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A District Mathematics Leadership Team: Deepening Collective Focus

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How can a school district work systemically to create a strong mathematics program focused on helping students learn mathematics that makes sense and will be useful to them in their lives?

This is a question often researched by many leaders in the field (Fullan, 2005, Hargreaves, 2006, Elmore, 2005, Senge, 2006) and asked recently by a dedicated group of mathematics leaders fundamentally committed to the improvement of mathematics teaching and learning in a New Mexico school district.

This school district was facing numerous challenges, including the fifth superintendent in five years, newly adopted K-8 standards-based curriculum materials, and a history of implementation of past mathematics initiatives that was described as "fragmented" and "lacking focus." When this diverse group of stakeholders congregated to create and structure a five-year district mathematics plan, it became clear that "lifting every child to powerful mathematics learning" was a responsibility that required a collective focus that included many voices and perspectives so a coherent plan could be created.

We tell the story of how a school district in the desert southwest worked together as a District Mathematics Leadership Team (DMLT) to create a focus and direction for mathematics learning. Specifically, we describe how the group worked systemically to create a shared vision, articulated this vision in a five-year mathematics plan, and thoughtfully considered what it would take to implement the plan, all the while maintaining itself as a community of learners that was able to successfully work together to achieve these goals. We also share important learning from the first year of this effort, identify potential benefits for continuing the DMLT work in this district, and consider what might be gained by initiating this work in other districts around the state.

What is and Why Have a District Mathematics Leadership Team (DMLT)?

The District Mathematics Leadership Team (DMLT) was a group that met regularly to guide and focus learning for mathematics improvement and sustainable change in the school district. The DMLT included individuals from all levels of the school district as well as the local community —district leaders, principals, teachers, school board members, university mathematicians and educators, a business person, parents, and a state representative—all agreeing to collaboratively embark on a journey together to strengthen mathematics teaching and learning in the district.

The National Council of Supervisors of Mathematics (NCSM, 2008, p. 3) believes that communities of adult learners are the building blocks needed to establish a new foundation in America's schools. Typically, creating opportunities for educators and community members to learn together through thoughtful, focused conversations is difficult in the fast pace life of our daily lives. This meant that in order to be successful our work together required a purposeful structure through which members of the team could think, plan action, and learn together.

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With these goals in mind, the DMLT engaged school, district, and community leaders in a *working systemically process* (SEDL, 2005) to develop a shared vision, create a five-year math plan, and articulate what it would take to implement this plan successfully—all the while looking toward the horizon of sustainability. What follows is how this process was put into place and what the DMLT was able to accomplish.

How Did the DMLT Get Started in the School District?

Creating a five-year mathematics plan for a district is a complex task. A small group of math educators, a professional development specialist, and a district curriculum specialist met to develop the math plan but soon realized there was a need for input from other stakeholders from the educational system and the business community. The idea for a DMLT was put on the table for discussion, with all members of the small group recognizing the benefits of collaboration and the sharing of ideas, and the director of instruction took the next steps to create and formalize this larger team.

The following four specific actions took place prior to the inaugural DMLT meeting:

Action 1: The initial small group identified who it thought should be invited to join the larger DMLT. Participants were suggested based on their roles in the school district and the community, their willingness to spend time learning in collaboration, and their openness to diverse perspectives. Because it was important to create a microcosm of the educational system and the local community, teachers and administrators from the elementary, middle, and high school levels were suggested as well as school board members, parents, business representatives, a state legislator, and university math educators and mathematicians.

Action 2: The Director of Curriculum and Instruction and university partners met with the Superintendent and Assistant Superintendent to discuss the formation of the DMLT and its role improving mathematics teaching and learning in the district. This was important because it allowed top-level administration to be involved in creating the DMLT and establishing its purpose. The Superintendent was asked to attend the first DMLT meeting and welcome the DMLT participants.

FIGURE 1

October 29

Dear Member of the Public Schools Community,

The beginning of the school year has been exciting and renewing. We strive to provide a quality education for all students in our district. In our continued commitment to provide students with skills necessary to be better prepared for college, work, or the military we constantly review what those skills may be.

How many times have you heard someone say, "I wasn't good at math"? It is almost like a badge of honor for someone to express this. Mathematical literacy is of significant importance to everyone. To be literate in mathematics means that one possesses procedural and computational skills as well as a conceptual understanding of mathematical concepts.

I am pleased to announce that our school system is creating a Math Leadership Team for the purpose of establishing a vision and goals for sustainable and effective mathematics achievement for the district and its students. You have been selected as someone who could make significant contributions to our Math Leadership Team.

I would like to invite you to our first meeting . . .

Sincerely,

Superintendent of Schools

Action 3: The Director of Curriculum and Instruction drafted an invitation letter to join the DMLT that was signed by the Superintendent (Figure 1). The contents of the letter included the following statement of purpose: "This district is creating a District Mathematics Leadership Team for the purpose of establishing a district-wide vision and action plan for sustainable and effective mathematics teaching and learning for the district and its students."

Action 4: The date, time, and location for the initial DMLT meeting was decided and the Director of Curriculum and Instruction sent an invitation to participate in the DMLT to the 25 participants nominated to participate. In the fall of 2007, the group met together for the first time for three hours. The group continued to meet monthly for three hours.

How Did the DMLT Create a Collaborative Culture for Learning?

Collaborative cultures for learning do not happen spontaneously. Fullan (2001) characterizes the need for leaders to "support informed judgment" developed "through cultures of interaction inside and outside the school." This requires creating shared norms and values, enacting purposeful reflective dialogue, and maintaining a collective focus on student learning. The DMLT chose to work together to build a culture of learning through an inquiry process that focused collaboratively on issues of relevance.

Several factors contributed to the development of a culture of learning. These included creating norms for collaboration, using inquiry agendas, facilitating focused learning conversations, and using reflective feedback to inform the explorations of subsequent DMLT work. Each of these factors are described more fully below.

Creating norms for collaboration helped maintain a focus on tasks that needed to be addressed during the meeting times. At the first meeting of the DMLT there was a discussion of how the group wanted to work together. Seven norms of collaboration developed by Garmston and Wellman (1999) were presented to them and DMLT members were asked to select three that could be embraced by the group. The DMLT chose *presuming positive intentions, paying attention to self and others*, and *pursuing a balance between advocacy and inquiry*. These norms were used at each meeting to support the collaboration needed to be successful as a DMLT.

Inquiry agendas were used to promote analysis and exploration. Frequently, agendas are a list of topics to be discussed. Less frequently, agendas are questions with unknown answers. The agendas for the DMLT team meetings included questions for inquiry and exploration that needed thoughtful consideration and a collective focus (Figure 2). All of these questions were essential to the development of a shared vision of mathematics teaching and learning and the creation of a viable mathematics plan for the district.

Facilitation of DMLT meetings was planned, intentional, and strategic. An outside facilitator who would be able to guide how the DMLT worked together was identified and brought into the group. This facilitator's role was to keep the focus of the conversations on exploring the inquiry questions while also creating a safe environment for sharing different points of view and helping the group adhere to its norms for collaboration. This facilitator, being an "outside" person, could also ask and help the group process the harder questions that an "inside" facilitator might have found threatening. This seemed to help the DMLT dig more deeply into the question of a vision for mathematics teaching and learning and the nature of the mathematics plan needed.

Written reflections were collected at the end of each DMLT meeting. Participants' responses were documented, categorized into themes, and shared at each subsequent meeting. This process enabled group learning to be connected from one meeting to the next. It also served to recognize how group learning grew from meeting to meeting. Team members often referred to the learning journey and acknowledged the collaborative efforts documented in this written feedback.

FIGURE 2

District Mathematics Leadership Team
November 5

AGENDA

8:00 am	Connections—Who's Here?
8:15 am	How Are Students Learning Mathematics? Observe student learning in classrooms in three sessions
9:30 am	Where Have We Been? Five-Year Math Plan Vision Sharing Process Update
10:00 am	Where Are We Going? Taking Action and Monitoring Implementation
10:30 am	Reflection/Next Steps
Future Meetings:	January 16th at the Professional Development Center: EPSS Session
	March 17th at the Middle School: Classroom Learning Observations
	May 14th at the Professional Development Center: EPSS Session

How Did the DMLT Work Systemically to Create a Shared Vision and a Five-Year Mathematics Plan?

The DMLT used a *working systemically* approach (SEDL, 2005) to develop their shared vision of mathematics teaching and learning and create the five-year mathematics plan. Working systemically means attending to the levels, components, and competencies that need to be addressed in order to work effectively toward school improvement. "Levels" takes into account important stakeholders from the district, schools, classrooms, state agencies, local universities, the parent community, and other key community members. "Components" include standards, curriculum materials, instructional approaches, assessment tools, and other resources that play a role in teaching and learning. "Competencies" include a focus on activities such as creating coherence; collecting, interpreting, and using data; ensuring continuous professional learning; building relationships; and responding to changing conditions. The DMLT used this approach as it moved toward its goals.

The DMLT also used a *five-phase process* designed to be used as part of a working systemically approach (SEDL, 2005). The five phases are 1) understanding the system, 2) analyzing the system, 3) planning action, 4) taking action and monitoring implementation, and 5) assessing and reflecting on outcomes. The DMLT worked through phases 1, 2 and 3 during the first year of its work together, ending with a plan for taking action. Year 2 of the DMLT work was scheduled to begin with taking action and monitoring implementation (Stage 4) and conclude with assessing and reflecting on outcomes.

Interspersed throughout the DMLT process were opportunities to examine data collected and organized by a research team from Scaling up Mathematics Achievement (SUMA, 2007), a partnership between a local university and this school district, funded by the National Science Foundation. Access to these data assisted the DLMT in making informed decisions related to mathematics teaching and learning and the 5-year mathematics plan. These data also were contributed to important conversations about the SUMA Capacity Building Model with its components of teacher quality and intentional collaboration; administrative, mathematician, and community support; and quality, aligned, and learned curriculum.

These strategies and processes were situated within opportunities to examine mathematics teaching and learning in the district by doing mathematics together, observing classrooms together, and examining data together. For instance, periodically the DMLT would explore math activities from the adopted curriculum materials, sharing their own solution strategies and discussing how students might approach such problems, with a focus on what these allowed students to learn. The conversations across teachers, administrators, community members, and mathematicians were rich and productive. In addition, the DMLT would periodically meet at a school in order to observe classrooms, and afterward, raise thoughtful questions about the mathematics teaching and learning they saw there. Here, too, the components of the SUMA Capacity Building Model provided a structure for the classroom observations and the subsequent discussions.

What was the Learning from the DMLT Work in Year One?

The artifacts, anecdotes, shared observations, reflections, and informal conversations that took place among DMLT members indicated that a good deal of learning was taking place through the DMLT work. This learning can be organized into the following six themes:

- The importance of the Superintendent's stable leadership, support, and full participation at all meetings, along with the support and participation of other district administrators, made an important difference to the success of the DMLT;
- The importance of a system-wide data collection plan that provided data for use in DMLT discussions and decision-making;
- The importance of creating shared commitments to collaborative learning and a systemic approach to achieve sustainable goals; and
- The importance of focused facilitation of each DMLT meeting.

The Superintendent's support was essential to starting the DMLT process and communicating clear expectations for the work of the team. The Superintendent opened the first meeting by stating the importance of the group's work in creating a five-year mathematics plan and speaking compellingly about he team's role in making a vital difference for students. The support and participation of other

district administrator in DMLT meetings was also a key factor in this effort.

The system-wide data collection, analysis, and reporting that was in place through SUMA made an important difference to the quality of DMLT discussions and decision-making. The SUMA data included student achievement data as well as data from classroom observations, teacher focus groups, teacher surveys of content knowledge, and other sources of data to share with stakeholders. These data informed decision-making regarding the district structures, resources, policies, and professional development needed to ensure a strong five-year mathematics plan.

There was continual reflection both on the work of the DMLT and the kinds of collaboration that supported that work. When the DMLT began, many were unfamiliar with the idea of identifying collaborative group norms or working systemically to effect change in a district. As the DMLT continued to meet, a shared commitment to this way of working grew stronger, influencing not only short-term goals and how they were enacted, but long-term goals as well. Two DMLT members offered the following reflections:

> *Working systemically creates effective change… but it is a slow, community-based process. It's important that all stakeholders actively attend, participate, and contribute to make this work.*

> *I have learned the value in a long-range, systems based approach. Initially my reaction was one of a more impatient, let's get in and fix it person. As our groups have morphed into a longer-range approach, I see that we have the potential to initiate far-reaching, positive change.*

The DMLT felt that it was through this kind of effort that sustainable goals could be achieved.

Focused and planned facilitation of the DMLT meetings was also essential to creating a collaborative culture that was safe for sharing different perspectives; engaging participants in thoughtful, reflective dialogue; assuring the accomplishment of tasks in between sessions; and linking learning from one meeting to the next (Figure 3). It was important for the facilitator to remain objective while also building on the experience and expertise of all members and focusing the learning conversations on relevant, authentic goals. Documenting the group's work as it progressed allowed the DMLT to see the results of their actions as they continue to learn together.

FIGURE 3

District Mathematics Leadership Team
January 14

AGENDA

8:00 am	Connections—Who's Here?
8:45 am	Connections From Classroom Learning Observations at Monumental Elementary School
9:00 am	What Do the Data Tell Us? Presentation and Discussion • MAP Data • K-5 Benchmark Data • SUMA Data from Parent and Teacher Surveys
10:00 am	Break
10:15 am	Next Steps: Deepening Framework Understanding *Choose one component for planning action: Quality Aligned Curriculum, Administrative Support, Teaching Quality*
11:00 am	Algebra Task Force: Embarking on the Journey
Future Meetings:	February 4th at the High School: Classroom Learning Observations March 17th at the Middle School: Classroom Learning Observations May 14th at the Professional Development Center: EPSS Session

What are the Potential Benefits for Continuing the DMLT Structure?

The potential benefits about the value of the DMLT from Year 1, based on written reflections from DMLT members, were cited as important reasons to continue meeting in Year 2. These benefits included:

- The DMLT provided a structure for articulating clear goals for the DMLT and a process for achieving them.

> *The purpose is to have a systems approach for sustainability of determining the direction of mathematics in the district for the benefit of our students.*

To create a five-year math plan to promote (sustain) progress in mathematics learning.

The purpose of our work is to make a difference in math achievement for all of our kids: to do this over a long-term timeline with all stakeholders.

- The DMLT provided a structure for using classroom and school data to discuss issues and make decisions.

  W*hat really worked for me was a long time spent on examining the data and the questions it generated.*

- The DMLT provided opportunities for professional learning and reflection, as well as allowing members to develop caring and productive relationships with stakeholders at different levels over time, thus making it likely that the work of the DMLT could be sustained over time.

  Sustainability of the shared vision should be a key for change.

What are the actions that will enable the vision to be a first step to reunite our district?

What do we do to make the vision our reality?

How will our long-term goals be achieved?

How can we impact learning at the classroom level?

The DMLT is a promising structure because it promotes participation and contributions of diverse stakeholders, provides learning opportunities to build a professional knowledge base for mathematics teaching and learning, builds relationships that contribute to the development of a district educational network, and helps a district achieve sustainable goals. This kind of structure holds promise for many schools and district seeking to undertake similar work.

References

Elmore, R. 2005. Accountable Leadership. *Educational Forum*, Winter.

Garmstom, R.G. & Wellman, B.M. 1999. *The Adaptive School: A Sourcebook for Developing Collaborative Groups.* Massachusetts: Christopher Gordon

Fullan, M. 2001. *Leading in a Culture of Change.* Jossey-Bass.

Fullan, M. 2005. *Leadership and Sustainability: Systems Thinkers in Action.* Corwin Press

Hargreaves, A. & Fink, D., 2006. *Sustainable Leadership.* San Francisco: Jossey-Bass.

Kouzes, J. & Posner, B. 2006. *A Leader's Legacy.* San Francisco: Jossey-Bass.

National Council of Supervisors of Mathematics, 2008. *The Prime Leadership Framework.* Bloomington, IN: Solution Tree

Scaling up Mathematics Achievement. 2007, National Science Foundation. Award Number 0733690.

Southwest Educational Development Laboratory (SEDL). 2005. *Working Systemically to Increase Student Achievement.*

APPENDIX 1

Sample Five Year Mathematics Plan

VISION STATEMENT: THE COMMUNITY WILL LEARN, UNDERSTAND AND USE MATHEMATICS AS CRITICAL THINKERS AND EFFECTIVE PROBLEM SOLVERS.

TARGETED AUDIENCE	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012
K-5 Schools	K-5 Implementation of Math Investigations	Refinement of Math Investigations use PK-5 Refinement of Math curriculum map (working document) K-5 Math Benchmark Assessments (intro) REL Intervention Program for 1st graders in ½ of our elementary schools. Use of math curriculum maps Implement end of unit assessments and rubrics Explore math intervention programs	Full implementation of MathInvestigations Roll out use of materials to support core Math Investigations program (PDC /PDTs/Specialists) Full use of end of unit assessments and unit rubrics Roll out math intervention program Use of math curriculum maps	Full implementation of Math Investigations Refine support materials Full use of end of unit assessments and unit rubrics Refine math intervention program Use of math curriculum maps	Full implementation of Math Investigations Full use of end of unit assessments and unit rubrics Full implementation of Math intervention program Use of math curriculum maps
Professional Development – K-5 Teachers	PD on Sept. 17 (Investigations) PD on Jan. 8 Investigations and Literacy Strategies in Numeracy)	PD in August for curriculum map Summer Academy IC (7/28-8/1/08) ($450 stipend = $15/hr. x 30) Develop PLCs (Peer modeling and coaching. Looking at student work) Video effective instruction. Developed highly effective teacher-facilitated PLCs that focus on student learning.	Deepen teachers understanding of math content knowledge Highly developed, teacher led PLCs Summer Academy Investigation in the Classroom (IC) and Building Computational Fluency (BCF) Explore Investigations vertical continuum. Explore Peer coaching and modeling through video broadcasting. Pearson Success Net Training Use common district rubrics for grading in End of Unit Assessments.	Deepen teachers understanding of math content knowledge Highly developed, teacher led PLCs Summer Academy Investigation in the Classroom (IC) and Building Computational Fluency (BCF) and Measurement. Continue to explore the vertical alignment in Investigations across grade levels.	Deepen teachers understanding of math content knowledge Highly developed, teacher led PLCs Summer Academy Investigation in the Classroom (IC), Building Computational Fluency (BCF), Measurement and Fractions, Decimals and Percentages.

APPENDIX 1
Sample Five Year Mathematics Plan (continued)

TARGETED AUDIENCE	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012
Middle Schools 6-8	Implementation of Connected Mathematics Program (CMP)	Establish school based professional learning communities for teachers to collaboratively study student progress, identify key concepts, common assessments, and identify instructional strategies with embedded technology applications to develop critical thinkers. Plan and develop a system to provide students with extra time and support to gain proficiency in challenging math courses. Identify and pilot/ implement math intervention programs (e.g. Voyager, Navigator, Ramp-Up) and Enrichment Programs (e.g. SiMCalc, Tubula Digita) Identify ways to promote math literacy in all curriculum areas. Work in vertical teams with elementary and high school to identify essential mathematics skills and concepts to ensure seamless transition in mathematics. Participate in District Algebra I taskforce.	Highly developed PLC. Finalize development and begin implementation of common assessments both school-wide and district-wide. Implement math literacy strategies throughout the curriculum. Ensure fidelity to district curriculum through professional development and ongoing reflection/refinement of curriculum maps. Work in vertical teams with elementary and high school to identify essential mathematics skills and concepts to ensure seamless transition in mathematics. Refine implementation of intervention programs through review of student data.	Highly developed PLC. On-going revision and review of common assessments to ensure effectives. Ensure fidelity to district curriculum through professional development and ongoing reflection/refinement of curriculum maps. Work in vertical teams with elementary and high school to identify essential mathematics skills and concepts to ensure seamless transition in mathematics. Continue to study intervention systems in place, modify as necessary to produce maximum results.	Highly developed PLC. On-going revision and review of common assessments to ensure effectives Standard-based learning environment evidenced by: • Opportunities for students to make conjectures about mathematical ideas. • Lessons which foster the development of conceptual understanding. • Multiple perspectives/ strategies are encouraged and valued. • Teacher values students' statements about mathematics and uses them to build discussion and work toward shared understanding.

APPENDIX 1
Sample Five Year Mathematics Plan (continued)

TARGETED AUDIENCE	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012
Professional Development – 6-8 Teachers	Grade Level math Workshops per grade level – one each semester. Professional Development Day – September 17, 2007	Appropriate and Effective use of NMSBA and MAP Data. Pre-AP: Strategies in Mathematics MC2 Summer Math Academy Leadership Team Workshop: Protocols for Effective PLC, June 17-18, 2008 School Based PLC focused on improving student learning Grade level professional develop days will be provided to continue to develop teachers' instructional strategies based on NM standards. Continue Video Club and Lesson Study (a forum for focusing on student learning and sharing instructional practices) as a form of after school professional development. Video Club will meet quarterly. Lesson Study teams will attend three workshops per semester.	Appropriate and effective use of NMSBA and MAP Data. Pre-AP: Strategies in Mathematics Grade level professional develop days will be provided to continue to develop teachers' instructional strategies based on NM standards. Continue Video Club and Lesson Study (a forum for focusing on student learning and sharing instructional practices) as a form of after school professional development. Video Club will meet quarterly. Lesson Study teams will attend three workshops per semester.	Appropriate and Effective use of Data. Pre-AP: Strategies in Mathematics Grade level professional develop days will be provided to continue to develop teachers' instructional strategies based on NM standards. Continue Video Club and Lesson Study (a forum for focusing on student learning and sharing instructional practices) as a form of after school professional development. Video Club will meet quarterly. Lesson Study teams will attend three workshops per semester.	Appropriate and Effective use of Data. Pre-AP: Strategies in Mathematics Grade level professional develop days will be provided to continue to develop teachers' instructional strategies based on NM standards. Continue Video Club and Lesson Study (a forum for focusing on student learning and sharing instructional practices) as a form of after school professional development. Video Club will meet quarterly. Lesson Study teams will attend three workshops per semester.

APPENDIX 1

Sample Five Year Mathematics Plan (continued)

TARGETED AUDIENCE	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012
High School Grades 9-12	Implementation of District math Curriculum including problem-solving based lessons to promote math process standards outlined in the NM Math Standards	Establish professional learning communities to study student progress, identify key concepts, common assessments, and instructional strategies with embedded technology applications to develop critical thinkers. Establish common assessments within math depts. Develop new End-of-Course Exams for Algebra I, Geometry, and Algebra II. Identify, pilot, and implement math intervention programs that address student gaps (e.g. Voyager, Navigator, Ramp-Up) and Enrichment Programs (e.g. SiMCalc, Tubula Digita) Work with middle schools to identify essential mathematics skills and concepts to ensure seamless transition in mathematics. Plan and develop a system to provide students with extra time and support to gain proficiency in challenging math courses. Ensure fidelity to district curriculum through prof. dev. and reflection/ refinement of curriculum maps. Develop District Algebra I taskforce to address Algebra I failure rate, Algebra I readiness	Highly developed PLC. Implement common assessments within math departments to guide instruction in each math course. Implement End-of-Course Exams for Algebra I, Geometry, and Algebra II. Work in vertical teams with middle schools to identify essential mathematics skills and concepts to ensure seamless transition in mathematics. Ensure fidelity to district curriculum through professional development and ongoing reflection/refinement of curriculum maps. Refine implementation of intervention programs through review of student data. Continue to conduct district Algebra I Task Force to monitor effectiveness of recommendations.	Highly developed PLC. Work in vertical teams with middle schools to identify essential mathematics skills and concepts to ensure seamless transition in mathematics. Ensure fidelity to district curriculum through professional development and ongoing reflection/refinement of curriculum maps. Continue implementation; revise End-of-Course Exams for Algebra I, Geometry, and Algebra II. Work in vertical teams with middle schools to identify essential mathematics skills and concepts to ensure seamless transition in mathematics. Continue implementation; revise End-of-Course Exams for Algebra I, Geometry, and Algebra II. Continue to study intervention systems in place, modify as necessary to produce maximum results.	Highly developed PLC. On-going revision and review of common assessments to ensure effectives Standard-based learning environment evidenced by: • Opportunities for students to make conjectures about mathematical ideas. • Lessons which foster the development of conceptual understanding. • Multiple perspectives/ strategies are encouraged and valued. • Teacher values students' statements about mathematics and uses them to build discussion and work toward shared understanding.

APPENDIX 1

Sample Five Year Mathematics Plan (continued)

TARGETED AUDIENCE	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012
Professional Development – 9-12 Teachers	Monthly PLC meeting by course with facilitation from SDS (Kathe)	College Board Training High Schools That Work training Leadership Team Workshop: Protocols for Effective PLC, June 17-18, 2008 School Based PLC focused on improving student learning (Monthly District Presence) Appropriate and Effective use of NMSBA and MAP Data. Two course specific professional develop sessions will be provided to continue to develop teachers' instructional strategies based on NM standards. Continue Video Club and Lesson Study (a forum for focusing on student learning and sharing instructional practices) as a form of after school professional development. Video Club will meet quarterly. Lesson Study teams will attend three workshops per semester.	College Board Training High School That Work (HSTW) training School Based PLC focused on improving student learning (Monthly District Presence) Appropriate and Effective use of NMSBA and MAP Data. Two course specific professional develop sessions will be provided to continue to develop teachers' instructional strategies based on NM standards. Continue Video Club and Lesson Study (a forum for focusing on student learning and sharing instructional practices) as a form of after school professional development. Video Club will meet quarterly. Lesson Study teams will attend three workshops per semester.	College Board Training High Schools That Work training School Based PLC focused on improving student learning (Monthly District Presence) Appropriate and Effective use of Data. Two course specific professional develop sessions will be provided to continue to develop teachers' instructional strategies based on NM standards. Continue Video Club and Lesson Study (a forum for focusing on student learning and sharing instructional practices) as a form of after school professional development. Video Club will meet quarterly. Lesson Study teams will attend three workshops per semester.	College Board Training Appropriate and effective use of data. Continue Video Club and Lesson Study (a forum for focusing on student learning and sharing instructional practices) as a form of after school professional development. Video Club will meet quarterly. Lesson Study teams will attend three work shops per semester.

APPENDIX 1

Sample Five Year Mathematics Plan (continued)

TARGETED AUDIENCE	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012
PDTs / PDC Math Specialists	1 Friday/month for math PD -SUMA protocols Begin awareness of math curriculum map Find support materials for District webpage	August, 2008—PD on Math curriculum map PLC Expectations (1 hr/week/1 hr.) Attend Summer Academies (TERC) Professional Development Institute, March 2009 Develop district rubrics for each End of Unit Assessment PDT's will refine Look-Fors Spring Training on Look-Fors	Professional development for Success Net Use common district rubric for each End-of-Unit Assessment. Train teachers on the use of support materials with teachers	Support full implementation of Success Net in schools Continue with math professional development through support of math PLCs in schools Continue to add resources to fill "gaps" in Investigations. Continue with one Friday per month for math Professional Development for PDTs	Continue with supporting full implementation and refinement of Investigations in schools (to include rubrics, looking at student work, District Benchmark Assessments etc.) Begin looking at Math Adoption resources Support school math PLCs Continue Friday math PDT training
Administrators	PD in November, 2007 PLC training, April, 2007	August, 2008—implementation of curriculum maps Spring training on "look-fors" in Investigations classrooms TERC Investigations Principals' Institute (PI) Ensure end of unit assessments are being used for PLC student progress discussions Ensure unit rubrics are implemented	Adult Learning • Look-Fors • Lesson Structure • End of Unit Assessment & Benchmark Training from PDT Ensure end of unit assessments are being used for PLC student progress discussions Ensure unit rubrics are implemented	Adult Learning Here Ensure end of unit assessments are being used for PLC student progress discussions Ensure unit rubrics are implemented	Adult Learning Here Ensure end of unit assessments are being used for PLC student progress discussions Ensure unit rubrics are implemented
Math Advisory Committee (MAC)	Six meetings - Understand and Analyze the System, Plan Action for Student	Three EPSS linked meetings, plus two learning meetings at school sites – Take Action, Monitor Results, Address Unique Challenges, Reflect on Progress, Share and Disseminate Successful Practices, Visit Math classrooms	Three EPSS linked meetings, plus two learning meetings at school sites– Analyze the System, Plan Action for sustainable structures that promote student achievement, observe in Math classrooms	Quarterly Meetings (1/nine weeks) Take Action, Monitor Results, Address Unique Challenges, identify and document sustainable learning structures, observe in Math classrooms	Quarterly Meetings (1/nine weeks) Analyze the system, plan action for sustainability, disseminate professional knowledge base of best practices, observe in Math classrooms

APPENDIX 1

Sample Five Year Mathematics Plan (continued)

TARGETED AUDIENCE	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012
MC2	District-wide professional development to develop district mission and plan for mathematics instruction. School-based support at Middle Schools to assist teachers in implementation of standards based mathematics instruction. Build Leadership Capacity for Mathematics in the District Provide Summer Math Academies and Math Courses for teachers K-12.	Provide district based professional development to address specific school needs: Implementing Standards in the SPED Classroom; Addressing the Learning Needs of ELL Students; Differentiating Math Instruction for a Range of Learners, etc. Provide weekly support for grade level PLC and individual teachers to include classroom modeling, observations for intentional learning, and using data to inform the work of the PLC. Build Leadership Capacity (teachers and administrators) Provide Summer Math Academies and Math Courses for secondary teachers.	Provide district based professional development to address specific school needs. Provide weekly support for grade level PLC and individual teachers. Develop inter campus collaboration and professional learning for standards based teaching and learning. Build Leadership Capacity (teachers and administrators) Provide Summer Math Academies and Math Courses for secondary teachers. (Based on Funding)	Based on funding: Provide Summer Math Academies and Math Courses for 6th -12th grade teachers Work with teacher leaders in classrooms, schools and across campuses in supporting effective mathematics teaching and learning Continue to work with administrators in to build leadership for mathematics learning	Based on funding: Provide Summer Math Academies 6-12 th grade and Math Courses Collaboration between school learning sites to support professional development with teacher leaders as the primary support providers Administrators leading mathematics professional development

APPENDIX 1
Sample Five Year Mathematics Plan (continued)

TARGETED AUDIENCE	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012
SUMA	January, 2008 – Researchers in classroom observations.	Continue to work with PDTs on use of instruments to gather data from the classroom. Gathering, analyzing, interpreting data and providing feedback to the district to help district determine if capacity is being built for mathematics achievement. Collaborative partnerships with District and NMSU, to include Teacher Researchers and other district members.	Gathering, analyzing, interpreting data and providing feedback to the district to help district determine if capacity is being built for mathematics achievement. Collaborative partnerships with District and NMSU, to include Teacher Researchers and other district members. (based on continuation of funding)	Present final findings from SUMA research to determine what is useful for building capacity for mathematics teaching and learning.	
Parents	District Parent Math Night - -October (Number & Oper.) --November (Algebra)	Parent Math Events at School Sites	Parent Math Events at School Site	Parent Events at School Sites	Math Events at School Sites