



# Mathbits

## MINNESOTA'S 4th and 8th GRADERS' MATHEMATICS SCORES LEAD THE NATION

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Minnesota's students' performance on the 2003 National Assessment of Educational Progress (NAEP) placed the state at the head of the class of the 53 states and jurisdictions that participated in the assessment. The state's eighth-grade students' performance was statistically higher than that of students in every one of the other 52 jurisdictions. The performance of the state's fourth-grade students placed them at the top of the nation with 8 other jurisdictions whose scores were not statistically different from Minnesota's.

NAEP assesses mathematics in five content areas: number sense, properties, and operations; measurement; geometry and spatial sense; data analysis, statistics, and probability; and algebra and functions. The NAEP mathematics scale scores range from 0 to 500. The enactment of the federal "No Child Left Behind" legislation requires all states to participate in NAEP every two years.

In 2003, the average scale score for eighth-grade students in Minnesota was 291. The average scale score for eighth-graders of the nation's public schools was 276. Minnesota's average scale score in fourth-grade was 242 compared with an average scale score of 234 for the nation's public schools.

The percentage of eighth-grade students in Minnesota who performed at or above the NAEP *Proficient* level was 44 percent compared with 27 percent for the nation. In fourth-grade, 42 percent of Minnesota's students performed at or above the *Proficient* level compared with 32 for the nation.

These results continue a rising trend of average scale scores and percentage of students at or above *Proficient* for both Minnesota and the nation as a whole,

While everyone in Minnesota can take great pride in this nation leading performance, there is still work to be done. The percentage of students in the state performing below *Basic*, while continuing to decline, is 18 percent in eighth-grade and 16 percent in fourth-grade. Some progress was made in narrowing the achievement gap between white students and black students in fourth-grade, but at both grades the gap still exists.

Detailed information about the 2003 administration of NAEP in both mathematics and reading is available at <http://www.nces.ed.gov/nationsreportcard/>. In addition to a wealth of statistics, this site also contains a large number of problems from previous administrations of NAEP that have been released.

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### Upcoming Events:

- Future Teacher's Conference
- Pi Day March 14
- MCTM Spring Conference in Duluth
- NCTM Regional Conference Nov 2004

**Pondering by  
the President**

As I write this ...

- I ate more turkey and the trimmings for Thanksgiving than was really necessary. It sure was good!
- The thirty days of Ramadan with the celebration of Eid-al-Fitr have come and gone
- The nine days of Chanukah have been remembered (started December 19<sup>th</sup>)
- The seven principles of Kwanza have been observed (started December 26<sup>th</sup>)
- Christmas, with its exchange of gifts and time spent with family, has gone by more quickly than I would really like.
- The New Year has started and, as usual, I have made some New Year's resolutions. Wonder if I will be able to keep them?

I am going to share some gleanings from the newspapers that were of interest to me:

From Joe Nathan: "Time to recognize the impact of teachers", St. Paul Pioneer Press, October 26, 2003. "...in excellent schools, "no one is invisible." .... Schools must organize themselves so every student is well known by at least one adult. Students who feel their teachers care about them work much harder and learn more. The best teachers believe they can make a difference and work in schools that improve and maximize their skills"

From the *Sainted/Tainted* column of the St. Paul Pioneer Press, November 22, 2003. "Sainted: Minnesota's math teachers, whose talents have created the highest scoring eighth-grade math students in the country, according to the U. S. Department of Education. Such dedication and professional competence enhances the state's reputation as a leader in education. Congratulations all around." Pioneer Press Editorial Board.

From the Star Tribune South, "Teacher heads to Africa," December 10, 2003, "A Shakopee math instructor will exchange places for a year with a teacher from Kimberley, South Africa." Jan Murphy (Kieber) will leave on January 10 and won't return until next December. This was arranged through the federal Fulbright teacher exchange program. Congratulations, Jan!

In September I told you about my new job, working with 10<sup>th</sup> grade students who have not yet passed the BST Reading and Mathematics Tests. Since then, we have been working (some students harder than others) on preparing for the reading, mathematics, and writing tests. I have a couple of stories to share with you.

**She got out a piece  
of paper and folded  
it! I nearly did a  
cartwheel!**

- One of my girls, who began the year with a multiplication table near her at all times and next to no confidence in herself, was working on one of the practice math tests. She came to the problem which asks how many layers of paper are there when a piece of paper is folded 4 times? Instead of looking at the pattern in the table or just quitting, she got out a piece of paper and actually folded it! I nearly did a cartwheel!
- I watched another one of my girls use a highlighter to mark the important words in each question. She asked me to correct the first half of her practice test. When she counted up how many were incorrectly done, she figured out for herself that she could pass this test. The grin on her face was ear to ear.

My last thought for this issue comes from a meeting with one of my students and a counselor at my school. We were checking her credits and schedule for second semester. As we were discussing which mathematics class she should take next, I commented that she

*(Continued on page 4)*

## MIXING WASHER FLUID WITH POWER-STEERING FLUID

On a very cold December day my wife and I were traveling to a family gathering. Since we were going to be uncharacteristically early for the event, we decided to stop at WalMart and do some shopping. As we pulled into the parking lot, a light on the instrument panel indicated the washer fluid was low. After about an hour of shopping, I purchased a bottle of washer fluid and went into the parking lot. Now there are many reasons for what happened next; it was very cold, the car is one we had purchased recently (okay, it was a year ago), I rarely get to drive it. I could go on but you get the point. I popped open the hood, lifted the lid and proceeded to pour about 1/2 cup of washer fluid into the *power steering reservoir*.

We drove to this nice gas station in town and once the mechanic stopped laughing, he said he had never heard of this situation before, but he did not think it was a good thing. So he set to work emptying the reservoir.

My wife wanted nothing to do with me at this point, so she went shopping in a store across the street. The one and a half-hour wait provided me with an opportunity to think about teaching mathematics. The mechanic's son had stopped in on his way home from school and we began to talk. He said he liked school, but math was his least favorite subject, for all the same reasons we have heard before. When the boy left, it occurred to me that sometimes in our instruction we pour in washer fluid when what is really needed is power-steering fluid.

Minnesota's students' performance on the National Assessment of Educational Progress (NAEP) is outstanding relative to the rest of the country. So more often than not, in our instruction, we must be using washer fluid when washer fluid is needed. But in both fourth-grade and eighth-grade we have over 50 percent of our students performing at or below the basic level, as well as an issue with an achievement gap.

There is not a quick fix to the issue of raising mathematics achievement. However, if we are going to be successful in helping all students become proficient in mathematics, we have to teach them in ways that help them make sense of the mathematics they are learning. Evidence suggests that at every grade level, even high school, and for all students, even our most capable students, instruction that thoughtfully and purposefully moves from concrete experiences through increasing levels of abstraction promotes understanding. However, no one set of activities, no one instructional strategy, no one method of assessment meets the needs of all students. As a profession we need to keep working at devising materials, instructional techniques, and assessment methods as well as identifying in what situations and for what students these materials, techniques, and methods are most effective. We need to know when and where washer-fluid is needed.

Isaiah is now fifteen months old. As reported in previous columns, he has already had to deal with several federal mandates in his young life. The latest is the "No Child Left Standing at the Top of the Stairs" legislation. In trying to become proficient at going up and down stairs, he has tried several alternative strategies. Going down headfirst was very efficient in terms of speed but had several undesirable consequences. His parents report that at this point his performance is at the *Basic* level, which means he successfully negotiates the stairs 60% of the time. I believe my role in his progress has been significant. One Sunday I was babysitting and something told me to stop watching the football game and check on the little guy. I quickly found him standing at the bottom of the stairs looking up at me with a big grin on his face. You know it is amazing what kids can do if we just provide them with the appropriate opportunities.

Tom Muchlinski  
State Mathematics Specialist

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## MDE Mathematics Specialist Report

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**Teach them in ways  
that help them make  
sense of the  
mathematics they are  
learning.**

*(Continued from page 2)*

was definitely college material. Later, the counselor came to me and asked me if I had seen the look on her face when I said this. No one in her family has completed high school so going to college wasn't even on her "radar screen." I wonder how many students can't even see themselves finishing high school ... much less continuing on at a post-secondary institution. So one of my New Year's resolutions is to encourage ... prod ... talk about ... expose my students to the idea of education after high school. Will you join me?

Winter is here ... Spring (and the Duluth conference) can't be far behind.

## Teacher Incentive Grant Awardees

The MCTM Teacher Incentive Grant Task Force has awarded three grants. The 2003 recipients of the awards include

### **Carmen M. Latterell, Ph.D., Department of Mathematics and Statistics, University of Minnesota Duluth**

The goal of the grant project is to enhance student learning in mathematics courses for elementary and secondary education students. The emphasis will be on developing conceptual understanding of arithmetic operations in various base systems and conceptual understanding of fractions. The grant will provide the necessary classroom sets of manipulatives such as fraction kits and base ten blocks that students will use to take their knowledge beyond a procedural understanding of the concepts. Students will also become familiar with ways that they can incorporate the materials into their future classrooms.

### **Susan Benjamin, Achieve Language Academy, St. Paul**

The Kaleidoscope Project: Constructing Kaleidoscopes to Investigate Geometric Concepts with 5<sup>th</sup> and 6<sup>th</sup> Grade Learners

Fifth and sixth grade students at Achieve Language Academy (a St. Paul public charter school) will construct working kaleidoscopes this winter. This project will provide these learners an opportunity to investigate transformational geometry and symmetry and deepen their knowledge of angles and polygons. Building and using the kaleidoscopes will provide a tangible means for learners to experience new math vocabulary. This will be especially helpful to the many English Language Learners at Achieve, who have difficulty learning academic English when it is abstract or out of context. Finally, activities done in association with the kaleidoscope project will encourage learning across curriculum areas including science, language arts, and visual arts.

### **Lana Epley, Nevin School, Austin**

The MCTM Teacher Incentive Grant Task Force is authorized to award \$1500 to Minnesota K - 16 mathematics teachers to fund projects according to the criteria listed below:

1. The project must promote standards based mathematics instruction.
2. The project may consist of a wide range of options (e.g., developing and implementing activities, purchasing materials, attending workshops, etc.)
3. The maximum dollar amount that will be awarded for any one project is \$500.00
4. The committee may reduce the amount requested by a project, depending upon the number of proposals and the quality of the proposals.
5. Grant recipients must make a presentation about their project at either the fall or spring mathematics conference, no later than one year after receiving the grant.

For more information and application information see "opportunities" on the MCTM website.

## Learning Mathematics at the High School versus the College Level

For this column, I asked my network of undergraduate mathematics professors what they perceive as the main differences between learning mathematics at the high school level and learning mathematics at the college level. It was interesting that nearly all college professors' responses repeated the following three themes.

1. *Students must learn how to read a mathematics textbook.* In high school, students may be more inclined to turn immediately to the problems, or possibly look for examples in the textbook to help with the problems. However, students might not actually read the textbook, as the high school teacher probably has done a thorough job of presenting what the textbook content. In college courses all material is not presented, and the student *must* read the textbook. Some professors mentioned that a student is better prepared reading the textbook before coming to lecture.
2. *Students in college are responsible for their own learning.* This might mean literally to learn on their own, or with other students, or even to make good use of the professor's office hours. But, the initiative rests with the student. Even attending class is a decision of the individual student. Although some professors may take attendance, it is not a common practice.
3. *The pace is quicker and the depth of coverage deeper at college.* This is not a value judgment against high schools; it is simply format. Rather than a 170-some day instructional year in high school, students might meet for 55 minutes for 39 classes in college. The same material needs to be covered, and it is likely that the college course has more of an emphasis on proof. Often the professor uses his or her time to show the *what* and the *why* and not the procedures. The student is required to think about what it means, versus what to do.

Several professors mentioned that tests are different at college the college level. Tests are a large part of the college grade, and sometimes look quite different from high school tests. It might be that there are fewer but more detailed questions, or that the questions do not match the homework to the degree that students think they should. The student will have to work quickly on the tests, and there are probably not many opportunities to retake tests or to do extra credit.

A few people mentioned that there might be a difference in technology use. There probably is more use of technology in the high schools than in college. It is also possible that colleges are more inclined to make use of computer technology, while high schools are more inclined to make use of hand-held calculator technology

Only one person indicated what I personally see as a huge difference—class size. I usually teach classes with 250 students. Even a class size of 50 will seem quite large to a new college student. The student really cannot receive individual attention during class.

None of these differences should make us think that either high school or college is better than the other. But, these differences exist, and it seems that neither "end" (high school or college) takes enough responsibility for helping students to bridge these differences. Of course just how to bridge these differences has no easy or clear solution. If both ends simply tried to explain the differences, it might help quite a bit. It is part of the college professor's responsibility to help students learn how to study college mathematics and to not expect students to hit the ground running when they get to college. Still, it is easier to talk than to do, because students do not all take the first incoming course. And, there is that class size issue that makes it difficult to do anything except lecture on material. High schools do more hand holding (as they probably should). But, growing up is hard to do, and I wish there would be more done at the college level.

## College Corner

Carmen M. Latterell  
University of MN Duluth

*The purpose of the College Corner column is to help build a closer connection between the secondary schools and the colleges in Minnesota in order to help bridge the gap that students often encounter in their transition from secondary to college mathematics classes.*

## 2004 Delegate Assembly

### Delegate Assembly Planned for the Spring Conference in Duluth

The Delegate Assembly for 2004 will be held on Friday April 30<sup>th</sup> at the Spring Math Conference in Duluth. If you are planning on going to the conference and are interested in being a delegate please contact your District Director.

<u>District</u>	<u>Director</u>	<u>Contact</u>
1	Jon Arnold	jarnold@schs.k12.mn.us
2	Bill Johnson	johnsonb@district112.org
3	Rose Gundacker	rosemary.gundacker@district196.org
4	Donna Forbes	dforbes@ties.k12.mn.us
5	Jane Kostik	jkostik@mpls.k12.mn.us
6	Paula Freidson	paula_freidson@hopkins.k12.mn.us
7	Lisa Conzemius	zemi@lakesnet.net
8	Kaye Tavernier	ktavernier@isd166.k12.mn.us

The district directors are looking for building representatives. The representatives would help in disseminating information. If you have any questions please contact your Director.

## MCTM Foundation Spring Conference Support

Applications are available online for the MCTM Foundation Award to support the attendance of new teachers at the Spring Conference in Duluth. To qualify, teachers must be within their first 5 years of teaching and be MCTM members or be sponsored by a current MCTM member. Visit [www.mctm.org](http://www.mctm.org) and follow the link to the application form. Applications must be post marked by March 5, 2004.

## Student exhibits at NCTM Regional Conference

Teachers from all public, private, and parochial schools are urged to begin collecting samples of student work for exhibit at the MCTM Regional Conference, November 11-13, 2004 in Minneapolis. Prizes will be awarded for exemplary displays in each of the following four categories: primary, intermediate, middle, and high school. A copy of the rules and guidelines and the application form appeared in the November 2003 issue of Mathbits and may also be downloaded from the website at [www.mctm.org](http://www.mctm.org). For further information, contact Sandy Jernberg at [jernberg@mpls.k12.mn.us](mailto:jernberg@mpls.k12.mn.us) or Jane Kostick [jkostik@mpls.k12.mn.us](mailto:jkostik@mpls.k12.mn.us).

## Donate resources to Future Teachers

Reduce the clutter in your office or classroom by donating materials for the "recycled resources" give-away at the Future Teacher Conference, March 6. Books, teaching supplies, and other items that you are no longer using will be appreciated. There will be a place for Future Teachers Conference attendees to pick up an item of use in building their own resource collection. If you have items to contribute, contact Tara Evenson-Daas at [Chateletvn3620@aol.com](mailto:Chateletvn3620@aol.com) or Becky Groseth at [becky.groseth@minneapolis.edu](mailto:becky.groseth@minneapolis.edu)

Also, if you are able to donate items for door prizes, they will gladly be accepted. Donors of any items will be issued a letter for tax purposes if requested.

Help the future teachers of Minnesota get off to a good start!

Insert MN Future Teachers conference flyer—cannot be pasted to MS Publisher

FTC flyer.doc

Insert :

page 1 ap2004.rtf

(2004 Minnesota Spring Mathematics Conference  
Mathematics: The More the Merrier)

Cannot be pasted to MS Publisher



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(2004 Minnesota Spring Mathematics Conference  
page that gives keynote speakers)

Insert

page3 sp2004.doc

(page including arrange lodging)

Insert

page4 sp2004.doc

(registration page)

Insert

2004SymposiumFlyer.doc

Insert

2004SymposiumRegistration.doc

## Coming in March Pi Day

March 14 is Pi Day. Mathematics educators and students around the country will take some time to celebrate pi with activities involving this special number as well as the mathematicians who have been intrigued and perplexed by pi throughout the ages. March 14 is also Einstein's birthday. Visit the following Web sites for ideas to help kick off a Pi Day celebration at your school:

- **Mathematics**—[archive.ncsa.uiuc.edu/edu/RSE/RSEorange/buttons.html](http://archive.ncsa.uiuc.edu/edu/RSE/RSEorange/buttons.html)
- **Pi Day on the "Math with Mr. Herte" Web site**—[mathwithmrherte.com/pi\\_day.htm](http://mathwithmrherte.com/pi_day.htm)
- **Pi Pages on the Internet**—[joyofpi.com/pilinks.html](http://joyofpi.com/pilinks.html)
- **The Pi Trivia Game**—[eveander.com/trivia](http://eveander.com/trivia)
- **The World of Pi**—[members.aol.com/loosetooth/pi.html](http://members.aol.com/loosetooth/pi.html)
- **A History of Pi**—[www-groups.dcs.st-and.ac.uk:80/~history/HistTopics/Pi\\_through\\_the\\_ages.html](http://www-groups.dcs.st-and.ac.uk:80/~history/HistTopics/Pi_through_the_ages.html)
- **Pi Day sites from the Math Forum**—[mathforum.com/t2t/faq/faq.pi.html](http://mathforum.com/t2t/faq/faq.pi.html)
- **Discovering Pi**—[askeric.org/cgi-bin/printlessons.cgi/Virtual/Lessons/Mathematics/Geometry/GEO0001.html](http://askeric.org/cgi-bin/printlessons.cgi/Virtual/Lessons/Mathematics/Geometry/GEO0001.html)

*List of resources reproduced with permission from NCTM News Bulletin January/February 2004.*

## Navigating through Data Analysis and Probability

The most recent books in the *Navigations* series will be highlighted in the MCTM Sixth Symposium on Mathematics Education to be held April 29, 2004 in Duluth. The *Navigations* series provides teachers with ideas, activities, materials to support the implementation of *Principles and Standards for School Mathematics*.

### *Navigating through Data Analysis and Probability in grades PK-2*

By Linda Jensen Sheffield, Mary Cavanagh, Linda Dacey, Carol R. Findell, Carole Greenes, and Marian Small

Develops ideas about data analysis and simple probability through the use of bar graphs, tallies, frequency tables, and Venn diagrams. Helpful margin notes provide teaching tips, anticipated student responses to questions, students' work, and ways to modify the activities for students experiencing difficulty or needing enrichment.

### *Navigating through Data Analysis and Probability in grades 3-5*

By Suzanne Chapin, Alice Koziol, Jennifer MacPherson, and Carol Rezba

Discussions, activities, and investigations emphasize the collection and analysis of data and develop the idea of probability as a measure of the likelihood of events that are meaningful and real to students.

### *Navigating through Data Analysis in grades 6-8*

By George W. Bright, Dargan Frierson, Jr., James E. Tarr, and Cynthia Thomas

Students develop their probabilistic thinking by introducing them to the notion of sample space and the use of tree diagrams and geometric regions to represent sample spaces. Activities present probability in the context of the fairness of games. Notions of population samples, prediction over the long term, and the law of large numbers are reinforced through games and engaging problems.

### *Navigating through Probability in grades 6-8*

By George W. Bright, Wallece Brewer, Kay McClain, and Edward S. Mooney

Illustrates the general notion of statistics as a process while also prompting discussions of increasingly complex mathematical issues. Extends and deepens students' knowledge of data analysis and introduces the comparisons of data sets with equal and unequal numbers of elements. Presents the analysis of data involving two variables.

### *Navigating through Data Analysis in grades 9-12*

By Gail Burrill, Christine A. Frankin, Landy Godbold, and Linda J. Young

Introduces students to simple random sampling, sampling techniques, and simulation as a tool for analyzing both categorical and numerical data. Students learn what makes a well-designed study; how to distinguish among observational studies, surveys, and experiments; and when statistical inference is permissible.

### *Navigating through Probability in grades 9-12*

Not yet available.

**Geometry Activity: Exploring the Diagonals of Quadrilaterals**  
(developing deeper understanding of definitions)

1. Experiment with the diagonals of quadrilaterals using pieces of uncooked spaghetti. Break the pieces of spaghetti into various lengths as needed. Position the diagonals first and then connect their endpoints to create a quadrilateral. Try several different arrangements for each diagonal relationship listed. Determine all types of quadrilaterals that **MUST result** in using each diagonal relationship. Sketch and name those quadrilaterals in the appropriate cells.

Relationship Between Diagonals	Non-Congruent Diagonals	Congruent Diagonals
a. Diagonals are perpendicular bisectors of each other		
b. Diagonals bisect each other		
c. Diagonals are perpendicular (and they intersect)		
d. Diagonals are perpendicular and one bisects the other (and they intersect)		
e. Diagonals are perpendicular and one, if extended, bisects the other (they do not intersect)		
f. Diagonals of ABCD intersect in point E such that $\frac{AE}{EC} = \frac{BE}{ED}$		

2. Write a definition for each type of quadrilateral in terms of its diagonals:
- Isosceles triangle
  - Kite
  - Parallelogram
  - Rhombus
  - Rectangle
  - Square
  - Trapezoid
  - Chevron (non-convex kite)
3. Based on the relationships between the diagonals and the quadrilaterals formed above, what relationships can you find among the quadrilaterals themselves? For example, which categories of quadrilaterals belong to other categories? Explain. Create a tree diagram or concept map illustrating the hierarchy of quadrilaterals.
4. Choose one of the definitions you wrote in (2) and prove that it is equivalent to the "standard" definition of the particular quadrilateral.

*Note: This activity is effective for helping students to develop a deeper understanding of the subtleties and hierarchies of definitions and in helping students transition from informal description to formal definition of mathematical ideas. It also stimulates lively discussion and debate among students.*

*Credits: This activity was adapted from a portion of a presentation given by Pamela Wells, Charlene Beckman, John Golden, and Karen Novotny of Grand Valley State University, Allendale, MI at the AMTE Conference, January 2003.*

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Check the mailing label for your membership renewal date.  
Renew online at [www.mctm.org](http://www.mctm.org)

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**Mark Your Calendar  
for 2004**

3/6	Minnesota Future Teacher's Conference
4/22 – 4/24	NCTM Annual Meeting, Philadelphia, Pennsylvania
4/29	MCTM Symposium on Math Education, Duluth
4/30-5/1	MCTM Spring Conference, Duluth
11/11 – 11/13	NCTM Regional Conference, Minneapolis Convention Center

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**Do we have your  
correct address?**

MCTM strives to provide membership with current information regarding mathematics education in the state of Minnesota. To accomplish this goal, we need an accurate, permanent address for each member. Is your correct address printed on the label of this issue of *Mathbits*? If not, please contact Executive Director Arnie Cutler at 612-626-8326 or [cutler@tc.umn.edu](mailto:cutler@tc.umn.edu) or visit MCTM's web site ([www.mctm.org](http://www.mctm.org)) and go to the membership page to make your change. Student MCTM members and members in transition are especially encouraged to provide us with a permanent address. Thank you for helping us stay in touch!

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Please submit items for the next issue of *Mathbits* to [tlgonske@nwc.edu](mailto:tlgonske@nwc.edu) by March 15, 2004.  
Thank You. You may also call 651-631-5228 if you have questions. - Teresa Gonske, editor

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# **Minnesota's Future Teachers**



**Hold the Key to Tomorrow!**

## **Coming This Spring!**

**The MinnMATYC Mentoring Program  
and  
Minneapolis Community and Technical College's  
Math Department  
Proudly Present:**

### **Minnesota's First Future Teachers Conference**

**Saturday, March 6, 2004  
Minneapolis Community and Technical College  
9am-4pm**

**All potential teachers and new teachers are invited!**

#### **Selection of Events to Include:**

Information sessions and workshops for new and potential K-14 teachers  
Exhibits featuring educational resources for new and potential teachers  
Hands-on Math and Science  
And more!

Conference information and registration application can be found on the following websites:

[www.mctc.mnscu.edu/math/](http://www.mctc.mnscu.edu/math/)  
[www.minnmatyc.org](http://www.minnmatyc.org)  
[www.mctm.org](http://www.mctm.org)

# 2004 Minnesota Spring Mathematics Conference

## *Mathematics: The More the Merrier*

Equity Principle   Assessment Principle  
Algebra   Number and Operation   Connections   Representation

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*Join hundreds of Minnesota educators*  
April 30 – May 1, 2004  
DECC • Duluth Entertainment Convention Center  
Duluth, MN

Jointly sponsored by:  
MCTM • *Minnesota Council of Teachers of Mathematics*  
MinnMATYC • *MN Mathematical Association of Two Year Colleges*

### *Get rejuvenated with*

- ideas to improve the teaching and understanding of mathematics
- effective ways to help students achieve state and national standards for mathematics
- information and ideas about what works in other schools to share with colleagues back home
- an opportunity to enjoy a great area of Minnesota and learn in the company of great educators



## **Register Early!**



*For registration, further  
conference information and  
program updates access*  
[www.mctm.org](http://www.mctm.org)

*For information about Duluth  
call 1.800.438.5884  
or access*  
[www.visitduluth.com](http://www.visitduluth.com)

**Still have questions? Contact one of the following:** Arnie Cutler, 612.626.8326, [cutler@umn.edu](mailto:cutler@umn.edu);  
Genni Steele, 651.407.7500 x7652, [glstee@wbl.whitebear.k12.mn.us](mailto:glstee@wbl.whitebear.k12.mn.us); Don Karlgaard, 218.764.2767,  
[tdkarlgaard@brainerd.k12.mn.us](mailto:tdkarlgaard@brainerd.k12.mn.us); Denise Anderson 763-753-7110 [denand@stfrancis.k12.mn.us](mailto:denand@stfrancis.k12.mn.us).

# 2004 Minnesota Spring Mathematics Conference

DECC, Duluth, MN • Friday, April 30 & Saturday, May 1, 2004

Program includes over 150 sessions covering the six strands of the conference  
Session Highlights • Complete program at [www.mctm.org](http://www.mctm.org) nearer conference dates

Equity Principle • Assessment Principle • Algebra

Number and Operation • Connections • Representation

Friday Banquet Keynote - Cathy Seeley, NCTM President

Saturday Lunch Keynote - The Human Calculator

**Elementary** • Sessions include: Developing Numerical Power; Data Collection for Elementary Students; Helping Primary Children Develop Algebraic Reasoning; Connecting Numbers to Language Arts; Probability Activities for the Primary Classroom; Putting Birthdays in their Place; Cooperative Learning Groups; Bridge the Gap between Concrete and Abstract with Transitional Algorithms

**Middle School** • Sessions include: Middle School Magic – TI73 Explorer; Using Children's Literature to Enhance Middle School Math; Aligning the New Standards with Current Curricula – Number Sense; Assessment Aligned to PSSM Grades 6-8; Literacy Strategies for Secondary Math Classroom; Activities for Algebra and pre-Algebra; Navigating through Number and Operations 6-8; Error Patterns in Computation; Things to Leave for a Substitute – a Give and Take Session

**High School - Post Secondary** • Sessions include: Loads of Codes – Cryptography Through the Ages and in your Classroom; What are the Basics in Mathematics Needed for College Success?; Conic Sections in Taxicab Geometry; Rats, Socks and M&M's: Experiments in Probability; Codes for ID Numbers: ZIP, UPC, and More; The Mandelbrot Set – The Most Beautiful Object in Mathematics; Parabolic Equations in Tetrahedron Art; Differentiated Instruction in Your Mathematics Classroom

**No Child Left Behind** • Examine the implications the *No Child Left Behind* legislation holds for mathematics education in Minnesota.

**Register early . . .** To register, obtain a form or register online at [www.mctm.org](http://www.mctm.org).

Note: register by April 9, 2004 to avoid a \$15 late fee.

**Friday/Saturday registration fee with 3 meals:** \$140 MCTM members, \$165 non-members  
Full time students: \$ 70 MCTM members, \$82.50 non-members  
**Saturday only registration fee with 1 meal:** \$ 90 MCTM members, \$115 non-members  
Full time students: \$ 45 MCTM members, \$57.50 non-members

**Still have questions? Contact one of the following:** Arnie Cutler, 612.626.8326, [cutler@umn.edu](mailto:cutler@umn.edu); Genni Steele, 651.407.7500 x7652, [glstee@wbl.whitebear.k12.mn.us](mailto:glstee@wbl.whitebear.k12.mn.us); Don Karlgaard, 218.764.2767, [tdkarlgaard@brainerd.k12.mn.us](mailto:tdkarlgaard@brainerd.k12.mn.us); Denise Anderson 763.753.7110, [denand@stfrancis.k12.mn.us](mailto:denand@stfrancis.k12.mn.us).

# 2004 Minnesota Spring Mathematics Conference

## *Mathematics: The More the Merrier*

**Equity Principle    Assessment Principle**  
**Algebra    Number and Operation    Connections    Representation**


**DECC, Duluth, MN • Friday, April 30 & Saturday, May 1, 2004**

**Program includes over 150 sessions covering the six strands of the conference**

<b>1</b>	<p><b>EQUITY PRINCIPLE</b>  NCTM's <i>Principles and Standards (PSSM)</i> states that excellence in mathematics education requires equity – high expectations and strong support for all students. It further mentions that the vision of equity in mathematics education challenges a pervasive societal belief that only some students are capable of learning mathematics. Find ways to enhance your teaching. Experience new strategies for reaching all students.</p>	<b>2</b>	<p><b>ASSESSMENT PRINCIPLE</b>  NCTM's <i>Principles and Standards</i> asserts that assessment should support the learning of important mathematics and furnish useful information to both teachers and students. It should be a routine part of the ongoing classroom activity rather than an interruption. Find out how other teachers use assessment from a variety of sources to enhance mathematical learning as it reflects the mathematics that students should know and be able to do.</p>
<b>3</b>	<p><b>ALGEBRA</b>  The PSSM explains that students who are successful in algebra will be able to: understand patterns, relations, and functions; represent and analyze mathematical situations and structures using algebraic symbols; use mathematical models to represent and understand quantitative relationships; analyze change in various contexts.</p>	<b>4</b>	<p><b>NUMBER AND OPERATION</b>  Historically, number has been a cornerstone of the mathematics curriculum. The PSSM states that instructional programs should enable students to: understand numbers and ways of representing numbers; understand meanings of operations and how they relate to one another; compute fluently and make reasonable estimates.</p>
<b>5</b>	<p><b>CONNECTIONS</b>  NCTM defines connections as the ability to understand how mathematical ideas interconnect and build on one another to produce a coherent whole and to recognize and apply mathematics in contexts outside of mathematics.</p>	<b>6</b>	<p><b>REPRESENTATION</b>  The PSSM says that the ways in which mathematical ideas are represented is fundamental to how people can understand and use those ideas. Students' use of representations to model physical, social and mathematical phenomena should grow through the years.</p>

### **Arrange your own lodging . . .**

Consider bringing family or friends and extending your stay through the weekend to take advantage of the Duluth area. Information on hotels and Duluth is available at [www.visitduluth.com](http://www.visitduluth.com) or [www.mctm.org](http://www.mctm.org). Special conference rates vary by hotel (\$72-\$119 + tax/night/room) and have been negotiated with the following hotels until the blocks of rooms run out. Mention the MATH conference and confirm rates for conference dates and any extended stay (rates may change for extra days, suites, location of room, extra guests, etc.).

 <a href="http://www.visitduluth.com">www.visitduluth.com</a>	<p>Comfort Suites 218.727.1378</p> <p>Hampton Inn 218.720.3000; 800.HAMPTON</p> <p>Hawthorn Suites 218.727.4663</p>	<p>Holiday Inn 218.722.1202; 800.477.7089</p> <p>Inn on Lake Superior 218.726.1111; 888.ON THE LAKE</p> <p>Radisson Harborview 218.727.8981</p>
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**Register early . . .** To register, send in the attached form or obtain a form or register online at [www.mctm.org](http://www.mctm.org). Note: register by April 9, 2004 to avoid a \$15 late fee.

<b>Friday/Saturday registration fee with 3 meals:</b>	<b>\$140 MCTM members, \$165 non-members</b>
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<b>Saturday only registration fee with 1 meal:</b>	<b>\$ 90 MCTM members, \$115 non-members</b>
<b>Full time students:</b>	<b>\$ 45 MCTM members, \$ 57.50 non-members</b>

**2004 MCTM Minnesota Spring Mathematics Conference Registration Form**

***Mathematics: The More the Merrier***

**Equity Principle ♦ Assessment Principle ♦  
Algebra ♦ Number and Operations ♦ Connections ♦ Representation**

**DECC, Duluth, MN • Friday, April 30 & Saturday, May 1, 2004**

Name \_\_\_\_\_

Mailing Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

If you are a new member OR if any of the following has changed, fill in the information requested below.

Home phone (include area code) (\_\_\_\_\_) \_\_\_\_\_ Work Phone (\_\_\_\_\_) \_\_\_\_\_

Fax (\_\_\_\_\_) \_\_\_\_\_ E-mail \_\_\_\_\_

School District Name \_\_\_\_\_ School Building \_\_\_\_\_

Circle one: teacher supervisor student retired other \_\_\_\_\_

Circle one: elementary jr. high/middle high school post secondary other \_\_\_\_\_

**Spring Conference Registration Fees**

Regular Friday & Saturday registration fee includes 3 meals. Regular Saturday only registration fee includes 1 meal.

**NOTE: Registrations on-site or those postmarked or sent after April 9, 2004 will be charged a \$15 late fee.**

	Fri.&Sat.	Sat. only	
MCTM Member	_____ \$140.00	_____ \$ 90.00	<b>Special Meal Requests</b> _____ vegetarian meals required Meal Tickets for Speakers or Non-registered Guests: _____ tickets for Friday lunch @\$16.50 = _____ _____ tickets for Friday banquet @\$27.00 = _____ _____ tickets for Saturday lunch @\$16.50 = _____
Non-member	_____ \$165.00	_____ \$ 115.00	
Student Member	_____ \$ 70.00	_____ \$ 45.00	
Student non-member	_____ \$ 82.50	_____ \$ 57.50	
Speaker	Registration fee waived – select and pay for meals using the table at the right		

**Individuals should make their own lodging arrangements.**

**MCTM Dues**

Circle one: new renewal do not need to renew

**Indicate membership category:**

\_\_\_\_\_ One year regular \$25.00  
\_\_\_\_\_ Two year regular \$40.00  
\_\_\_\_\_ Student \$12.50  
\_\_\_\_\_ Retired \$12.50

I do not wish to have directory info published

**NCTM Dues (optional)**

Circle one: new renewal do not need to renew

**Indicate membership category:**

\_\_\_\_\_ Membership with one teaching journal (choose below) \$72  
\_\_\_\_\_ Additional teaching journal(s) (choose below) @ \$30  
\_\_\_\_\_ Journal for Research in Mathematics Education \$52  
*(Full time students may join NCTM at half the cost of memberships above)*

**Circle choice of teaching journal(s):**

Teaching Children Mathematics (K-6) Mathematics Teacher (8-14)  
Mathematics Teaching in the Middle School (5-9)

**Amount Due & Method of Payment:** \_\_\_ credit card \_\_\_ check \_\_\_ p.o. # \_\_\_\_\_ (copy attached)

Conference Registration/Meal Fee \_\_\_\_\_

Credit card number \_\_\_\_\_

Membership MCTM \_\_\_\_\_

expiration date \_\_\_\_\_

Membership NCTM \_\_\_\_\_

type of card \_\_\_\_\_ Master Card \_\_\_\_\_ Visa

Additional NCTM journals \_\_\_\_\_

Signature \_\_\_\_\_

**Total Due** \_\_\_\_\_

**Mail to: MCTM, P.O. Box 120418, New Brighton, MN 55112 or register online at [www.mctm.org](http://www.mctm.org)**

For information about lodging and events in Duluth call 1.800.438.5884 or visit [www.visitduluth.com](http://www.visitduluth.com)



**YOU ARE INVITED TO**

**the  
Minnesota Council of Teachers of Mathematics  
SIXTH SYMPOSIUM ON MATHEMATICS  
EDUCATION**



***“Principles and Standards for School Mathematics:  
Resources for Translating Concepts to Action”***

*Thursday, April 29, 2004  
Duluth Entertainment and Convention Center – Duluth, MN*

Join leaders from across the state to investigate new resources for teaching and learning mathematics. Explore strategies to implement the vision of the National Council of Teachers of Mathematics document, *Principles and Standards for School Mathematics*, particularly as it relates to teaching ALL students probability and data analysis as well as examine what the *No Child Left Behind* legislation means for mathematics education in Minnesota.

Who should attend?

- Administrators
- School board members
- District curriculum leaders
- Teacher leaders
- Teacher educators
- Teams from districts or schools

Why should you attend?

- Learn how the NCTM *Navigations* resources can assist teachers in helping all students learn important probability and data concepts.
- Examine how the NCTM *Principles and Standards* focus the curriculum and articulate probability and data concepts across all grade levels, from early work with chance, randomness and data representation through theoretical probability and data analysis.
- Explore teaching strategies for encouraging problem solving, reasoning, communicating, and modeling in specific grade level bands: PreK – 2, 3 – 5, 6 – 8, or 9 – 12.
- Examine the implications the *No Child Left Behind* legislation holds for mathematics education in Minnesota.
- Develop plans with your school or district team to implement resources and teaching strategies that support continued improvement over time.

# REGISTRATION FORM

Register by April 2, 2004 – Registration is limited to the first 150 registrants

## Minnesota Council of Teachers of Mathematics SIXTH SYMPOSIUM ON MATHEMATICS EDUCATION

*“Principles and Standards for School Mathematics:  
Resources for Translating Concepts to Action”*

Thursday, April 29, 2004

Duluth Entertainment and Convention Center - Duluth, MN

NAME \_\_\_\_\_  
TITLE \_\_\_\_\_  
SCHOOL or \_\_\_\_\_  
DISTRICT \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_  
PHONE \_\_\_\_\_ E-MAIL \_\_\_\_\_

### INDIVIDUAL REGISTRATION

\$135.00

*Includes one copy of NCTM's "Navigating through Data Analysis and Probability" book for your specified grade level, a copy of the "Principles and Standards Quick Reference Guide", lunch and reception.*

\_\_\_\_\_ Vegetarian lunch required

Circle One: Grade Level Choice for Navigations Book: PreK - 2 3 - 5 6 - 8 9 - 12

### DISTRICT or SCHOOL TEAM REGISTRATION

\$135.00

(Please complete the information on the reverse side for each additional team member)

(first registration)

*Includes one copy of NCTM's "Navigating through Data Analysis and Probability" book at specified grade level, a copy of the "Principles and Standards," lunch, and reception for each team member.*

\$85.00

(each additional registration)

\_\_\_\_\_ Number of vegetarian lunches required

### TOTAL REGISTRATION FEE ENCLOSED

\_\_\_\_\_

### METHOD of PAYMENT

\_\_\_\_\_ Check \_\_\_\_\_ Purchase Order \_\_\_\_\_ Credit Card  
Credit card number \_\_\_\_\_  
Expiration date \_\_\_\_\_  
Type of card \_\_\_\_\_ VISA \_\_\_\_\_ Master Card  
Signature \_\_\_\_\_

Team registration and lodging information is available on the MCTM website

If you have questions concerning the symposium contact:

Marlys Otis

651-604-3739

[marlys.otis@isd623.org](mailto:marlys.otis@isd623.org)

Mail the completed registration form and payment by April 2, 2004 to:

MCTM

P.O. Box 120418

New Brighton, MN 55112