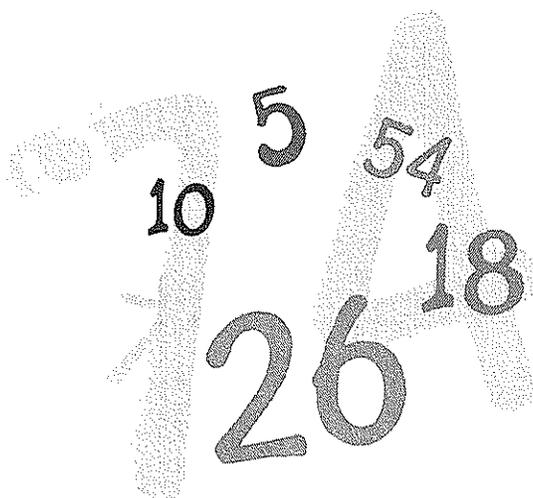


# MMSD Mathematics Task Force Response





DATE: November 2, 2009

TO: Board of Education

FROM: Daniel Nerad, Superintendent of Schools  
Brian Sniff, Coordinator of Mathematics  
Lisa Wachtel, Executive Director, Teaching and Learning

RE: Mathematics Task Force Administrative Recommendations

### Background

The purpose of this report is to describe the recommendations in response to the Madison Metropolitan School District Mathematics Task Force Report: Review of Mathematics Curriculum and Related Issues, submitted to the Board of Education June, 2008.

### Administrative Recommendations Summary

The materials included in this packet update and replace those distributed to the Board of Education in April 2009. Included in the materials is a proposed budget.

### *Middle School Mathematics Specialists (see Recommendations 1-5)*

- The Superintendent and UW-Madison Deans of Letters and Sciences and the School of Education commissioned a representative and collaborative group to design a professional development plan for this initiative. The group was convened in June and has since met four times during the summer to research and design a professional development plan to support middle school mathematics teachers.
- The Middle School Math Partnership committee has tentatively planned five courses for the professional development proposal. Those courses are Number and Generalization, Rational Number and Proportional Reasoning, Geometry, Measurement and Trigonometry, and Algebra and Functions. The courses would be spread out over two years and be co-facilitated by UW and MMSD staff.
- Research, data gathering and design will continue through 2009-2010 with the initial cohort of middle school teachers beginning in summer 2010. Upon completion of an initial draft, the plan will be presented to district teachers for further input and refinement.
- In collaboration with the above group, a National Science Foundation Targeted Partnership proposal, Professional Learning Partnership K-20 (PLP K-20), was submitted on August 20, 2009. A UW-Madison and MMSD team of nearly 30 members worked during the summer to craft a proposal focused on systemic and sustainable mathematics professional development. The vision described in the proposal creates "a lasting interface to coordinate material, human, social, and cyber resources" among the UW-Madison and District. The principal investigator of the NSF proposal is Eric Wilcots. Co-PI's include Provost Deluca, Superintendent Nerad, Dean Sandefur and Dean Underwood.

### *District-wide Curricular Consistency (see Recommendation 6)*

- A District-wide committee of elementary teachers and Instructional Resource Teachers has developed a list of curricular resources that support a balanced elementary mathematics classroom. Elementary schools will develop a plan to transition to these resources within the next

three years using Title I and ELM funds. District level support was provided this summer to purchase Investigations and Singapore resources in order to help schools acquire the set of balanced elementary mathematics resources more quickly.

- Throughout the next three years professional development is planned to support the implementation of mathematics resources in elementary classrooms. A Balanced Math Resource Advisory Group which consists of eighteen classroom teachers and instructional resource teachers will convene periodically throughout the school year. Using action research principles this group will address the needs of staff as they implement new resources. Another component of professional development will be consistent support and coaching of all building based Instructional Resource Teachers (IRT's.) IRT's will convene every Friday during the school year. During this time the resource teachers who are focused on mathematics will come together to problem solve around their building priorities. Discussions and implementation will be facilitated by Teaching & Learning Elementary Mathematics Resource Teachers.
- Through the support of the Education Development Center, District leadership will use the Lenses on Learning framework with building principals, department chairs and other teacher leaders to develop consistent vision for a rigorous high school mathematics program. High school mathematics coursework will be designed by collaborative teacher teams to prepare students for success on the ACT College & Career Readiness Standards.

***Achievement Gap Focus (see Recommendation 7)***

- The District will continue to support the classroom implementation of research-based practices in mathematics that address the needs of every student. The District will continue to support teachers with the resources and professional learning opportunities necessary for them to be successful with every student. Examples of resources include Lenses on Learning at the high schools and the Learning Mathematics instructional guides at the elementary schools.

***Assessment (see Recommendation 8)***

- In 2009-2010, the District will be making recommendations about value-added methods for gathering and reporting student achievement and growth to be used in addition to the standardized state Wisconsin Knowledge and Concepts Exam (WKCE) data. Examples include the Explore/Plan/ACT at the high schools and common formative assessments being created at the middle schools.

***Teacher Collaboration (see Recommendation 9)***

- Mathematics Division staff provide opportunities for collaboration and support among building-based teacher leaders. Examples include: cohorts of IRT's at the elementary focused on implementation of balanced math resources and math interventions; a balanced math resource advisory group of MMSD teachers, the Middle School Math Leadership Academy; and professional development planning and implementation of the Lenses on Learning program at each of our high schools.
- In preparation to extend face-to face professional collaboration time in 2010-2011 at middle and high schools, Teaching & Learning staff is creating a web-based system for teacher to communicate and share resources across the District.

***Parent and Community Communication (see Recommendation 10)***

- The Mathematics Division re-allocated existing staff to focus particularly on how to improve the way we use our website and other online resources to communicate with students, teachers, families and other interested community members.
- A specific project within the Mathematics Division is focused on the development of online resources. The repertoire of online resources will be available for school-based staff to use in

multiple ways to improve parent and community communication including Parent Teacher Organizations (PTO) and activities such as Family Math Night.

***Balanced Mathematics Approach (see Recommendation 11)***

- District-wide curricular resource decisions and professional learning opportunities for mathematics will reflect a K-12 balanced approach to mathematics instruction including emphasis on both conceptual understanding and procedural fluency.

***Address Failing Grades in Algebra (see Recommendation 12)***

- In the fall of 2009 the District will implement the use of Infinite Campus to gather student grade data in addition to mathematics completion data. The disaggregated data will be analyzed with school-based leadership and guide continual improvement in Algebra instruction across the District.

***Algebra in 8<sup>th</sup> Grade (see Recommendation 13)***

- The District will continue to research 8<sup>th</sup> grade Algebra initiatives nationwide and make a recommendation to be presented to the Board of Education in the fall of 2010.

1. Math Specialists
  2. Hiring Math Specialists
  3. Increase Funding
  4. IHE Partnership
  5. IHE/DPI Advocacy
  6. Consistency
  7. Achievement Gap
  8. Assessment
  9. Collaboration Design
  10. Parent Communication
- 
5. Balanced Mathematics
  6. Interventions
  7. 8th Grade Algebra
  8. Additional Community Input

## Criteria for MMSD Middle School Math Specialist

A principle finding of the Math Task Force was the need for middle school mathematics specialists. The MMSD/UW Partnership work group was charged with defining criteria for the middle school mathematics specialist role. By unanimous consent, those criteria are as follows:

1. Have a thorough, connected understanding of the major concepts in the following domains and mathematical practices:
  - Number and Generalization
  - Rational Number and Proportional Reasoning
  - Algebra and Functions
  - Geometry, Measurement, and Trigonometry
  - Experimentation, Conjecture, and Reasoning
  
2. Understand the connections:
  - Between concepts and procedures
  - Among the big ideas in number and algebra (e.g. constant rates of change are connected to linear function)
  - Among elementary, middle school, and high school mathematics
  - Between mathematics in science and real world situations/everyday life
  
3. Be able to develop student proficiencies as defined by national, state, and local standards.
  
4. Understand student learning:
  - Knowledge of students' thinking and misconceptions
  - Recognize and understand multiple strategies for problem solving
  - Able to move students in mathematically productive directions
  
5. Recognition and differentiation based on each student's mathematical background while accounting for language knowledge, culture, and the range of student abilities.

## Middle School Math Specialist PD Survey

MMSD is in the initial phases of developing a professional development plan with the University of Wisconsin in response to the Madison Mathematics Task Force Recommendations regarding Middle School Mathematics Specialists. Please help us by responding to the following brief survey. The survey contains 15 questions and should take you no more than 10 or 15 minutes to complete. Your input will help us make decisions about the structure and content of this program that will be most valuable and accessible for you.

### Course Set-up Preferences

- 1 If you were to participate in a three credit UW course, what schedule would you prefer? Please choose your two preferred options.
  - Weekly meetings after school for 3 hours each
  - Monthly meetings on Saturdays for 8 hours each
  - Monthly meetings during the school day
  - Online only
  - Combination of online and face-to-face meetings
  - Summer institutes only
  - Combination of summer institutes and during the school-year meetings
  - Other: \_\_\_\_\_
- 2 If a three credit course were offered as a summer institute, what schedule would you prefer? Please choose your two preferred options.
  - Half days spread throughout the summer
  - Full days spread throughout the summer
  - Half days daily over two weeks
  - Five full days for one week
  - Some half days during summer paired with regular meetings during the school year
  - Some full days during summer paired with regular meetings during the school year
  - Other: \_\_\_\_\_
- 3 In a professional development experience where the same teachers will be together from start to finish, how should the teachers be chosen? Please choose your preferred two options.
  - Group participants based on school
  - Group participants based on grade-level taught

- Create a mixed group with participants from different grade levels and schools.
  - Include participants on a first-come first-served basis
  - Other: \_\_\_\_\_
- 4 Please choose the two most motivating benefits to participating in a professional development with attached university credit(s) from the list below.
- Advancement of a Professional Development Plan for license renewal
  - Advancement of your personal content knowledge
  - Advancement of your personal teaching knowledge
  - Advancement on the pay scale
  - Credit(s) earned towards a Masters of Education degree
  - Credit(s) earned towards Wisconsin teaching license renewal
  - Having your tuition for the attached credit(s) be reimbursed
  - Portfolio advancement towards National Board Certification
  - Other: \_\_\_\_\_
- 5 Please indicate the area(s) of mathematics that you feel you have the greatest need for further study.

	No Need	Some Need	Great Need
Proportional reasoning			
Rational Numbers			
Numeration and number theory			
Computation			
Estimation			
Measurement			
Algebra (symbolic manipulation)			
Algebra (functions)			
Patterns and relationships			
Geometry and spatial sense			
Data collection and analysis			
Probability			
Use of technology to support mathematics (computers, software, and calculators)			
Discrete mathematics			
Problem solving			
Reasoning and proof			

Communication (written and oral)			
Connections within mathematics			
Connections from mathematics to other disciplines			
Multiple representations (e.g., concrete models, and numeric, graphical, symbolic and geometric representations.)			
Other:			

**Teaching Assignment Information**

- 6 Which mathematics courses do you teach/support? (check all that apply)
- 6<sup>th</sup> grade Math
  - 7<sup>th</sup> grade Math
  - 8<sup>th</sup> grade Math
  - Honors Algebra
  - Honors Geometry
  - I do not currently teach or support mathematics.
  - Other: \_\_\_\_\_
- 7 Besides Math, what courses do you teach/support? (check all that apply)
- Health
  - Language Arts
  - Reading
  - Science
  - Social Studies
  - No other courses
  - Other \_\_\_\_\_
- 8 What is your role in the classroom?
- Regular Education Teacher
  - Special Education Teacher
  - ESL Teacher
  - Bilingual Teacher
  - Other: \_\_\_\_\_
- 9 How many years have you been teaching? \_\_\_\_\_
- 10 How many years have you been at your current grade level? \_\_\_\_\_

**Education Background Information**

11 In the list below, check all of the items that **best** describe your teaching credentials.

- Elementary (k-8, 1-8 or 1-9) General Education Certification
- Middle Level (6-8 only) General Education Certification
- Secondary Mathematics Certification
- Mathematics Minor, Emphasis, or Area of Concentration
- Mathematics Emphasis in undergraduate studies
- Area of Concentration in Mathematics
- Mathematics Major
- Participated in the Math Master courses
- National Board Certification including a focus on Mathematics
- Other: \_\_\_\_\_

12 What is the highest post-graduate certification that you currently possess?

- None
- Some post-graduate course work
- Masters
- Doctorate

13 If you are currently working on extending your teaching credentials, which of the following institutions are you working with?

- UW-Madison
- Edgewood College
- Cardinal Stritch University
- Viterbo University
- Concordia University
- National Louis University
- National Board for Professional Teaching Standards
- I am not currently working to extend my teaching credentials.
- Other: \_\_\_\_\_

### **Interest and Concerns**

14 If it were at no cost to you, indicate your level of interest in participating in a Math Specialist program.

- Absolutely no interest
- Very little interest
- Fairly interested
- Strongly interested

15 What questions or concerns would you like addressed concerning the district initiative towards middle school Math Specialists?

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Thank you for completing this survey. It will help us plan future professional development opportunities that are more responsive to your needs. If you have any questions concerning the Math Task Force recommendation of Middle School Math Specialists, please contact Brian Sniff, MMSD Math Coordinator, at [bsniff@madison.k12.wi.us](mailto:bsniff@madison.k12.wi.us).

**MATH TASK FORCE INFORMATION SESSIONS**  
**January & February 2009**  
**Table #4 Notes**

**Math Specialists – Group 1**

- Edgewood College – eager to hear what teachers have to say.
- Elementary teacher of math – how does it impact elementary schools? Grade 4/5 combo of math instruction would be impacted.
- Parent and MMSD teacher – curious
- Against math specialist – eroded math backgrounds from 6-7 years ago – students don't have good elementary background – now 10<sup>th</sup> grade don't have good skills – reinventing something that worked well – what do high school math teachers think – parent who isn't happy with results. Should bring back deeper knowledge of math backgrounds – state superintendent recommended 3 years ago don't need math certification for middle school.
- Crazy that specialists teaching art and music – why not math? At least in 6<sup>th</sup>-8<sup>th</sup> grade.
- Math specialist might not have math background/degree.
- Major is required for math but different teaching strategies for middle school is needed – bit of confusion.
- Supporting teacher content in middle school instruction yet supporting content knowledge – coordination of both.
- Elementary is left out – more at grade 5 – what is the elementary process going to look like? Not articulated. Personal experience – child had no understanding of math with four curriculums.
- Principal of middle school – one particular curriculum has better curriculum for transition to middle school math.
- Math specialists and middle school model 1 don't have to be separate issues.
- Dependent on the person who is teaching – math specialist would work well if skilled person. More common across state to have specialists in each content area at middle school level. Need to have depth of knowledge.
- The smaller the school, the harder to have specialists and staffing arrangements.
- Business 20 years ago – needs generalists – must be able to teach multiple ways.
- Math masters – excellent program – look for people who have emphasis in certain areas – in depth staff development.
- Have pedagogical piece and content piece – need to have both. Get creative with allocations. Middle school model in blended fashion – concern about junior high model with only specialists.
- Universities – talking about blending math and science minor. Elementary staff doesn't generally apply for middle school jobs.
- Specialists become a dead-end. Content is inconsistent change – need to enhance skills continuously.

- Specialists can be more flexible than generalists? (question of debate?)
- "Specialist" not well defined – people have different perceptions – need to clarify what is/isn't.
- What do you do with other teachers? Grandfather them in?
- Need to identify what teachers need to know – depth of knowledge – 21 credits?
- Single subject – hard to find staff in core content area – not in applicant pool – high school candidates may not be appropriate for middle school or highest qualified candidate.
- Specialists can do more than just teach one subject.
- Concern regarding elementary to middle school as a IHE person – need more professional development at middle school – many state offerings for PD at elementary/middle school.
- Jefferson – 8<sup>th</sup> graders not prepared for 9<sup>th</sup> grade English.
- Specialist – scheduling conflicts/allocation issues – lose collaboration among curriculums – need flexibility in how it is defined. Instructional skills come first – need to have staff development.
- Don't want to lose the middle school model.
- People who are in education – choices become limited.

## Math Specialists – Group 2

- Currently some specialists in district – how many? Transition models/different configurations – 5 to 6 secondary certified teachers working at middle school level – 11 have emphasis in math – 120 (?) teachers teaching math overall.
- Clarification on curriculum team? Is it a book? Is curriculum? Resource books? Does the book drive the curriculum or does the curriculum drive the curricula? Needs to be clarified.
- Different districts' perspectives – K-6 remedial support.
- Subbing in district – see what's happening. As a former math teacher, I didn't understand middle school model. Good teachers but concepts are being missed or confusing messages/misconceptions being taught – they don't have a deep understanding of mathematics. High school teachers will need to unteach these misconceptions.
- I taught 4<sup>th</sup>-6<sup>th</sup> grade math – I gained deeper understanding of math by teaching across grade levels. Need lots of professional development for deep knowledge and horizontal/vertical alignment.
- Spend lots of time collaborating across departments – you become so busy but systematic changes are hard to get at. College or university courses over summer with incentives comingling of middle school/high school teachers in these venues are deeper in these more extensive courses. Other inservices and collaboration are baby steps.
- Rural area – unable to find courses in elementary mathematics – went to book studies/online workshops.
- Recommendations that colleges/universities offer more math courses – flexibility.

- Parent perspective – improve math instruction through a specialist makes sense – stronger skills may be needed at higher levels (or not necessary).
- Teacher sees misconceptions that start at elementary level – may have made assumptions about what child knows and they actually didn't.
- Math specialist – need to make sure to teach conceptual and procedural understanding – may need at elementary as well. Difference vs. mathematician vs. math specialist.
- Concern about middle school model vs. specialist. Can have both but hard to be an expert at every subject.
- Specialist may only see kids one time a day over 2 to 3 years to build relationship. All teachers may build relationship even one time a day.
- Drawback of middle school model – if you have teachers and students who don't connect with same teacher.
- Hire sufficient numbers of math specialists so they aren't spread too thin.

### Group A – Math Specialists

- Wants "specialist" clarified, not secondary certification. Support additional professional development. A way to get rigor.
- Ambiguous – some concerns – fear that some good math teachers might not be eligible. Brian's comments clarified that not math certified – entry way to teachers who are good already – just give them more training.
- Concern about adding transitions to 5<sup>th</sup> graders. Impact on multi-age.
- Critical to maintain middle school model. Could have specialists teach two areas (ex. math and science). Professional development piece exciting. CMP very rich and powerful for teachers.
- Concern about focus 5-8 when funds are limited – need for resources for primary grades to close achievement gap. Concern about one area advantaged (one grade). Concern about special ed – pull-out.
- Lack of content knowledge of EEN teachers, special education teachers need same training.
- Need for high quality math for Special Ed.
- Standards-based instruction should support breaking down curriculum to meet needs of special ed teachers – need to move away from pull-out.
- Concern about ELLs, not new arrivals, but students coming from middle school. Some students taking algebra 3 times. Students are not passing geometry. Prioritize middle school to make a difference in high school – change situation in middle school.
- Parent participation lacking in high school. Need more bilingual documents for students and parents.
- Will specialist be in math content, curriculum or intervention?
- Specialize in teaching math and effective middle school teaching. Deep knowledge of development of concepts and diverse achievement.
- Address needs of students who need advanced work. Differentiation.

- Don't see three-year commitment to training as an issue. Teachers would feel more confident.
- Will be opposition if we go to a junior high model entirely.
- Figure out how to make it work.
- Clarify if we intend to provide professional development for all middle school teachers or just a specialist.

### Group B – Math Specialists

- Concern about materials, that high achievers are being overlooked. How to help advanced students at lower grades – support differentiation.
- Specialists could teach at different levels, matching child's skill to level of instruction.
- Middle school model – could professional development be given to existing teachers as well as new teachers who come in? (Ex., nine teams, one math specialist would each only teach two sections? Each teacher would also teach other subjects).
- Would some positions be eliminated?
- Our school already has one math teacher at 8<sup>th</sup> grade. One math teacher at 7<sup>th</sup>. Already have math specialists. Each teacher is already specializing. Each middle school is different.
- What is meant by math specialist? Content and pedagogy deepened. Define creatively so that we don't choose between specialist and middle school model.
- Need time for math teachers to collaborate.
- Give math teachers more time to talk to each other including special ed, ESL and TAG.
- Meeting diverse needs of students is an enormous task.
- Middle school opportunity to "capture" not "lose" kids.
- Consider countries with higher scores – do kids spend more time in schools?
- Tie the process to stretching the goals. This is a city-wide issue. Post goals, make them city-wide. Build awareness. Use great talent in Madison. Think about loss of skilled labor to fill skilled jobs. Adopt global standards.
- Key is training teachers. Professor who tutored at middle school saw teachers saying things that weren't true. A high school teacher didn't know how to do the math homework.
- How would schools deal with goal of algebra by 8<sup>th</sup> grade? What would be the effect on elementary and middle school?
- The concern is how to increase teacher content knowledge.
- Need to address college preparation to meet needs of all learners and knowledge of math content.
- Give veteran teachers credit for teaching math for many years.

## Math Specialists Group #1

Teacher, Learning Coordinator, two parents:

- Math Specialist is more important than the middle school student connection.
- Though they could do looping with math.
- Also, increasing collaboration can make this idea even stronger.
- Teacher training can help focus the effort of teachers to tackle the unique challenges of the middle school level.
- Single most important thing to be done.
- We used to have 2<sup>nd</sup> certified math teachers in the middle school.
- Students are coming with a wide-range of experiences – really bond on teacher background.
- All subjects could benefit from a specialist-style teacher in all content areas.
- Students find each other based on interest any way, so having specialist and less individual students contact won't matter since students will find friends any way.
- Lack of FTE, might restrict specialist idea.
- Teacher sharing might cause some teachers losing a lot of contact.
- Eagle school has specialists and causes the students achievement to be so much more.
- Specialist idea can help get teachers balance the idea of conceptual ideas and practical/skill work.
- Different students have different needs in concepts/skills – specialist can help individualize learning.
- Other content areas (science/tech ed) are commenting that their kids are lacking math (like fractions).
- Some of the upper level students are being left behind since their teacher didn't push them.
- Enrichment activities are given to high end, but not often given to lower level students to advance them.
- Student lack of skills is trickling up to other higher level math classes.
- Entrance exam for an honors course and for a regular Algebra 1 course.

Two parents, three teachers, and a university teacher:

- Try to get part-time teachers to be specialist to help out the other teachers (like a resource).
- Implementation to university is huge and expensive in the C&I programmatic level – currently many of our middle schools don't.
- We should have specialist at the elementary schools that can travel between schools and help teachers better their teachers.
- Our TAG team doesn't help students unless they are 2-3 years ahead so unless there is private tutoring they don't get services.
- Possibly having an elementary specialist in math.

- Shouldn't every subject have their specialist?
- What about our current teachers? What type of support will those teachers get? Who will pay for those credits?
- We will need an interim plan.
- Holding students and teachers accountable to the standards and expectations.
- Vertical learning can help focus needed work.
- It helps to see common work and not duplicate work.
- High school teachers are easy to blame middle school teachers. Middle school teachers are easy to blame elementary school teachers. Everyone blames parents. We all need collaboration.
- Will additional time be given to focus on math in their class?
- If we are not, then we need to look at data of higher level courses to see if demographics have changed since CMP has come into play.

## Math Specialists

1. From my perspective of having a child in 4/5, there is a focus/specialist already.
2. What is a specialist? At the elementary level, they'll have to look at your certifications and what you've done. Referenced Math Masters class. Without looking at teacher's professional development, won't find enough teachers with math minors.
3. One problem is that it takes away flexibility at small schools – need to use staff flexibly.
4. Need to use the elementary curriculum – what kids need in 4<sup>th</sup> or 5<sup>th</sup>.
5. Specialist for my child is a great idea – my child needed a teacher that recognized his talents and accelerated his curriculum. My daughter is bored in math at 6<sup>th</sup> grade and would benefit from a specialist. He does give her extra credit work.
6. This recommendation doesn't necessarily respond to issues in #6 – not tracking, just having more math knowledge might also include information regarding handling differences among learners.
7. Part of issue is DPI and certification UW designs courses – may need to be Wisconsin – not just Madison.
8. Smaller school districts sometimes have students change teachers by subject.
9. Other models – Sennett houses – teaching teams.
10. References to changes from 6<sup>th</sup> (modified core) → 7<sup>th</sup> → 8<sup>th</sup> (more like high school). Recognize the variability in structure from school-school within MMSD at a grade level.
11. If I know that my daughter would do better in the model used by another school, but I can't use that as the basis for in-district transfer.
12. Common 5<sup>th</sup> grade curriculum might help.
13. If you have kids coming to middle school from 4-5 schools, can you see patterns by elementary school or teacher? NO per middle school staff present.
14. There is open communication between 5<sup>th</sup> and 6<sup>th</sup> (and 8<sup>th</sup> and 9<sup>th</sup>) teachers, but it's very hard to do.
15. Also, we had Memorial area math meetings at one time and that helped share information about kids and programs.

16. How much do you share at transition meetings? We don't have them for general education kids (others did have transition meetings for both regular education and special education students).
17. Teachers need to have opportunities to share information and learn from each other. Want to recommend teacher to teacher communication vs. directives from T&L.

Refocused on question:

1. Integrated curriculum at Spring Harbor would suffer – could still do it in a junior high model.
2. Would lose mentoring of young middle schoolers at point of transition and relationships between staff and students. Recommend that we don't do specialist design at 6<sup>th</sup>.
3. Have specialists already at middle school in PE, band, etc. How does that work in terms of mentoring, relationships, and the MS model?

### **Math Specialists Group #1**

- What is going to happen with 5<sup>th</sup> grade?
- What is a "math specialist?"
- What curriculum would be used with grade 5? (It is different from middle school curriculum which is grades 6-8 – CMP.)
- Math specialist could offer challenges to "TAG" students or maybe not! Hopefully specialist could better address differentiation.
- How would math specialist affect the "teams" in the current middle school settings? Would it be more like a junior high setting?
- This would probably improve communication between 5<sup>th</sup> and 6<sup>th</sup> grade teachers.
- How is information communicated from grade 5 to grade 6? What is done for transition?
- What happens to integrated curriculum? Will we lose this?
- What will happen to "middle school design?"
- Have a math specialist in only grades 7 & 8 and not 5 & 6.

(LAST ONE)

- Surprised that there isn't a math specialist already. Required background? (1-8 certification)
- Ridiculous
- Explanation at certification process
- How prepared are the students coming in from elementary?
- Clarification: cycles through several years, need understanding of fractions, teacher needs to be qualified above/below
- Strong background of elementary students at Lincoln – focus them on coherence
- Discrepancy of students knowledge and gaps
- Middle school – affective element is critical, strength of teacher is key, "specialist" approach needs to be done correctly
- Math Masters already been done
- Single textbook? Great idea! Variety/movement – frustrating.
- Elementary – not a decent, choice upon text available
- Emphasis on teacher collaboration
- Can you read all students with one text? Depends upon the teacher and teacher knowledge, need to supplement, can do if know what you teach.
- Calculus teacher – would use complex strategies and not know MS learning
- Reading specialist – same approach? Mid-term step?
- Fear? Not enough in pool.
- Coordinator at school – support not just staff, also address parent support, help their student learn
- IRT – very helpful role (READ 180 program example) – intervention/four block – powerful, have at Cherokee in here of WL
- Support additional time
- Teacher knows material – no problem – credibility – deal with issues well – no credibility with teacher with content respect – comes from content knowledge – can go beyond grade level – this will help all struggling and adolescent issues
- Can't teach if you don't know subject. Don't want students to "just survive."
- Knowledge of subject – feel it
- Pairing of subjects at elementary become passionate at content
- Pairing with secondary education, student teacher – compliment at other's strength – math teacher not confident – math secondary education
- Students can interact with several teachers
- 6<sup>th</sup> grade is good for transitional year – still ok for middle school model
- Higher level – more important to specialize
- Teacher interest is important
- Whatever model – teacher must know content

- Ensure teacher is well prepared
- Test? Rumor at hiring practice.
- Not 3-year – too long
- Immediate benefits – can we see results now?
- Began 2006 – now 2008 – see options soon – teacher may want to do this now
- Support for teacher, same time to implement
- Clarify specialist – define is it classroom teacher? Defined as knowledge – not certification – "math geek"

**Curriculum Plan  
Middle School Math Specialist**

**Middle School Mathematics Partnership Recommendations for  
Course Content and Structure**

General characteristics of all courses include:	Hours: 45 contact hours; (homework and practicum work is in addition to 45 contact hours)	Provider(s)/Developers: Developed and team taught by UW faculty/staff and MMSD Mathematics Resource Teachers	Resources Needed: Time for collaboration design between UW and MMSD
Characteristics that are course specific:	Topics	Format	Timing
Number and Generalization	<p>The following is a brainstorm list from the committee. Further research and discussion will be necessary for the design of the course content.</p> <ul style="list-style-type: none"> <li>Equivalence</li> <li>Computational Algorithms (standard and non-standard)</li> <li>Operations</li> <li>Place value/base ten</li> <li>Equal sign</li> <li>Decimal notation</li> <li>Properties of number(Field Axioms)</li> <li>Generalizability of computational strategies</li> <li>CGI problem types</li> <li>Euclidean algorithm (Division)</li> <li>Divisibility tests</li> <li>Prime factorization</li> <li>Conjectures about odd and even numbers</li> <li>Large numbers (Scientific Notation)</li> <li>Multiple representations of computational strategies</li> </ul>	One Week (15 hours) Summer Class plus regular meetings (10X3 hour meetings) through out the school year	First class in sequence; First cohort to begin summer of 2010
Rational Number and Proportional Reasoning	<ul style="list-style-type: none"> <li>Analyzing Change (e.g. rates and ratios)</li> <li>Fractions and operations with fractions</li> <li>linearity/non-linearity</li> <li>Probability and statistics as context</li> <li>Fraction Represents what?</li> <li>Partitive and quotative(measurement)</li> <li>Derive and explain invert and multiply</li> <li>Representation of fractions</li> <li>What is the whole?</li> <li>Ratio table (Iterating a ratio)</li> <li>Developmental stages of proportional reasoning</li> <li>Use of cross multiplication</li> <li>Effect of changing part of ratio on the entire ratio</li> <li>Relate to linear function</li> </ul>	Semester class	Second class in sequence; Offered in conjunction with Number and Generalization; First cohort to begin fall 2010

**Curriculum Plan  
Middle School Math Specialist**

**Middle School Mathematics Partnership Recommendations for  
Course Content and Structure**

<b>Characteristics that are course specific:</b>	<b>Topics</b> The following is a brainstorm list from the committee. Further research and discussion will be necessary for the design of the course content.	<b>Format</b>	<b>Timing</b>
Geometry, Measurement, Trigonometry	Similarity Trigonometric Functions (intuitive understanding of the unit circle) Properties of two and three dimensional shapes (e.g. area and perimeter) Symmetry/Transformations Scale Factor and Scaling Pythagorean Theorem	Semester class	Third class in sequence; First cohort to begin spring 2011
Algebra and Functions	Multiple Representations (connections between) Linear and non-linear functions Symbolic fluency (writing, operating with, modeling, solving,...) with expressions and equations Function (linear, exponential, quadratic, inverse functions, composite functions, rational functions) Domain and range Variable (Literal symbols) Include topics through Calculus	One Week Summer Class plus regular meetings through out the school year	Final class in sequence; First cohort to begin summer 2011
Experimentation, conjecture and reasoning	Nature of proof Generalizing Justifying/Proving Discrete Math Levels of proof		

## Mathematics Task Force Budget Proposal 2009-2010

The following is a proposal from the \$150,000 that is in the 2009-10 Budget for the implementation of the Mathematics Task Force Recommendations. While this budget is primarily focused on the implementation of consistent district-wide curricular resources, the 2010-2011 budget will shift to support the implementation of the Middle School Mathematics Specialist professional development plan through tuition reimbursement.

Professional development will be provided to District staff for each of the following items.

### Middle School District-Wide Consistency

Additional support is needed at various Middle Schools to complete their transition to the latest version of Connected Mathematics (CMP2). The following estimates are based upon \$8.97 per English version book and \$9.47 per Spanish version book. The District needs approximately 10% of the books in Spanish.

Professional development will be provided through in-class and online support, summer institutes and the Middle School Mathematics Leadership Academy.

School	Grades	# of books	# of copies	Total Cost
Hamilton	8 <sup>th</sup>	2	200	\$3,608.00
O'Keeffe	8 <sup>th</sup>	3	135	\$3,653.10
Sherman	8 <sup>th</sup>	3	65	\$1,758.90
	8 <sup>th</sup>	2	140	\$2,525.60
Spring Harbor	7 <sup>th</sup>	1	100	\$902.00
	8 <sup>th</sup>	3	90	\$2,435.40
Toki	8 <sup>th</sup>	8	175	\$12,628.00
Whitehorse	6 <sup>th</sup>	3	150	\$4,059.00
	7 <sup>th</sup>	2	190	\$3,427.60
	8 <sup>th</sup>	3	130	\$3,517.80
			<b>Total Estimate</b>	<b>\$38,515.40</b>

### Elementary School District-Wide Consistency

Based upon teacher feedback through a survey provided to Instructional Resource Teachers on October 2<sup>nd</sup>, the schools indicated the following resources should take priority in the next phases of implementation of recommended materials for balanced mathematics.

Professional development will be provided through the building-based Instructional Resource Teachers, online support and summer institutes.

### **Survey Result Priority #1**

The following resource presents the final component of teacher resources that will compliment the Learning Mathematics in Primary/Intermediate Grades instructional guide and the Investigations teacher resource guide.

Teaching Student-Centered Mathematics by John Van De Walle:

Grades K-3 = 145 copies

Grades 3-5 = 102 copies

Grades 5-8 = 93 copies

The District will search out the lowest pricing possible on the market. The current range of pricing is from **\$8,297.80 to \$12,563.00**.

### **Survey Result Priority #2**

The following resource is the main research that has gone into the MMSD mathematics intervention suggestions in SIMS and in Chapter 10 of the Learning Mathematics Guides. Many teachers have found these to be helpful resources when providing interventions.

Teaching Number series by Robert Wright:

Teaching Number in the Classroom: 4-8 Year Olds = 158 copies

Teaching Number: Advancing Children's Skills and Strategies = 480 copies

Early Numeracy: Assessment for Teaching and Intervention = 64 copies

The District will search out the lowest pricing possible on the market. The current range of pricing is from **\$23,866.98 to \$28,302.90**.

### **Survey Result Priority #3**

Primary Mathematics Workbooks:

To reach full implementation of the Primary Mathematics Workbooks, the 13 non-Title I schools would need 7,206 workbooks from levels 1A-6B.

Total Estimate at \$7.65 per book = **\$55,125.90**

### **High School District-Wide Consistency**

All high school professional development through Lenses on Learning is being supported through REaL grant and Teaching and Learning existing funding.

### **Total Cost Proposal**

Total estimated costs for curricular resource purchases with Mathematics Task Force Implementation funds depending on negotiated purchases range from **\$125,806.08 to \$134,507.20**.

# Mathematics Partnership

Daniel Nerad, Superintendent    May 13, 2009

## .....Goals.....

Through a collaboratively planned partnership between the Madison Metropolitan School District (MMSD), the University of Wisconsin-Madison School of Education and the Department of Mathematics, the University of Wisconsin Extension, the following goals will be addressed:

1. Define middle school math specialist criteria and evaluation process within MMSD and for reference to DPI.
2. Develop a curriculum plan to provide District middle school teachers with professional development to improve math instruction. The plan will focus on mathematical knowledge for teaching.
3. Identify how the curriculum plan will be implemented including the number of professional development sessions, the total hours, format, timing and session providers.
4. Utilize the partnership to evaluate the plan to provide middle school teachers with professional development experiences to improve mathematics instruction and to make necessary adjustments based on the evaluation.
5. Other goals may be developed upon the collaborative development of the plan; in particular there may be UW specific goals for systemic benefits from participation in the partnership.

## .....Guiding Principles.....

For the partnership to be effective and sustainable, the following guiding principles will be adhered to:

- √ The plan will be developed by a predetermined number of participants from each entity involved.
- √ The plan will be developed through meetings of the partnership.
- √ The partners will demonstrate respect for the various roles each partnership institution provides.
- √ Partner representatives will be assigned based upon commitment to common goals and mutually beneficial outcomes.
- √ Consensus decision-making processes will be used by the partners to make decisions connected with the goals of the partnership.
- √ If a mutually developed plan cannot be arrived at through the partnership process, this will be acknowledged by the partners with the understanding the District will then seek other means to plan and implement a professional development model to improve instruction of middle school math teachers.

## .....Planning Process.....

The following planning process will be utilized by the involved partners.

- Each individual partner institution will formally assign members to the planning group.
- A facilitator will be utilized to assist the partners in developing the plan.
- The plan will include costs and necessary implementation resources.
- When drafts of the plan are developed, they will be sent for review to the Superintendent of Schools and the Deans of Letters and Science and the School of Education.
- The final plan will be approved by the Superintendent of Schools and the Deans of Letters and Science and the School of Education prior to being submitted to the Board of Education for final approval.

# UW Math and Math Ed Meeting

## February 26, 2009

Introduction

Overview

### Achievement Gap

- What causes the achievement gap?
- Influence of families?
- Survey – great # of minority families.
- Families need feedback.
- Value of collaboration effort. Research and content draw on these resources, plus research on achievement gap.

### Scores

- African-American – score low statewide.
- Like racial group = comparable.
- Slipping, explanation? Scores relative to same groups?
- Separated out MMSD / min. – doing better than outside groups
- 6 districts similar districts in WI, 10,000+ = MMSD doing well in comparison

### Student Expectations

- Algebra by 8<sup>th</sup> grade, rushing too much, focused on going deeper, wider; not a good idea; deeper; appreciate, use the math. Should have ability to remember.
- Geometry 9<sup>th</sup> grade, finished required by 10<sup>th</sup> – no more math in high school – haven't had anything for 2-3 years – must continue to learn → high school.
- Can students finish math in 8<sup>th</sup> or 9<sup>th</sup> grade? They should continue math study throughout high school.

### Make Learning Interesting

- Make learning interesting for kids (e.g., dice & monopoly – learn quickly = games; trick, based on algebra identity).
- Make learning math interesting for kids. Dice race around the monopoly board.  $2X - X^2 + X = 1$  ?

### Teacher Knowledge & Specialists

- Need to start with local system, model collaboration = to improve middle school content knowledge.
- Teachers don't have knowledge to do this and don't believe what you say.
- Problem – teaching out – now need more math knowledge.
- Our expertise is math content knowledge.
- Grab on to others who have other knowledge.
- Agree – more resources to teach knowledge – not more technology.

- Big issue: current teachers need math content knowledge – math department can provide – mathematicians can get involved.
- Put more emphasis on teacher content knowledge.
- Resources are needed. Grade 6-8 certifications are needed. We need to lobby with state. Message comes from MMSD.
- Resources are needed. UW-Math needs resources to help. MMSD should lobby state for more resources.
- Pre-K, 8 certifications OR 6-12 certifications – not this one but add math content to middle school.
- Some states have middle school certifications – special program.
- Why not 6-8 certifications?
- What is difference between recommendation 2 and 5? Why not say 6-8 math teachers need 6-8<sup>th</sup> certification? Clarify that certification change would be gradual.
- The state and school districts are standing in the way of a middle school math specialists. Both want generalists. (Why can the district set own requirements? Have local system provide a model for the state. Have PD when they take the job?) Teachers not educated enough in math to do this.
- Not valued. No market. Principal doesn't want to have specialist. When state values this, will be attractive.
- Superintendent of Beloit, no need for middle school specialists. Not going to happen.
- Formulate a model = math specialist.
- Define math specialist.
- Set up a committee of 3 entities (UW Math, UW Math Ed. And MMSD) to set up a curriculum, requirements. Goal degree for math specialist. Funds from NSF?
- #2 vs. #5 – hire specialist ≠ high school certification.
- More improvement – content knowledge is critical. Hope MMSD will come to Math Department for help/collaboration. Don't gloss over "Math Specialist" definition – be very careful about definition.
- Financial incentive certification.

### Textbooks

- Large extent teachers aren't using textbooks – using worksheets. Why?
- Textbook isn't responsive to students. Very diverse; textbooks ≠ diverse.
- K-12, teaching good, textbooks not as relevant but, realistic how many good teachers do we have? Parents need this resource. Is important, good resource is needed.
- Elementary teachers are not using textbooks. Why aren't textbooks being used? (BS shouldn't say students require different approaches.) No research supports that. I want to see research. Kids have trouble reading a textbook.
- Do see trouble reading a textbook. Issue later on, especially high school and college.
- Important to have a good textbook.

### Calculators

- Agree, too much emphasis on use of calculators. Don't know how to add fractions.

- Like – less emphasis on use of calculators.
- Too much emphasis on calculators in the grades. Kids can't add fractions in calculus – less calculators.

### State Requirements

- State, increase high school grading requirements to 3 years.
- State committee suggested DPI encourage students to take 4 years.
- Most broken thing, DPI no additional expertise required. Reason = convenience for state and principals. Autonomy of principals for generalists. Results = middle school math learned on job.
- WKCE, 2003 analysis, misleading NAEP...MMSD increase, decrease, below state average.
- State committee goes on separately. Not right.
- Get UW/MMSD backing/state.
- State committee is too separate. Need more communication.
- DPI stated non-starter, won't bend on this

### Common Ground

- Come together, find common ground. Work on teacher training, leave curriculum to district. Teachers collaborate to provide in-service. School of Ed to come up with financial incentives, piece of paper.
- Focus on content, leave curriculum to those who deal with teaching.

### Professional / Staff Development

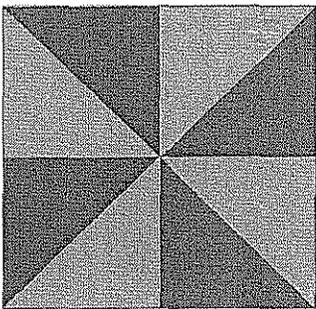
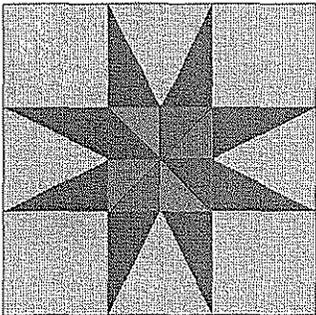
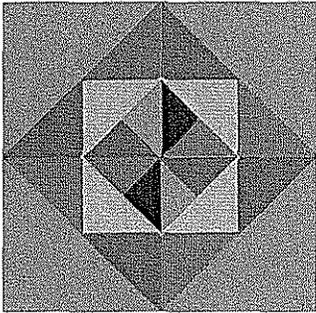
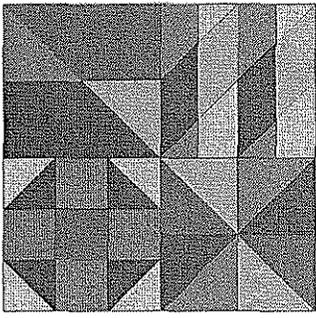
- BOX, 3 people to design/run professional development with current teacher and create a 3-year degree. PM courses?
- Comprehensive design for professional development – price/partners – consistent with our thinking.
- Up in the air – at professional development.
- SD should come to UW for course on a large scale for middle school – big staff, faculty, grad students to help implement PD on large scale.
- School of Ed has good research on how to do successful PD.
- Less money for technology – more for PD.
- Board will be presented with a 1-year plan for PD. Welcomes input on a model.
- Math Ed, Math + MMSD = PD plan.
- EMK – one week institute + 1 year
- New Title IIB – require 3 years
- What is incentive? Degree

- Longer, deeper than Math Masters. Not enough.
- Masters in mathematics? Six years ago Math & Education Masters developed. Not well known. No market for it because it isn't valued? Principals won't hire? (You can get Master's from St. Louis University called Math Ed?)
- Deeper level than Math Masters.

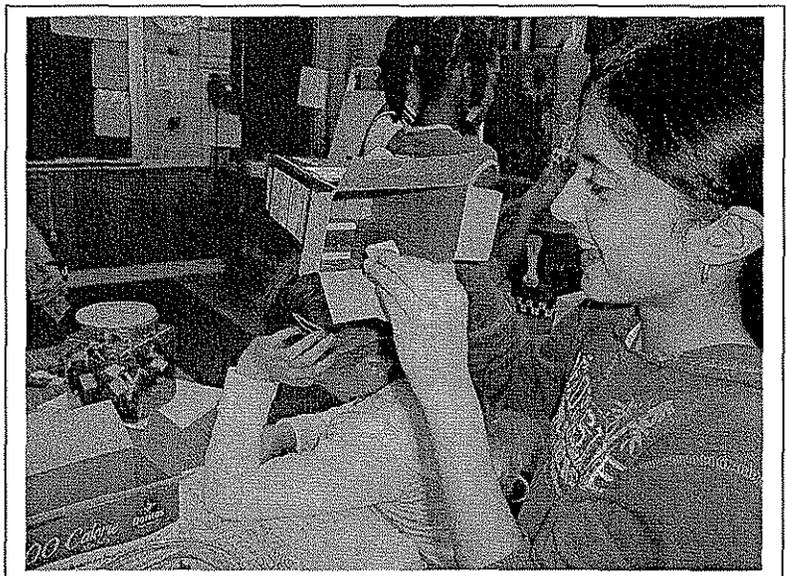
### **Scholarships**

- Committee led to a math minor supported by a scholarship.
  - Yes, 7-18 students – scholarship attracts students.
-

# Elementary Balanced Math Resource Recommendation Table of Contents



1. Justification for Core Curricular Resources in Elementary Math
2. Descriptions of MMSD Elementary Balanced Math Resources
3. How MMSD Elementary Balanced Math Resources Support a Balanced Mathematics Framework Chart
4. Elementary Balanced Math Resources Recommendation Timeline 2005-2012



“Mathematically proficient students have the necessary skill to carry out procedures flexibly, accurately, efficiently, and appropriately.”

## Justification for Balanced Mathematics Resources at Elementary

Madison Metropolitan School District mathematics standards define the mathematics that children should know and be able to do. These standards were drafted to address the need for grade-level proficiencies to be successful in future math related experiences as well as on the Wisconsin Knowledge and Concepts Exam. As such, the standards provide a framework for teaching math in the elementary grades.

The Teaching and Learning Math Department has worked closely with Madison teachers over the past five years to develop two instructional guides entitled *Learning Mathematics in the Primary Grades* and *Learning Mathematics in the Intermediate Grades (LMIG)*. These guides provide the core instructional plan for teaching a balanced math curriculum to all children in MMSD.

Notably, the guides incorporate years of research from around the world about how children learn mathematics (see Appendix in *LMIG*). The *Learning Mathematics* guides offer information about process and content standards, assessment of student learning, communication to parents, ways to organize classrooms, and activities to help children develop mathematical proficiency. Nearly all teachers in MMSD have received these guides along with some professional development to begin implementing the ideas within them.

However, ongoing professional development is critical. The department recommends:

- math instructional resource teachers in every elementary school and continued professional development for these IRTs
- ongoing professional development to help teachers delve deeper into the math content knowledge they need for teaching
- special attention to strategies aimed at closing the achievement gap
- continued development of intervention strategies for students who fall outside the expected learning trajectory (considerably below or above proficiency)
- continuation of online classes for teachers about to provide additional support for a balanced math framework

Teachers also need published instructional materials (those that school districts purchase from education publishers) to support their balanced math curriculum.

In 2000, a math leadership committee recommended published materials to support the MMSD Framework and Strategic Plan. In 2005, a committee of district math resource and classroom teachers analyzed the use of those materials. Evidence suggested that some materials didn't function as expected and the committee identified a new set of elementary core curricular resources. The recommendations in the recent Math Task Force report affirmed the need for K-5 resources.

The following criteria influence our ongoing evaluation of nationally published education materials. The materials must:

- Comply with the instructional framework provided within *Learning Mathematics in the Primary Grades* and *Learning Mathematics in the Intermediate Grades*
- Allow for flexible use of the materials so that math instruction meets the diversity of our learners and classroom structures
- Support the grade-level learning trajectories implicit in the math standards

Strong educational systems support and encourage diversity. No one set of student or teacher materials supports the diversity in our district. The Teaching and Learning Department, in partnership with building based staff, is therefore recommending a set of core resources to support student learning, instead of a “single textbook.”

The following selection criteria builds on the 2005 evaluation that had recommended using *Everyday Mathematics*©2004 or *Investigations*©2004 and a pilot of *Math Expressions*©2005.

1. The balanced mathematics curricular resources (published instructional materials) should align with the district math process and content standards and the new instructional framework.
  - a. The 2005 Curriculum Evaluation Committee rated *Everyday Math* high in support of MMSD standards. However, *Everyday Mathematics* does not currently support the MMSD instructional balanced math framework due to a spiraling curriculum design, expected pacing guide, and constraining lesson sequence requirements.
  - b. The 2005 Committee rated *Investigations* high. The committee noted that *Investigations* had gaps in the alignment within the number, operations and algebra standards and therefore required supplementation. However, *Investigations* can support the new instructional framework due to its modular design.
  - c. The Committee recommended piloting *Math Expressions*. It has a structured pacing guide and whole group lesson design that is inconsistent with the MMSD instructional framework. However, some teachers have modified the design to meet the balanced math framework.
2. The balanced mathematics curricular resources must allow for flexible use in order to provide differentiated instruction for all learners, including students in a multi-age classroom.
  - a. *Everyday Mathematics* requires students to proceed sequentially through every lesson as described in the Teacher Guide, without variation.
  - b. *Investigations* modules provide units that can be implemented separately. Other materials can easily be substituted into the suggested sequence.
  - c. *Math Expressions* requires students to proceed sequentially through every lesson as described in the Teacher Guide. The curriculum guide provides some alternate problem choices for differentiation but not in-depth teacher guidance about learning trajectories and who should use them.

3. The balanced mathematics curricular resources should support the District's bilingual education program by supplying materials in Spanish or by granting permission to translate the program. It should be feasible to translate all student materials.
  - a. *Everyday Math, Investigations, and Math Expressions* provide student and teacher materials in Spanish.

Experience with current materials adds the following refinements to the selection criteria:

1. The balanced mathematics curricular resources should provide teachers with content explanations and student work examples.
2. The balanced mathematics curricular resources should provide guidance for differentiation of mathematics content and teaching strategies based upon the mathematical knowledge and skills of the individual student.
3. The materials should incorporate the current research in children's development of mathematical knowledge.
4. The balanced mathematics curricular resources should be non-biased and culturally responsive to provide meaningful and memorable mathematics for all students.

## Descriptions of MMSD Elementary Balanced Mathematics Resources

### Recommended Professional Resources for Classroom Teachers

*Listed by priority*

#### *MMSD Learning Mathematics in the Primary Grades. Current edition*

*This teacher guide provides information for the development of a balanced math curriculum in grades K-2. In addition, the guide provides information about assessment and intervention for students who struggle with basic math concepts. Some intermediate students may need instruction at this level. As such, this guide should be readily available for teachers in grades 3-5.*

#### *MMSD Learning Mathematics in the Intermediate Grade. Current edition*

*This teacher guide provides information for the development of a balanced math curriculum in grades 3-5. In addition, the guide provides information specifically about more advanced topics appropriate to intermediate level students. Some primary students may need instruction at this level. As such, this guide should be readily available for teachers in grades K-2.*

#### *Van de Walle J.A. 2005. Teaching Student-Centered Math in Grades K-3*

*This professional resource provides teachers with the foundations of the most important ideas for children's mathematics and how to best teach them. The author provides an in-depth explanation of additional foundational concepts not present in the intermediate grade books. As such, it is important material for intermediate teachers as well as primary teachers.*

#### *Van de Walle J.A. 2005. Teaching Student-Centered Math in Grades 3-5*

*This professional resource extends the foundations discussed in the K-3 edition to more advanced concepts developed in the intermediate grades. As such, it is important that this book be made readily available for both primary and intermediate teachers.*

#### *Investigations Teacher Curriculum Package*

*The units for Geometry, Measurement, Data and Probability are recommended. These extensive guides provide activities and problems for students to develop concepts and skills in areas other than number and operations. Recommendations from teachers who have used these materials is available on request from the Teaching and Learning Department.*

#### *Primary Mathematics Textbooks Series 1A-6B and Challenging Word Problems U.S. Edition*

*These textbooks provide a wide-range of problems from the simple to more complex for advanced students. These materials provide examples for teachers new to writing word problems for their students. It is important that teachers learn how to choose the appropriate problems and activities with the support and guidance of their math resource teachers. Schools may need to purchase additional books for individual teachers specific to the needs of their students.*

### Recommended Professional Library Resources

*Listed by priority*

#### *Carpenter T.P., et.al. 2003. Thinking Mathematically: Integrating Arithmetic & Algebra in Elementary School*

*This resource written by renowned researchers Carpenter, Franke, Levi at the University of Wisconsin and University of California, Los Angeles provides the research base, direction, and guidance to support one of the most important features of MMSD's balanced math curriculum, the development of algebraic reasoning. It extends the discussion presented in the Learning Mathematics guides so that teachers will fully understand how to implement this portion of the balanced math curriculum in grades 1-5.*

#### *Carpenter T.P., et.al. 1999. Children's Mathematics: Cognitively Guided Instruction*

*This is the primary resource, written by renowned researchers Carpenter, Fennema, Franke, Levi and Empson, in Cognitively Guided Instruction(CGI). The text describes how young children develop mathematical thinking through problem solving. The CGI framework continues to be at the core of MMSD's balanced math curriculum.*

**The following three texts form the basis for the intervention work done at our district.**

*Wright, et.al. 2003. Early Numeracy; Assessment for Teaching and Intervention*  
*This text clearly outlines the stages of development in early numerical understanding and includes the background for MMSD's Number Development Assessment.*

*Wright, et.al. 2003. Teaching Number; Advancing Children's Skills and Strategies*  
*Within this book there are learning activities for one on one instruction. Many of the ideas in our district's intervention chapters stem from the activities in this text.*

*Wright, et.al. 2003. Teaching Number in the Classroom with 4-8 Year Olds*  
*This third book uses the learning activities in the previous books and extends them for teaching small groups of children in the classroom.*

*Van de Walle J.A. 2005. Teaching Student-Centered Math in Grades 5-8*

*This professional resource extends the foundations discussed in both the K-3 and 3-5 edition. As such, it is important that this book be made readily available for elementary teachers with students who need to extend the learning of any particular child. (In addition extra copies of the K-3 and 3-5 texts should be available for paraprofessionals and other staff)*

*Principles and Standards of School Mathematics, NCTM, 2000.*

*This comprehensive resource and guide is grounded in the national research in mathematics education. This important tool for teachers and education professionals updates the messages of NCTM's previous Standards and shows how students' learning should grow across four grade bands—pre-K–2, 3–5, 6–8, and 9–12. It incorporates a clear set of principles and a sharper focus on how students' knowledge grows as shown by recent research. This national document forms the basis for much of the work in our state and district.*

*EDThoughts- What We Know about Mathematics Teaching and Learning, McREL, 2008.*

*This publication, updated in 2008 summarizes educational research and surveys best classroom practices in elementary mathematics. It also answers many questions put forth by the community and other educators, as well as offers implications for improved teaching and learning, including, Foundations for Success: Report of the National Mathematics Advisory Panel.*

*Helping Children Learn Mathematics, National Academy Press, 2002.*

*This text is cited in the beginning of each of the Elementary Math Notebooks. The authors explain the five strands of mathematical proficiency and discuss the major changes that need to be made in mathematics instruction, instructional materials, assessments, teacher education, and the broader educational system and answers some of the frequently asked questions when it comes to mathematics instruction. The book also provides recommended actions for parents and caregivers, teachers, administrators, and policy makers.*

## **Recommended Student Materials**

One single published instructional program currently on the market cannot adequately serve all students well. Given the diversity of our student population, the Teaching and Learning Department suggests parts of *Investigations* and *Primary Mathematics*. Each should be enhanced through the careful selection of problems and activities that meet the needs of individual or small groups of students. Ultimately, teachers should be designing specific problems and activities as needed based on professional development that supports their reflective practice.

The following recommendations are based upon MMSD's current knowledge regarding best practices in elementary mathematics and reflect the current funding and organizational structures present in MMSD. These recommendations will be continuously reviewed and enhanced to stay current with research and the changing landscape in MMSD.

### ***Manipulatives (See attached spreadsheet for district inventory list per grade band)***

*Every elementary classroom and school should have a core set of math manipulatives to support their instruction. These should be readily available and easy to access for teachers. A recommended grade-level list is available in the Learning Math guides as well as from the Teaching and Learning Department.*

### ***Math Boxes and Math Journals***

*Math Boxes are a take off from Literacy Book Boxes, which contain a student's INDEPENDENT level materials. In Number and Operations this can include; a fluency number range, number identification cards, a fluency/maintenance game, a strip of numbers to practice counting, a number sorting activity and a numeral writing activity. These boxes might also be used to house independent activities for Geometry, Measurement and Data. Math journals or notebooks can be reflectively integrated into practice as early as kindergarten. These tools allow students space to solve and represent problems. A math journal is both a work log and workspace.*

### ***Optional Investigations Student Activity Books for Geometry, Measurement, Data, and Probability***

*At this time the preliminary feedback around workbooks from teachers in the district is mixed. The need for such workbooks is highly dependent on the culture of each school building and the needs of the teachers. Building leaders should spend time discussing with their staff which, if any student workbooks are necessary before ordering. Further support is available by request from district math resource teachers. These workbooks are also available in Spanish for ELLs, ESL or Bilingual programs.*

### ***Primary Mathematics Student Workbooks***

*These workbooks provide opportunities for students to build fluency and maintain concepts in number and operations. Teachers will need to assess their students' independent levels in order to select the appropriate book(s) for each student from their school's collection. For budget planning it is anticipated that most students will utilize two books in a school year. Currently preliminary estimates are suggested on the ordering spreadsheet. As the use of these materials becomes common practice, these estimates will be refined. It may be possible for teachers within a school to purchase needed materials for the following Fall based on the book a student is using in Spring. By using these workbooks for fluency and maintenance schools will be able to reduce copying costs.*

## **Recommended Secondary Resources**

A list of additional recommended professional resources and student materials to support a balanced math curriculum is available from the Teaching and Learning Department. All software included in the *Investigations* curriculum package is recommended. Many schools have used this software in the REACH classrooms as a support to daily math instruction.

## **Other District and Teacher Created Materials**

Teachers in Madison continue to develop student-centered materials to support the balanced math curriculum. These materials generally support students at their independent level to build fluency and maintain their knowledge and skills throughout the school year.

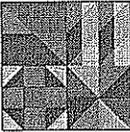
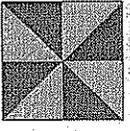
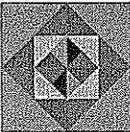
Word problem examples and additional supports are available in the District intranet to assist teachers in writing their own problems for students.

(i.e.: [http://dww.madison.k12.wi.us/tl/math/elementary/math\\_problems\\_intermediate.htm](http://dww.madison.k12.wi.us/tl/math/elementary/math_problems_intermediate.htm))

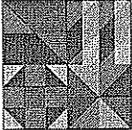
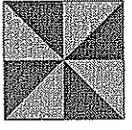
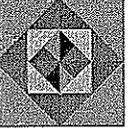
## How MMSD Elementary Recommended Resources

### Support a

### Balanced Mathematics Framework

<b>Number, Operations, Algebra</b>						
	Kindergarten	First	Second	Third	Fourth	Fifth
<b>Problem Solving</b>  	<p>Problem-solving activities should invite the study of mathematics and provide a context in which concepts and skills are learned. Through problem solving students learn to make effective use of their knowledge which in turn builds competence, a productive belief in their ability to do mathematics, and prepares them for everyday life.</p> <p>Using the <b>Assessments</b> from Ch. 4 in LMPG/IG and <b>the Teaching and Learning Cycle</b> teachers match problems with a child's instructional and independent level. These problems come from the joint classroom experience of the teacher and student. During problem solving activities, students are engaged in meta-cognitive work around reasoning, communicating and representing mathematical problems. Teachers need a diverse and comprehensive set of resources at their fingertips to meet students at their Zone of Proximal Development.</p>					
	<p><b><u>Supporting Balanced Math Resources:</u></b>  <i>Learning Mathematics in the Primary/ Intermediate Grades</i>  <i>Teaching Student Centered Mathematics</i>  <i>Math Journals</i>  <i>Story Problems from the dww</i></p>					
<b>Fluency and Maintenance</b>  	<p><b><u>Supporting Balanced Math Resources:</u></b>  <i>LMP/IG Ch. 9</i></p>					
	<p><i>Math Boxes</i> for Fluency and Maintenance                      Optional: <i>Math Journals</i></p>		<p><i>Math Journals</i>                      Optional: <i>Math Boxes</i></p>			
		<p>Optional: <i>Primary Mathematics Workbooks</i></p>	<p><i>Primary Mathematics Workbooks / Challenging Word Problems</i></p>			
<b>Number Work</b>  	<p><b><u>Supporting Balanced Math Resources:</u></b>  <i>LMP/IG Ch. 7</i></p>					
	<p>Number work is a <b>multiple entry point</b> activity that is developed into a <b>routine</b> that can be used as a whole class activity or individually.</p>					
	<p><i>Math Boxes/ Math Journals</i></p>			<p><i>Math Journals</i></p>		
	<p><i>Teaching Student Centered Mathematics</i>  <i>Investigations: 10 minute math</i></p>					
<b>Inspecting Equations</b>  	<p>Teacher Designed Mini-lessons  <b><u>Supporting Balanced Math Resources:</u></b>  <i>LMPG/IG Ch.8</i> and <i>Thinking Mathematically</i>  <i>Math Journals</i></p>					

**Geometry / Measurement and Data & Probability**

	Kindergarten	First	Second	Third	Fourth	Fifth
Problem Solving 	The goals of the problem solving block remain the same in these standard strands. However the problems may be more open ended and students can work in cooperative groups while investigating multiple perspectives. During problem solving activities, students: <ul style="list-style-type: none"> <li>▪ identify and understand the elements of the problem and their relationships</li> <li>▪ engage in finding one or more ways to answer the question(s) in the problem</li> <li>▪ represent and share their strategy(ies)</li> <li>▪ reason about the accuracy of their solutions</li> <li>▪ compare their strategy(ies) with the strategies used by classmates</li> </ul> <p align="center"> <b><u>Supporting Balanced Math Resources:</u></b>  <i>Investigations, Learning Mathematics in the Primary/Intermediate Grades and Teaching Student Centered Mathematics</i> </p>					
Fluency and Maintenance 	Centers, Games and/or Math Boxes		Optional: Centers, Games and/or Math Boxes			
	<p align="center"> <b><u>Supporting Balanced Math Resources:</u></b>  <i>Investigations Math Workshop</i>  <i>LMPG/IG Ch. 9</i> </p>					
Number Work 	Number Work routines that have been built on throughout the year can contain ideas from Geometry, Measurement and Data. This is an opportunity for children to see the connections between all of the content standards.					
	<p align="center"> <b><u>Supporting Balanced Math Resources:</u></b>  <i>LMPG/IG Ch. 7</i>  <i>Investigations 10 Minute Math</i> </p>					



### Elementary Balanced Math Resource Recommendation Timeline 2005- 2011

Date	Audience	Location	Content	Notes
2005-2006 School Year			Analysis of current published materials and alignment to elementary mathematics standards	
Fall 2007	Math Division of Teaching and Learning		Defined need and purpose for Core Resources Selected Investigations as one component of the Core Resources	See attached statement
Winter 2008	Elementary Principals	Warner Park	Presentation of Core Resource Definition, Purpose and Plan for Spring 2008 Analysis of Investigations	
Spring 2008	Core Resources Advisory Committee	Lapham Elementary	Review of 2009 edition of Investigations resources Alignment to MMSD Standards and Purchasing Recommendations	The committee recommended that decisions be based on teacher implementation and reflection.
Spring 2008	Principals and Instructional Resource Teachers		Designed 2008-2009 Phase I implementation of Core Resources "Pilot" invitation sent to all schools	Intent: • Assessment of necessary components of Investigations for implementation of a balanced mathematics classroom
Summer 2008			Teaching and Learning supported eleven elementary schools in materials acquisition	See attached list of schools
Fall 2008	"Pilot" Schools Instructional Resource Teachers	Individual Schools	Participating school IRT engaged in planning meeting around pilot process Feedback Forms disseminated	
2008-2009 School Year	"Pilot" Schools	Individual Schools	Professional Development implemented with participating teachers around a balanced math structure using the Core Resources	
2008-2009 School Year	Teaching and Learning and "Pilot" School	Olson Elementary	Monthly collaborative meetings held to support and provide feedback around	

	Instructional Resource Teachers		Phase 1 Implementation	
February 25 <sup>th</sup> and March 3 <sup>rd</sup> , 2009	Representative teachers from "pilot" schools	Olson Elementary	Reflection of Phase 1 Core Resource Implementation	See attached summary
Spring Break 2009			Feedback Forms due to Teaching and Learning	
April 2009			Feedback Data Compiled and Purchase Recommendations provided to Elementary Principals and IRTs	
Spring 2009			Review Feedback to determine design of Phase 2	Intent: <ul style="list-style-type: none"> <li>• Feasibility study of book room model with Singapore Materials</li> <li>• Analysis of multiyear Core Resource implementation in multiage programs</li> <li>• Further analysis of necessary Investigations components</li> </ul>
Summer 2009	Elementary Staff	LaFollette HS	Summer Institutes focused on Balanced Math Implementation using District Recommended Core Resources	
Summer 2009			Phase 2 Support for material acquisition in preparation for Phase 2 implementation	Use of ARRA Funding, Math Operating Budget, and Title I funds
Fall 2009 – Winter 2009	Elementary IRT's and Principals		Develop plan for transition to Core Resource Recommendations by 2011-2012 school year.	
2009-2010 School Year			Phase 2 Implementation and Data Gathering Professional Development includes: -IRT support -online course offerings -Summer Institutes	Professional Development focuses on a Balanced Math Framework supported by the Core Resources
2009-2010 School Year			Additional Purchases for implementation support	Use of Mathematics Task Force Funding
Spring 2010			Phase 2 Data Synthesis and Design for Phase 3 Implementation	Possible Intent: <ul style="list-style-type: none"> <li>• Development of Online Support Materials, including reflections on the use of the Core Resources</li> <li>• Streamline Grade 5-6 transition</li> </ul>
2010-2011 School Year			Phase 3 Implementation and Data Gathering Professional Development includes: -IRT support	Professional Development focuses on a Balanced Math Framework supported by the Core Resources

			-online course offerings -Summer Institutes	
2011-2012	IRT's and Principals		Ordering will be made using Core Resource Recommendations list	
Ongoing			Refinement and Reflection of Core Resource Use and List of Recommendations	

DRAFT

## Narrative of High School Program Improvement Plan

### **Recommendation 6:**

Give serious consideration to selecting a single textbook for each grade level or course and to requiring a common core sequence across all high schools.

### **Recommendation 7:**

In making improvements and investing resources, the district should consider how best to reduce the large achievement gaps among subgroups of students.

### **Recommendation 9:**

More time should be provided for teacher collaboration for teachers to learn from each other, analyze achievement data, meet needs of diverse learners, plan for instruction, and ensure both horizontal and vertical alignment of the curriculum.

### **Recommendation 11:**

Instruction at all grade levels should focus on the integration of conceptual and procedural knowledge; in particular, laying conceptual foundations for procedural and symbolic manipulation skills.

### **In response to the previous listed Recommendations:**

Since 2006, the Mathematics Division of Teaching & Learning has been supporting collaborative work among all four comprehensive high schools toward greater consistency in programming. Teacher Leadership Teams from required math courses have been created and are working collaboratively to set District-wide common course standards. Simultaneously, Department Chairs have been meeting and working on course names, numbering systems and sequencing.

It is recognized that there are significantly different philosophies across our District regarding what is essential and critical mathematics for all students to learn and how that mathematics is taught. Therefore, particular attention needs to be given to what resources the District will use to guide the development of consistent programs. Decisions need to be based upon the non-negotiable outcomes for MMSD students in order for all students to be prepared for college and/or careers beyond high school. Given our current reality, the following plan has been developed for input and review by interested stakeholders. This plan is intended to develop and embed high quality, sustainable and equitable mathematics education District-wide.

### **Professional Development**

The Lenses on Learning Professional Development was developed by the Center for the Development of Teaching – Education Development Center (EDC) in Newton,

Massachusetts. Based upon prior MMSD experience with the Lenses on Learning program at the elementary level, the Mathematics Coordinator and an Assistant High School Principal participated in the Secondary Lenses on Learning: Team Leadership for Mathematics in Middle and High School Institute during the summer of 2009. The support of high school principals and assistant principals will be a critical component to the success of this initiative. Principals and Department Chairs are key co-participants in both the professional development and committee work in order to develop high quality, sustainable and equitable mathematics programming District-wide. With support of the Assistant Superintendent for Secondary Schools, the District is moving forward with using the Lenses program as a structure for working towards District-wide consistency. More information regarding Lenses can be found at [www.mathleadership.org](http://www.mathleadership.org).

The Lenses program is intended to assist schools in making programmatic improvements as they focus on the following questions:

Session 1	What does it mean to know algebra?	<i>Content</i>
Session 2	What does high quality instruction look like?	<i>Instruction</i>
Session 3	How can assessment support learning and instruction?	<i>Formative Assessment</i>
Session 4	How can we hold high expectations and provide strong support for all students?	<i>Equitable Practices</i>
Session 5	How can professional development enable teachers to improve student achievement?	<i>Professional Development</i>
Session 6	How can school leaders advance their mathematics program toward success for all?	<i>Mathematics Improvement Process</i>

### **Content Standards**

The District has begun to explore the use of the ACT College & Career Readiness Standards to be used as a guide in defining content standards in our academic courses. Beginning in spring of 2011, teachers will map mathematics content into a consistent three- and four-year course sequence. Teachers will map the course content sequence using a curricular mapping tool (Eclipse) and rubrics provided by the Lenses program. The ACT College & Career Readiness Standards will help assure that the sequence will prepare students from 8<sup>th</sup> grade math through Advanced Placement (AP) mathematics course offerings.

### **Curricular Resources**

In the fall of 2011, core curricular resources will be researched and identified through Evaluation of Learning Materials (ELM) pilots. The selected resources will support the implementation of a balanced and cohesive MMSD mathematics program for grades 9-12.

Implementation of Year One courses will begin in 2012 for both 9<sup>th</sup> grade and middle school. The evaluation plan will include systematic gathering and analysis of student and programmatic data.

**Teacher Collaboration**

The use of sub days, extended employment and/or UW credit, Eclipse and Moodle will provide a flexible and responsive collaborative working environment for classroom teachers.

**Student Achievement**

Throughout the course development process, emphasis will be placed on building systemic structures to ensure adequate challenge and support for all students. In particular, mathematics programming and instruction will be enhanced for students needing intensification, intervention and acceleration. The Lenses on Learning Professional Development offers strong models to better engage, motivate and support students that have traditionally not experienced success within the MMSD high school mathematics program. Through extensive collaboration with District staff in the Department of Educational Services and Talented and Gifted Division, learning needs for students with exceptional needs beyond classroom differentiation will be carefully examined and addressed.



MADISON METROPOLITAN  
SCHOOL DISTRICT

**Secondary Core Resources Recommendation Timeline 2006- 2013**

Date	Audience	Location	Content	Notes
2006-2007	Core Math Teachers		Leadership Team established for Algebra, Geometry and Integrated Mathematics Professional Development focused on diversity, integration of technology and connecting with community and UW partners	Funding from Diversity in Mathematics Education
2006-2007	Department Chair Meetings		Collaborative problem solving time and building leadership	Leading Every Day
2007-2008	Core Math Teachers		Leadership Teams tasked with writing standards for Algebra, Geometry and Integrated Math 1 and 2	Discussed implementation ideas for standards including assessment, curriculum and instruction.
2007-2008	Department Chair Meetings		Meetings focus on structural aspects of mathematics program	Creation of common course sequence with three exception classes for 09-10 implementation
Spring 2008	9-12 Math Teachers	Wisconsin Math Council Annual Conference	Teachers travel to Green Lake to present at and participate in state-wide mathematics conference	Funding from SCALE NSF grant
2008-2009	Core Math Teachers		Leadership Teams worked towards finalizing standards, building leadership capacity and creating scope and sequence	Collaboration expands beyond meetings via moodle.
2008-2009	Department Chair Meetings		Department chairs engaged in collaborative problem solving, data exploration, review ELM process and discussions of new role as instructional leaders	PRIME – Principles and Indicators for Mathematics Education Leaders (NCSM) Art and Science of Teaching (Marzano)
Spring 2009	Individual Department Meetings		Math Coordinator presents and discusses plan for response to MTF Recommendation #6 regarding consistency	Input gathered on plan and list of sources for guidance
Summer 2009	Math Coordinator and	Mt. Holyoke College,	Review of Lenses on Learning	Identified as crucial component for progress

	Asst. Principal	MA	Professional Development	towards consistency
Fall 2009	District Leadership Team	Mt. Holyoke College, MA	Develop two year implementation plan for Lenses Professional Development	Team consists of Math Coordinator, Math Resource Teacher, Asst. Principal, Dept. Chairs and Teacher Leaders
Spring 2010	Department Chairs, Asst. Principals, T + L, Ed. Services and Student Services		Consultant from Lenses/EDC provides two days of facilitated professional learning	Board of Education members invited to participate
Spring 2010	Building level teams		Discussions begin using Lenses case studies and articles at the building level during professional collaboration time	Includes Asst. or Head Principal
July 2010	District Facilitation Team	Mt. Holyoke College, MA	Two week intensive facilitation training provided by Lenses	Group may include Asst. Principals, Department Chairs, Teacher Leaders, Math Resource Teacher and Math Coordinator
August and Fall 2010	Building level teams		Discussions continue using Lenses case studies and articles at the building level during professional collaboration time	Includes Asst. or Head Principal
Spring 2011	Building level teams		Curriculum mapping using Eclipse and the ACT College Readiness Standards to define a three and four year course sequence to AP Calculus or AP Statistics	Careful consideration needs to be given to the needs of students that are requiring acceleration or intensification. What criteria and tools will be used for assessment of needs?
Fall 2011	District teacher teams		Review curricular resources that align with Lenses rubrics and district curriculum plan	
Spring 2012	Building level teams		Pilot potential curricular resources and make final recommendation	
Summer 2012	Year one math course teachers		Provide a summer institute to prepare teachers for implementation of new curricular resources	
2012-2013	Year one and year two math course teachers		Implementation of year one math course and preparation of year two math course implementation	
2013-Ongoing	Remaining math course teachers		Annual implementation of new curricular resources for years two –three math courses. Teachers will receive professional development prior to implementation each year.	

**MATH TASK FORCE INFORMATION SESSIONS**  
**January & February 2009**  
**Table #2 Notes**

Single Textbook District Wide

PLUS	MINUS
<b>CONVERSATION #1 (7 people)</b>	
<ul style="list-style-type: none"> <li>• mobility – transient population</li> <li>• 1 book or 2-3 resources per grade level</li> <li>• <b>new hires</b> – specific places to go – set curriculum – TAP into a common curriculum (supplement with your own)</li> <li>• vertical consistency – language similar</li> <li>• special ed would love core curriculum so for kids at 2<sup>nd</sup> grade</li> <li>• same books – same resources – same technology – same supplement</li> <li>• common differentiations in a common place for full access for teachers – maybe parents &amp; tutors too</li> </ul>	<ul style="list-style-type: none"> <li>• CMP – worst program ever seen</li> <li>• teacher only can help with homework</li> <li>• parent &amp; tutor resources available for CMP</li> <li>• Since we teach children in 4<sup>th</sup> grade, who is operating at 2<sup>nd</sup> grade level, doesn't matter what 4<sup>th</sup> grade text is. Need to meet kids at level.</li> <li>• A lot of table agreement → how do you get "buy in" from K-5, 9-12?</li> <li>• Singapore math is exceptionally good. Toki-Shoseki, GER, #1 in Japan.</li> <li>• no one way to teach all kids</li> <li>• WANT radical texts Madison-based context Social Justice especially lose kids</li> </ul>
<b>CONVERSATION #2 (12 people)</b>	
<ul style="list-style-type: none"> <li>• agree that should be essential curriculum with materials available to supplement to meet my kids needs</li> <li>• professional development wonderful in middle school</li> <li>• Braille, etc., would be able to be re-used because common (save \$)</li> <li>• easier to find resources to support kids outside of "proficient"</li> <li>• P.D. easier &amp; smoother – more efficient</li> <li>• deeper, richer conversation and more parent involvement &amp; more community involvement</li> </ul>	<ul style="list-style-type: none"> <li>• doesn't mean a single text book for</li> <li>• currently funds <u>not</u> made available to provide supplement</li> <li>• teachers need to know how to differentiate – not be tied to text book</li> <li>• very difficult to get H.S. teachers to change</li> <li>• need to have a lot of conversations about essential ideas, pedagogy curriculum before asking H.S. to change text books</li> </ul>

- can't just look at books & make judgments – need to teach & experience before evaluating
- have parents as learners
- Teachers need to understand the development of . . . .
- parent – want integrated in all H.S. big and small – not just in 2
- want consistent options at all high schools

## TO FIND GOOD CURRICULUM:

- look at who in nation, in world is being successful
- one size fits all model – does not work
- we do it better than the curriculum presented to us – so one book would set us back
- individual children can be lost
- Parent – NOT all kids need such high level of math to be successful in life. Deny them a diploma?
- WE EDUCATE everybody
- need to look at different route and different speeds to reach same goals (standards)
- look at mutual resources for differentiation to support a common curriculum

## Common Curriculum

- Accelerated text different than regular text.
- NO embedded honors (more, not more in depth, lost opportunities for student discussion at a high level).
- Bad socially for kids to have embedded – makes them stand out.
- Encourage underachievement.
- Stand out socially.
- Implies that one book stands out (merits) so much that we should adopt it.
- Encourages less differentiation for students.
- A teacher is limited to what they can differentiate – only so much per teacher.
- Algebra 1 would have a different book than Algebra 2 – in same way embedded and/or honors should use different texts.
- Limited research to make these conclusions. Only a few met the criteria.
- Steffan – many studies show core plus puts kids 1 year behind in math.
- Task force middle of the road – NOT taking a stand.
- Active attempt to hire secondary certified teachers (Steph). No generalist in math.
- All teachers should teach both pedagogy and content – BUT middle school need content knowledge.
- Increase number semester hours on content.
- Specialists in vague – CONTENT.
- Think teachers would feel demoralized if forced to teach a particular text book.
- CMP – language-based – struggling readers – needs human complexity.
- Middle school teachers were told that CMP or not teaching math anymore.
- Single text is not respectful to over arching needs of diversity – celebrate diversity.
- College professors are NOT required to use a particular text.
- High achievers – score same – but doesn't address feelings, experiences discovery approach.

- Common curriculum – for low achievers – will not make students able to think or become problem solvers. It is NOT the common curriculum.
- Spend money on professional development and teacher education – NOT common curriculum.

## District Wide Curriculum Conversation 2

- Parent: NO common curriculum – elementary teachers with middle school used Singapore Math. MTI lets her close the door and teach what want.
- Parent: NO new teachers – come in to one curriculum WKCE – NOT designed to assess students.  
 YES: Common assessments across district – common goals. Have library available to teachers – they each can choose whatever they like. Given different teachers, principals – NO way to really give same idea.
- Hire best teachers – let them do what I want.
- UW Professor and Tutor: Everybody at Toki uses a different book. One textbook, all story problems. One textbook, all computation. All teachers teach different content. Wants to see standard curriculum.
- Reason the feeders are bringing different quality students to Memorial is all the different books in middle textbook need similar textbook in ALL middle schools. Toki six books, Jefferson uses five books.
- Teachers should have resources to supplement common textbook.
- High school teacher (Kevin):
  - Vast range of middle schools at different strengths.
  - Some kids come in say “I did 2½ of 8 of the units.” That’s all we got to.
  - When teachers close doors, they are NOT giving students equal education.
  - Need all middle school teachers to teach common agreement that this is what to teach.
  - More economic way to look at common resource.
- Kindergarten teachers (two of them):
  - No matter which grade level or school, kids should gain same content.
  - Some kids can read and work on story problems, others can’t. How do I try to find a series to teach what needs to be taught.
  - So many assessments – need to get BEST Practices laid out – we have people that know how kids learn.
  - We are starting to understand how kids learn math because they are interviewed
  - New assessments – math notebook – with excellent assessments and unify elementary.
  - Assessments are great – see they don’t understand and now you can see why you can patch that.

- Textbook gets in the way.
- Using textbook only see what students know at end – not during.
- High school teacher (Kevin): Seeing wider range of what students can do – but overall NOT as prepared as in past. Need to melt both understanding and operational – BOTH.
- Parent: My favorite element teacher still uses Singapore in middle school.
- CMP – consumer oriented instead of science-math oriented. We should not emphasize consumerism in middle school (e.g., cell phone pay plans).
- Kids are not learning real math in constructivist math.
- UW Professor and Toki and Jefferson tutor: We are teaching elementary algebra at the University level because don't know elementary math or elementary algebra.

## Round #1

- What are the plus and minuses of a curriculum?
- How do you determine which is the best text?
  - You need to think about it at 3 distinct levels – elementary, middle school, high school. The district needs to look at variances throughout and the variance increasing as the students move up through the grades.
  - Concepts are NOT coherently taught because of a lack of textbooks – how do students smoothly go through the grade/concepts?
- How could you pick a curriculum when multiage classrooms exist and fluxuate?
- Sixty percent of his son's friends went to Kumon – the kids who went to Kumon blurted out answers. This interrupted the classrooms that are constructivist.
- Curriculum needs to more than computation so that children who only compute are challenged to prove their thinking.
- High school teacher: WKCE declining → difficult to use results when students have little motivation to do well – TOO MANY variables.
- At the elementary level there is NO way to KNOW how a student is doing in schools (NO GRADES).
- I have kids coming into Algebra I with all U's in my class → does this account for success?
- If you have qualified teachers, anything works very well.
- HOW MANY STRANDS ARE AT MEMORIAL HIGH SCHOOL? Algebra I/Algebra honors/Geometry
- Can you use one textbook? If you had the right book, IT could be done. We did in Geometry but we ended up using a LOT of supplementary because there was NOT enough material to cover what we needed to teach.

## SINGLE TEXTBOOKS

- If we look at grade levels and see the textbook as only a vehicle to achieve a standard INSTEAD of being so textbook driven.
- We need better communication between parent and standard. A textbook could help.

- Can make sure there are uniform expectations for students at each grade level. The resources/texts are a vehicle to achieve uniform expectations and make them explicit to the community.

## District Wide Curriculum Round #2

- There IS NO MAGIC BULLET.
- A textbook can be a communicator between the parent AND teacher. When a teacher isn't teaching out of a book, the parent doesn't know what is happening.
- Even if we would ADOPT a text, the way it is enacted VARIES greatly by the teacher.
- To choose one book would take a lot of agreement. Although it can be used as a TOOL to communicate to parents.
- The curriculum IS only as good as the person delivering it.
- The uniform curriculum at middle school has great benefits, for example:
  - a website with support/supplementary materials
  - parent help resources
  - professional development
- At the 5<sup>th</sup> grade level because there are many more teachers and schools, when students come to middle school there is a large degree of variation.
- If 5<sup>th</sup> grade teachers had a common curriculum to communicate around, middle school 6<sup>th</sup> graders may have a more uniform background.
- High school: Two different high schools LOW achieving AND high achieving → do we push them all into one group, therefore not meeting anyone's needs?
- The word TEXTBOOK is NOT the right word. Use the term CORE RESOURCES instead.
- Kids have been learning algebra since Kindergarten.
- NOT all students in our high schools are learning math in the same structure/experience. (INTEGRATED vs. traditional for example.)
- Constructivist approach (integrated) is designed to have a diverse group and we've already skimmed the top off into honors algebra. Kids are currently tracked – "if you look into a classroom, you can tell by the number of kids of color which class it is."
- A current textbook cannot meet the needs of all levels of learners. A core resource list may be a better avenue.
- A TAG student can do really well with a curriculum like CMP or CORE PLUS – they don't have to be in an honors course.

(LAST SESSION)

- Kids: not differentiated
- Kids not taught math in elementary school
- Parents need to provide supplemental Singapore math
- Not just one book at each level, have books available from various levels
- Not connected math
- Not Core Plus
- A book that has proven track record
- Not a single book
- Need professional development in order to make Singapore math work
- Need Singapore math text, not only work book
- Need Singapore math successful at college teacher training level
- Need to teach teacher fractions – takes time
- Not a single curriculum in high school – unrealistic
- Discovery algebra too weak
- Some staff – all need to know but other staff needed for specialists, college-bound students
- Standard → rigorous, traditional, 50-60% of students with a slower pace doing something else, simplified, parental choice, involvement
- Problems are simple already in elementary school – need to learn standard algorithm
- Concepts vs. drill
- Students need to construct everything themselves → too simple
- Students never get to multi-step
- Single book – if it's bad for high achieving student, we will all leave!
- No good!
- Should not be for lowest common denominator – you should tailor it for different students

## The NCSM Vision of Equity Leadership

*A growing body of research makes it clear poverty and ethnicity are not the primary causal variables related to student achievement... leadership, teaching and adult actions matter. Adult variables, including the professional practices of teachers and the decisions leaders make can be more important than demographic variables.*

—Reeves, 2006, p. xxiii

Leaders in mathematics education have an obligation to provide students with a mathematics curriculum and learning experience that prepare them for their future, whatever that may be.

A vision for equity begins with understanding our leadership responsibility to seek out and erase biases and inequities that exist in student learning and assessment experiences. Time and again, too many students—especially those who are English language learners, are poor, disabled, members of minorities, or female—are victims of low expectations by mathematics teachers and by programs with barriers of access to the best school curriculum. Students who do not have access to a *rigorous* and *coherent* curriculum that holds high expectations for each student will have limited opportunities available to them later in school and in life. Leaders in mathematics education have an obligation to provide students with a mathematics curriculum and learning experience that prepare them for their future, whatever that may be. As Kati Haycock (2001) indicates, “to increase the achievement levels of minority and low-income students, we need [leaders] to focus on what really matters: high standards, a challenging curriculum, and good teachers.”

It is the responsibility of mathematics education leaders to ensure underperforming student populations are identified and to provide teachers with the resources, structures, and accountability to address the identified gaps in student achievement and identified gaps in access to the curriculum. More specifically, it is imperative leaders help all teachers to collaboratively monitor the progress of traditionally underrepresented populations and create strategic plans to raise the achievement of all students, especially those who are underperforming. Mathematics education leaders are responsible for leading teachers out of private practice into a collaborative working culture focused on making thoughtful and consistent decisions about curriculum, instruction, and assessment that will meet the unique needs of all students while at the same time helping students develop deep and connected mathematical understandings.

Leaders need to eliminate practices that begin tracking students in the primary grades or lock students into particular levels of mathematical study, thereby essentially precluding opportunities to learn the mathematics necessary to open future opportunities for success. Effective leaders diminish barriers that limit student access to rigorous mathematics and at the same time ensure that every student is taught by highly qualified and well-informed mathematics teachers.

## Action Indicators for Equity Leadership

The indicators for NCSM's leadership standard for equity focus on the following key issues:

- Ensuring high expectations for each student
- Providing strong intervention and support for each student
- Orchestrating continuous improvement of achievement for each student

For every student to succeed, mathematics teachers must work together by grade or course level to build a foundation of challenging mathematics that present students with rich, engaging mathematical tasks and require higher-order thinking. Mathematical experiences must be meaningful and relevant; that is, the mathematics we teach should connect to student knowledge and personal experiences. Thus, leaders need to define effective teaching beyond content knowledge and classroom environment to one of developing and nurturing student, family, and community relationships by infusing culturally relevant, engaging, rigorous, yet accessible mathematics tasks into instruction (Haberman, 1997; Strutchens, 2000). It is up to the mathematics education leader to help classroom teachers create learning environments that place a high value and focus on student discourse. In these environments, teachers ask all students high-level, probing questions, while also providing differentiated instruction to support every child's learning.

PRIME leaders also understand that if *every* student is to achieve high levels of mathematical skills and understanding, teachers must collectively and critically examine meaningful data—data that will identify where students are underperforming and provide direction for action and intervention. When used wisely, data on achievement, participation, and access to the curriculum help to address inequity in a straightforward and constructive way (Chu Clewell, 1999). Using research-informed best practices, the leader determines how best to address the needs of students and works with individual teachers as well as teacher teams to make instructional and curricular changes that will hold all students to high standards and expectations.



# **MATH TASK FORCE INFORMATION SESSIONS**

## **January & February 2009**

### **Table #3 Notes**

#### **Communication with Parents Round 1**

1. Parent tried to help student at home (engineer) and review problems with child. CMP book was so hard no wonder children are confused. (Parent couldn't remember how to do, so went to book as a reference.) Recommended: Select a book that makes sense. Teachers may not have time to instruct parents, but they can use resources sent home. Never talked to a parent who likes it (CMP). Kids need references they can use. Disorganized – no procedural information.
2. What's the challenge – some parents feel it is the first time they've understood math. Need to find a text that communicates with a variety of different styles. Communicating with everyone is so difficult.
3. Very frustrated since daughter was in 6<sup>th</sup> grade (now she's a senior). Special Ed teachers were helpful with other daughter who has disabilities. Squeaked through 9<sup>th</sup> grade – support not always available. Her D meant she could graduate. The book meant no sense to parent. Couldn't find reference material – looked on web but couldn't find much.
4. Web resources might be really helpful. Focus on areas that kids struggle most – use video examples.
5. May be good to keep both tracks of math at big schools. One teacher who taught my child didn't teach – "Figure it out on your own." I couldn't help my daughter.
6. Tutors good idea. Variability in kids – one mature and has high goals, the other very different. Lots of kids/adults never use advanced math – keep lower tracks.
7. Are there opportunities for parents to volunteer in math classes at school? Would help parents understand and help others. Broadcast information about volunteer opportunities. Varied hours for working parents?
8. Also, offer volunteer opportunities at community centers.
9. Stigma to seeking help as kids get older – may be better to do tutoring off site.
10. Once a kid is in integrated track, you can't switch. Same teacher taught it all. No summer school option at the time, was finally added last year. Also, checked online for resources. Need summer school, online option to support kids switching tracks.
11. Would be good to have a listing of options – i.e., if student struggling with a topic, here are options: online, summer school, math tutoring at Goodman, etc. A menu of options, and maybe, also, ideas and options to extend learning.
12. Harder to reach parents as the kids get older. Elementary kids bring things home and give it to you – older students don't do that, so mail via backpack not a good option.
13. Concern that everyone doesn't have web access. If do, kids may also need to be online for homework. Need a variety of options.
14. Khan Academy – another resource I looked at for my kids. I'm used to learning by example. Connected Math all over the place – jumps around and kids are lost – parents are lost.

15. Would that be different if a specialist was teaching? Father: my kids both have specialist math teachers now, so no.
16. Concern that my kids aren't getting the math they need because of the lack of focus on math – shouldn't be all about reading and writing. Hired a tutor for my son, but shouldn't have to do that and other can't afford it.
17. Children are different and need different things. Parents need to distance themselves. Kids don't want you there either.
18. I like the menu idea – put in MS and HS newsletter – short monthly 1-pager. Extending ideas . . . things to do . . .
19. Could be in IC for those who use it.
20. North side and Eastside News would also be good vehicle.

## Communication with Parents – Round 2

1. As principal, I get lots of phone calls from parents, always from parents whose kids are in CMP math never from parents whose kids are in algebra and geometry.
2. On the face of this, sounds like a fantasy. Teaching students well seems like a big enough challenge. Could host meetings to talk about curriculum, but not teacher math.
3. Another group talks about CMP having more online resources and (Hank →) CMP2 more user friendly; have addressed some of the concerns parents express.
4. In general, a good idea to teach parents math curriculum. Unrealistic to teach all parents but could train a professional tutor group.
5. To help parents reach out to parents, we do a math night where we demonstrate the same concepts in CMP and algebra/geometry. Then when parents see the demo, they usually choose CMP (7<sup>th</sup>/8<sup>th</sup>).
6. Discuss specific to Hamilton: Is Algebra/Geometry more advanced than CMP? Yes. Teacher honors Algebra/Geometry using same text at West. What happens at West? Continue.
7. Brian answered a question about the survey . . . K-12 parents communicated they can't help their child – can't understand text.
8. CMP doesn't work for ESL because of language – program provides an additional opportunity vs. to practice language. Take out all the words.
9. Links to single text – could translate a single text, but not multiple versions. Hasn't been a push for this but could work on.
10. Put entire curriculum online so that parents can access – if kids don't have the text, parents can't help. Need resource all the time.
11. Can drop higher concepts into earlier grades but needs to be done appropriately.
12. Periodic events where parents and kids can work together/learn math together. Expansion of math night.
13. Parent/teacher math conferences – could be student led – focus only on math.
14. Foundation grant regarding math nights – what outcome?
15. Problem is that parents who come are high performance students.

16. Maybe do these sessions in community centers. Maybe a central team who does it district-wide.
17. Do math early with kids and parents. I need someone to sit and explain it to me.
18. Would video (in public library) be a more cost effective strategy?
19. What is the status of math competitions, math clubs, etc.? These tend to be for high flyers . . . high school state-wide math meets, Edgewood does a middle school math competition. Middle schools have math clubs.
20. Can you make a school-wide math competition that engages all students?

### Parent Communication Question #3

- Internet:
  - Access to all teachers not using Infinite Campus
  - Parent portal in same way
  - “Sporadic” but great potential
  - See surround schools – Mt. Horeb
  - Very helpful – find out too late at poor grades
  - Voluntary now – “too busy”
- Parents without computers – how to address. Supplemental materials – too many now. Recommend a few would be helpful.
- Hungry to help at home. Very helpful for parents' to use.
- Elementary math expressions – instructions to parents “parent math” very helpful.
- Nothing comes home at middle school. Recovered resources for middle school.
- Heads up – beginning of year – what is curriculum? Only way I know what's going on – Friday folder – PT conference – only 1 year.
- Afraid to help, maybe wrong.
- Spanish speaking parents – difficult and different to communicate both language and content.
- Bilingual documents are helpful, not monolingual. Always thinking at bilingual. Only report cards now. Not only beneficial to Spanish speakers, but all.
- Teach myself how system works, what's on standards, curriculum, internet = big picture. Where are goals? Teach parents the system. Where to go for help.
- Not always easy to navigate – current internet site.
- Teacher wraparound edition – helpful to parents – glossary of terms.
- Need a “book” to take home at middle school. Skeletal at best – need more information from teacher guide.
- Star math – elementary, parents loved it – taken away. Activities, choice, get a sense of how well students are doing. Completely parent run.
- Parents need to have education in order to help – unfair to put on us on parents to do this.
- Elementary level – build certified curriculum so can support but not be relied upon to help teach simple engagement – taking interest shows benefit. How can we help?

- More information "this week", notes to help child with this material. Point at which student surpasses our ability/knowledge.
- Be a dad, not involved as teacher, kid's personality, issues to deal with.
- Adult mentors available.
- Teacher stress to students – I am available, come and take help. Parents push to access help.
- University model where athletes have support for academics. No feeling of inferiority. Part of the curriculum – no negative label.
- How engaged are students in really wanting education? My student really wants it! Build this in elementary to develop over time.
- Not all students respond same. Can't make students feel stupid. Compare with others – can be a shock.
- Entitlement to extra support. Outliers – Malcom Gladville. Not entitled – lower SES – entitled.
- Community involved to educate.
- Folders – unopened for weeks, backpack mail doesn't open.
- Help provide environments of receptivity – openness to learning – appreciating.
- Environment – where instruction is provided to help you help your kids.
- Available online, non-threatening.
- Mentor/community connection.
- Drop off community center – won't close achievement gap.
- Gap – Asa Hillard – know/can know (we can't)

(LAST ONE)

- Provide materials used in district and specific schools in public libraries
- Assign a person at school to be liaison to parents
- Provide on-line supplemental resources or websites with supplemental resources
- E-mail
- Math night meetings for parents
- Math night for students & parents



## **Algebra: What, When, and for Whom**

A Position of the National Council of Teachers of Mathematics

### **Question**

What is algebra, when should it be taught, and to whom?

Algebra is a way of thinking and a set of concepts and skills that enable students to generalize, model, and analyze mathematical situations. Algebra provides a systematic way to investigate relationships, helping to describe, organize, and understand the world. Although learning to use algebra makes students powerful problem solvers, these important concepts and skills take time to develop. Its development begins early and should be a focus of mathematics instruction from pre-K through grade 12. Knowing algebra opens doors and expands opportunities, instilling a broad range of mathematical ideas that are useful in many professions and careers. *All* students should have access to algebra and support for learning it.

### **Algebra is more than a set of procedures for manipulating symbols.**

Algebra provides a way to explore, analyze, and represent mathematical concepts and ideas. It can describe relationships that are purely mathematical or ones that arise in real-world phenomena and are modeled by algebraic expressions. Learning algebra helps students make connections in varied mathematical representations, mathematics topics, and disciplines that rely on mathematical relationships. Algebra offers a way to generalize mathematical ideas and relationships, which can then be applied in a wide variety of mathematical and nonmathematical settings.

### **Algebraic concepts and skills should be a focus across the pre-K–12 curriculum.**

The development of algebraic concepts and skills does not occur within a single course or academic year. An understanding of algebra as a topic, a course of study, and a collection of mathematical understandings develops over time, and students must encounter algebraic ideas across the pre-K–12 curriculum. At the elementary level, teachers should help students develop fluency with numbers, identify relationships, and use a variety of representations to describe and generalize patterns and solve equations. Secondary school teachers should help students move from verbal descriptions of relationships to proficiency in the language of functions and skill in generalizing numerical relationships expressed by symbolic representations. Teachers should also help students develop skills in the strategic use of a range of technological tools, including graphing calculators, spreadsheets, statistical software, and computer algebra systems. Because knowing algebra is essential in a wide variety of careers and professions, students should have the guidance of highly qualified teachers as they learn algebra.

### **Algebra When Ready**

Only when students exhibit demonstrable success with prerequisite skills—not at a prescribed grade level—should they focus explicitly and extensively on algebra, whether in a course titled Algebra 1 or within an integrated mathematics curriculum. Exposing students to such coursework before they are ready often leads to frustration, failure, and negative attitudes toward mathematics and learning.

### **All students should have opportunities to develop algebraic reasoning.**

Algebra is an important gateway to expanded opportunities. Because of the importance and power of algebra, *all* students should have opportunities to learn it. With high-quality teaching and suitable support, all students can be successful in their development and use of algebra.

## EDUCATION WEEK

Published Online: March 6, 2009

Published in Print: March 11, 2009

# Algebra-for-All Policy Found to Raise Rates Of Failure in Chicago

By Debra Viadero

Arlington, Va.

[← Back to Story](#)

Findings from a study involving 160,000 Chicago high school students offer a cautionary tale of what can happen, in practice, when school systems require students to take algebra at a particular grade level.

Buoyed by recommendations from national mathematics experts, growing numbers of districts and states, such as New York and Texas, have begun requiring students to study algebra in 9th grade. Notably, California recently moved to require the subject even earlier, in 8th grade, although the policy faces legal roadblocks.

The Chicago school district was at the forefront of that movement in 1997 when it instituted a mandate for 9th grade algebra as part of an overall effort to ensure that its high school students would be "college ready" upon graduation.

The policy change may have yielded unintended effects, according to researchers from the Consortium on Chicago School Research, based at the University of Chicago. While algebra enrollment increased across the district, the percentages of students failing math in 9th grade also rose after the new policy took effect.

By the same token, the researchers say, the change did not seem to lead to any significant test-score gains for students in math or in sizeable increases in the percentages of students who went on to take higher-level math courses later on in high school.

"This policy that Chicago tried in 1997 seems to be sweeping the country now and not a lot of thought is being given to how it really affects schools," Elaine M. Allensworth, the lead researcher on **the study**, said in an interview.

### District Responds

Her co-author, Takako Nomi, presented the findings here in Virginia on March 3 at the annual meeting of the Society for Research on Educational Effectiveness, a group based in Evanston, Ill., that promotes cause-and-effect studies.

"It's not surprising that you're going to see an increase in [failure] rates if you raise the

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instructional requirements and you don't raise the supports," said Michael Lach, the director of the school system's office of high school teaching.

Over the past seven or eight years, he said, the district has tried to boost student-success rates under the policy, which remains in place. Steps include developing curricular materials introducing students to algebra concepts in grades K-8, requiring struggling 9th graders to take double periods of algebra, and providing more professional development in math to middle and high school teachers, Mr. Lach said.

The consortium researchers said their findings grow out of an ongoing study of the district's across-the-board efforts to upgrade academic requirements for all students. They plan to publish a report on the effects of the double algebra periods in April.

The scholars based their findings on data gathered on 11 waves of students entering 9th grade from 1994 to 2005.

They compared changes within schools from cohort to cohort during a period before the policy took effect with a period several years afterward. They also compared schools that underwent the changes with those that already had an "algebra for all" policy in place.

#### **Effects Varied by Ability**

The researchers calculate that, for a school that saw an increase of 20 percentage points in algebra enrollment due to the requirement, for example, the percentage of 9th graders failing math would increase by 3 percentage points for students in the lowest-ability quartile, 3.5 percentage points for students in the next quartile, and 8.9 percent for students in the quartile of students who were labeled to be of "average" ability.

The failure rate was not appreciably higher, though, among the highest-ability students, most of whom would presumably have taken algebra anyway.

"We thought the average-ability kids would be better able to handle algebra than the lowest-ability kids," said Ms. Allensworth. "But it seems to have hurt their outcomes more than the lowest-ability kids." One possible explanation, the researchers suggested, is that the lowest group had a higher failure rate before the policy took effect.

The lack of test-score growth, Ms. Nomi said, may be because math classes included children with a wider range of ability levels following the change, which might have spurred some teachers to water down their teaching.

Whether similar sorts of algebra mandates—or efforts to teach algebra at even younger ages—would have the same impact in other locations, however, is unclear, said Leland S. Cogan, a senior researcher at the Center for Research on Math and Science Education at Michigan State University in Lansing.

"Some research suggests the longer you wait to expose students to algebra the more difficulty they have making the transition," he said.

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This story is taken from Sacbee / Our Region

## **Board of Education sued over eighth-grade algebra testing**

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**Published Tuesday, Sep. 09, 2008**

A controversial decision that requires all California eighth-graders to be tested in algebra has started a court fight between groups representing local schools and the State Board of Education.

Two organizations that advocate for hundreds of school districts and thousands of school officials are suing the board over its July 9 vote to require eighth-grade algebra tests.

Gov. Arnold Schwarzenegger had urged board members in a letter to make the change. Others opposed it because they said not all 13- and 14-year-olds were ready for the abstractions and unknowns of algebra.

The California School Boards Association and the Association of California School Administrators filed their complaint late last week in Sacramento Superior Court.

In the 21-page filing, the groups claim the board failed to give adequate notice prior to its July 9 meeting that it would be considering a change of such dramatic proportions. "This was a huge change in public policy done at the last minute, with no opportunity for school districts to weigh in," said Holly Jacobson, assistant executive director of the School Boards Association.

The lawsuit also claims board members appointed by the governor exceeded their authority by effectively changing the state's curriculum for middle-school math – a task that belongs to the Legislature.

Lawmakers had recently designated algebra as a high school subject, Jacobson said.

"By requiring that all eighth-grade students take the Algebra 1 end-of-course examination, the SBE has essentially required that all eighth-grade students learn and be taught Algebra 1," reads the complaint.

The lawsuit asks a judge to declare the board's actions "null and void."

The head attorney for the Board of Education said Monday that the dispute is a matter of

legal interpretation for a judge to decide.

"It really comes down to whether the description the board did post was legally sufficient," said Chief Counsel Donna Neville.

She said the board has responsibility for making sure the state complies with the testing provisions of the federal No Child Left Behind act.

"What the state board did at the meeting was adopt an Algebra 1 exam," Neville said. "They are charged with complying with the (federal) law."

The Schwarzenegger administration echoed that opinion. "We believe the state board acted legally, responsibly, and in the best interests of California schoolchildren by increasing academic standards," said Camille Anderson, a spokeswoman for the governor.

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## Judge delays 8th-grade algebra in Calif schools

By JULIET WILLIAMS, Associated Press Writer

Tuesday, October 28, 2008

(10-28) 18:17 PDT Sacramento, CA (AP) --

A Sacramento County Superior Court judge on Tuesday ordered the state Board of Education to postpone its expensive and bold plan to force all California eighth-graders to be tested in algebra.

The board approved the first-in-the-nation mandate in July after a forceful last-minute recommendation from Gov. Arnold Schwarzenegger. The move was opposed by California's schools superintendent.

Superintendent Jack O'Connell and education groups questioned whether the state had the money, staff and training to handle the requirement.

Just half of California eighth-graders currently take full algebra, up from about 34 percent four years ago. But only about a quarter of those who take it score proficient or above on standardized tests. The rate is even lower for black, Hispanic and poor students.

Opponents argued the decision was made hastily and that the public did not have adequate time to comment. The California School Boards Association and the Association of California School Administrators sued in September.

In her ruling granting a temporary restraining order, Judge Shelleyanne Chang agreed the two groups would "suffer irreparable injury before the matter can be heard" formally. She ordered the state Board of Education not to make any further decisions on the algebra test until a Dec. 19 court hearing.

The Schwarzenegger-appointed board was scheduled to take up its plan to phase-in algebra over the next three years during a meeting next week.

Scott Plotkin, executive director of the school boards association, said the restraining order validates his belief that the board overstepped its authority.

"Prior to making their decision, the (board of education) didn't provide the public with an opportunity to express how such a change in policy will have significant ramifications for all aspects of the educational system," he said.

State Board president Ted Mitchell said he had not yet seen the judge's ruling but called the delay unfortunate.

"I think the state has a great deal of planning to do to meet this objective," Mitchell said.

"Californians are ready for this discussion, and I am hopeful that this current ruling does not delay the kind of deliberation that will be necessary."

Critics say pushing students into higher-level math too early could increase the dropout rate. Algebra I is a requirement to graduate from high school, but many students need remedial classes or a pre-algebra course first.

The state was under pressure from the U.S. Department of Education to change its current eighth-grade math test or face losing up to \$4.1 million in funding.

O'Connell had proposed a new eighth-grade test that would have measured some algebra standards, but not all. He filed a brief in support of the lawsuit Tuesday.

He said it will cost California billions of dollars to prepare schools, teachers and students for the algebra testing so quickly — money he said the state doesn't have.

"California would have to double the number of middle school Algebra I teachers over the next three years. Given the growing budget shortfall in our state and the troubled national economic climate ... it is unlikely that the governor would be able to find the resources necessary," O'Connell said in a news release.

Schwarzenegger announced this week that he will call a special session of the Legislature in November to address California's growing budget deficit, which he estimated is "well above \$3 billion" for the current fiscal year.

The governor also met with education groups Tuesday to warn them about the dire budget situation and possible cuts in funding.

As the state board debated the algebra rule during its July meeting, Schwarzenegger's education secretary, Dave Long, pledged that the governor would help find the billions of dollars it would cost to boost what he referred to as California's education "infrastructure."

"It will be done. The governor feels he wants this gold standard," he said outside the meeting.

But Long has since resigned from the job, and Schwarzenegger has not named a replacement.

Lisa Page, a spokeswoman for the governor, said Schwarzenegger still believes in algebra testing for all eighth-graders.

"We believe it is in the best interests of all Californians that our nation-leading Algebra I standard be implemented and remain confident that it will be," she said.

# **MATH TASK FORCE INFORMATION SESSIONS**

**January 6 & 7, 2009**

## **Table #5 Notes**

### **Group 1 – General Discussion**

- Algebra trend in 9<sup>th</sup> grade where students coming in sub-par.
- CMP2 doing a better job from a 6<sup>th</sup> and 8<sup>th</sup> teacher.
- Students coming into 6<sup>th</sup> grade unprepared – not being able to do mental math.
- Middle school does have a common textbook.
- Elementary school has a set of common standards and thus has a common curriculum.
- High school chemistry and physics – 7 years. Algebra skills are getting progressively weaker. Students choosing lower level science courses since students not prepared. More students passing "Algebra" but fewer ready for advance science, thus algebra must be a lesser course than it needs to be.
- We need to start the UW-Math sequence very early. That focus on the "why" it was a very difficult class for someone who passed calculus.
- In physics, it is slowed, fewer topics but more time ends up getting better results.
- We need urgency, we need to set a target and goals and get going NOW.
- Set stretch goals.
- Community needs to be involved. Classroom time isn't enough.
- There was no talk about technology and fun in our classes. Students need to be more engaged.
- Set 1-year goal, 3-year, 5-year, 10-year and they all need to be stretch goal.
- Don't dismiss International evidence.
- Technology – some way to keep replacing technology to keep them up to date.

### **Group 2 – General Discussion**

- Middle school and high school curriculum was taken to University – that math team at university level suggested that the curriculum was lacking.
- District curriculum matches NCTMs expectation but not university expectations.
- Curriculum doesn't work well with high achieving students – no single curriculum helps the high-level students.
- Report suggest a single approach – single text but if our students have different needs.
- Passing Algebra is the goal but if they are not just passing Algebra but knowing Algebra.
- Students losing interest in math . . .
- Memorial Algebra gives multiple opportunities . . . when are the students going to learn the issues at the first time?

- Would like to teach math/science together.
- You may have to teach "this section on this date." But we need to teach the students where the student is at.
- We need to start early – problems don't just start in middle school.
- IEP . . . there are high schools provided the issues of lower level students supplemented.
- Higher level students – "here is 50 problems." (Thought here was non-engagement.)
- Lower level students – "you should already know this." (Thought here was degrading student background.)
- Teacher needs to take some responsibility in keeping professional.
- Teachers prefer to have after school opportunities – professional development – but most of it is during school.
- Do teachers that take the professional development end up having positive result with student result? (Suggest as a study/evaluation.)
- Will this really cost money? Since we are working with teachers, they should be able to learn quickly.
- We won't really know where we are at until we measure how we get there.
- We can't only look at top groups to get to our progress.
- We "don't have time" isn't acceptable – companies who don't have time go out of business.
- We need to be more innovative – we need to help all of our students – we need to innovate.
- People are the problem and solution. When we want to excel, people will do it, else we don't have the right people.
- People are not coming out of school with acceptable knowledge that includes college.
- Six years is too long – if we can make a difference in 1½ - 2 years than we are doing the wrong things.
- When parents are as smart as teacher, there are bound to be problems.
- Motor skills are needed. Writing art Kinisetic activities help creates creativity.
- Students don't want to just sit on their butt to learn.
- Get data from those teachers that are doing well. See what they are doing well . . . expand that good practice.
- We give teachers the pay raise for a Masters degree but without showing they are a better teacher for getting that degree.
- One size doesn't fit all.
- Everyone has a great capacity to learn if we meet them.
- IC is our data collector and information sharing. All teachers need to be using this.
- We aren't teaching students to learn.
- Why are we re-inventing things – other places have a better system, we need to adopt.
- We need to learn to work smarter.

## Open Forum

1. Conversation included a re-emphasis on maintaining separate focus on professional development and collaboration that was mentioned earlier in the session. Recommend that the district study and assess then address separately.  

So many of the recommendations hinge on collaboration model and professional development. Need to attend to this; will easily be lost in a district this size.
2. Thematic instruction – a lot could be accomplished in this model.
3. I worked in a district that had K-12 department meetings. Provided articulation and consistency across the board. Articulation across grade levels would be very beneficial. Should be part of planning.
4. Departments need common planning time so that they can meet daily.
5. Staff development could be across departments – integration of curriculum would benefit (e.g., math and science).
6. Having physics teachers on task force to look at application needs to be expanded.
7. Economics education related to mathematics needs to be included as another example.
8. Mobility – does common curriculum exist in other subject areas? Is this a math problem? Felt data on mobility under represented the issue.
9. When I heard this task force was being formed, I was aware that there were those out there who wanted to see the reform curriculum destroyed. Thought the task force was a great way to settle that.
10. If you really respect the standards-based movement, then textbook may not need to be focus of the implementation.  

Don't want the teacher to be a slave to curriculum. Give teachers materials that are compatible with the outcome you want – standards implementation.
11. Parents: Implementation of new report cards seems to suggest that only classroom work counts and homework doesn't matter. This is a mistake. Clearly help parents understand their role no matter the grading process.
12. Implement changes so that every student has a textbook that their parents can understand. More and more textbook companies are providing those materials. Communication would allow you to take a low profile approach to parent training.
13. Regarding failing grades – remediation doesn't exist when students are failing algebra – it reflects a poor instructional background. Do it (build knowledge and skills and develop background) at an earlier age.

## Open Discussion Round #1

- Parent: Wanted Singapore math to be taught by a teacher. Parent felt that our math program is inadequate. The concern was "How realistic is to impose the book and standards?" given the size of MMSD. Parent said, "Hire the most qualified teachers and district get out of the way. Quality teachers matter most."
- Parent: Better curriculums are available other than the one being used in MMSD.

- Parent: Parent was concerned about the cost efficiency of one text because not all teachers will use one text. Hire teachers who are qualified.
- Parent: Just buying a text doesn't do it → teachers don't use it.
- UW Rep: Economics are not impacting this decision. Curriculum and text are not the same. Curriculum is the standards established by MMSD, state, district, and country. (What algebra is . . .) "What book I use is not the curriculum . . . gave example." Curriculum is a broad target. "Most teachers use a broad spectrum of materials."
 

Task force seems very focused on grades 5-8. Elementary teachers don't have the needed training to teach math adequately. Why are we waiting for middle school to focus on math?
- Arlene: Parental outcry regarding Connected Math and appropriate class work that drove the study.
- Parent: I support Math Specialist in grades 3 and above.
- Parent: I have children in 7<sup>th</sup> grade Geometry and 8<sup>th</sup> grade struggling with Geometry I. Kids didn't get what they needed in the elementary grades.
- UW & parents: Professional development needed in math and more testing to inform instruction. District needs to provide support to teachers in the area of math.
- UW & parents: Graded math program needed, but not available, for elementary schools. There are choices at the high school level.
- Parent: High school is really good at the "what for" in science and math but not at the elementary level (gave the example of the connections to engineering, etc.).

## Open Discussion Round #2

- Parents: Not one parent of color on the task force. "Why weren't there parents of color??"
  - Survey → 23% parents of color → small return on survey a concern.
  - Sampling process? → MMSD expected great return → 20 something response rate.
- Parent: "Only mailed out?"
 

(Parent thought this was a weak tactic.)

Parent: How were participants chosen and who chose them? Parent responded by saying, "Art Rainwater called me."
- UW/BOE: "Were parents originally put on the task force? (BOE) → participants were chosen due to math background/knowledge. "BOE is much more focused now on make-up of committees."
- UW: "Balanced choice of participants."
- Parent: "Classroom action survey" is assumed to be happening.
- UW: "No, this is not common practice."
- Parent: C.A.S. – not enough staff to do this for all students who need them. "Only with G & T's and this is a well kept a secret."
- UW and Parent: A discussion took place around the research that would support recommendations from the task force. A scholar who chooses met analysis . . . (and the reasons why for this kind of study), (explanation was given for the good of the group).

- Parent: There isn't a whole lot of data to suggest that.
- UW: Data is available on the traditional texts/methodology for the most part.
- Parent: S.E. Asians, etc., do the best in math. Why don't we look at curriculums used in other countries?
- Parent: These schools support parental authority vs. schools in authority so there are cultural differences.
- Parent: I was taught math in India. Here there is a lack of single textbook, feedback to parents, and lack of communication home. Coherence, feedback and common text. Are all needed.
- Parent: Not clear that this study addresses the movement of all groups but rather just the reduction of achievement gap.
- Parent: Writers of report were putting a positive spin on the data/findings whenever possible.

# MATH TASK FORCE INFORMATION SESSIONS

**January 7 & February 2009**

## Table #1 Notes

### Priorities Recommendation

- Consider the addition of paid Madison staff who provide immediate tutoring for students experiencing difficulty.

	#1	#2	#3	
13	1			<ul style="list-style-type: none"> <li>★ well trained</li> <li>★ quality of teachers</li> <li>★ math collaboration (along with science) and professional development</li> <li>★ alignment of standards/learning curriculum outcomes</li> <li>★ measures of success</li> </ul>
3				
6				
8	1			
9	1			
12	1			
2	1			
7	1			

- #8 – Need relevant data to make decisions
- #12 – Need more rigorous skills early on. Even those passing algebra don't have application skills. College board – high level math/physics = increased % success in post-secondary.
- #1-2 – Lack of math knowledge depth at middle school – teachers don't know exactly where it's going – where does it lead – at times lead off
- We have moved away from specialists in middle schools math/science
- Evaluations of our progress – how will we know? Can't just be to "pass" – has to be more performance oriented measures.
- In some Physics classes, identifying actual math skills.

### Group #2

	#1	#2	#3
3	3		
9		1	
7	1		
12		1	

- Need for high quality professional development for teachers most important aspect – more important than curriculum.
- Collaboration time peers in building and district-wide.
- Summer professional development with school year follow-up.
- Achievement gap should be front and center.
- Need to target more resources to decrease achievement gap.

- Meeting students at the level where they are – build on experiences but maintain high standards/outcomes.
- Identify why students are failing and know less.
- Even though more students are passing Algebra, students are less prepared for application.
  - physics
  - chemistry
  - science/engineering
- Collaboration with Science Department to identify needed learning outcomes (standards) alignment – needed for success.
- Need higher quality teachers with deep math knowledge.
- Will teachers have to pay for this extra certification? Will it impact their ability to teach other subjects?
- How does the recommendation of 8<sup>th</sup> grade Algebra and 9<sup>th</sup> grade Geometry comport with developmental readiness? In other words, are the majority of 9<sup>th</sup> graders developmentally ready for Geometry?

### **Recommendations for Priorities Group A/Overall #7**

- #12 – Staff development days. Try to address achievement gap. Speaker achievement gap every day in high school classroom. This is the biggest issue. How do we move forward?
- #9 – Top priority – Analyze achievement data, time for teachers to meet, need data on individual kids. Need data.
- #3 – Math professional development. Development where instructor has experience with the same grade level.
- #3 – Huge range of students in classroom. Need professional development to meet everyone's needs.
- #7 – Reduce achievement gap. The problem has always been there. Too many students are not passing algebra. Parents of color raised in Madison didn't achieve. Teachers don't know how to teach all groups of students. Not the students who have the problem. Teachers need to learn how to teach the students.
- Low income parents of color are more focused on teaching children than data show.
- #10 – District not welcoming to parents of color. Parents are limited in ability to help.
- #10 – Address need for parent support.
- #3 – Small changes in teacher mindset may make a difference – we need more differentiation.
- #3 – Professional development combined with collaboration.
- #9 – Have teachers learn from parents, students and other teachers.
- Need a recommendation for how the whole system runs – more time for math than 30 minutes (50 minus the time for transitions).
- There were no people of color on the task force.

## Recommendations for Priorities Group B

- #10, 12, 13 – Parents: Parents most important piece. Spanish speaking students have a high rate of failure. Monolingual documents not as effective as bilingual documents in fostering communication. Reflect multilingual reality. Address Algebra issues.
- #3 – Better math training for middle school. Try to hire more secondary ed teachers for middle school. Middle school teachers barely at the level of their students.
- Disagree with #6 – Single level adoption will impose curriculum on teachers. The choice may not be the best for all kids. This should not be a priority.
- Disagree with #3 – Concern about pushing algebra before kids are ready – more. This should not be a priority.
- Disagree with #6 – Not sure one text is the answer. This should not be a priority.
- #10 – Support parent involvement – many parents don't have opportunity to receive training. Find ways to equitably reach all parents.
- #1, 2 – Math specialists need to really know how to work with adolescents.
- #1 – Hire math specialists.
- Concerned about #13. Failure rate needs to be addressed first – make sure kids are prepared.
- Concerned about #12, 13 – Are all kids brains ready for algebra? Wait until kids are ready.
- Concern: DPI is unwilling to create a middle school math certification (puts #5 in question).
- Hiring practices: Why doesn't MMSD hire more specialists in math (with secondary credentials)?

(LAST SESSION)

- We felt that the most important recommendation should be to hire only teachers who have mastery of the math they will be teaching. Hires should have successfully completed a calculus course/additional classes.
- We felt this \_\_\_\_\_ is defining on attrition and retirement was inadequate. We would reword #2 to read "Focus hiring of grade 5-8 math teachers who are math specialists." We cut the rest of #2. Tim disagrees from an administrative perspective.
- DPI certification: Some classes beyond what is required now to be a math specialist – professional development.
- Discussion of only one text at elementary level, concerns at root that whatever book is selected it must be used by a skilled, competent teacher

The following are comments emailed to MMSD from community members unable to attend the public input sessions.

I wanted to say that I'm very excited about this task force. I think it has been needed in this district for a very long time. My background is an undergraduate degree in math from U of Delaware and a masters in computer science from UW-Madison. I taught 7th and 8th grade math in Racine for a semester followed by 2 years of teaching math at Middleton High School. Our two sons went thru the Madison school district (Stephens, Jefferson/Spring Harbor and Memorial). Both have now finished college with degrees in computer science for one and econ for the other. As a parent I followed their homework nightly when they were in elementary school and watched the curriculum carefully in middle and high school. Throughout their elementary years, I volunteered on my morning off to help in the classroom. I continue to talk with my friends that teach in the district and also who teach math at the college level. It is a great interest of mine and dropping scores throughout the US concern me greatly. I have also seen the change of our district towards diversity which is a big plus. Unfortunately there are also issues of economics and languages to place great challenges on education.

I'm only writing now as not having children in school, I didn't know this task force existed until the notice of this meeting. These are things I've thought about over the course of many years.

\* A standard math curriculum for the district, which you propose, is HUGE. What an excellent step. I've watched my children move from grade to grade within the same elementary school with no real plan of what was to be taught. As you noted in your task force guide, most math series are pretty good - one just needs to be in place. This is definitely a place where site based education should not stand in the way. Madison needs a common roadmap to mathematics for children to succeed.

\* I also think it is excellent to seek out excellence in math teachers for grades 5-8. Math is getting difficult at this point and teachers that do not have this as part of their background should not be teaching it to students.

In addition I would like to see:

\* A balance between conceptual learning and drills (axioms, facts, building blocks). My elementary education in the 50s was black and white - no thinking outside the box. I watched my children go through MMSD and become experts at creative thinking and problem solving. However, it was at the expense of learning the basics of math infrastructure (for both my sons, we did flashcards and worksheets on our own in order for them to attain these skills). I think children should be able to have the best of both worlds by taking the fundamentals seriously in the lower grades - a small portion of each day, along with time for problem solving, computer fluency and conceptual understanding. Drill is not fun, but sometimes this district has a hard time telling kids that 'yeah, it's not fun, but you still have to do it' - which is sort of a reflection on how life is.

\* I'm concerned about giving too much choice in the younger grades and asking the kids to 'figure' out infrastructure. They are more concrete thinkers at this age and facts are facts - there should be one method of multiplication - they shouldn't have to deduce it, and it should be uniform. I noted an example in the task force book that showed 3 different multiplication examples. For kids that don't understand math, let them just memorize the right way. It is a tool. After they have this solidly in their minds (when they are older) then they can be exposed to different methods - and if they want - the whys behind it.

\* Finally - and most people don't agree with me - I believe children be grouped by ability when they reach the age (5th grade) where they have a dedicated math teacher. Kids that are average to above average can be grouped in large math classes (I don't recommend this but my elementary school classes actually had over 65 kids in a class). These average and above average kids will 'get' math. It's the kids that come from tough environments or really don't have the aptitude that need a great deal of attending. This troubled me greatly when I taught - that there was just not enough time to help the kids that really struggled. These kids should be in small math classes and have the best of teachers to help them get traction.

I applaud all of you for the time and work put into this task force. MMSD is a special district which I believe can be first class in math with the right processes put in place.

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My three children all attended Madison schools and graduated from West High. I am very concerned about math skills and worked with my children to make sure they did well in math. Some teachers were very helpful in communicating to me what I needed to do to help my child; others blew me off and left me to guess what should be done. I would like to comment on the proposed use of a math specialist for grades 5-8.

Use of a math specialist runs the risk of "isolating" math from the rest of the curriculum and from parental involvement. It also has the potential of reinforcing the widespread aversion of students, teachers, and parents to math.

If this route is followed, frequent and detailed communication between the math teacher with other classroom teachers and parents is essential. Specifically, parent-teacher conferences in 5th grade must include the math teacher. In middle school, the math teacher should meet with all parents, not just those lucky enough to get a spot on the schedule. The math teacher should communicate clearly and often to parents about their child's strengths and weaknesses and their role in promoting their child's math skills. The math teacher should educate the other classroom teachers in methods of incorporating math into all aspects of the curriculum and reinforcing the skills learned in math class.

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Notes from phone conversation:

Quality of teaching at 5-8, what about grades K-5? Sees a problem at grades 2-4....basic knowledge missing from those students. No effort to teach the simple algorithms to get the answer. There is a form of teaching for someone who knows math well. They introduce a wide variety of topics, Geometry/Probability that causes confusion. Focus on numeracy. When students are introduced to algorithms they are overwhelmed without the proper background. No ability to do computation on paper and pencil. Need to memorize facts in order to be efficient. Teachers would like to teach that way, but fear reprimand. Is there any evidence that [CGI] works. Kids can not deal with these abstractions, they need some simple math to work with.

Volunteer tutor at Thoreau.....Formerly community partnerships committee member. Former parent.

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I am a member of the Madison community, and am very interested in the discussions that you and your colleagues are currently having regarding the direction that you'd like the district's math program to go in. Unfortunately, I was unable to attend the community meetings that were held this week. (I could have sworn the State Journal's article said the Memorial meeting was tonight!) I have two small children at home who will eventually attend Thoreau elementary school.

Before becoming a stay-at-home mom two years ago, I taught second and third grades for a total of seven years in Edina, MN, Green Bay and Middleton. All three of those districts used the Everyday Math (Chicago Math) curriculum, and I wanted to briefly tell you about what a stellar curriculum that was, and why I think it would be in the best interests of MMSD to seriously consider adopting that curriculum. The EDM curriculum is research-based, and has an excellent record of promoting high student achievement in districts across the country. In addition, from a teacher's perspective, it was a great curriculum to teach from. It offered enrichment, extra practice for those students who needed it, and I always felt that my students were being taught to develop a very strong number sense. Parents were very pleased with the curriculum as well. Besides the fact that EDM is a very successful program, I also think that MMSD would greatly benefit from adopting a district-wide curriculum, rather than the system that is currently in place. In each of the districts where I taught, I recall many staff development hours and in-service days that were devoted to teaching math. Those professional development opportunities were invaluable, as teachers in different schools came together to collaborate and discuss how to best use the curriculum in their classrooms. We learned so much from each other. Having a common language regarding the teaching of math was so important for not only the staff, but also for those students who transferred schools in the district either mid-year or over the summer. They were able to walk into their new classroom and immediately understand the terminology and concepts that were being taught in their new school because the curriculum was the same.

I wish you and the Math Task Force well as you weigh the options and recommendations in front of you. Although change is always difficult, especially for us teachers it seems, I sincerely hope that your committee considers adopting the EDM curriculum. I know that the children of Madison and their teachers would benefit greatly from it. I would love to continue this conversation with you or other members of your task force if you would like more information on my experiences or have any questions.

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Math curricula and instruction in schools needs to be considered differently for at least 3 levels - elementary, middle school and high school. The needs of students at each level are very different and so are the psychological, socio and economic factors. There needs to be different action plans for different levels.

\* Traditional vs Reform-based curricula and use of single textbooks across the district: The discussion and choice on this dependant on the point above. For example, at elementary grade a large portion of curricula and instruction can be traditional with only a small amount being reform-based and as progression happens through middle school to high school, reform based curricula can be emphasized and traditional based being de-emphasized. What I have observed, especially in John Muir, is reform based curricula is used extensively in elementary too at Gr. 2-3, when the kids are not ready with their basic arithmetic.

A single textbook approach is something that may restrict the teachers - but will help parents a lot in understanding the sequence and level of math instruction that is being given to the kids and also help in reinforcing math at home. While MMSD has published what math a student is expected to learn in a grade, there is no way I can understand

- o the sequence in which the concepts will be covered,
- o which method (algorithm and computation) is being used to teach a particular concept and
- o what is being done to reinforce the concept.

The only way I get to know what my child is learning is through the homework or completed practice sheets that are sent home every Friday. The way that I try to find out the method being used in class to teach a concept is by looking at the copyright notice in the footer of the practice sheet and trying to Google for the material.

So a single textbook is indeed helpful. Alternatively, the grade teacher will need to inform parents about the reference/learning material that is being used and make it available to the parents. It will always be challenging to enforce this on the teachers, so a single textbook may be an acceptable choice especially in elementary and early middle school

\* Generally, I have noticed that a math concept is introduced and taught, students complete 2-3 practice sheets and after that there is no reinforcement. This will need to be addressed. The level and degree of practice/reinforcement can reduce as in elementary to middle to high school progression but it has to developed at school. It can definitely be done at home, but that shouldn't be a requirement and teacher will need to tell the parents about the resources for the same.

\* Effect of private coaching like Kumon: I am sure you are well aware of the out-of-school Kumon coaching for Math that is being available in Madison area for some years now. I have seen that about 40-50% of students in kid's class of Gr. 4 at John Muir are enrolled into Kumon. (My kids aren't.) Kumon follows are very traditional approach to Math. Algorithmic, computational instruction and practice through repetition. The Kumon tutored kids have edge over kids not going for Kumon. The Reform based curricula cannot be effective when Kumon tutored kids are in the group. These kids have solutions ready and the purpose of group learning is lost. The other kids get the answer to the problem but not the concept behind it. Teachers will need to pay more attention to this aspect. While it is not possible to stop Kumon and kids going to Kumon, its effect should definitely looked at. Reform-based curriculum is a very good concept, however are the teachers appropriately trained to run classes using this curricula especially at Elementary level? It can achieve its desired effect if implemented properly in a class, else it can pull students away from Math at a very early age.

\* Focus on Practice: I have eluded to the points above. Practice makes perfect. In my opinion, continued has to be part of the math instruction. Parents are responsible, however it has to be a part of the school. I understand this may be controversial - homework vs no-homework debate - the parents should be told about the recommended resources that are available.

I grew up in the school system of India, so I have a very different perspective. I have closely observed how math is taught in schools, colleges, universities in India. It is a known fact that that education system has produced more engineers and mathematicians. I have done quite a bit of thinking to compare the two systems, the syllabi and the curricula. I will be more than happy to share my thoughts with the task force and MMSD.

The MMSD math program is good and not broken, there is a definite room for improvement though.

Thanks for the patience with this long email.

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While I am pleased with my son's math curriculum now (he's a 6th grader in 8th grade algebra), I also know that:

- 1) the math facts program in early elementary is horrible and almost prevented my son from showing how good he is at math;
- 2) the only reason my son was able to show that he could excel at math is due to the extraordinary efforts of his 4th and 5th grade teachers who got volunteers to pull a few advanced kids out and taught them off curriculum the following year's math.

So, while the end result is fine for my son right now, that was only due to teachers who broke from the school district's curriculum.

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Here are some comments from a parent who has a seventh grade daughter at O'Keeffe Middle School and a 9th grade son at East High School:

I have been impressed by the quality of math education at MMSD. Both of my children tested out of sixth grade math and both are taking a grade level above in math. When my son reached eighth grade, he took geometry at East High School and I assume my daughter will do the same. Not only did this help my son adjust to high school much easier this year when he started his freshman year, but the challenging curriculum has been good for him.

I am in full support of recommendation #4 which recommends extending the partnership with the UW-Madison and other colleges and universities. For those students who like math and want additional challenges, I think this is an excellent option for them.

I also support recommendation #1 - for those students who struggle with math, I think the one-on-one teaching is by far the best way to go.

I would request that recommendation #10 be moved up in priorities (to #4 at a minimum). While we have excellent teachers at MMSD - it's isn't the teachers that do all the teaching - parents are key. The district needs to do a better job teaching (or strongly encouraging) parents that they need to take a lead in helping their students learn - not just the district. My husband spends a minimum of 30 minutes every night with our children on their math. He not only tests them, but he also asks them to explain what they are learning - so he can learn. Our son has taught my husband what he is learning in Calculus, which has helped our son be a better student. I know this is rare occurrence in households, but I think more parents would at least consider doing this at their home, if they were encouraged or showed how this will help their student by the district.

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Requiring teachers in grades 5-8 to have a mathematics pedigree would go a long way to improving instruction in mathematics. It must be combined, however, with inservice training in effective methodologies. Further, finding large numbers of "qualified" math teachers could be problematic. M.T.I. could present a challenge as well, particularly as regards removing "unqualified" teachers from their present positions. Proper posting for "new hires" would resolve the issue to some degree, but it is subject to "attrition." A district-wide selection of "the" math program is, also, a sound recommendation. Large purchases could save \$\$\$ , but it would help the transferring student problems as well.

I am very favorably impressed with the adoption at Wright, Connected Mathematics 2, but I agree that there are a number of solid programs out there. It , CM2, has many positive qualities . . . integration of math strands, real world applications, alternative problem solving strategies. I'm not sure I see a "plan" in the sequencing and emphasis that various units, however. It seems to me that some of the units should be viewed as basic or fundamental, particularly for struggling students. They should receive greater emphasis.

I, also, see that many students have yet, to memorize basic facts, particularly multiplication and division. They engage in "adding or subtracting strategies, or resort to the calculator. I applaud the use of the calculator, but for many students, it has become a crutch. Ongoing review of previously learned material seems to be lacking as well.