the implementation of the M/S standards through sustained PD of a core cadre of individuals who can support and sustain the implementation of the NGSSS in their local context.
4. Enhance the leadership content knowledge<sup>1</sup> of administrators to provide a supportive context for teachers to implement high-quality, standards-based M/S instruction.

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<sup>1</sup> The construct of “leadership content knowledge,” recently introduced by Stein & D’Amico (2000) adapts Shulman’s construct of pedagogical content knowledge (Shulman, 1986) to the administrative domain. They suggest that school leaders must have sufficient subject matter knowledge to understand the curricular expectations for various subject matter, and in particular mathematics.

5. Develop online resources that teachers and other stakeholders can use to understand and support the implementation of the NGSSS for M/S.
6. Align university M/S teacher education and content courses with the content and pedagogy used in PROMiSE teacher training.
7. Operate as a well-functioning partnership that provides well-designed and implemented PD programs and supports activities to support the implementation of the M/S standards.

Goal 1 has been addressed as part of the Florida PROMiSE Year 1 efforts and will continue through ongoing dissemination of Florida PROMiSE products and information. During its second year, Florida PROMiSE will focus primarily on deepening the content knowledge of those charged with increasing achievement in M/S (Goals 2 – 4). Specifically, PROMiSE will implement intensive PD programs that will enhance teachers' and school administrators' understanding of content addressed in the NGSSS. Goals 5 – 7 will continue as an ongoing part of Florida PROMiSE efforts to ensure that Florida teachers have continued access to the best information and programs available.

## 2. Need for this Project

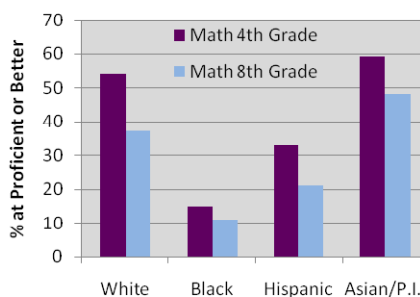
On the national level, the need for improved Science, Technology, Engineering, and Mathematics (STEM) education has been extensively documented in over a dozen recent reports, most notably, the book "The World is Flat" by Tom Friedman (2006), "Rising Above the Gathering Storm" by the National Academy of Sciences (NAS) (2005) and "Foundations for Success" by the National Mathematics Advisory Panel (2008). National Science Foundation (NSF) data indicate that 80% of the workforce now needs M/S skills, and that 32% of the current workforce is in science, engineering and related professions (NSB, 2006). However, the U.S. continues to lag internationally in the production of STEM postsecondary degree production (Tapping America's Potential, 2008). In fact, the October 2006 U.S. Chamber of Commerce's Education and Workforce Summit (USCC, 2006) noted that "The current lack of U.S.-trained scientists and engineers is a direct threat to the leadership of U.S. innovation."

The 2005 Florida Summit on Mathematics and Science Education provided evidence that Florida faces a major economic challenge. At the present time, Florida ranks 46<sup>th</sup> in the nation in STEM degrees, making it difficult to attract innovation and technology-based industry (Synder, Dillow, & Hoffman, 2007). Only 6% of Florida's need for M/S graduates is currently being met, making it difficult to attract innovation and technology-based industry. A high quality education in M/S is not just a matter of Florida's economic survival, it is also essential in "personal decision making, participation in civic and cultural affairs, and economic productivity" (NRC, 1996). PROMiSE will attend to both workforce and literacy concerns in working to strengthen mathematics and science education for all students in Florida. Specifically, PROMiSE will enhance teachers' content knowledge so that they are able to prepare students for both the workforce and for postsecondary education.

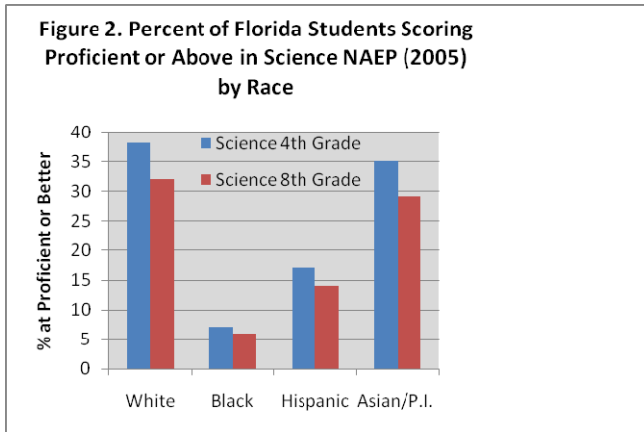
- **The magnitude of the problem is evident, and the need for the services is apparent.**

Several major assessments of M/S achievement underscore the lack of strong academic achievement in these areas for a large number of students in the United States, particularly at the middle school level (Loveless, 2004; National Center for Educational Statistics (NCES), 2006). In the 2007 National Assessment of Educational Progress (NAEP), only 39% of fourth-graders

Figure 1. Percent of Florida Students Scoring Proficient or Above in Mathematics NAEP (2007) by Race



and 31% of eighth-graders scored at or above the Proficient level in mathematics. In the 2005 NAEP, the latest version to include science results, only 26% of fourth-graders and 21% of eighth-graders scored at or above the Proficient level in Science (NCES, 2007).



In Florida, results from the 2008 mathematics FCAT indicate that 61% of fifth-graders, 67% of eighth-graders, and 69% of tenth-graders scored at Achievement Level 3 (on grade level) and above. Results from the 2008 science FCAT were even more disappointing, with only 43% of fifth-graders, 40% of eighth-graders and 38% of eleventh-graders scoring at Achievement Level 3 and above (FLDOE 2008). Improving M/S education will require knowledgeable M/S teachers who are able to engage students, make M/S meaningful and relevant, pursue fewer topics in greater depth, and emphasize inquiry and problem-solving skills.

- **PROMiSE focuses on identified needs of the targeted population, on those with greatest needs, and is strongly justified through supportive data.**

**Need 1: A significant portion of teachers of M/S lack content knowledge needed to support the implementation of the NGSSS for M/S in ways that address the needs of Florida’s diverse student population.**

**Goal 2:** Enhance the content-specific knowledge and skills of teachers of M/S to effectively deliver the NGSSS. (Priorities 1, 2, 3, 4, & 5)

**Goal 3:** Build capacity of schools and districts to support the implementation of the M/S standards through sustained PD of a core cadre of individuals who can support and sustain the implementation of the NGSSS in their local context. (Priorities 1, 2, 3, 4, & 5)

The increasing expectations outlined in the NGSSS are raising the expectation for what students must know and be able to do in M/S. In tandem, expectations have risen for what K-12 teachers need to know and be able to do in order to effectively instruct students and increase their subject matter achievement. Numerous studies and the results from a variety of teacher licensing and certification examinations provide evidence that many teachers, especially those who teach K-8, do not have sufficient content knowledge or adequate background for teaching mathematics or science (Darling-Hammond, 2007). For example, a generalist at the middle school level can be assigned to teach mathematics and science as is supported by the Florida’s requirements for the Middle Grades Integrated Curriculum 5-9 teacher certificate. Recently, the National Council of Teacher Quality reported that many colleges of education do not cover the mathematics content needed by elementary teachers (Greenberg & Walsh, 2008). This report bolsters findings from prior research (see for example, Arons, 1990; Eisenhart et al, 1993) that suggest that teachers do not develop a deep understanding of mathematics or science during their K-12 or undergraduate education. In several studies, teachers have been found to make a difference in student achievement (Sanders and Rivers, 1996; Wright, Horn and Sanders, 1997). Other research has identified a link between teacher content knowledge and the quality of the instruction they provide (Brown & Borko, 1992; Evens 1993; Stein, Baxter, & Lienhardt, 1990) and student achievement (Wayne & Youngs, 2003; Hill, Rowan, & Ball, 2005). The studies reveal that teachers cannot deliver effective instruction if they have weak conceptual knowledge of the subject matter. Teachers with robust conceptual understanding of disciplinary

content were found more likely to engage students in activities that strengthened their depth of knowledge (Ma, 1999). In a study of elementary students in grades K-3, Wright, Horn and Sanders (1997) found that grades 3-5 teachers have an effect on students' performance, particularly in the areas of mathematics and science.

**Many groups have concluded that content knowledge must be a central focus of teacher education and PD.** For example, calls to enhance the content preparation of teachers have come from various organizations including the American Institute of Physics (1999), Association for the Education of Teachers of Science (1997), National Council of Teachers of Mathematics (2007), Mathematics Association of America (1999; Scott, 2008), National Science Teacher Association (1998) and the Conference Board of Mathematics Sciences (2001). Specifically, these reports assert that teachers must engage in teacher education and PD that results in deeper and fundamental understanding of the content they will be required to teach (Coble & Koball, 1996; Ma, 1999, Hill, Rowan, & Ball, 2005). The Interstate New Teacher Assessment and Support Consortium (INTASC) (1999) has emphasized that teacher education should develop teachers' disciplinary content knowledge in ways that help them "understands the central concepts, tools of inquiry, and structures of the discipline(s) he or she teaches and can create learning experiences that make these aspects of subject matter meaningful for students" (p. 15).

**There is evidence that suggests major gaps in the M/S content knowledge of Florida teachers.** For example, baseline data from the MSP-funded, multi-year Projects LAUNCH and SMART (362 participants; Howard, 2006) showed that only 39% of participants could answer science items correctly (e.g., questions related to the solar system). Only 20% of 164 elementary teachers entering Project SMART could correctly answer questions that dealt with earth science content. Ninety-nine middle school teachers correctly answered only 28% of items. Similar data are not available for mathematics. However, only 37% of elementary and 56% of middle school mathematics teachers reported feeling well prepared to teach mathematics, and only 41% of middle school teachers reported feeling well prepared to teach algebra, functions, data and measurement. Only 22% of middle school mathematics and 56% of science teachers had completed the number of courses required to qualify for a major or minor in the subject area.

While not a sufficient indicator of teacher effectiveness, certification is one measure of teacher quality. Table 1 documents that a substantial proportion of Florida's M/S teachers are not certified to teach in these

Table 1. Percent of Florida Mathematics and Science Teachers NOT Certified in Their Field		
	Mathematics	Science
All teachers 2006	12.2%	7.5%
New Hires Fall 2006	9.2%	10.2%
Source: FLDOE, 2008		

areas. Clearly, it is important that Florida strengthen the new and continuing teacher corps.

**Teachers of M/S need content-based PD that focuses on the use of Florida's NGSSS.** In order for schools to make real gains in improving students' M/S learning and achievement teachers must engage in sustained PD designed to enhance their understanding of subject matter assumptions, debates, misconceptions, and concepts (Ball & Cohen, 1999). PD efforts must go beyond the individual and often superficial workshop and attend to the long-term "serious and sustained learning of curriculum, students, and teaching" (p. 4). Such long-term programs of intense, research-based PD, reflection, and inquiry within M/S hold promise in their potential to affect long-term changes in instructional practice and, ultimately, to enhance student test scores and thinking abilities (Bianchini & Cavazos, 2007).

Teachers' content knowledge and pedagogical skills are both important to instructional effectiveness. The selection of tasks and how teachers guide student thinking is dependent on their knowledge of content, pedagogy, and students (Bransford, Brown, and Cocking, 1999). Also, teachers' ideas and beliefs about M/S teaching and learning directly influence how they

teach (Good & Brophy, 1990; NCTM, 2000; NRC, 2000). Teaching goals are often reflective of what teachers think is important and how they think students learn most effectively. Strengthening teachers' subject matter knowledge and understanding about the connections among concepts will provide them with the knowledge needed to make appropriate decisions for K-12 students.

Several reports, including *Educating Teachers of Science, Mathematics, and Technology* by the National Research Council (2001) and the *Joint Statement on the Education of Future Teachers* by the American Institute of Physics (1999) address the issue of content preparation of teachers. **These reports call for intentional partnership between discipline-specific university content and education faculty and K-12 school systems to design and implement high quality teacher professional development or education programs.** Each of these groups possesses knowledge that when combined can enhance teachers' knowledge and preparation for teaching disciplinary topics.

**Need 2:** School administrators are not currently trained to provide effective feedback or support of high quality M/S teaching.

**Goal 4:** Enhance the leadership content and pedagogical content knowledge of administrators to provide a supportive context for teachers to implement high-quality, standards-based M/S instruction. (Priorities 1, 2, 4, 5)

**Highly effective principals are required to ensure that teachers operate in an environment that values the application of new knowledge related to the NGSSS for M/S.** These school leaders must be prepared to provide job-embedded, inquiry-based opportunities for teachers to receive feedback, reflect on and extend new knowledge, skills and practices demonstrating a deeper understanding of content and process standards in mathematics and science. Instructional leaders in Florida's schools must build professional learning communities that meet regularly to examine student work, monitor students' progress, and use student performance data to guide instructional decisions and identify needs for continued professional learning (Murphy & Lick, 2005). They must spend large amounts of time in classrooms observing teaching and learning in light of the new standards, providing teachers with feedback that will encourage continued growth and development. These school leaders must also allocate resources based on the learning needs of their students, particularly those whose instructional needs have not been met in the past (Hallinger & Heck, 1996; Jones, 2000; Jones & Jackson, 2007a, 2007b; Lang, Goldwyn, Schatschneider, Roehrig-Bice, & Johnson, 2007; Waters, Marzano, & McNulty, 2003).

Current principals are not uniformly prepared to build supportive cultures that clearly tie adult learning to student learning. In fact, the more traditional, university-based preparation programs for school leaders have not proven to be effective at developing principals who impact student learning (Fry, O'Neill, & Bottoms, 2006; Hess & Kelly, 2005; Levine, 2005). Principals themselves indicate that their graduate preparation programs did not prepare them for the challenges they face in today's schools (Tucker & Coddling, 2002). Three years ago, Florida adopted a new set of standards for school leaders based on revised national standards (Council for Chief State School Officers, 1996) that recognizes they must increase their knowledge and skills to effectively lead their schools as described above (SBE Rule 6-B-5.00012, Approved April 19, 2005).

**Need 3:** There are not enough online resources to support understanding and implementation of the standards for all stakeholders statewide.

**Goal 5:** Develop online resources that teachers and other stakeholders can use to understand and support the implementation of the NGSSS for M/S. (Priorities 1, 2, 4)

With the introduction of the new M/S standards, it is important that teachers and other stakeholders have access to information that will help them understand the nature and content of the standards as well as their implications for curriculum, instruction, and assessment. These standards represent a significant shift in terms of the nature of the subject matter (i.e., the focus on fewer topics with more depth), the organizational structure of the content (i.e., some topics previously taught in one grade level have been moved to another), and implied instructional approaches to support their implementation. But because current curriculum materials do not address fully the nature and content of the standards it is difficult for teachers to recognize and enact such practices (Yore et al., 2007). Teachers and other stakeholders will need access to additional information in order to support student learning.

Working with the Florida Center for Research (FCR-STEM), PROMiSE will build on and extend web-based resources to serve and **reach a large number of teachers in the state** who have a stake in implementing the standards. Web-based resources developed as part of PROMiSE will be continuously updated to reflect current, accurate, and peer-reviewed information that is aligned to the standards. The goal is to provide resources to enhance understanding about the content of the standards, support decision-making related to the standards, and provide technical assistance to support the implementation of the standards.

**Need 4:** University teacher education programs do not currently align with the content in the new M/S standards or the instructional approaches necessary for teaching those standards.

**Goal 6:** Align university M/S teacher education and content courses with the content and pedagogy used in PROMiSE teacher training. (Priority 1, 3, 4 & 5)

Coursework for teachers at Florida's universities should align with and model the research-based PD needed for teachers of M/S. There is a substantial gap between this desired methodology and the common current practice, which all too often demonstrates M/S as textbook disciplines that emphasize transmittal of facts, and measures students' performance by their ability to recall such facts. Teachers will utilize the strategies modeled for them as part of university coursework. Many university faculty members may not be sufficiently aware of the changing expectations to provide appropriate types and levels of instruction needed by university students who are interested in becoming teachers. STEM faculty also may not have the PD experiences in teaching that would enable them to model effectively the pedagogy needed for success in K-12 classrooms. As a contributor to teacher and, subsequently, student learning, university faculty must be knowledgeable about the new standards, incorporate information about those standards as part of content and methods courses, and model content instruction and pedagogy consistent with what is expected of M/S teachers and instructional leaders. Through this intentional partnership and collaborative effort that engages both IHE faculty and teachers, it is expected that university content and education faculty will have acquired new knowledge and skills that they can incorporate in the courses that they teach. Improvements of content and pedagogy in undergraduate courses will benefit all students, both education majors and non-majors.

COE and CAS faculty have collaborated effectively for well over a decade on the development of education degree programs. For example, USF M/S faculty worked with Hillsborough County from 1998 to 2000 to develop a training program and materials for an

integrated M/S approach for elementary teachers (SAMI – Science and Mathematics Integration). USF CAS and COE faculty have partnered successfully in past M/S Partnerships grants as well as federal M/S grants (e.g., USDOE & NSF). Recently, seven mathematicians from USF participated in an MSP grant, Project ACE (*Achievement through Content Expertise*), for which Dr. Kersaint was principal investigator, to enhance teacher content knowledge using the NCTM (2006) *Curriculum Focal Points* as the basis of content knowledge development for teachers who teach grades K-8 mathematics and algebra. An outflow of that collaboration is that the mathematics faculty has committed to link advanced mathematics courses taken by secondary education mathematics preservice teachers to the content secondary mathematics teachers will be required to teach. This is an initial step in the examination of the secondary mathematics program to ensure that it addresses the needs of teachers. In addition, FSU and UF are recipients of grant funding to locally implement the U-teach model that engages content faculty in the preparation of teachers. CAS STEM faculty members were also involved in some of the PROMiSE Year 1 PD development efforts.

Florida PROMiSE will build on these initial efforts in working to align teacher education and teacher training by:

1. Incorporating the research-based knowledge of teacher education faculty and content-specific knowledge of CAS STEM faculty to support the work of the project.
2. Engaging COE and CAS STEM faculty in all aspects of the project, including the design and delivery of PD for teachers and principals, and the review of content for inclusion as part of the CPALMS.
3. Encouraging COE and CAS STEM faculty to incorporate PROMiSE training as part of their university courses.

#### **4. Organizational Structure and Program Implementation**

**Need 5:** No current mechanism exists for a statewide project of this magnitude that involves the three Florida Flagship Research universities, school districts and educational consortia.

**Goal 7:** Operate as a well-functioning partnership that provides well-designed and implemented PD programs and supports activities to support the implementation of the M/S standards.

PROMiSE is designed as a collaborative infrastructure that builds on the strengths of each partner to best meet the needs of Florida’s teachers and students. Decision-making for PROMiSE will be done at two levels to ensure that all project activities are aligned with and integrated with each other by including common or related activities. The first is an Executive Team that is comprised of one representative from each university, a representative from a school district and a representative from the FLDOE. The work of the Executive Team will be guided by the Leadership Council, which includes one CAS STEM and one COE representative from each university, one member from each of the school district/consortium and other partner organizations. Appendix A includes a list of PROMiSE Leadership Council Members.

#### **5. Project Design and Implementation**

Florida PROMiSE will use a 3-tier model of PD over the three-year project period.

- Tier 1: Building Understanding of the M/S Standards
- Tier 2: Building Capacity to Implement and Support the Standards
- Tier 3: Building Capacity for Continued Renewal and Sustainability

Table 2: Tier Implementation through Project Duration.

	Year 1	Year 2	Year 3
Tier 1	→		
Tier 2		→	
Tier 3		→	

Each tier will reach different numbers of stakeholders, with the majority of teachers developing understanding of the standards through Tier 1 products and information. Tier 2 will offer more intensive PD, leading to a cadre of instructional leaders (i.e., teachers and administrators) in Florida who are able to support the implementation of NGSSS for M/S. Teachers who participate in Tier 2 will receive in-depth PD that includes a 2-week institute and follow-up during the school year that focuses on enhancing their conceptual understanding of subject matter they will be responsible for teaching. Specifically, connections will be made between the content of the PD and the NGSSS. The final level, Tier 3, will be planned during this project. In collaboration with school district M/S supervisors and PD directors, a plan will be developed to create graduate degree, certificate, and other programs aimed at a small number of educators in the state who will become experts and leaders in M/S education reform. Tier 3 will not be funded by Florida PROMiSE. Tier 3 is an effort to sustain and continue the partnerships and efforts that were initiated as part of this project.

Each Tier will focus on both disciplinary content and pedagogical knowledge, and will focus on creating a community of learners. Each Tier includes three components:

- **Building a Rationale:** The PROMiSE PD program will provide teachers and other stakeholders with an overview and conceptual framework of the NGSSS for M/S and their implications for learning and teaching. It is expected that teachers will be convinced of the need for enhanced content knowledge given the depth of knowledge expected of Florida’s students. By making explicit links to the NGSSS, PROMiSE will stimulate motivation for exploring subject matter in depth. Teachers will examine requirements for students as a means to help teachers understand the subject-specific knowledge they will need in order to teach the NGSSS for M/S effectively.
- **Subject Matter Knowledge:** PROMiSE professional development will focus on the development of *fundamental* and *conceptual* understanding of the subject matter teachers are expected to teach. In particular, Tier 2 Summer Institutes will focus on the nature of mathematics and science; that is, they will focus not only on “What do we know?,” but also on “How do we know it?,” and “What it means to ‘do’ mathematics and science?”
- **Subject-Specific Pedagogy:** The NGSSS provide a rich context for deep exploration of *subject matter resulting in* conceptual understanding that has not previously been possible given the large number of standards teachers were asked to address. To help teachers view their role in the classroom differently, PROMiSE will model instructional practices that actively engage teachers in learning content at an advanced level; that is, teachers will engage in the types of learning experiences that teachers are expected to practice with students – inquiry-based science and mathematics activities.

During Years 2 and 3, PROMiSE will focus on Tier 2 professional development for teachers of K-12 M/S that will be designed around the NGSSS for M/S. Each summer institute will provide teachers with in-depth knowledge of key concepts through engagement with inquiry-based experiences, activities, and investigations. These sessions will be designed and delivered by a team that will include CAS STEM faculty who are partnered with disciplinary-focused teacher education faculty and/or master teachers. As part of the PD design efforts, each PD team will determine what content knowledge understanding teachers will need in order to

effectively provide instruction related to the appropriate standards in the NGSSS. The institute will focus on topics and concepts that are most difficult for students to learn and most difficult for teachers to teach based on available research and insights from school district M/S supervisors.

Tier 2 Teacher PD will target current and emerging M/S instructional leaders who will support the learning of M/S with a deeper understanding of content, standards, and how to promote student learning. Compared to Tier 1, Tier 2 is expected to have more substantive impact not only on teacher knowledge of content and pedagogy, but also on teacher practice in the classroom and, ultimately, student performance. Groups of teacher leaders will engage in an intensive 2-week summer institute and follow-up activities (4 days) to further develop their understanding of subject matter to support the implementation of the Florida M/S standards in the local context. These individuals' knowledge base will be expanded through engagement in a variety of research-based PD offerings such as *Developing Mathematical Ideas* (<http://www2.edc.org/CDT/dmi/dmicur.html>) for teachers of mathematics. Other research-based sources to support M/S PD can be obtained from *TE-MAT* (Teacher Education Materials Project (<http://www.te-mat.org/>)), a database of resources and tools to help PD providers design, implement, and evaluate PD programs. Specifically, PROMiSE summer institutes will address similar topics (e.g. Algebra, Life Science) across all partner school districts. Each summer institute will be evaluated using pre/post instruments and questionnaires. Follow-up activities will be evaluated to determine the extent to which new knowledge and skills learned in training are used to instruct students in the classroom.

Each university will be responsible for coordinating, facilitating, and implementing PROMiSE Summer Institutes and follow-up activities, working with their assigned PROMiSE partner school districts that are identified below:

USF: Hillsborough and HEC

FSU: PAEC & Seminole

UF: Duval, NEFEC, & Miami Dade

To maximize the number of teachers who can be reached, PROMiSE may form alliances with CAS STEM faculty from other universities to deliver summer institutes locally to PROMiSE school district and consortia partners (e.g., faculty at FIU to deliver training to Miami-Dade).

Responsibilities of each partner university include, but are not limited to:

1. Providing overall oversight to ensure the timely attainment of project goals and objectives.
2. Providing direction related to development, coordination, and implementation of the Tier 2 PROMiSE summer institute and follow-up activities.
3. Coordinating and delivering Tier 2 PD within their assigned school districts and with other partners.
4. Consulting with others as necessary to ensure all project programs are delivered effectively.
5. Providing regular status reports of project activities.

Constant and consistent communication among these groups will be necessary to ensure that activities are aligned with and integrated with each other.

Given the statewide scope of PROMiSE, it is necessary to utilize a process to design and implement the summer institutes in ways that reflect a coherent and well designed program that is aligned across the partnership. To that end, PROMiSE PD providers (CAS STEM faculty and others) from across the state who will deliver a "common" institute (e.g., algebra) will meet to reach consensus about the overall scope of the institute. They will collaborate to jointly (1) identify specific concepts to be addressed in the particular institute course, (2) develop learning activities and experiences to be included as part of the institute, and (3) reach consensus about expected delivery approaches and pedagogy. Regional PD provider teams will be charged with developing particular aspects of the institute. Each regional team will share their developed component with other regional teams working on the same "common" institute. Through an

iterative process of developing, reviewing, and revising, each PD provider team is given an opportunity to contribute to the framing of the institute. The summer institutes will be delivered by regional PD provider teams. Details regarding the development and implementation of the Summer Institute are found in Appendix B.

USF will coordinate and facilitate this process for the PROMiSE institutes that will focus on mathematics, and UF will coordinate and facilitate this process for science. Teachers from partner school districts will apply to participate in PROMiSE PD to ensure that we are working with those with the greatest need. Appendix C contains letters of commitments regarding the involvement of CAS faculty from each partner university.

### **Professional Development for School Leaders**

In Year 1, the PROMiSE principal PD program was developed and piloted with 100 principals from across the state. Two cohorts of fifty, one elementary and one secondary, began participating in a year-long, carefully planned PD built around the new leadership standards, the NGSSS M/S standards, and focused on content knowledge and pedagogical content knowledge, student achievement, data-driven decision making, collaborative inquiry and reflective practice. In addition to the four two-day face-to-face institutes led by an interdisciplinary group of university faculty associated with FCRSTEM from the Florida State University College of Arts and Sciences, the College of Education and the Learning System Institute, peer learning communities provide opportunities for principals to work and problem solve with other principals, as well as university faculty, building upon the successfully implemented model of the “Middle School Principal Leadership Academy” – a partnership between The Florida Department of Education, Florida Association of School Administrators (FASA) and Laura Hassler Lang.

During Year 2, professional development will be provided to 400 principals (300 new participants and 100 pilot participants who began the PD program in May 2008 and will complete the 3<sup>rd</sup> and 4<sup>th</sup> sessions during year two). Each cohort will participate in four 2-day meetings or workshops:

	1 <sup>st</sup> workshop	2 <sup>nd</sup> workshop	3 <sup>rd</sup> workshop	4 <sup>th</sup> workshop
Pilot Group 100 principals 2 cohorts; 50 ea (1 Elem, 1 Sec)	May/July 2008 (Year 1) 2 wkshps; 50 ea	July/Sept 2008 (1 in Year 1; 1 in Year 2) 2 wkshps; 50 ea	Dec 2008 (Year 2) 2 wkshps; 50 ea	Apr 2009 (Year 2) 2 wkshps; 50 ea
Group 2 300 principals 6 cohorts; 50 ea (4 Elem, 2 Sec)	Jan/Feb 2009 (Year 2) 6 wkshps; 50 ea	Mar/May 2009 (Year 2) 6 wkshps; 50 ea	Jun/Jul 2009 (Year 2) 6 wkshps; 50 ea	Sept/Oct/Dec 2009 (2 in Year 2; 4 in Year 3) 6 wkshps; 50 ea
Group 3 250 principals 5 cohorts; 50 ea (4 Elem, 1 Sec) 50 asst principals (secondary)	Jan 2010 (Year 3) 6 wkshps; 50 ea	Spring 2010 (Year 3) 6 wkshps; 50 ea	Summer 2010 (Year 3) 6 wkshps; 50 ea	Fall 2010 (Year 3) 6 wkshps; 50 ea

*Year 1: Mar 1 to Sept. 30, 2008    Year 2: July 1, 2008 to Sept. 30, 2009    Year 3: July 1, 2009 to Sept. 30, 2010*

School leaders were recruited via nomination by their respective school superintendents and by self-nomination. The goal by the end of Year 3 is to serve all nominated principals and secondary assistant principals in the state (elementary, middle and high school) who are willing to participate in the principal leadership professional development. That number is expected to include up to 650 principals and 50 secondary assistant principals total over the three years. 61 of 67 school districts are represented in the participants who have registered.

Year One focused primarily on development of professional development materials and principal recruitment; and a pilot project for two cohorts. Workshops for the first cohort (50 elementary principals total) began in May 2008 and continued in July 2008 with the elementary cohort's second session. Workshops for the second cohort (50 secondary principals) began in July 2008.

## **Year 2: (July 1, 2008 to Sept. 30, 2009)**

Pilot Group (Cohorts #1 & 2 continued): Delivery of five additional 2-day workshops (one at the end of September and two workshops at each of the following times: Dec 2008 and April 2009). Follow-up support and mentoring will be provided online resources and professional learning communities built throughout workshops during 2008-09 school year.

Cohort 2	Sept. 29 & 30, 2008	46 secondary principals to be trained in 2 <sup>nd</sup> workshop
Cohort 2	Dec. 2 & 3, 2008	46 secondary principals to be trained in 3 <sup>rd</sup> workshop
Cohort 1	Dec. 4 & 5, 2008	47 elementary principals to be trained in 3 <sup>rd</sup> workshop
Cohort 2	April 21 & 22, 2009	46 secondary principals to be trained in 4 <sup>th</sup> workshop
Cohort 1	April 23 & 24, 2009	47 elementary principals to be trained in 4 <sup>th</sup> workshop

Group 2 (Cohorts #3-8, approximately 300 principals total): Delivery of the first (Winter 2009) of four 2-day workshops. There will be eighteen workshops total; an average of 50 principals per workshop. Follow-up support and mentoring will be provided online resources and professional learning communities built throughout workshops during 2008-09 school year. Appendix D includes the schedule of the workshops for each cohort.

## **Curriculum Planning and Learning Management System (CPALMS)**

PROMiSE is creating a web-based system to be added to the Standards Database and Course Code Directory (CCD) currently being created by FCR-STEM for the Florida Office of M/S to support statewide implementation of the revised standards by all K-12 teachers of M/S. The purpose of CPALMS (Curriculum Planning and Learning Managements System) will be to (1) increase access of teachers and instructional leaders to high quality information and vetted resources aligned with the new standards, (2) support the delivery of teacher PD, and (3) support teacher application of new content and pedagogical knowledge in the classroom.

Building on top of these two systems creates an integrated system for all the elements the teacher needs for teaching the Standards. Under its first year of PROMiSE, FCR-STEM began the design and development of this electronic performance support system to serve as a web-based platform portal to disseminate information built around the NGSSS. The Math and Science course descriptions are already aligned with the NGSSS, and using the two existing systems (Course Code Directory and Standards Database) with CPALMS, the teacher will be able to set a profile and use the following modules:

1. Standards Database: A searchable database of all of the mathematics standards and benchmarks across the grade levels (including Access Points for ESE students). Each benchmark has been rated by content experts (teachers, mathematics supervisors, mathematics education university faculty) on level of cognitive complexity according to Norman Webb's Depth of Knowledge. The revised science standards will be added after their adoption. This module was developed before the PROMiSE project.
2. Course Code Directory (CCD): A searchable database of the State's course catalog that displays all the requirements for teaching a course including the standards and benchmarks. The CCD includes a course builder tool that allows creating a new course that ties to the

new standards and submitting it to the Department of Education for an electronic review and approval. This module is not built under the PROMiSE project but through another grant from the Florida Department of Education.

3. Instructional Resources and Lesson Plans: The CPALMS team will be evaluating available instructional resources and lesson plans and aligning them to the Standards. These resources go through an approval process but eventually will be displayed on the standards website and on the CPALMS portal. Teachers will be able to search for resources, see a list of related resources for each benchmark or for the entire course. Teachers will be able to submit resources to go through the approval process. They will also be able to rate existing resources and provide feedback for the CPALMS team. Content screened by a core staff of content coordinators and graduate students will be reviewed by content review panels according to a defined set of criteria (e.g., level of research evidence, content accuracy). A total of three review panels are anticipated for mathematics and three for science (elementary, middle and high school). Members recruited by the Florida PROMiSE partners will include M/S experts from COE and CAS, teachers, and FLDOE representatives. Review panelists will review and rate content online and meet quarterly to discuss content on which there was no consensus.
4. Lesson Planning Tool: Teachers will have access to a lesson planning tool that guides them through building a lesson and aligning it to the standards. These lessons can be submitted to go through the approval process for feedback and sharing with other teachers.
5. Curriculum Planning Tool: Teachers and district specialists will have access to a curriculum planning tool that allows them to organize their course plans and tie it to all the lessons, resources and benchmarks. Simply, the teacher will select the course they will be teaching from the CCD, and CPALMS will import all the benchmarks that are required for that course. Then, the teacher will go through a process of creating their courses, and the tool will help them to cover all the requirements and provide them with the available resources and tools to build others.
6. Professional Events List and Registration: Teachers will be able to view professional development events that are related to them and in their areas. PROMiSE training events will be listed on the site for teachers to easily register and attend. Other events will be reviewed and approved for listing.
7. Related News: As resources and revisions are made to standards, the teachers will be automatically notified on their homepage. The news is specific to the teacher and their teaching rather than all news for everyone.

The tool will be built as a platform that allows others to build additional helpful widgets based on the NGSSS. The system will be built and tested to be compatible with recent versions of browsers and different operating systems. The software is programmed on the Microsoft .NET platform and in accordance to the Department of Education guidelines. Sciberus is the programming company that built the Standards Database, CCD, and will be building the CPALMS software application.

CPALMS will be designed by teachers and for all teachers of M/S statewide. The launch of CPALMS will be announced via emails to all registrants on the Florida Standards website, PROMiSE website, newsletters and professional meeting presentations, with assistance from FLDOE, FCR-STEM and professional organizations (e.g., FASA, FAMS, FCTM). An interactive online tutorial, online Help feature and a toll-free number “help desk” with designated hours will be provided.

As part of the Year 1 effort, PROMiSE, through FCR-STEM, began gathering existing instructional resources for Math grades K-8 and aligning them with the NGSSS. Five experienced teachers representing different grade levels were selected to work with the project team over the summer period to identify these resources. These teachers received intensive

training on the standards and worked closely with the Mathematics specialist on the project to identify over 250 resources. Along with the resources, the CPALMS team along with the programmers (Sciberus) began the development of performance specifications and layout designs for CPALMS that includes a Curriculum Planning Tool and the Lesson Planning Tool and builds on top of the Standards Database and Course Code Directory systems that were previously funded by the State.

During Year 2, PROMiSE will continue to collect resources and align them to the NGSSS in both mathematics and science. PROMiSE will complete the design of the Curriculum Planning Tool and Lesson Planning Tool and make modifications as necessary based on feedback from the Office of Math and Science and district users and proceed with the development of the software application that will be open to be used by all the state teachers. PROMiSE will complete the identification, screening and review of mathematics content/resources for benchmarks and Big/Supporting Ideas in grades K-8 and Bodies of Knowledge in grades 9-12. Because of the large number of benchmarks at the high school level, FCR-STEM (with input from OMS and the districts) will develop a strategy to target benchmarks that are the highest priority. PROMiSE (FCR-STEM) also will identify, screen and review content/resources for science benchmarks in grades K-12. This work is expected to continue through the end of Year 3. FCR-STEM will establish a project review panel for CPALMS that includes math and science specialists and PROMiSE District Resource Teachers for feedback and testing of the tool and identified resources. This panel will contribute from the design phase until the rollout of the system.

CPALMS will release the Math K-5 resources via the FloridaStandards.org website early 2009 and will continue to release the Math and Science resources as they are collected and reviewed.

**PROMiSE Goals, Objectives, Activities, & Outcomes/Measures**

By effectively addressing the identified needs, **Florida PROMiSE seeks to enhance K-12 student performance in M/S**. Achieving this goal is a long-term process, requiring progress in multiple areas over the project’s three-year period and beyond. Therefore, PROMiSE has established a focused set of goals, objectives, activities and outcomes to guide both the design and implementation of project activities. During Year 2, PROMiSE will focus on Goals 2-4. Goals 5-7 will be an ongoing part of PROMiSE efforts.

<b>Goal 1: Increase familiarity with the NGSSS for M/S and the implications of the Standards for M/S instruction and achievement [Addressed as part of Year 1 Activities]</b>	
<b>Objectives:</b>	
<ul style="list-style-type: none"> <li>• Develop PD modules/resources to inform teachers about the NGSSS</li> <li>• Disseminate information about the developed PD modules</li> </ul>	
<b>Activity</b>	<b>Outcomes/Measures</b>
<ol style="list-style-type: none"> <li>1. Convene PD design teams that include CAS/STEM faculty to design modules (Tier 1 Teacher &amp; Induction)</li> <li>2. Implement review process for developed materials</li> <li>3. UF team finalize Tier 1 Teacher PD modules for dissemination</li> <li>4. USF team finalize Induction PD Modules for dissemination</li> <li>5. Disseminate PD modules (conference &amp; school</li> </ol>	<ol style="list-style-type: none"> <li>1. Quality of Products: <ul style="list-style-type: none"> <li>• Facilitator Guides &amp; Materials for Tier 1 Teacher PD</li> <li>• Facilitator Guides &amp; Materials for Induction PD</li> </ul> </li> <li>2. List of School Districts who received copies of the materials</li> <li>3. Records of dissemination efforts (e.g., conference presentations, etc.)</li> <li>4. Records of use of materials (or parts thereof)</li> </ol>

<p>district presentations).</p> <p>6. Provide information about the NGSSS as part of an Awareness Campaign*</p> <p>7. Disseminate information about the NGSSS and PROMiSE activities (e.g., website, newsletters, etc.) *</p> <p>* Ongoing activity throughout PROMiSE</p>	<p>by school districts.</p> <p>5. Awareness survey</p> <p>6. PROMiSE Website</p> <p>7. Products: Awareness materials (e.g., Newsletters, PSA, etc.)</p>
<p><b>Goal 2:</b> Enhance the content-specific knowledge and skills of teachers of M/S to effectively deliver the NGSSS.</p>	
<p><b>Goal 3:</b> Build capacity of schools and districts to support the implementation of the M/S standards through sustained PD of a core cadre of individuals who can support and sustain the implementation of the NGSSS in their local context.</p>	
<p><b>Objective:</b> Increase teachers’ understanding of key M/S concepts needed to effectively deliver the NGSSS</p>	
<ol style="list-style-type: none"> <li>1. Determine Framework for the design of PROMiSE summer institutes</li> <li>2. Review research-based PD materials, research related to student and teacher misconceptions and other resources as a basis for designing the institute courses.</li> <li>3. Develop the institute courses</li> <li>4. Develop and implement application process for participation in the summer institute, with priority given to cohorts of teachers from the same school</li> <li>5. Deliver 2-week summer institute courses (Target number of teachers: 1000)</li> <li>6. Provide 4 days of follow-up training during the following school year to link institute activities to classroom practice</li> </ol>	<ol style="list-style-type: none"> <li>1. Participants: <ul style="list-style-type: none"> <li>• Demographic information of CAS/STEM faculty &amp; other members of the PD design team</li> <li>• Demographic information about institute participants</li> </ul> </li> <li>2. Use of Research-Based PD: <ul style="list-style-type: none"> <li>• Developed Framework</li> <li>• Correlation chart that aligns institute objectives with PROMiSE PD framework and NGSSS</li> <li>• Quality of developed courses</li> </ul> </li> <li>3. Results from pre/post assessments of teacher content knowledge</li> <li>4. Survey results about the Institutes</li> <li>5. Student achievement (e.g., FCAT)</li> </ol>
<p><b>Goal 4:</b> Enhance the leadership content knowledge of administrators to provide a supportive context for teachers to implement high-quality, standards-based M/S instruction.</p>	
<p><b>Objective:</b> Enhance the leadership content and pedagogical content knowledge of administrators to provide supportive context for teachers to implement high-quality, standards-based M/S instruction.</p>	
<ol style="list-style-type: none"> <li>1. Provide M/S leadership training to 650 elementary, middle and high school principals in Florida and 50 assistant principals over the 3-year grant period.</li> <li>2. Support principals as they lead in the implementation of the Next Generation M/S standards in their schools.</li> </ol>	<ol style="list-style-type: none"> <li>1. Participant: Demographic information</li> <li>2. Results of pre/post measure of administrators’ content knowledge</li> <li>3. Survey results</li> </ol>
<p><b>Goal 5:</b> Develop online resources that teachers and other stakeholders can use to understand and support the implementation of the NGSSS for M/S.</p>	
<p><b>Objective:</b> Develop and disseminate online resources that stakeholders can use to learn more about the standards and their implications for Florida students.</p>	
<ol style="list-style-type: none"> <li>1. Develop a website for the project that identifies the project goals, objectives, activities, and information to support the implementation of the new M/S standards. The site will solicit</li> </ol>	<ol style="list-style-type: none"> <li>1. Quality of Developed Products: <ul style="list-style-type: none"> <li>• CPALMS website</li> <li>• PROMiSE website</li> </ul> </li> <li>2. Record of CPALMS use by school districts</li> </ol>

<p>feedback, ideas and resources from teachers to build the sense of ownership and motivation to use CPALMS, the Curriculum Planning Tool.</p> <ol style="list-style-type: none"> <li>2. Design and programming of CPALMS modules to support teacher integration of revised M/S standards into instruction.</li> <li>3. Review and align resources to the NGSSS and pass them through a rigorous approval process before they come available to the teachers.</li> <li>4. Develop help and instructional materials for the teacher to use CPALMS.</li> </ol>	<p>(e.g., registration information, # of web hits, etc.)</p>
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**Goal 6:** Align university M/S teacher education and content courses with the content and pedagogy used in PROMiSE teacher training.

**Objective:** Increase M/S content and teacher education faculty understanding of the new M/S standards and their implications for teachers and students.

<ol style="list-style-type: none"> <li>1. Provide orientation activities to CAS/STEM faculty members who may have limited experiences in the K-12 setting.</li> <li>2. Engage university M/S content and teacher education faculty in the development and implementation of PROMiSE PD program.</li> <li>3. CAS/STEM faculty members co-teach at least one lesson in a K-12 classroom related to the concepts to be addressed in the institute he/she will deliver.</li> </ol>	<ol style="list-style-type: none"> <li>1. Participation of CAS and education faculty in PROMiSE activities</li> <li>2. Records of CAS/STEM faculty orientation activities</li> <li>3. Records of K-12 lessons taught by CAS/STEM</li> <li>4. Survey IHE faculty about their engagement in PROMiSE</li> <li>5. Interview results</li> </ol>
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**Goal 7:** Operate as a well-functioning partnership that provides well-designed and implemented PD programs and supports activities to support the implementation of the M/S standards

Objectives: Partners will

- Identify and fill appropriate roles in the design and delivery of project activities.
- Demonstrate effective collaboration in project management and operations.
- Implement PROMiSE programs consistently with design and refine based on feedback.
- Ensure that PROMiSE components are aligned, coherent, and integrated with each other.
- Deliver project activities as intended.

Activities	Outcomes/Measures
<ol style="list-style-type: none"> <li>1. Leadership Council regularly meets to share and exchange information and concerns about project activities, including information about about regionally developed, organized, and delivered PROMiSE PD.</li> </ol>	<ol style="list-style-type: none"> <li>1. Minutes from LC meetings</li> <li>2. Minutes from Executive Team meetings</li> <li>3. Survey/Interview results (Perceptions of stakeholders)</li> <li>4. Delivered PROMiSE programs and activities</li> </ol>

**Tier 3: Building Capacity for Continued Renewal.**

The purpose of Tier 3 activities is to lay the groundwork for more sophisticated PD for M/S teacher leaders that can occur after the funding period with other funding streams. District personnel with direct responsibility for M/S education and PD will be polled to gather needs data related to development of job-embedded graduate degree programs. Interested school partners will work with PROMiSE IHE partners to develop a conceptual plan and explore possible financing options. The value to participants will be the direct focus on improving classroom instruction by deepening teachers’ content knowledge, examining strategies to enhance students’ understanding of content, and examining evidence of student learning.

## 5. Key Project Activities and Timeline

YEAR 2 ACTIVITIES	July 1, 2008 - Sept 30, 2009													
	J/A	S	O	N	D	J	F	M	A	M	J	J	A	S
<b>Mathematics and Science Summer Institutes for Teachers (Goals 2, 3, &amp; 6)</b>														
Identify CAS faculty to Design/Develop Summer institute	X													
Establish Design team members		X												
Develop PROMiSE PD framework		X	X											
Schedule Summer Institutes, including locations		X	X											
Review research-based PD materials		X	X	X	X	X	X	X						
Design Team Meetings			X	X			X							
Develop institute courses			X	X	X	X	X	X						
Edit Developed Materials									X	X				
Establish Recruitment Criteria		X	X											
Recruit institute participants				X	X	X								
Select institute participants						X	X							
Videotaped (selected) participant lessons (lesson #1)								X	X	X				
K-12 lessons taught by CAS/STEM faculty						X	X	X	X	X				
Deliver Summer Institutes											X	X	X	
Administer Pre/post Assessment											X	X	X	
Analyze Assessment Results													X	X
4 days of follow-up [ Year 3]														➔
<b>Leadership Workshops (Goal 4)</b>														
PD Delivery Cohort 1	X				X				X					
PD Delivery Cohort 2	X	X			X				X					
PD Delivery Cohort 3						X				X	X			X
PD Delivery Cohort 4							X	X				X		
PD Delivery Cohort 5						X				X	X			X
PD Delivery Cohort 6							X		X			X		
PD Delivery Cohort 7							X			X	X			
PD Delivery Cohort 8							X			X	X			
<b>Curriculum Planning and Learning Management System (Goal 5)</b>														
Identification, Screening, and Panel Review complete for:														
• K-5 Mathematics	X	X	X	X	X	X	X	X	X	X	X	X	X	X
• 6-8 Mathematics		X	X	X	X	X	X	X	X	X	X	X	X	X
• 9-12 Mathematics				X	X	X	X	X	X	X	X	X	X	X
• K-5 Science						X	X	X	X	X	X	X	X	X
• 6-8 Science								X	X	X	X	X	X	X

• 9-12 Science													X	X	X
Launch CPALMS Component:															
• K-5 Mathematics						X									
• 6-8 Mathematics										X					
• 9-12 Mathematics														X	
• K-5 Science								X							
• 6-8 Science												X			
• 9-12 Science															X
<b>Partnership/Dissemination Efforts (Goal 7)</b>															
Leadership Council meetings		X		X			X		X						
Newsletter Issues		X		X			X		X						
Conference Presentations (FCTM/FAMS/FAST/FASS, NCTM)			X			X			X						
Media Campaign	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Update Website	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Building on Years 1 and 2, Year 3 will include the following activities:

- follow-up for summer institute participants,
- continued efforts related to the Leadership PD,
- refinement of the institutes based on participant and PD provider feedback,
- Delivery of additional summer institutes,
- Continuation of dissemination, and
- Addition of information to CPALMS:
  - Mathematics: Geometry, Trigonometry, Calculus, Discrete Mathematics, Statistics, & Probability
  - Science: Earth and Space Science, Life Science, Nature of Science, & Physical Science

## 6. Evaluation

In this section we describe our approach to conducting internal and external evaluation activities. In conceptualizing our plan, we have designed a continuum of assessments intended to complement each other and provide a rich picture of the program. Our internal and external evaluation teams work closely together and, in some cases, jointly where activities are expected to serve both purposes.

### Formative Evaluation

Formative evaluation assists the project leaders in recognizing where changes in activities and programs may be needed to assure that the project remains on-track and achieves what it has promised in its proposal. Formative evaluation also informs summative evaluation of adjustments and changes, and helps pave the way for appropriate summative measures that provide an assessment structure that is appropriate, doable, objective, and meaningful. PROMiSE formative evaluation will provide feedback to project leaders on the following key issues:

1. Fidelity of implementation. Is the project being implemented according to its plan? Are

activities conducted consistent with their design, and are activities at multiple sites implemented in a consistent manner? What changes were made to the original proposed plan, and why?

2. Program quality. To what extent do the design and implementation of professional development activities and materials demonstrate desired characteristics, including: meet USDOE GPR requirements for focus on content learning in mathematics and science, and involvement of content (A&S) faculty? Do such activities employ strategies that research has shown to be effective for learning by adults and effective PD, such as job-embedded components? Do activities display appropriate balance of enhancing content knowledge and applying knowledge to classroom practice; do they model the strategies intended for participants to implement in their classrooms? To what extent have programs for principals and other non-M/S teaching staff emphasized factors specific to mathematics and science? To what extent do participants exhibit the outcomes intended from the activities? To what extent do participating A&S faculty report being influenced by the project in their own perceptions and teaching practices?
3. Meeting local needs. Are project activities designed to address needs identified by partner districts and schools? How does the project adjust as the needs change over time? Do targeted participants of PROMiSE programs (teachers, principals, etc.) see these programs as relevant, useful, and effective? Are school administrators acquiring the knowledge and skills needed to provide effective support for and meaningful evaluation of teachers' classroom implementation? Have school-based PLC's been established and to what extent do they demonstrate evidence of effective operation to support local implementation?
4. Operation of the partnership. Do project planning, implementation, decision-making, and administration indicate a collaborative partnership? In what specific ways does each partner contribute to design as well as effective and efficient implementation of the project? To what extent does the project seek and act on formative feedback, demonstrate sensitivity to "lessons learned," and identify emerging challenges and opportunities? To what extent does the project make adjustments in strategies, activities, and resources (personnel, budget, etc.) based on such information?

Formative feedback to project leaders will be collected through a variety of triangulated methods:

- Participant feedback forms will be used to document participant perceptions of the quality and effectiveness of project activities (workshops, mentoring, etc.). Feedback instruments, developed by the internal evaluation team, will contain both "participant rating" items and open-ended prompts for narrative response; they will be completed by participants in each major project activity and as an end-of-year reflection.
- Observations of a sample of PD sessions and other project activities by trained observers from the internal and external evaluation teams will provide a consistent set of ratings using a validated, reliable instrument – the "Professional Development Observation Protocol" developed by Horizon Research, Inc.
- Focus group and individual interviews will be used to gather feedback from a subset of participants, PD providers, and PROMiSE partners regarding project activities and impact. Probing questions will help add information about individuals' perceptions and experiences, adding depth and detail to the data obtained through surveys.
- Project-produced materials, such as web-based support tools and course or workshop materials will be reviewed by external experts to evaluate the design and content of such materials, ease of access and use, to provide feedback on accuracy, appropriateness, and usability of the products. The internal evaluation team will work with the developers to carry out this effort.

In addition, the internal team has designed and will maintain a database of project participants and their activities.

This set of formative evaluation data will provide a rich set of triangulated information to present in periodic formative reports to the project leadership team, for their use in project planning and decision-making.

### **Summative Evaluation**

Summative evaluation provides data on whether or not a project is meeting its goals. Strong summative evaluations provide evidence of causal linkages between activities and the results that are found. High quality evaluations also provide data that explain what it is about the key components of a project that make it effective, and, conversely, the factors that may be less successful than originally anticipated. The summative evaluation plan for PROMiSE has been developed to address five key outcome areas:

- **Change in student achievement**—are Florida students increasing their proficiency in M/S?
- **Change in teachers' content knowledge**—are teachers gaining new content knowledge in areas addressed by the summer institutes and is that knowledge retained over the course of a school year?
- **Change in administrators' content knowledge**—are administrators gaining the knowledge they need to provide leadership and support to teachers' implementation of the NGSSS?
- **Change in awareness of the standards and their implications for teaching and learning**—is the education community across the state becoming increasingly aware of the new standards and their implications for instruction?
- **Change in the infrastructure to support ongoing capacity building**—is PROMiSE enhancing the capacity and willingness of administrators, teachers, and IHE faculty to support high quality M/S education consistent with the revised M/S standards?

The strategies for addressing each of these areas are described below:

**1) Achievement.** The evaluation plans to use changes in M/S performance on the FCAT as the key outcome variable for examining student achievement. Analyses will focus both on overall performance across grades, and on disaggregated data by race, gender, and special population status of students. Starting with performance in the 2005-06 school year,<sup>2</sup> the evaluation will look at trends in performance before and during the operation of PROMiSE to see if desired changes are occurring in students' acquisition of knowledge and skills. In addition to examining overall proficiency scores, the external evaluation will examine performance on a number of subscales, including Number Sense, Measurement, Geometry, Algebraic Thinking, and Data Analysis in mathematics, and Physical and Chemical, Earth and Space, Life and Environmental, and Scientific Thinking in science<sup>3</sup>.

As the project progresses, the evaluation will assess linkages between participation in PROMiSE and changes in student performance. Using the data monitoring system (described below) the evaluation will examine relationships between teacher and school-level participation in PROMiSE PD and overall test performance. We are also proposing a substudy which links data from the pre-post test of teacher content knowledge to student FCAT performance. Specifically, we would like to examine differences in student performance in relationship to the

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<sup>2</sup> We suggest starting in 2005-06 to capture trend data before this MSP is initiated.

<sup>3</sup> Given the revision of the M/S standards, the current FCAT is not completely aligned with the new M/S standards, and it is anticipated that the FCAT will be undergoing revision during the implementation of PROMiSE. This fact will have to be taken into account in using and interpreting the test data

specific knowledge changes observed as the result of institute attendance. If for example, algebraic thinking is an area of focus for an institute, we propose to examine the relationship between changes in teacher knowledge in this area with differences in FCAT performance in the same area for the students of participating teachers. We propose to do this on a selected basis. This could be done by evaluating student FCAT scores by teacher participation in an institute. Alternatively, this could be evaluated by comparing student FCAT scores pre- and post-institute attendance.

**2) Teachers' content knowledge** Teachers across the state will be given the opportunity to participate in content-focused summer institutes in mathematics and science. In addition, participating teachers will be offered four days of additional training during the school year. In order to assess the efficacy of this training, teachers will be given a test of content knowledge before and after summer institute participation. A sample of these teachers will be examined again at the end of the school year to get further information on the impacts of professional development on their knowledge and teaching practices. If interest in these institutes is high enough, we also recommend randomly assigning applicants to attend an early or later institute session. Under this plan, the teachers whose participation is delayed could serve as a comparison group for the short term assessment of changes in content knowledge.

In addition, the evaluation team will describe patterns of participation in the project over three years using the data monitoring system. This system will be developed to provide data on who participates in PD, the type and extent of professional development in which teachers participated, and the demographic characteristics of participants. This information will be used to generate data on the extent to which PROMiSE is reaching its target audiences over its three years of implementation.

**3) Change in administrators' content knowledge**—similar to teacher activities described above, administrators will be given assessments of their content knowledge both before and after participation in principal leadership training.

**4) Change in awareness of the standards and their implications for teaching and learning**—the evaluation team will conduct a survey of teachers and principals in Years 2 and 3 in the core partner districts to assess the extent to which these educators are aware of the revised standards and feel prepared to implement them. The survey will also query teachers about their use of various instructional practices believed to support the M/S standards. Because of the nature and distribution of these districts, the results will provide bell weather information on the progress of the state, overall.

**5) Change in the infrastructure to support ongoing capacity-building.**

The evaluation will document the engagement of critical partners—traditional IHE CAS/STEM faculty — in PROMiSE work to provide a picture of the emergent infrastructure for support. The extent and nature of their work will be described, along with a description of their perceptions of whether, and how participation in the MSP may have changed how they approach teacher preparation and disciplinary area instruction.

## **7. Support for Strategic Imperatives**

PROMiSE alignment with Florida's State Board of Education **strategic Imperatives** is illustrated in the table below.

Table 4. Program Components Where Strategic Imperatives are Addressed.

Strategic Imperative	Tiers			Project Components			
	1	2	3	CPT	Induction	Teacher Ed.	Leadership
1. Increase the Supply of Highly Effective Teachers	X	X	X	X	X	X	X
2. Set, Align & Apply Academic Curricular & Testing Standards	X	X	X	X	X	X	X
3. Improve Student Rates of Learning	X	X	X	X	X	X	X
4. Imp. Quality of Instructional Leadership							X
8. Coordinate Efforts to Improve Higher Student Learning	X	X	X	X	X	X	X

- **The project utilizes a comprehensive plan for integrating pertinent aspects of the Just Read, Florida! initiative.**

The unequivocal goal for *Just Read, Florida* is for all students in Florida to be able to read on grade level or higher throughout their school years by 2012. The Florida M/S standards directly support this goal by requiring students to construct meaning from a wide range of texts, locate, organize, and interpret written information, engage in collaborative decision-making, and perform school or real-world tasks.

Communication (speaking, reading, writing) in mathematics is far more than merely recognizing words and locating information in texts (Thompson, Kersaint, Richards, Hunsader, Rubenstein, 2008). Reading in mathematics often differs significantly from reading in other content areas in that texts include large numbers of numeric and nonnumeric symbols; tables, graphs, and charts with supporting text, and unusual page layouts. Students often have not learned strategies for dealing with such mathematical text features. Mathematics vocabulary can be confusing for students; many terms are unusual or have different meanings in mathematics than in other everyday usages. Students' opportunities for using the language of mathematics outside the classroom are limited, making development of fluency more difficult. Reading strategy instruction will be interwoven throughout Florida PROMiSE as part of its PD program.

Encountering similar challenges in science literacy, research reveals that students spend consistently less time in science instruction compared to either math or language arts. One reason may be the historical FCAT focus on students' math and reading performance. Many teachers and administrators believe that time spent on science is time taken away from math and reading (Marx & Harris, 2006). But this assumption appears to be unwarranted. For example, students who read well also tend to succeed in M/S (Pungello, Kupersmidt, Burchinal et al., 1996). Moreover, a recent study (Connor, Rice, Thomas et al., in review) examined the correspondence between science instruction and students' reading skill gains. Overall, time spent in science instruction enhanced rather than harmed students' reading skills although this depended, in some instances, on students' incoming vocabulary and background knowledge.

There is some evidence that children with learning disabilities may be less well served by guided inquiry or project-based science (Palincsar, Collins, Marano et al., 2000), and this may be the case for children living in poverty, who typically begin the school year with weaker language and literacy skills. On the other hand, these hands-on activities were associated with gains in these same students' word reading skills. Clearly, experiments that investigate the impact of these kinds of activities on all students' achievement are needed (See also, Marx & Harris, 2006) and are currently underway through FCR-STEM. Such findings will be incorporated into the PD developed for Florida PROMiSE.

## **8. DISSEMINATION PLAN**

**The dissemination plan describes methods/strategies used to disseminate and market information about the project to appropriate populations.**

Multiple methods, both electronic and non-electronic, will be used to disseminate information about the project as discussed throughout this proposal. The primary methods used will be conference presentations, PD sessions, and web-based resources (project website and CPALMS). A PROMiSE staff is charged with maintaining the PROMiSE website ([www.flpromise.org](http://www.flpromise.org)) to reflect changes to project activities and updates. The website will be updated at least monthly, and the most recent revision date will be provided (e.g., *last updated on August 20, 2008*). The website will include information and description of all PROMiSE products and dates of PROMiSE activities, including meetings (Leadership Council and PD design teams) and scheduled summer institutes.

School district and consortium partners will advertise the summer institutes and facilitate the application process for teacher participation in the summer institute.

As part of the Awareness Campaign, PROMiSE is working with the Florida Knowledge Network to develop video clips of information related to the NGSSS that can be broadcasted in all schools in Florida. In addition, public service announcements will be aired through local NPR radio stations. Newsletters for educators and parents, titled *Mathematics and Science Matters*, will continue in Year 2 and 3. During Year 2, we will create and distribute 4 Educator newsletters and 2 Parent newsletters. The newsletters will be created to inform and update these audiences about progress with the project.

## **9. GENERAL EDUCATION PROVISIONS ACT (GEPa) REQUIREMENT**

**Equal Access For All:** On the basis of race, color, sex, national origin, marital status, disability, age or religion, no person shall be excluded from participation in, denied the benefits of, or subjected to discrimination under any education program or activity, or in any employment conditions or practices conducted by this school district, except as provided by law.  
Statutory Authority: Florida Statute 230.22(2): 228.2001:230.23(5)

The primary goal of PROMiSE is to ensure that each student succeeds in his or her quest for a secure future. To that end, PROMiSE continues to focus on equal opportunity for all individuals regardless of race, creed, ethnicity, socio-economic status, gender, or any other discriminatory criteria. Specifically, PROMiSE will seek to include faculty, students, parents, and community members in project activities without regards to race, creed, ethnicity, socio-economic status, gender or any other discriminatory criteria. Participants will not be discriminated against in regards to disabilities, and accessibility options. To the extent possible, PROMiSE will provide accommodation to ensure access to individuals with special needs.

**Equitable Services for Private School Participation.** The PROMiSE project will follow each core partner school district's procedures regarding equitable services for private school participation. Working through school district partners, private school personnel have been consulted prior to the submission of the grant, and schools wishing to participate with the district in grant activities have informed the district of their interest. Throughout the grant period, private schools will be contacted to determine additional interest in the project. Private school personnel will be invited to be full participants in the project, including being invited to all PD activities and follow up sessions, and receiving project materials.

## 10. Budget

Table 5 provides an overview of the budget categorized by function. The detailed budget narrative is available in Appendix F.

Table 5: Budget categories by PROMiSE Program Function for Year 2

<b>Program Function (Lead University or Organization)</b>	<b>Component design</b>
M/S Teacher PD (USF,FSU,& UF)	\$4,223,901.05
Curriculum Planning and Learning Management System Tool (FSU)	\$1,181,408.85
Leadership Development (FSU)	\$1,471,691.00
Evaluation (Westat & CSL-USF)	\$893,490.00
Awareness & Dissemination (USF)	\$50,000.00
<b>Total Direct Cost</b>	<b>\$7,830,490.90</b>
<b>Indirect Cost (5%)</b>	<b>\$412,131.10</b>
<b>Grand Total</b>	<b>\$8,242,622.00</b>

**Professional Development of Teachers.** The majority of Year 2 funds will be used to support the development and delivery of intensive 2-week summer institutes for teachers that address key concepts in mathematics and sciences needed to effectively deliver the NGSSS. The Design budget includes time for PD providers (CAS STEM faculty and others) to develop “common” institutes that will be delivered to all partner school districts.

**Curriculum Planning and Learning Management System (CPALMS).** Funds used to develop the CPALMS will cover the cost for 1.5 FTE Math specialists, 1.25 FTE science specialists, 2.0 FTE of part time math and science teachers, 0.38 FTE students for system support, 0.7 FTE project manager and 0.08 FTE for project director. Other expenses include the cost for travel for content review, programming subcontract and materials and supplies for the use of the project. This component is expected to reach 100% of teachers in Florida.

**Leadership Development.** Funds are used to support time for individuals (e.g., faculty, staff, graduate students) to support the implementation of this component. It also includes cost for principal travel, meeting facilities, and supplies and materials needed to deliver the PD (e.g., printing, copying, postage, communications, and computers). This component is designed to reach 400 principals in Year 2.

**Evaluation.** Funds are used to cover the cost for both internal and external evaluation. Costs associated with the evaluation component include data collection (e.g., surveys and PD observations), travel to project activities, and supplies.

**Awareness Campaign & Central Management and Oversight.** Funds are used to support time for individuals (e.g., faculty and staff) to provide general oversight, deal with compliance issues, serve as liaisons to the executive and leadership committee, coordinate the project, and provide necessary support services.

Year three will be similar to Year 2, but will include the 4-days of follow-up for summer institute participants.

## References

- American Chemical Society (1999). *Recommendations for the education of chemistry teachers*. Washington, DC: American Chemical Society Committee on Education.
- American Institute of Physics (1999). *Joint Statement of the Education of Future Teachers*. College Park, MD: Author available <http://www.aip.org/education/futeach.htm> (retrieved on 8/8/08)
- Arons, A.B. (1990) *A Guide to introductory physics teaching*. New York: John Wiley and Sons.
- Association for the Education of Teachers of Sciences (1997). *Professional Standards for Science Teacher Educators*.
- Ball, D. L., & Cohen, D. K. (1999). Developing practice, developing practitioners: toward a practice-based theory of professional development. In L. Darling-Hammond & G. Sykes (Eds.) *Teaching as the learning professional: Handbook of policy and practice* (pp. 332). San Francisco: Jossey-Bass
- Bransford, J., Brown, A., & Cocking, R. (Eds.) (1999). *How people learn: Brain, mind, experience, and school*. Washington, DC: National Academy Press.
- Brown, C.A. & Borko, H. (1992). Becoming a mathematics teacher. In D.A. Grouws (Ed.) *Handbook of research on mathematics teaching and learning* (pp. 209-239). New York: MacMillan Publishing Company.
- Coble, C.R., & Koballa, T.R. (1996). *Science education: Handbook of research in science teaching and learning*. New York: Macmillan.
- Conference Board of Mathematical Sciences. *The Mathematical Education of Teachers*. Providence, RI: American Mathematical Society, 2001.
- Council for Chief State School Officers. (1996). *Interstate school leaders licensure consortium: Standards for school leaders*. Washington, DC: Author.
- Darling-Hammond, L. (2007). We need to invest in math and science teachers. *The Chronicle of Higher Education* 54(17), 3-4.
- Eisenhart, M., Borko, H., Underhill, R., Brown, C., Jones, D. & Agard, P. (1993). Conceptual knowledge falls through the cracks: Complexities of learning to teach mathematics for understanding. *Journal for Research in Mathematics Education*, 24 (1), 8-40.
- Evens, R. (1993). Subject-matter knowledge and pedagogical content knowledge: Prospective secondary teachers and the function concept. *Journal for Research in Mathematics Education*, 24 (2), 94-116.
- Florida Department of Education (2008a). Florida Comprehensive Assessment Test (FCAT) 2008 Scores. Available at <http://fcats.fldoe.org/fcainfopg.asp>
- Florida Department of Education (2008b). *Critical teacher shortage areas*. Office of Research and Evaluation.
- Friedman, T. (2005). *The world is flat*. New York: Farrar, Strous and Giroux.
- Good, T.L. & Brophy, J.E. (1990). *Educational psychology: A realistic approach* (4th Ed.). New York: Longman.
- Greenberg, J. & Walsh, K. (2008). No common denominator: The preparation of elementary teachers in mathematics by America's education schools. Available at [www.nctq.org](http://www.nctq.org).
- Hallinger, P., & Heck, R. H. (1996). Reassessing the principal's role in school effectiveness: A review of empirical research, 1980-1995. *Educational Administration Quarterly*, 32(1), 5-44.
- Hess, F. M., & Kelly, A. (2005). *Learning to lead: What gets taught in principal preparation programs* (PEPG 05-02). Cambridge, MA: Program on Education Policy and Governance at Harvard University.
- Hill, H.C., Rowan, B., & Ball, D.L. (2005). Effects of teachers' mathematical knowledge for teaching on student achievement. *American Educational Research Journal*, 42, 371-406.

- Howard, Michael (2006) Baseline data from Projects Launch and SMART (Florida-based MSP projects); personal communication
- Interstate New Teacher Assessment and Support Consortium (INTASC) (Council of Chief State School Officers),  
[http://www.ccsso.org/Projects/interstate\\_new\\_teacher\\_assessment\\_and\\_support\\_consortium/](http://www.ccsso.org/Projects/interstate_new_teacher_assessment_and_support_consortium/)
- Jones, B.A., & Jackson, N.D. (2007a). Learner-centered leadership in “urban” contexts: Key elements to consider for professional development. In A. Danzig, K. Borman, B.A. Jones, & W. Wright (Eds.), *Learner-centered leadership: Research, policy and practice* (207-220). Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.
- Jones, B.A., & Jackson, N.D. (2007b). Student resiliency, institutional structures and arts education: Manchester craftsmen’s guild as a model. In D. M. Davis (Ed.), *Student resiliency reconsidered: Policy implications of the resiliency movement* (pp. 69-82). Charlotte, NC: Information Age Publishing, Inc.
- Jones, B.A. (2000). The school leadership shortage: Framework for policy discussion. In B.A. Jones (Ed.), *Educational leadership: Policy dimensions in the 21<sup>st</sup> century* (pp. 153-170). Stamford, CN: Ablex Publishing Corporation.
- Levine, A. (2005). *Educating school leaders. Report of the Education Schools Project*. Retrieved on March 24, 2005, from <http://www.edschools.org/pdf/Final313.pdf>.
- Little, J. W., and McLaughlin, M.W., eds. (1993). *Teachers' work: Individuals, colleagues, and contexts*. New York: Teachers College Press.
- Loveless, T. (2004). *The 2004 Brown Center Report on American Education: How well are American students learning? With studies of NAEP math items, middle school math teachers, and revamped Blue Ribbon Schools awards*. Houston, TX: The Brown Foundation, Inc.
- Ma, L. (1999). *Knowing and teaching elementary mathematics: Teachers’ understanding of fundamental mathematics in China and the United States*. Mahwah, NJ: Lawrence Erlbaum and Associates.
- Mathematical Association of America (1991). *A call for change, Recommendations for the mathematics preparations of teachers*.
- Murphy, C. U., & Lick, D. W. (2005). *Whole faculty study groups: Creating professional learning communities that target student learning*. Thousand Oaks, CA: Corwin Press.
- NAS (2005). *Rising above the gathering storm*. Committee on science, engineering, and public policy, National Academy of Sciences. Accessed at <http://www.nap.edu/books/0309100399/html> .
- National Center for Education Statistics (2005). *The Nations Report Card 2005*. Washington, DC: US Department of Education Institute of Educational Sciences.
- National Center for Educational Statistics (2006a) – *Highlights from the TIMSS 1999 video study of eighth-grade mathematics teaching*. Washington, DC: US Department of Education.
- National Center for Educational Statistics (2006b). *Highlights from the TIMSS 1999 video study of eighth-grade science teaching*. Washington, DC: US Department of Education Institute of Education Sciences.
- National Center for Education Statistics (2007). *The Nations report card 2007*. Washington, DC: US Department of Education Institute of Educational Sciences.
- National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics*. Reston, VA: Author.
- National Council of Teachers of Mathematics (2006). *Curriculum focal points for mathematics in prekindergarten through Grade 8 mathematics: A quest for coherence*. Reston, VA: Author.
- National Mathematics Advisory Panel (2008). *Foundations for success: The final report of the National Mathematics Advisory Panel*. Washington, DC: U.S. Department of Education

- National Research Council (1996); National Research Council, National science education standards. Washington, DC.
- National Research Council. (2000). *Inquiry and the national standards in science education*. Washington, DC: National Academy Press.
- NSB (2006). *Science and engineering indicators 2006*. Accessed at <http://www.nsf.gov/statistics/seind06/pdfstart.htm>
- Sanders, W. I., & Rivers, J. C. (1996). Cumulative and residual effects of teachers on future student achievement. Knoxville, TN: University of Tennessee Value-Added Research and Assessment Center.
- Simon, M. A. (1995). Reconstructing mathematics pedagogy from a constructivist perspective. *Journal for Research in Mathematics Education*, 26(2), 114-145.
- Stein, M.K., Baxter, J.A., & Leinhardt, G. (1990). Subject matter knowledge and elementary instruction: A case for functions and graphing. *American Educational Research Association*, 27, 639-663.
- Stein, M. K., & d'Amico (2000). How subject matter in school leadership. A paper presented at the annual meeting of the American Educational Research Association. New Orleans
- Synder, T. D., Dillow, S. A., Hoffman, C. M. (2007). *Digest of Educational Statistics 2006*. Washington, DC: U.S. Department of Education.
- Tapping America's Future (July, 2008). Gaining momentum, losing ground. Report available at <http://www.tap2015.org/>
- Tucker, M. S., & Coddling, J. B. (Eds.). (2002). *The principal challenge: Leading and managing schools in an era of accountability*. San Francisco: Josey-Bass.
- USCC (2006) U.S. Chamber of Commerce's Education and Workforce Summit, Dallas, TX October 4-6; <http://www.uschamber.com/icw/default>
- Waters, T., Marzano, R. J., & McNulty, B. (2003). *Balanced leadership: What 30 years of research tells us about the effect of leadership on student achievement*. Aurora, CO: Mid-continent Research for Education and Learning.
- Wayne, A. J. and Youngs, P. (2003). Teacher characteristics and student achievement gains: A review. *Review of Educational Research* 73(1), 89-122.
- Wright, S. P., Horn, S. P., and Sanders, W. L. (1997). Teacher and context effects on student achievement: implications for teacher education. *Journal of Personnel Evaluation in Education*, 11, 57-67.
- Yore, L, Henriques, L., Crawford, B., Smith, L.K., Zwiép, S., & Tillotson, J. (2007). Selecting and using inquiry approaches to teach science: The influence of context in elementary, middle & secondary schools. In E. Abrams, S.A. Southerland, & P. Silva (Eds.). *Inquiry in the classrooms: Challenges and Opportunities*. Greenwich, Ct: Information Age Publishing

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