Wisconsin Mathematics & Science Partnership

LEARNING NETWORK CONFERENCE

2013
Effective Instruction

WISCONSIN DEPARTMENT OF PUBLIC INSTRUCTION

Tony Evers, PhD, State Superintendent

Introduction

The reauthorization of the Elementary and Secondary Schools Act in January of 2002 (also known as the No Child Left Behind Act, NCLB) introduced the Improving Teacher Quality Grant Programs (Title IIB). These programs encourage scientifically-based professional development, as a means for improving student academic performance, in all 50 states.

Each state's department of education is responsible for administering the program on a competitive basis. The program is a formula grant program, with each state's funding determined by student population and poverty rates. The program is commonly known as the Mathematics and Science Partnership Program (MSP).

Wisconsin's MSP *strives to improve teacher quality* through partnerships between state education agencies, institutions of higher education, local and regional education agencies, and school districts; for the purpose of increasing *student academic achievement in mathematics and science*. The program supports partnerships between one or more of Wisconsin's high-need Local Educational Agencies (LEA) and at least one institution of higher education department of science, mathematics, and/or engineering.

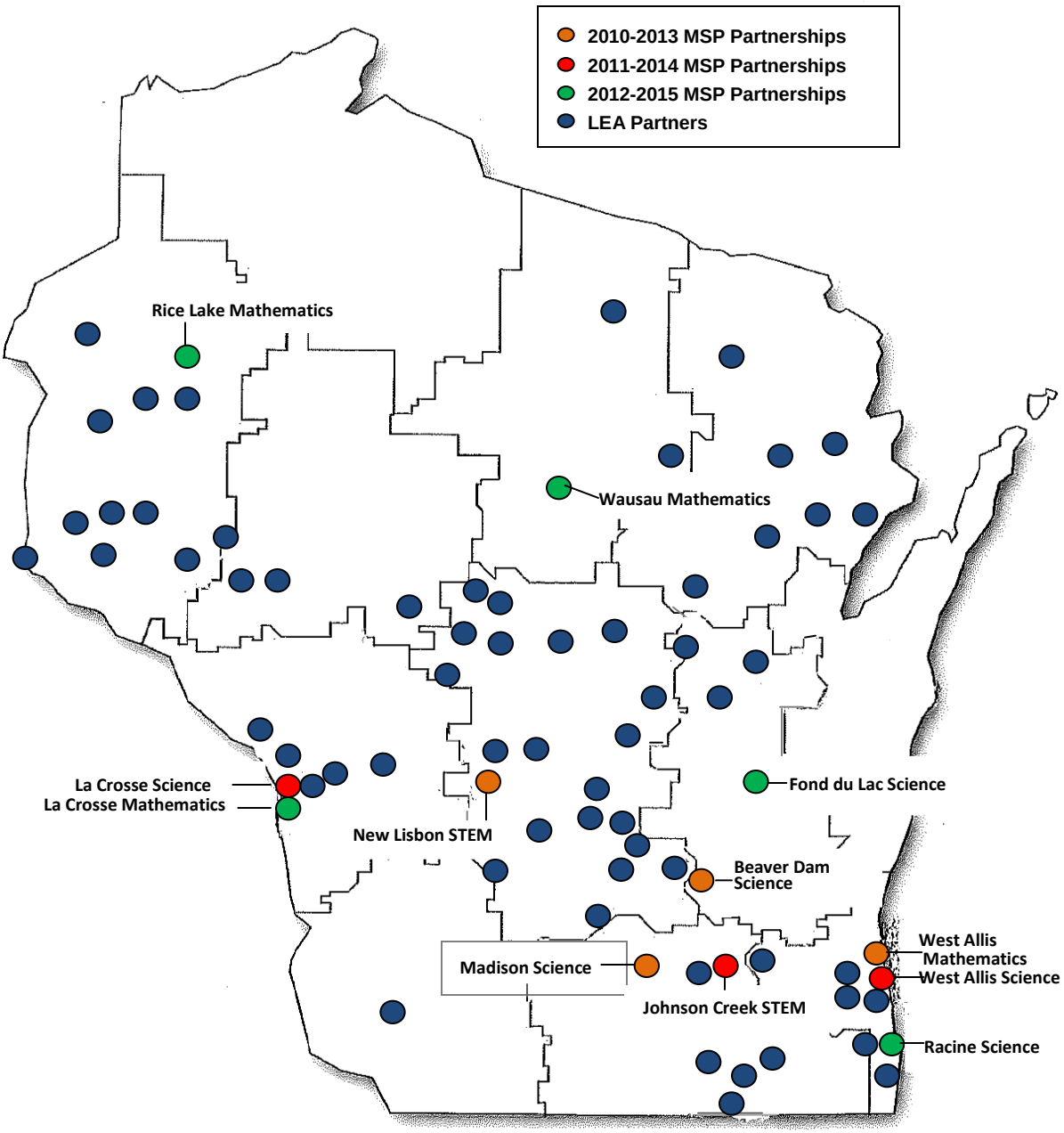
Partnerships between these high-need school districts and the science, technology, engineering, and mathematics (STEM) faculty in institutions of higher education, are at the core of each MSP. Each individual partnership focuses on increasing and enhancing the content knowledge and teaching skills of classroom teachers of mathematics and science. Partnerships are typically two to three years in duration, and include face-to-face instruction and continual electronic dialog between participants.

*A high need LEA is any district where mathematics or science student proficiency scores do not exceed 65 percent, based on disaggregated Wisconsin Knowledge & Concept Examination (WKCE) scores, and where there is no currently active Title II, Part B grant, in the same content area, and one of the following:

1. At least 10 percent of the student population is from families with income below the poverty line as identified by the Census 2011, or
2. Schools/districts having Rural Education Achievement Program (REAP) or meeting local codes of 6,7, or 8, or
3. Not achieving Adequate Yearly Progress (AYP) in mathematics based on 2011/12 data.

MSP Program Locations

Mathematics and Science Partnership Program



Mathematics & Science Partnerships

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Immersion into Inquiry: i3

Immersion into inquiry (i3) is a partnership between Beaver Dam Unified School District (BDUSD), the University of Wisconsin-Oshkosh, and the Wisconsin Center for Educational Research, to provide systemic and systematic professional development to teachers of science in grades 3 through 12.

The goals of i3 are to improve student achievement in science by deepening teachers' knowledge, skills, and understandings through four core components. The focus is to reform the BDUSD science program through professional development that can be replicated, expanded, and sustained. The project will target 2,554 students and 35 teachers of science in grades 3-12.

The core components of the i3 include widespread implementation of:

- Understanding by Design framework for designing educational units
- Teaching science as inquiry (WI science standard C)
- Using science note-booking to increase literacy in science
- Implementing classroom Collegial Learning Walks

The four components will be foundational pieces as participants learn to continuously embed them, using the curricula content as the vehicle for performance tasks leading to transfer.

Project Objectives:

- Increase student achievement in science
- Increase teachers' science knowledge, skills, and understandings
- Change teachers' and students' attitudes and beliefs surrounding teaching and learning science
- Increase targeted professional development, collaboration and discussion of science and science teaching

Project Activities:

- Summer Science Institute
- Professional development seminars during the academic school year
- Content focus, interactive science note-booking, and collegial learning walks
- Attendance at state, regional, and national conferences

Science Content:

- Life Science (Year One – Wisconsin Science Standard F)
- Earth and Space (Year Two – Wisconsin Science Standard E)
- Physical Science (Year three – Wisconsin Science Standard D)
- Using the Science Framework and Next Generation Science Standards to guide us forward

Mathematics & Science Partnerships

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Cooperative Educational Service Agency 2

Delavan-Darien School District

Janesville School District

Madison Metropolitan School District

UW-Madison

Whitewater Unified School District

Improving Understanding of Science for Students and Educators

The project brings together a broad partnership created to provide powerful professional development in science to middle level teachers. Two cohorts of 20 teachers each will participate in six content-based modules over the course of three years. One of the cohorts will be in the Madison Metropolitan School District, while the other will be located within CESA 2, and the participating districts. Strong support, in the form of coordination, cognitive coaching, and content knowledge will come from the UW-Madison Wisconsin Leads in Middle School Math and Science Initiative.

The professional development is using the "Making Sense of Science" program developed by WestEd. The six modules are based on the premise that to develop pedagogical content knowledge, teachers must have opportunities to learn science content in combination with student thinking and instructional strategies for helping students learn that content. There are strong connections to literacy strategies embedded within each course. The courses also provide connections to UW scientists to support teacher understanding and eliminate misconceptions. Critical components of all courses are development and strengthening of ESL strategies and connections to culturally relevant practices.

Topics of the three year program include: Earth Systems, Weather and Climate, Force and Motion, Organisms, Matter, and Energy. Teachers will participate in two week-long summer courses, each on a different topic, during the three years. Throughout the course of the school year, the cohorts will gather to look deeper at student work and how assessments can be improved to better get at student understanding. Cohort members will also be supported through cognitive coaching visits to their classrooms.

The final component seeks to deepen the understanding of building level leadership. As teachers are asked to change and try new practices, it is important that principals both understand and support the changes that are happening. Principals will be involved in an annual day-long professional development experience to support them.

Participants will earn UW credit as they deepen their understanding of science content, connections to literacy, cultural relevance and ESL strategies.

Mathematics & Science Partnerships

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Raising Achievement in Mathematics through Fostering Algebraic Thinking (RAM t-FAT)

The West Allis West Milwaukee School District and Marquette University are partnering to provide an opportunity for approximately 30 teachers, grades 6 – 10, to grow collaboratively as they engage in professional development activities. The foundation of the Raising Achievement in Mathematics through Fostering Algebraic Thinking program is based on three assumptions:

1. Good mathematics teaching is more about seeing and interpreting than it is about doing.
2. Many teachers find it challenging and problematic to facilitate problem-solving in their classrooms.
3. An important aspect of teacher learning is collaboration and participation in joint work.

Central to this project are efforts to create and maintain a teacher learning community characterized by trust and respect, as well as by norms for critical dialogue about mathematics teaching and learning. Each of the three years the teachers participate in two week-long summer institutes and evening follow up professional development workshops. The expected outcomes of the program relate to an increase in teachers' mathematics content knowledge for teaching, changes in classroom practices as evidenced by emphasis on problem-based collaboration among the students, and a focus on students' mathematical thinking and reasoning. The project also fosters teachers' on-going professional collaboration.

Teachers engage in four major types of activities:

- Solving mathematical problems
- Examining students' thinking
- Reading and discussing current literature
- Reflecting on one's own teaching

The teachers will be expected to work collaboratively with their colleagues throughout the institute as they address a wide selection of algebra problems, analysis of student's thinking, and reflect on their own practice.

Mathematics & Science Partnerships

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Auburndale School District
Baraboo School District
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CESA 5
Columbus School District
Fall River School District
Lodi School District
Montello School District
Necedah Area School District
New Lisbon School District
Nekoosa Area School District
Pardeeville Area School District
Pittsville School District
Port Edwards School District
Poynette School District
Princeton Public Schools
Randolph School District
Reedsburg School District
Rio Community School District
Rosholt School District
Sauk Prairie School District
Tri-County Area School 3
Wild Rose School District
UW-Platteville
Wautoma Area School District
Westfield School District
Wisconsin Dells School District
Wisconsin Rapids School District

STEM Connects: Enhancing Teacher Quality and Student Proficiency

STEM Connects is a partnership between UW-Platteville and 23 CESA 5 school districts to improve student achievement in mathematics and science by improving the content knowledge and pedagogy of teachers in grades 3-10.

The goals of the project are to:

- Provide 60 teachers with professional development in evidence based practices.
- Increase student's achievement in mathematics and science as measured by WKCE data and benchmark assessments
- Develop one STEM integrated curriculum unit each year focused on a career cluster aligned to the standards
- Build strong collaborative relationships among K-12 teachers, higher education faculty and career cluster business partners to foster sustainability.

Project Objectives:

- Build skills, that teachers in small rural districts need, to address the disproportionate performance of students with disabilities and those from low-income families
- Help prepare all students with 21st century skills

Year One Project Activities:

- Action Research
- Develop Career Cluster
- STEM Summit: A collaboration between teachers and students on Action Research findings

Year Two Project Activities:

- STEM Connects Summer Academy
- Professional Development networking sessions
- Classroom Observations and follow-up sessions
- Study groups
- Online learning
- Peer coaching
- Technology integration coaching

Participants will receive six graduate credits if they are involved in both summer institutes and subsequent networking sessions.

Mathematics & Science Partnerships

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UW-Whitewater
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Waukesha STEM Academy K-8

JC STEM Connections Project

JC STEM Connections Project seeks to increase teaching capacity to take advantage of the best practices in mathematics professional development, to increase our local teachers' content knowledge, problem-solving skills and conceptual understanding of mathematics. The cornerstone of this effort is the incorporation of the Intel Math program. The Intel® Math course is a scaled-up adaptation of the Vermont Mathematics Initiative (VMI), a content-intensive professional development program developed by Dr. Kenneth Gross, Professor of Mathematics and Education, at the University of Vermont. With a vision of developing a scaled-up, nationally available, research-based mathematics professional development program, Intel Corporation and Foundation has piloted the program successfully in other states. The program incorporates 80 hours of content-rich professional development organized into eight units of study that integrate and emphasize problem-solving. The course is co-taught by a mathematician and a mathematics educator and is "designed to close the gap between insufficient mathematics training of elementary school teachers and the demands of the contemporary mathematics classroom." (Dr. Kenneth Gross) President Obama highlighted the Intel Math program as part of the "Educate to Innovate" campaign, which addresses many of the Race to the Top initiative criteria. To maximize the effectiveness of the Intel Math program, a Mathematics Learning Community (MLC) component will be utilized as a follow up, to help teacher participants revisit and better implement what they've learned in their classroom.

Goal 1: To increase teachers' mathematical content knowledge

To evaluate progress towards this goal, tests will be created using items from the Mathematical Knowledge for Teaching (MKT) item bank that, was created by Deborah Ball and her colleagues. Two tests will be developed, one for year 1 and one for Year 2 of implementation. It is envisioned that these tests will be based on the mathematical strands that are the focus of the year. Each of these tests will be given on the first day of the summer institute (pre-test) and in the subsequent spring (post-test). Dependent t-tests will be conducted to determine if teachers' MKT has improved, as a result of the professional development. Statistically significant gains will be used to indicate an increase in teachers' mathematical content knowledge.

Hypothesis: An increase in teachers' mathematical content knowledge will lead to an increase in student achievement in mathematics

To test this hypothesis student gain scores on the MAP test will be used as the dependent variable in a hierarchical linear modeling framework while teachers' scores on the MKT from the spring will be used as teacher level variables in the model to determine if variability in teachers' scores on the MKT is predictive of student gain scores on the MAP.

Mathematics & Science Partnerships

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Partners:
CESA 4

La Crosse School District

Onalaska School District

Tomah Area School District

UW-La Crosse

"A LOT of Science"

The vision of the "A LOT (**L**a Crosse, **O**nalaska, and **T**omah) of Science" Consortium is to ensure that more highly-qualified science teachers will be part of the educational infrastructure in southwestern Wisconsin, resulting in increased student learning and performance. To achieve this vision, the University of Wisconsin-La Crosse (UW-L), CESA #4, and three participating school districts formed a collaborative partnership. This partnership was formed on the premise that student achievement could be improved only by enhancing the content knowledge, the quality of instruction, and the confidence level of science educators. The "A LOT of Science" Consortium provides a high-quality and sustained professional development experience in science content and pedagogy for 31 teachers, Grades 3 - 10.

Based on six national, state, and local needs, determined by the Project Planning Team, four project goals* were identified:

- **Student Achievement:** Increase student achievement so that 70% of the students, in grades 3-10, will show growth in physical science as measured by local benchmark assessment data.
- **Science Content:** Increase participants' content knowledge in physical science so that 90% of the grade 3-10 teachers will show growth as measured by pre- and post-content assessment data.
- **Constructivist Pedagogy:** Increase participants' inquiry-based, contextualized, constructivist pedagogy knowledge so that 90% of the grade 3-10 teachers will show growth as measured by pre- and post- self-assessment survey.
- **Learning Plans:** Develop and disseminate 10 elementary and middle school physical science learning plans, annually, aligned to Common Core (Next Generation Science) Standards.

Teachers will participate in an intensive two-week Summer Academy and three weekend seminars during the academic year using the NSF Operation Primary Physical Science (OPPS) program as a reform framework. UW-L faculty will, over a three-year period, teach six units of physical science content centered on the Next Generation Science and National Assessment of Educational Progress (NAEP) Frameworks:

- Matter and Force & Motion (Year 1)
- Electricity and Magnetism (Year 2)
- Sound & Music and Light & Color (Year 3)

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Mathematics & Science Partnerships

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Partners:
CESA 4

La Crosse School District

Onalaska School District

Tomah Area School District

UW-La Crosse

"A LOT of Science" (continued)

A science coach will provide a classroom teacher's perspective on practical applications of the OPPS curriculum. The participants will apply the new knowledge gained, and pedagogical techniques learned, by developing standard-based learning plans using the Learning Cycle format. Grant-funding will be used to pay instructor salaries, teacher stipends, substitute teacher reimbursements, purchase training resources for instruction, and support program logisitics. Three weekend seminars are planned for the school year to support the summer academy through building background knowledge, concept and skill development, learning activities, and assessment analysis. Business partnerships have been developed and field experiences planned so that participants can see the central role of science in preparing young people for the 21st century workplace and real-world physical science applications.

The project director, together with an external evaluator, will direct project evaluation. An experimental research design will be used to collect qualitative and quantitative data, using multiple instruments in order to monitor progress, provide feedback, and determine overall program effectiveness. Dr. Thomas Guskey's model for evaluating professional development will serve as the basis for guiding the evaluation process and descriptive, inferential (t-tests), effect size, and disaggegated statistics will be reported. Teacher performance will be evaluated using data from pre- and post-content tests, an inquiry-based self-assessment (INQ SA), reflective journaling, and an assessment rubric for the learning plans. Student achievement gains will be measured against established baselines using standards-based benchmark assessments. The assessments will be administered in a pre- and post-test format to paired classroom sets of students in a control and treatment format.

The "A LOT of Science" Project Planning Team is confident that comparison data will demonstrate that, engaging in scientifically-based professional development, will enhance student academic performance in science. Moreover, teachers who participate in this professional development will be well on their way toward full alignment with the Next Generation Science Standards that will guide science instruction in the coming decade.

Mathematics & Science Partnerships

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Partners:
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South Milwaukee School District

UW-Milwaukee

West Allis-West Milwaukee School District

Framework for Elementary Science Teaching (FEST)

The Framework for Elementary Science Teaching (FEST) project will engage 50 elementary level teachers (K-8) from the West Allis West Milwaukee (WAWM) School District, the School District of South Milwaukee (SM), and other private and public schools in the Milwaukee area. In partnership with the University of Wisconsin-Milwaukee (UWM) College of Letters and Science (L&S), College of Engineering and Applied Sciences (CEAS) and the School of Education (SOE), teachers will engage in a sustained and rigorous professional development program. The vision of FEST is to increase the participating teachers' science subject matter knowledge and science teaching skills. As a direct result of the building of their own knowledge base of science content and teaching pedagogy, the teachers will then serve in science leadership roles at their schools and districts.

Three goals provide the framework for obtaining the vision of the FEST program:

1. Increase the science content knowledge of elementary grade level teachers (K-8) and improve student achievement in science.
2. Increase teacher pedagogical content knowledge (PCK) and use of effective standards-based and best-practice teaching methodologies, curriculum and assessments in science, technology, engineering and math (STEM).
3. Improve the quality of science teaching with advanced and sustained professional development coupled with the establishment of the program's participants as science instructional leaders at their schools and district.

UWM will provide a series of in-service activities and courses that focus on science content and science pedagogy over the three year duration of the program (from the spring of 2012 through the summer of 2014). Program activities, in the form of course sessions, will address the construction of basic and advanced science concepts (in disciplinary core ideas from earth science, physical science, life science, engineering) with an awareness of the content, processes and practices in STEM; transferring that learning into a framework of effective science teaching and learning experiences.

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Mathematics & Science Partnerships

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South Milwaukee School District

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Framework for Elementary Science Teaching (FEST) (continued)

Project topics and in-service session activities will also focus on understanding and using best-practices promoted by the newly released Frameworks for K-12 Science Education, the newly adopted Common Core State Standards for Mathematics and English, the WI-DPI Models Academic Standards, WI-DPI Teaching Standards, and local district science standards and benchmarks.

Activities will also include:

- Building participating teachers' pedagogical content knowledge (PCK) to implement inquiry-based activities;
- Formative and summative assessments
- Inclusion of the nature of science
- The use of community-based resources for teaching science content and STEM
- Establishing linkages between science and language arts literacy instruction
- Integrating STEM with literacy initiatives
- Using differentiation/adaptations for exceptional students and english language learners

The program will cumulate with leadership activities that involve the participants conducting action research plans that initially focus on improving their own knowledge-base and practices and then the knowledge and instructional skills of their colleagues. The latter forms of action research plans include peer mentoring; conducting staff training sessions; acting as science liaisons, aiding the district and school administration in the dissemination of information and resources for science instruction and; active involvement in the alignment of their disctricts' elementary science program to initiatives, current and revised state standards, curricular activities and instructional strategies at the classroom-level.

Mathematics & Science Partnerships

UW Oshkosh
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Kenosha Unified School District
Racine Unified School District
UW Oshkosh
UW Parkside
UW Stout (Evaluator)

K-5 STEM

The K-5 STEM project represents an ongoing partnership between two institutes of higher education (UW Oshkosh and UW Parkside) and school districts in Racine, Kenosha, Fond du Lac, Oshkosh, and Menasha, envisioning development of sustainable partnerships between industry, K-12 schools, and higher education institutions focused on raising STEM awareness in the community; enabling innovations in STEM education, and improving STEM teacher preparation. These partners began exploring common needs and opportunities two years ago, with support from an NSF Math Science Partnership START grant. K-5 STEM represents the first project based on that vision. Our purpose in K-5 STEM is to increase student achievement in STEM, improve STEM teaching, and foster excitement for STEM at the elementary level. The K-5 STEM project will create a community of elementary (K-5) teachers focused on using project-based learning techniques to integrate STEM content and practices to meet the following goals:

1. To improve student understanding of STEM content
2. To improve elementary educators' knowledge and understanding of standards based STEM content
3. To improve elementary educators' pedagogical understanding of how to integrate STEM content using project-based learning techniques

Sixty-seven participants in the K-5 STEM project will deepen their understanding of STEM content related to the practices of science, engineering, (Framework for K-12 Science Education) mathematics (CCSS-Math), (Numbers and Operations in Base Ten and Measurement and Data), and science (physical, life, Earth/space) during two one-week summer institutes, academic year meetings and online activities. In addition, participants will learn about effective approaches to teaching STEM content, with a focus on using project-based learning to integrate content. Participants will enact what they have learned, which will increase their capacity to teach STEM content and directly impact student learning.

Mathematics & Science Partnerships

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Baldwin Woodville School District

Ellsworth School District

River Falls School District

Menomonie School District

Prairie Farm School District

Prescott School District

Math Transition into the Common Core Era

The *Math Transition into the Common Core Era* is a partnership of the University of Wisconsin – River Falls, the Rice Lake Public Schools, and the University of Wisconsin – Eau Claire. Thirty-eight grades, 6-12, mathematics teachers representing 14 school districts in Western Wisconsin will engage in intense training to increase their pedagogical content knowledge pertaining to both the content and practice standards, as defined in the Common Core Mathematics Standards and Wisconsin's Six Principles for Teaching and Learning. Participants will prepare for mathematical modeling in problem solving and teaching mathematics, from the theoretical as well as from the applied side, with math in context.

Project Goals:

- Increase teachers' pedagogical content knowledge in mathematics.
- Increase teachers' ability to differentiate instruction through different forms of questioning techniques, and reasoning and sense making activities.
- Increase the focus in teaching to include the modeling and solution of applications.
- Establish effective ways to evaluate student achievement in areas of the Common Core.
- Increase professional development in an underserved region of our state.
- Increase collaboration and discussion around the integration of the Common Core standards, providing a support network.

Project Activities Each Year:

- Problem Solving & Task Sessions (2 Saturdays)
- Showcase Events (Common Core Focused Visits and Observing Each Teacher)
- Intense Training (40 Hours Each Week – 2 Weeks Each Summer)

Mathematics Content Focus

- Algebra and Function (Year 1)
- Geometry, Statistics and Probability (Year 2)
- Measurement, Number and Quantity (Year 3)

Mathematics & Science Partnerships

UW – Marathon County
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Est. 2012

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North-central Technical College
Wisconsin Advanced Manufacturing Pathway Network
Wausau School District
School District of Rhinelander

STEM for the FUTURE!

STEM for the FUTURE! A joint project between the Wausau and Rhinelander School Districts, which provides an intensive, sustained, and content-specific professional development program that weaves curriculum, instruction, and assessment. Promoting both teacher and student understanding of mathematics content, as well as science, technology, and engineering, STEM incorporates the teaching framework from the scientifically-based series, How People Learn (HPL). The participant's knowledge-centered training provides a focus on both content knowledge as well as pedagogical content knowledge. Professional development approaches are assessment-centered, offering opportunities for teachers to clarify ideas, correct misconceptions and test their understanding, by trying out ideas and receiving feedback; allowing refinement of teaching strategies. A community-centered approach involves norms to encourage collaboration and learning while developing practices involving peer relationships and teachers' participation in educational research.

The project goals are:

- Improving the academic achievement of students in Science, Technology, Engineering, and Math (STEM) across grades 6-12.
- Enhancing the STEM content knowledge and teaching skills of classroom teachers in grades 6-12 by providing high-quality content courses on major concepts of STEM and 21st Century Learning Skills.
- Increasing participant's inquiry-based, contextualized, constructivist pedagogy knowledge so that 90% of the 6-12 teachers will show growth as measured by pre- and post- self assessment survey
- Developing and disseminating 10 math and science learning plans annually that are aligned to state Common Core Standards for Math and the Next Generation Science Standards.

In partnership with North-Central Technical College and University of Wisconsin Marathon County, a "community of learners" is promoted through collaboration, networking, and in-depth study with peers and experts in the field. Professional development is embedded in the daily work life of teachers to create a culture of inquiry and reflection about student learning and understanding. Training in differentiated instruction, flipped classrooms, instructional technology, and multiple forms of more authentic assessment techniques are included. Special attention is paid to increasing teachers' instructional skills to better meet the needs of a diverse set of learners, including special education, ethnic minority, and economically disadvantaged students to help narrow the achievement gap.

MSP Resources

U.S. Department of Education/MSP Program:

The website of the U.S. Department of Education offers background and legislative information on the MSP Program: http://www.ed-msp.net.

Teacher Education Materials Project (TE-MAT):

The TE-MAT site offers a database of resources to support mathematics and science professional development providers as they design and implement programs for in-service teachers: http://www.te-mat.org.

Horizon Research, Incorporated (HRI):

The website of HRI offers a wealth of information related to research and evaluation of mathematics and science initiatives. Some of its tools may be helpful in conducting a professional learning needs assessment: http://www.horizon-research.com/instruments.

Learning Mathematics for Teaching (LMT) Project:

The LMT Project website offers information on the assessment instruments required by all funded mathematics MSP projects: http://sitemaker.umich.edu/lmt/home.

Project MOSART:

Project MOSART's website offers thorough information, including a tutorial, on the required assessment instruments: http://www.cfa.harvard.edu/smgphp/mosart/.

Common Core State Standards for Mathematics:

The Common Core State Standards for Mathematics were adopted by Wisconsin on June 6, 2009, officially becoming the Wisconsin Common Core Standards for Mathematics. As teacher preparation programs and K-12 school districts work to implement the new standards, it is important that MSP projects and activities are aligned to and reflect the intent of both the Common Core Standards for Mathematical Content and the Standards for Mathematical Practice.

- http://dpi.wi.gov/standards/math-tchingandlrng.html
- https://sites.google.com/a/dpi.wi.gov/disciplinary-literacy-in-mathematics/

National Council of Teachers of Mathematics (NCTM):

The NCTM is a public voice of mathematics education supporting teachers to ensure equitable mathematics learning of the highest quality for all students through vision, leadership, professional development and research: http://www.NCTM.org.

Wisconsin Mathematics Council (WMC):

The WMC was formed to lead in the development of, advocate for, and promote quality mathematics education for all students: http://www.wismath.org.

Wisconsin Society of Science Teachers (WSST):

The Wisconsin Society of Science Teachers was founded in 1958. Today it is the largest Wisconsin organization of individuals interested in the advancement of science education. WSST's purpose is to promote, support and improve science education in the state of Wisconsin by providing leadership, advocacy, and programs to enhance the teaching and learning of science: http://www.wsst.org.

MSP Resources

Next Generation Science Standards:

- http://www.nextgenscience.org/
- http://www.nap.edu/catalog.php?record_id=13165

Differentiated Instruction for Math and Science:

Differentiated instruction is used to adapt instruction to meet the individual needs of the learner. A differentiated classroom offers multiple ways for students to access content, to process and make sense of the concepts and skills, and to develop products that demonstrate their learning (Tomlinson, 2001). It is a process through which teachers enhance learning by matching student characteristics to instruction and assessment. Differentiated instruction allows all students to access the same classroom curriculum by providing entry points, learning tasks, and outcomes that are tailored to students' needs (Hall, Strangman & Meyer, 2003).

Differentiation in science and math instruction provides students with varied experiences to engage in the content. The following resources focus on differentiating science and math instruction.

- Differentiated Instruction for Math
  http://www.k8accesscenter.org/training_resources/mathdifferentiation.asp
- Differentiated Instruction for Science
  http://www.k8accesscenter.org/training_resources/sciencedifferentation.asp
- Instructional strategies/techniques that show how to differentiate in the science classroom
  http://www.mcps.k12.md.us/curriculum/science/instr/differstrategies.htm

The National Science Teachers Association:

The NSTA website offers science teaching resources developed by Page Keeley and colleagues. To order Page Kelley's publications refer to the NSTA at:
http://www.nsta.org/store/product_detail.aspx?id=10.2505/9780873552554.

- Page Kelley et al. (2008). Uncovering Student Ideas in Science: Another 25 formative assessment probes. A set of four books can be purchased separately or as a set. This resource contains brief activities to help identify students' preconceptions about core science topics. It also includes teacher notes, research summaries and strategies teaching elementary, middle and high school students.
- Page D. Keeley. (2008). Science Formative Assessment: 75 Practical Strategies for Linking Assessment, Instruction and Learning. This book contains a concise description of 75 formative assessments linked to instruction. Most activities take 5-10 minutes of class time.

Vertical Teams

What is a Vertical Team?

Most commonly a vertical team consists of middle school and high school educators who teach in the same academic area. It may also include elementary teachers, school counselors, administrators, department chairs, or curriculum specialists. Through communication and cooperation, teams design curricular change and create support structures necessary to make high achievement by all students a reality.

Purpose of a Vertical Team

In vertical teams, teachers from different grade levels work together to develop a continuum of knowledge and skills that build from one grade level to the next. Team communication leads to a greater understanding of what is taught each year, which helps teachers organize strategies, plan introduction of concepts, and reduce repetition of content. As a result, student achievement and success is enhanced.

Goals of a Vertical Team

- To increase achievement of all students to close the achievement gap
- To bring about coordination and communication between grade levels
- To foster greater inclusion and to build enrollment in advanced coursework
- To introduce skills, concepts, and assessment methods to prepare students for success in advanced coursework
- To encourage innovation
- To stimulate enthusiasm for advanced coursework in the school, family and community

Benefits for Students

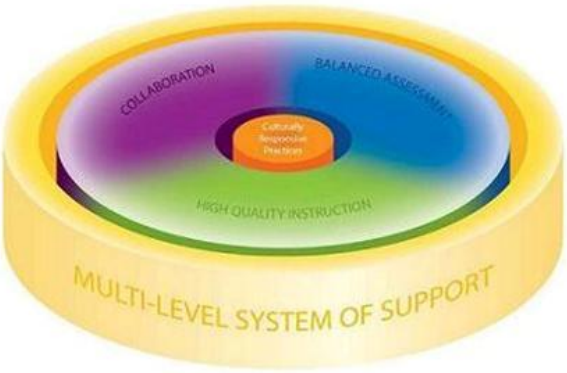
A successful vertical team will:

- Prepare students for the next level of challenge by developing skills and strategies necessary for success in advanced coursework
- Promote greater inclusion and progress towards closing the achievement gap
- Improve student achievement

Equity and Access

The concept of vertical teams is based on a philosophy of inclusion; on the notion that all students benefit from experiencing a rich and rigorous curriculum. Research shows that students of color and socio-economically disadvantaged students tend to be under-represented in advanced coursework. The goal of vertical teams is to prepare all students for success in rigorous courses at the secondary level, not only certain groups. This results in an organizational pipeline that promotes equity and access for all.

Wisconsin's Response to Intervention



Why RtI? Wisconsin's Response to Intervention (RtI) is a process for achieving higher levels of academic and behavioral success for all students. RtI is not distinct from a school improvement plan or a school-wide program plan; RtI is a school-improvement plan/School-wide program plan. Culturally responsive practices are at the core of the RtI process, to reflect the growing diversity in Wisconsin, and to ensure that Wisconsin educators are positively impacting each and every student through curriculum and instruction, assessment, and collaborative practices.

In thinking about RtI, your first thoughts might turn to interventions and the typical triangle model of interventions, but it is important to note that an RtI process is about more than providing interventions to struggling students. The first element of an RtI system must be effective, high quality instruction in the core program. High quality instruction is engaging, standards-based, data-driven, and research-based. All students, including Special Education students, should receive high-quality, culturally-responsive core academic and behavioral instruction, that is differentiated for student need, and aligned with the Common Core/State Standards. Implementing an RtI system may require professional development in providing differentiated instruction to all students. A guiding principle for high quality instruction is that RtI is something you do, not necessarily something you buy. Interventions, provided in addition to core academic instruction, are intended to increase student performance in the general curriculum for students who are not meeting benchmarks. Additional challenges are intended to meet the needs of students who are exceeding benchmarks. Interventions and additional challenges are the responsibility of both the Regular Ed and Special Ed staff.

We live in a data-rich world, but how effectively do we really use all that data? RtI is about being more mindful and systematic in our practices. Balanced assessment refers to a continuous review of student progress using multiple measures to determine the current skill level of a student or group of students; how students are responding to core curriculum and instruction, and how students are responding to interventions or additional challenges. No single test score should determine a student's experience at any phase of an RtI system. Data collected on students can be formal (quantifiable, norm-referenced tools) or informal (observations and/or teacher-developed formative tools) and can be implemented with individual students or an entire class. To get a complete picture of students, data such as teacher observation, family interviews, and student self-assessments should also be among data collected on students. Some components of an RtI system may also be used as a method for identifying students with specific learning disabilities (SLD). As a student moves further toward a process of a SLD determination, the criteria of progress monitoring tools becomes more stringent to ensure strict consistency, fidelity, and reliability across the state.

Collaborative protocols such as problem-solving processes and professional learning communities (PLC) can be used to systematize discussions of student, class, grade, school, district, and state-level data.

The frequency and intensity of collaborative teaming should increase with student need. Including common time for collaboration, in school schedules can be a challenge, but many different models of incorporating cooperative effort into all types of school schedule structures currently exist. Collaborative time is not enough, however. It should be structured, and protocols should be established, so that the time is used efficiently and effectively.

The RtI process requires us to think differently about our students, our schedules, and our practices. That is no easy undertaking! Using a multi-level system of support, to identify and respond to student needs, can increase the success of all students. Implementation of a multi-level support system includes meaningful family involvement, data-based decision making, and effective leadership. Comprehensive RtI implementation will contribute to increased instructional quality, equitable access to high quality and effective programming, and will assist with the identification and support of learners with varied abilities and needs. Visit the Wisconsin RtI Center website at www.wisconsinrticenter.org for information on resources, tools, and professional learning.

Notes