



Mathbits

ELECTION RESULTS

The Nominations Committee thanks the MCTM membership for submitting election ballots! We thank all the candidates for their leadership and expertise in mathematics education and we congratulate the following people who won the election for our Board of Directors.

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President-Elect	Michelle Luke
Vice President Mathematics Education	Kathleen Cramer
Vice President Middle School	Mary Jo Hughes
District 3 Director	Cheryl Tucker
District 6 Director	Courtney LaRoche

We look forward to working with these MCTM members, and thank all the candidates for their diligent work in mathematics education. The new officers will be installed and commence their terms of service at the close of the spring conference.

2010 MCTM SPRING MATHEMATICS CONFERENCE

Making Mathematical Connections

Conference strands:

Algebra	STEM	Learning Principle	Problem Solving
Connections	Standards	Teaching Principle	

Featured speakers:

Hank Kepner

President - National Council of Teachers of Mathematics

Ellen Delaney, 2009 MCTM Honorary Lifetime Membership Award,

Associate Principal, Spring Lake Park High School

More conference information will be posted and on-line registration is available at the MCTM web site. www.mctm.org Advance registration deadline is April 23.

**2010 MCTM
Spring Conference**

*Making
Mathematical
Connections*

April 31—May 1

Remember, the three state-level finalists for the 2009 Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST) will be honored at the 2010 Spring Conference.

The 2009 Minnesota finalists were: **Karen Hyers**, Tartan High School, **Kathleen Meyer**, Stillwater Jr. High School, and **Meredith Boucher**, North Jr. High School in Saint Cloud.

Mathbits

What's New in Statewide Assessment?

Rosemary Heinitz

Math Content Specialist
MDE Research & Assessment
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Preparing for the Final Administration of MCA-II in Grades 3-8

Classroom teachers have been moving ahead with implementation of the 2007 standards in the curriculum but are mindful of the fact that students will be assessed on the 2003 standards. As teachers prepare students for the spring MCA test administration, MDE often gets questions as to which standards are being tested. For grades 3-8, the 2010 MCA is the final administration under the 2003 standards and MCA-II test specifications. This means that the operational test (the information that is reported to determine AYP) must meet the MCA -II test specifications. The items embedded in the MCA that are being field tested are aligned to the 2007 standards and the MCA-III draft test specifications. Field tested items do not impact the student's score and are not used for AYP reporting.

Because the communication from MDE must be so technically precise, teachers often feel overwhelmed by the whole testing picture. I will attempt to capture the essence of test preparation in two statements:

1. Teach your curriculum.
2. Use MCA-II Item Samplers to prepare students for the look and feel of the test.

Goals of MCTM

- ♦ *To develop an active interest in the science of mathematics.*
- ♦ *To help provide opportunities for the exchange of ideas and materials regarding instruction in mathematics.*
- ♦ *To further the study of problems relating to the teaching of mathematics at the elementary, secondary, and college levels.*
- ♦ *To work for the improvement of mathematics instruction at the elementary, secondary, and college levels in Minnesota.*
- ♦ *To work for the improvement of employment and service of members of the Council and members of the profession in general.*

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A clandestine meeting takes place each year that helps shape the course of mathematics education in Minnesota. Those in attendance make plans and devise tasks that will directly affect you—and you may not even be aware that the meeting is taking place. Does that cause you to shout, “What’s going on here? I demand to know what is happening. I want to hear everything that is being said at that meeting. In fact, I want to be at that meeting!” Well I certainly hope so.

The meeting in question is the MCTM Annual Delegate Assembly held the Friday evening of the MCTM Spring Conference in Duluth. And the tasks that shape your future originate from the resolutions submitted by MCTM members. The MCTM Board of Directors wants you, as an MCTM member, to be aware of the process, so that you have an opportunity to shape your own future.

The process is straightforward and logical, just what you would expect from an organization of mathematics teachers. Minnesota has been divided into eight districts, closely aligned with the federal congressional districts. Each district has a district director elected by the MCTM members from that district. (To find your district director you can look on the MCTM website or search this issue of *Mathbits*.)

Your district director is interested in hearing from you about your concerns and ideas; email communication often works best. Your district director will compile all the ideas and concerns you submit and bring them to Duluth. Then after the Friday luncheon there are eight district meetings led by the eight directors. You are encouraged to attend and contribute to your district meeting. Since there are no other sessions scheduled during the district meetings, it should be easy for you to be able to attend.

During the district meeting members will propose resolutions to be presented to the board of directors. Each year there are questions regarding what type and how many resolutions should be submitted. Here are some suggested guidelines.

- A resolution should be about something that we are actually able to accomplish. We all would like to see world peace, but MCTM can do little to bring it about. So well meaning resolutions that are outside of the scope of MCTM sound nice but will never get accomplished.
- A resolution should not deal with lobbying. MCTM is a 501c3 organization. This means we are tax exempt, but it also means we have to be careful not to spend more than a small fraction of our time and resources lobbying the government. Consequently, a resolution that involves a good deal of lobbying cannot be taken on by the board of directors.
- A resolution has to be handled by volunteers. Your district directors and all other elected board members get no compensation for their efforts. They are on the board because they care about students and want them to have quality mathematics instruction. They would like to do much to help you, but they have to work on the resolutions after they have marked homework, planned their lessons, and dealt with all of the issues teachers deal with every day. That doesn’t give them much time. So please make sure your resolution is important enough to have your colleagues use their spare time to work on it.

With those guidelines in mind, the districts, led by their district directors during the district meetings, craft resolutions and submit them to the delegate assembly held Friday night, right after the dinner buffet. The delegate assembly is the official business meeting of MCTM. Each district is allocated a specific number of delegates based upon the number of MCTM members in that district. Your district director is responsible to find delegates to represent

(Continued on page 4)

MCTM Resolutions What are they and how the process works

Submitted by
Bill Eppright
MCTM Recording Secretary

**Each year there are
questions regarding
what type and how
many resolutions
should be submitted.**

the district. This is not as easy a task as you might think. So if you are interested in serving as a delegate, let your director know. Delegates are expected to attend the assembly. They will discuss and vote on the resolutions. MCTM members who are not delegates are welcome to attend the assembly proceedings, but are not allowed to vote on a resolution or submit a resolution from the floor (that is what the district meetings held in the afternoon are for).

The assembly is conducted as follows. The executive director, Tom Muchlinski, and the financial secretary, Craig Rypkema, present short reports on the state of the organization. Then the resolutions are introduced, debated, and voted upon. During this process some resolutions that do not meet the guidelines do not pass. Those resolutions that do pass are submitted to the board of directors. The board discusses the resolutions, determines whether each can be accomplished and is within the scope and mission of the organization and then votes on acceptance of the individual resolutions. Those resolutions that are accepted are then assigned to the appropriate committee to start working on them. During the school year MCTM members are giving a status report on the resolutions through *Mathbits* (see below) and the MCTM website.

The board of directors truly wants to serve all of its members and hopes this article has answered some questions, sparked some interest, and will encourage you to be part of the process.

Status of 2009 Resolutions

Resolution #1 Math/Science Academy

Be it resolved that MCTM continue support Math/Science Academy activities and encourage expansion to elementary grades in the area of Algebra.

Action Taken:

- ♦ Assigned to both the Algebra Task Force and the Professional Concerns Committee. (5/3)
- ♦ An article will be written for *Mathbits*. The Math/Science Academy website has modules for professional development activities. (9/12)
- ♦ Resolution COMPLETED.

Resolution #2 Honor Retiree

Be it resolved that MCTM recognize the contributions of Dr. Wayne Roberts for the 29 years of service to the MN High School Math League.

Action Taken:

- ♦ Assigned to the Professional Partnership committee with a suggestion that MCTM make an annual contribution of \$100 to the math League in honor of Wayne Roberts. (5/3)
- ♦ The Math League representative (Tracy Bibelnieks) has been contacted. There was a suggestion for an annual award for a Math League coach. The amount of the award is yet to be determined. (9/12)
- ♦ \$500 has been budgeted for the recognition. MCTM will meet with Tracy Bibelnieks to work out the details. (12/5)

Resolution #3 Spring Conference

Be it resolved that MCTM explore the feasibility of a Saturday/Sunday spring conference. This option may support budget cuts and could possibly increase participation. Exploring this could include a survey question on the next two years conference evaluation forms to gather information.

Action Taken:

- ♦ Assigned to the Spring Conference Committee (5/3)

- This will be on the agenda of the November planning meeting (9/12)
- The Spring Conference Committee will put a question on the evaluation form to determine membership interest. (12/5)
- ONGOING into 2010.

Resolution # 4 PLC's

Be it resolved that MCTM begin to explore, support and/or facilitate Professional Learning Communities around the state to study a selected concept or topic by need. This may include the creation of modules that can be checked out for groups to use as a growth tool.

Action Taken:

- Assigned to the Professional Concerns Committee with a suggestion there be a session at the spring conference to help facilitate what to share. (5/3)
- The Professional Concerns Committee will address this in November. A spring conference session seems like a reasonable suggestion. (9/12)
- The Professional Concerns committee reported that overhead costs make the original resolution impractical. However, some progress has been and can continue to be made: a) the math/science academies funded by the state are doing some of this, b) the Technology Committee is exploring developing social network capabilities for our members (volunteers welcome), and c) articles will be written for *Mathbits*. (12/5)
- ONGOING into 2010

Resolution # 5 Advocate Funding

Be it resolved that MCTM communicate to legislators a request for ongoing technology funding to support the new standard requirements.

Action Taken:

- Assigned to the Legislative Committee (5/3)
- Nothing to report (9/12)
- The Legislative Committee determined this was not feasible considering the current economic climate in Minnesota. (12/5)
- Resolution COMPLETED.

The following NCTM Delegate Assembly resolution was acted on by the NCTM Board of Directors during its meeting in October 2009:

Be it resolved that the Delegate Assembly recommends to the NCTM Board of Directors that there be established new reduced-rate one-day registration categories for the annual meeting and exposition and regional conferences for student members and student non-members.

Action: The following rationale was provided with the resolution: Scholastic and financial responsibilities often preclude students from participating in a full conference schedule. Students are future educators and leaders in mathematics education. All are potential NCTM members. NCTM can encourage these students to participate in professional development and to be active members of their professional community by giving them multiple avenues for participating in the Annual Conference and Exposition and regional conferences.

It is important to know that NCTM already has multiple avenues in place to encourage student to participate and be active members of NCTM. (See <http://www.nctm.org/about/affiliates/content.aspx?id=24606> for details.)

In addition, students are eligible to serve as volunteers at NCTM conferences. In exchange for four hours of service as a volunteer at NCTM conferences, registration for the remainder of the day is complimentary.

The Board of Directors accepts the spirit and intent of the resolution. At its October meeting the Board approved the resolution. The new reduced-rate one-day registration categories for the annual meeting and exposition and regional conferences for student members and student non-members will be effective beginning with the annual meeting in 2011.

MCTM acts on five resolutions 2009-10

NCTM resolution and actions for 2009

More information can be found under the Affiliate Resources section of the NCTM website.

MCTM is an affiliate of NCTM.

CONNECT

Committee to Orient
and Network New/
Novice Educators into a
Community of (math)
Teachers

CONNECT Session at the Spring Conference

Preservice teachers and those in their first few years of teaching are invited to the CONNECT Session which is held from 7:00-9:00 PM on Thursday, April 29, the evening before the MCTM Spring Conference in Duluth, at the DECC. Sponsored by the CONNECT Committee and the MinnMATYC Mentoring program, this event offers an orientation designed to maximize the conference experience during the next two days as well as an opportunity to network with other teachers with similar interests and to meet leaders in Mathematics education. In addition to teaching ideas participants are eligible for door prizes and can come away with free learning materials from the famous "Book Giveaway". There is no charge for this event, that's right – free food courtesy of MCTM! Reservations are not necessary but are greatly appreciated, especially if several people from a school or college are coming. If you know you're coming. Please contact Betty Johnston at elizabeth.johnston@comcast.net

Mentors

MCTM's virtual mentoring program, conducted by Ann Sweeney of St. Catherine University provides a bi-weekly email message to beginning teachers that includes teaching suggestions, problem ideas, useful websites and information about upcoming events. The Council also offers one-on-one mentoring with an experienced teacher to those who request it. In addition, we offer our *Matt Mentor* advice column found elsewhere in this issue of *Mathbits* as well as previous *Matt Mentor* columns archived at www.mctm.org But we know that many districts designate mentors for beginning teachers and we'd like to be of service to them as well. If you or someone in your district is in the position of mentor for beginning mathematics teachers, please let us know so that we can share ideas, information and support.

For any information about mentors or other CONNECT activities, contact Larry Luck at larryluck@aol.com.

MCTM Foundation

Scholarship
opportunity

The MCTM Foundation is now accepting applications for the **Arnie Cutler Scholarship for Mathematics Course Work for Middle Grades Teachers**. The purpose of this grant is to provide financial support for teachers to improve their understanding of mathematics by completing course work in mathematics. Scholarships in a maximum amount of \$800 will be awarded to persons currently teaching in grades 6 through 8 who are members of MCTM, meet the other requirements, and complete the application process. A detailed description of the scholarship and the application materials are available through the Foundation page on the MCTM website. Applications are due by March 31, 2010.

The 2009 recipient of the Cutler Scholarship, Jessica Stuewe, is using the award to support her participation in a masters program at Bemidji State University. Jessica, a teacher at Detroit Lakes Middle School, will earn a Master of Science degree in Elementary and Middle Level Mathematics. The MCTM Foundation is pleased to support Jessica's personal and professional development efforts. The Foundation Governing Board members are eager to review applications for this year's scholarship.

For more information about the Cutler Scholarship and the MCTM Foundation, contact Bill Johnson, Foundation Board chair, at wedge1973@yahoo.com.

Become a fan!

Did you know that MCTM is now on *Facebook*? Become an MCTM fan.

NCTM is also on *Facebook*. A new math problem is posted each day.

What other math pages are you a fan of?

Dear Matt:

One area of discussion during the beginning of the school year has been homework – how and when to deal with it, and how to grade it outside of class. Usually the teacher will go over any questions students might have at the beginning of class before collecting the homework to grade. Grading is done on a scale of 0 to 10, with 0 indicating the student did not turn it in or turned in a blank, and 10 indicating the student showed thoroughness and accuracy throughout the assignment. I question whether going over the homework in class is beneficial, since some students are simply copying down the answers. However, I also don't believe it is fair to leave legitimate student questions unanswered. This dilemma makes me wonder, *what is the point of homework?* For me, the point of homework is not to punish students for getting answers wrong, but rather to help them learn. This being said, I think there is a fine line between giving the answers in class and simply collecting the homework right away. Currently, I feel that perhaps the best was to administer homework help as a teacher is before or after school.

Puzzled Student Teacher

Dear Student Teacher:

You already have a great start to becoming a reflective professional! You have also raised a question that has provoked discussions among teachers for a long time, and will probably continue to do so. Your italicized question is a good place to start. As you suggest, a key purpose of math homework should be to help students learn mathematics.

Another related purpose for homework is to connect and prepare for the next and future lessons. When homework is carefully planned for this purpose, this is done, spending time on it provides a good lead-in to the next day's activities.

Yet another purpose is to provide feedback, both to the teacher and to the students. This might include clarifying concepts for students, while alerting the teacher to concepts that are not clear for a few or many students. One problem with answering student questions in class is that the teacher does not know if only the student asking has that question, or if many have the same question. A strategy some teachers use is to have students record on a board as they enter problems they would like clarified, with tallies for multiple students with the same question. The teacher can determine quickly whether s/he should talk to individuals later, or address the whole class. An alternate idea is to have students check their work with members of a small group, giving everyone a chance to talk and explain mathematics and clear up many questions quickly. The teacher can then answer questions the group cannot answer, and talk individually with students who have questions remaining. This could be during class times when students are not engaged in whole class activities, or before or after school.

Another homework purpose can be providing practice and opportunities to extend learning and connect to prior lessons. Depending on the type of assignment, this will be more or less effective. We know that practice is most effective when it happens over time. That is, when many practice problems are assigned immediately after teaching a skill or procedure, retention after a day or so is minimal. On the other hand, when homework addresses not only recent skills, procedures and concepts, but earlier ones, the retention is much better. Since what we want for our students is long term understanding and continuing flexibility in applying skills and procedures to new situations, the so-called "distributed practice" can yield much stronger results. The idea of revisiting material from last week, month, or term can be incorporated not only into homework but into daily warm ups, which can help students know they have mastered ideas, reawaken prior knowledge that will be used in the day's lesson, and review earlier material, addressing multiple math strands and skills.

The first 5-10 minutes of class represent prime learning time for students. It seems like a

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Ask Matt Mentor!!



One problem with answering student questions in class is that the teacher does not know if only the student asking has that question, or if many have the same question.

**Have a Question
for Matt?**

Send your questions about teaching math topics to MattMentorMCTM@aol.com and watch for Matt's response in the next issue of *Mathbits*.

Current teachers, what other ideas do you have for dealing effectively with homework? Please send your ideas to Matt Mentor for a future follow-up column.

waste of this rich opportunity to fill it by reading out a list of answers, with students passively listening (or filling in answers, as you have observed). Even a short warm up of 5 minutes can be a more engaging and active learning time for students, while still providing feedback for students and teacher. For older students, posting answers for students to check as they enter class helps them take responsibility for their own learning.

Another strategy some teachers find effective and manageable is the Homework Quiz. Students have daily or regular assignments, have opportunities to check their work, and take responsibility for asking questions on problems they do not fully understand. After several days or a week, the teacher identifies a small number of key problems from the homework. For this quiz, students use their completed (or incomplete) homework to answer the identified questions on a new sheet, showing all work, handing the paper in to be graded as a quiz. Among the advantages of this are that students can clearly see the primary purpose of homework as a tool for learning; teachers can more easily manage the “paper tiger” of piles of homework to correct each day by reducing it to a single sheet less frequently; and students who do a careful and thorough job of doing homework regularly and asking questions as needed will do well on the Homework Quiz. It also allows the teacher to focus on those essential problems that best represent the small number of core concepts s/he wishes to be sure all students understand.

As you suggest, the topic of correcting and grading homework is another issue for teachers. Using a 0-10 scale may be difficult and time consuming, especially for less experienced teachers. Though the 0 and 10 scores are straightforward, distinguishing among the others might be quite hard. Especially during your early years of teaching, the most important goal for your time outside of class should be planning for effective content and instruction. You will want to find ways to quickly and efficiently check in students' homework without it taking undue time to correct, either in or out of class.

As you progress and grow in your career, you may want to try various strategies – these and others - for addressing homework, based on the class, students, school policy, and your own preferences and needs. (One way to monitor how valuable homework is for your students is to observe that they do with papers when they are returned!) There is no one right answer for homework questions that fits all occasions or all teachers, and this issue will no doubt continue to offer material for discussions in Mathematics Departments for years to come!

Good luck to you, and keep up the good thinking!

Matt Mentor

A Missed Opportunity: Mathematics in Early Childhood

For many of us, our focus on mathematics learning is tied to the grade levels of the students whom we teach. For a moment, however, if early childhood education is not our area of expertise, let's expand our vision of mathematics learning to encompass the earliest learning. Prior to kindergarten, many children have the interest and capacity to learn meaningful math and acquire considerable mathematical knowledge. Regrettably, too many preschool children are not exposed to the kind of sequenced experiences that can support and guide their development of important mathematical concepts over time.

The recently released National Research Council (NRC) report *Mathematics Learning in Early Childhood: Paths Toward Excellence and Equity* identifies the need to focus on children's learning paths in number, geometry, and measurement. In our roles as parents, family members, caregivers, or teachers, we can expose young children to math opportunities that abound in everyday experiences. Early interactions can focus on learning to count, naming quantities, and pointing out shapes in the environment.

by NCTM President
Henry (Hank) Kepner

This article appeared
in NCTM *Summing Up*,
February 2010

From the beginning, we should help children go beyond the vocabulary and rote elements to focus on mathematical relationships. The age-old question, “Who has more?” is foundational to all of mathematics. I contend that our human fixation on comparison was a fundamental impetus for our invention of numbers. Initially, determining who was taller was settled by standing back-to-back, who was heavier was established by using balance pans, and who was faster was decided by running a race. As comparisons became more complex, numbers and units became more useful in comparing. In fact, we are not able to compare today’s marathon winner with the first Greek Olympic champion without numbers and common units of measure.

Developing proficiency in counting has several parallel components. The most recognized is learning the number names in sequence. Having a child count to 5, to 10, or to 20 is a rote and sequenced routine. But building on this achievement requires that the child bring mathematical concepts and reasoning into play. Adults can provide direction and opportunities in this learning process by engaging the child in making one-to-one correspondences in increasingly challenging contexts. (Note that mathematicians use one-to-one correspondence as the pivotal concept and tool in dealing with infinity in advanced mathematics!)

To me, a child’s development of the concept of cardinality is one of the strongest and most visible indicators of his or her growth in mathematical knowledge. I find evidence of a child’s progress in acquiring this understanding by observing his or her response to my question, “How many?”

Consider a simple formative assessment task: Have the student count a number of objects. Observe the child using one-to-one correspondence, pointing to each object in turn and saying the appropriate number name. Then ask, “How many?” A child who has not grasped the concept of cardinality typically simply repeats the counting technique.

By contrast, a child who has developed the idea of cardinality often simply smiles and repeats the number name paired with the last object! The clear implication is that this child knows that the last number name also represents a name for the quantity of the entire collection. This task provides a formative assessment of the fact that a child has formulated the idea of cardinality—one of the most important mathematical concepts. For me, this is one of the high points in observing a learner putting big ideas together!

The NRC study reports that many early childhood programs do not extend children’s mathematical knowledge. Instead, they have these young students repeat the same tasks in varied settings without posing challenges that would push them to the next level. Analyses of numerous early childhood “complete” curricula indicate that a 360-minute weekly program typically includes only 58 seconds of mathematics. Although these programs frequently claim math connections, they are not pushing children’s knowledge and reasoning but merely repeating in varied settings concepts that the children already know.

Against the backdrop of my struggles on behalf of equity during my presidency, I find the evidence in the NRC report most discouraging. Young children from low socioeconomic backgrounds are already vulnerable and at risk, demonstrating lower mathematical knowledge than their peers from higher socioeconomic backgrounds. Regardless of the ages of our students, we are challenged to make up for the inequities that our students have experienced.

Beyond our grade-level responsibilities and expertise, I encourage each of us to push for solid preschool mathematics education. This is not a push for hundreds of minutes of child time in formal mathematics learning, but rather an appeal to all of us to direct young children’s attention to mathematics in more thoughtful ways as we help our youngest students to look at, and learn about, the world around them. By expanding their mathematical view of the world, we also expand their worldview!

From the beginning we should help children go beyond the vocabulary and rote elements to focus on mathematical relationships.

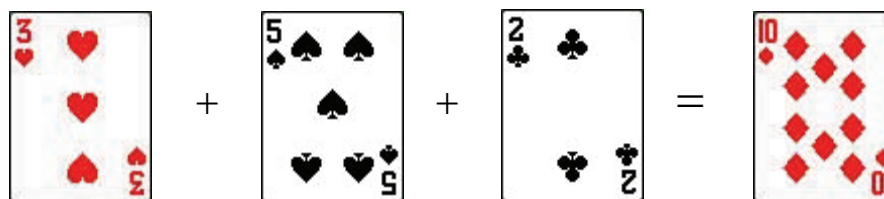
**Focus on
Elementary
Grades**

 Contributed by
Judy Hansen
Pipestone

Making the most out of the time we have with the students becomes a challenge. For my students one of the hardest things is learning addition and subtraction facts. We try to have fun while working on the facts by using games. I especially like to use dice or cards so they can go home and continue playing with family members. One of their favorite games is **Family of Cards**. You need one deck of cards with the face cards removed, scrap paper, and pencils.

Here is how you play:

1. One player deals five cards facedown to each player.
2. At the same time, players turn over their cards. Each player tries to make an addition equation, including one card as the sum.



3. If a player makes a correct equation, the player reads the equation aloud. The player records the sum of the equation as his or her points for that round. In the example above, the player earns 10 points.
4. Players return their cards to the stack, and the dealer shuffles the cards.
5. Players repeat steps 1-4. The first player to reach or exceed 50 points wins.

Variations of the game by forming subtraction, multiplication, or division problems.

This game is from the book: *Mega-Fun Card-Game Math* by Karol L. Yeatts. [Published 2005, Scholastic, Inc.]

**Mathematics and
Sports**
**Theme for
Mathematics
Awareness Month
April 2010**

The American Mathematical Society (AMS), the American Statistical Association (ASA), the Mathematical Association of America (MAA), and the Society for Industrial and Applied Mathematics (SIAM) announce that the theme for Mathematics Awareness Month, April 2010, is **Mathematics and Sports**.

Sports offers a cornucopia of instances involving data, strategies and chance, each of which is perfectly suited to mathematical analysis. Beyond the obvious uses of mathematics for things such as rating baseball players and football quarterbacks, mathematics is used to design the dimple patterns on golf balls and the composition of racing tires; it is used for scheduling tournaments and for ranking teams; and it is used to determine tactics and to predict the ultimate limits in sports records.

In the 1960s the ABC television network began a popular weekly series called "The Wide World of Sports" that spanned the globe to show the tremendous variety of sports. For 2010, the Joint Policy Board of Mathematics has chosen the theme "Mathematics and Sports" to highlight the intersection of the sports world with the wide world of mathematics—a universal language that is used to investigate problems ranging from the athletic to the cosmic.

The 2010 Mathematics Awareness web site has articles on baseball, basketball, football, golf, soccer, track and field, tennis, and car racing as well as videos and links to other resources. Resources for this year's Mathematics Awareness Month are designed to help explain the theme. At www.mathaware.org you can download articles and essays, as well as an 8.5 x 11" copies of any of the four 2010 posters.

Football

How to Kick a Field Goal by Daniel C. Isaksen
Linear Algebra on the Gridiron by Daniel C. Isaksen
A Look at Overtime in the NFL by Chris Jones
Extending the Colley Method to Generate Predictive Football Rankings by R. Drew Pasteur
How Deep is Your Playbook? by Tricia Muldoon Brown and Eric B. Kahn

Baseball

Surprising Streaks and Playoff Parity: Probability Problems in a Sports Context by Rick Cleary
Sabermetrics: The Past, the Present, and the Future by Jim Albert
Did Humidifying the Baseball Decrease the Number of Homers at Coors Field? by Howard Penn
Streaking: Finding the Probability for a Batting Streak by Stanley Rothman and Quoc Le

Track & Field

The Effects of Wind and Altitude in the 400-m Sprint with Various IAAF Track Geometries by Vanessa Alday and Michael Frantz
Mathematical Ranking of the Division III Track and Field Conferences by Chris Fisette
What is the Speed Limit for the Men's 100 Meter Run? by Reza Noubary
May the Best Team Win: Determining the Winner of a Cross Country Race by Stephen Szydluk
Biomechanics of Running and Walking by Anthony Tongen and Roshna E. Wunderlich

Golf

The Science of a Drive by Douglas N. Arnold
Is Tiger Woods a Winner? by Scott Berry
G. H. Hardy's Golfing Adventure by Roland Minton
Tigermetrics by Roland Minton

Soccer

Bending a Soccer Ball with Math by Tim Chartier

Basketball

Bracketology: How can math help? by Tim Chartier, Erich Kreutzer, Amy Langville and Kathryn Pedings
Jump Shot Mathematics by Howard Penn
Down 4 with a Minute to Go by G. Edgar Parker

Tennis

Teaching Mathematics and Statistics Using Tennis by Reza Noubary
Percentage Play in Tennis by G. Edgar Parker

And more sports . . .

Can Mathematics Make a Difference? Exploring Tire Troubles in NASCAR by Cheryl E. Crowe
Scheduling a Tournament by Dalibor Froncek

MIT OpenCourseWare (OCW) is a web-based publication of virtually all MIT course content. OCW is open and available to the world and is a permanent MIT activity. Free lecture notes, exams, and videos from MIT. No registration required.

For teachers, a range of materials to help you:

Show science demonstrations by MIT faculty in your classroom. Provide alternate explanations to reinforce key concepts. Guide students to additional homework problems and exam examples. Add to your knowledge.

You can use this site to help your students:

Understand concepts by watching video demonstrations. Study for AP exams. Sample the kind of work they'll be doing in college.

For students: Highlights for High School is your guide to MIT courses selected specifically to help you prepare for AP exams, learn more about the skills and concepts you learned in school, and get a glimpse of what you'll soon study in college.

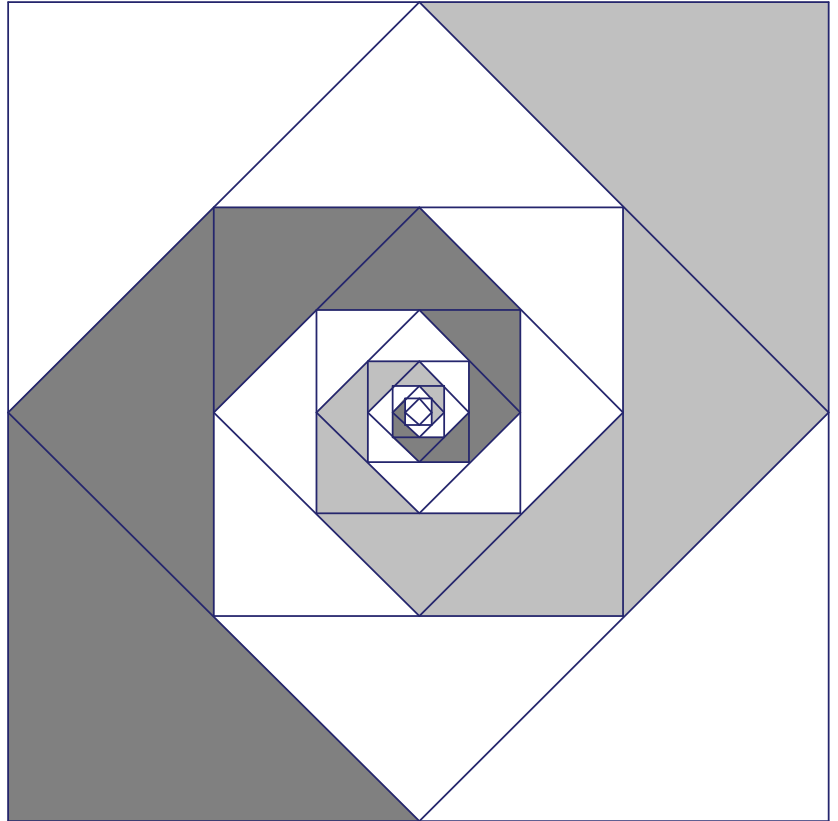
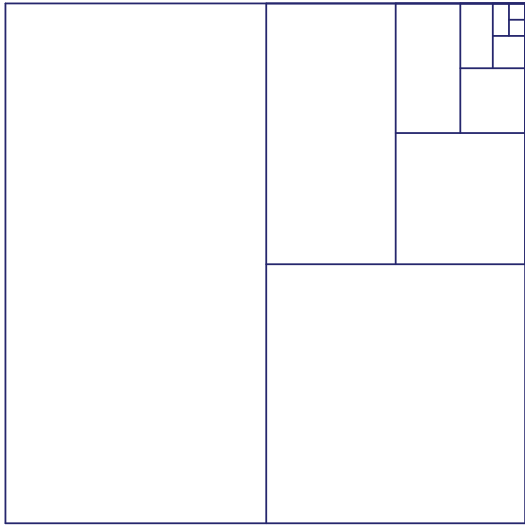
Check out videos of competitions at MIT like the Solar Decathlon. Ever see a bullet smash through a rose dipped in nitrogen? Check out the Strobe Project Laboratory. Studying for the Physics AP exam? Watch an MIT professor explain pendulums by swinging across his classroom.

Articles and Essays on Mathematics and Sports

Available as pdf files at <http://www.mathaware.org/mam/2010/essays/>

Highlights for High School**MIT Open CourseWare for high school teachers and students**

<http://ocw.mit.edu/OcwWeb/hs/home/home/index.htm>

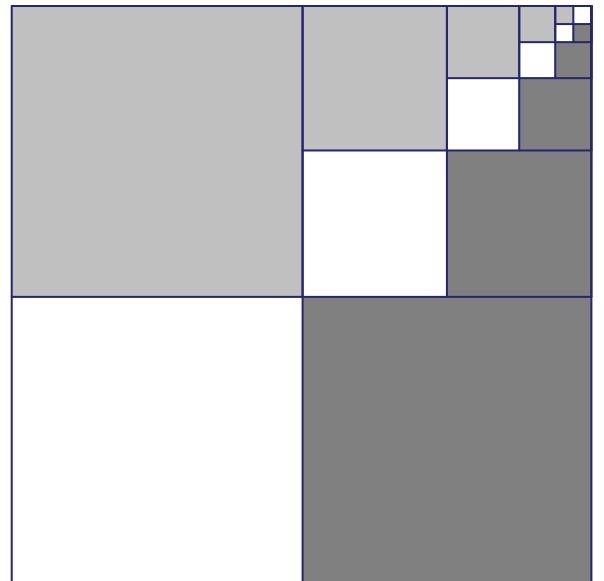
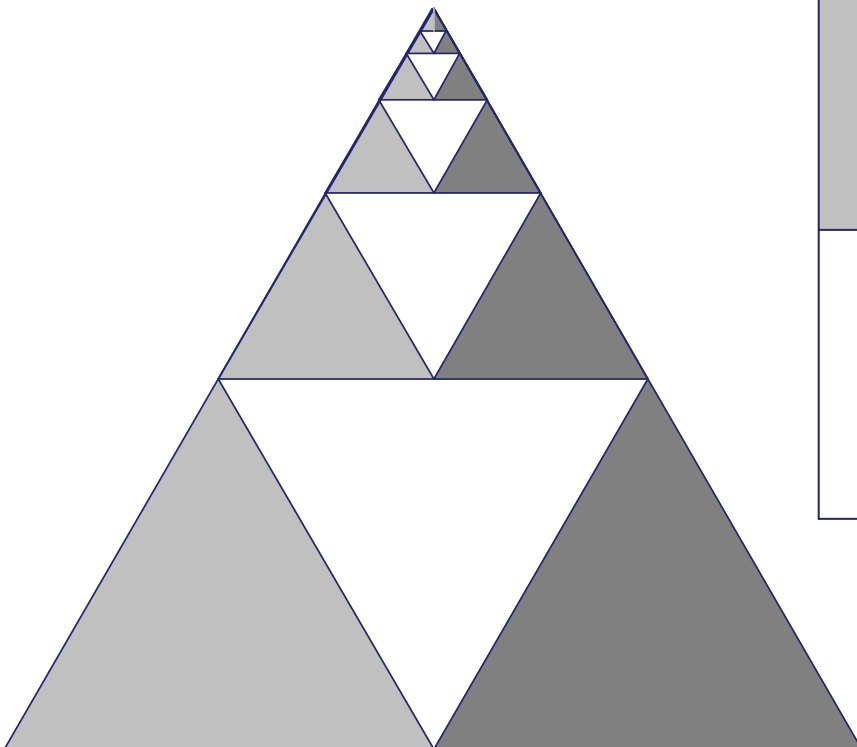


What do you see?

Find the sums of the geometric series represented.

Construct the figures with a dynamic geometry software.

Make a generalization.



Insert “Advance Registration Form”

The 2010 Ross Taylor Symposium for Leadership in Mathematics Education

STEM: Bringing It to Life in Your School

Thursday, April 29, 2010

Duluth Entertainment and Convention Center – Duluth, MN

The STEM (Science, Technology, Engineering, and Mathematics) disciplines provide realistic, engaging contexts in which to teach “big ideas” in mathematics. By integrating these contexts into mathematics classrooms, students can make connections and achieve deep conceptual understanding. This symposium focuses on the integration of STEM concepts in K-12 mathematics classrooms. Join leaders from across the state to discuss the role that STEM Integration can play in improving understanding in mathematics.

Keynote Speaker

Tamara J. Moore is an Assistant Professor of Mathematics/Engineering Education and co-director of the STEM Education Center at the University of Minnesota. Dr. Moore is a former high school mathematics teacher and her research interests are centered on the integration of STEM concepts through contextual problem solving in the mathematics and engineering classroom. She has been developing curricular tools and researching professional development and student learning in this area. Before coming to the University of Minnesota, Dr. Moore received her Ph.D. from the School of Engineering Education at Purdue University.

Who should attend?

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

Why should you attend?

The symposium will provide practical tools and activities for classroom STEM Integration in order to answer the following questions:

- ♦ How can teachers provide rich and engaging learning experiences that foster deep content understanding in mathematics through looking at the intersections of mathematics and the other STEM disciplines?
- ♦ What kinds of teaching models are needed if STEM Integration is to lead to meaningful learning in mathematics, given that most teachers have not learned disciplinary content using STEM contexts, nor have they taught in this manner?

9:00 AM – 9:30 AM	Registration	Pre-function Area - Skywalk Level
9:30 AM – 9:40 AM	Welcome Terry Wyberg - MCTM President	Meeting Rooms 301 – 304
9:40 AM – 10:45 AM	Keynote Address Tamara Moore	Meeting Rooms 301 – 304
10:45 AM – 11:00 AM	Break	
11:00 AM – 12:15 PM	STEM Activity	Meeting Rooms 301 – 304
12:15 PM – 1:00 PM	Lunch	Meeting Rooms 301 – 304
1:00 PM – 2:30 PM	Concurrent Sessions- • Grades Pre K – 2 • Grades 3 – 5 • Grades 6 – 8 • Grades 9 – 12	Meeting Room 202 Meeting Room 205 Meeting Room 204 Meeting Room 203
2:30 PM – 2:45 PM	Break	
2:45 PM – 3:30 PM	Closing Session Tamara Moore	Meeting Rooms 301 – 304
3:30 PM – 4:30 PM	Reception Appetizers sponsored by MCTM	Harbor Side Ballroom Foyer

Insert “Registration Form—Ross Taylor Symposium”

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Mission Statement:

The MCTM is an organization of professionals dedicated to promoting the teaching and learning of meaningful mathematics for all students by supporting educators in their efforts to improve mathematics education.

Mark Your Calendar

March 20, 2010	Winning Strategies Conference
April 21-24, 2010	NCTM Annual Meeting & Exposition, San Diego, CA
April 23	Advance registration for MCTM conference closes
April 29-May 1, 2010	MCTM Spring Conference, Duluth, MN

Do we have your correct address and email?

Check the mailing label for your membership renewal date. Renew online at www.mctm.org

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, contact Exec. Director Tom Muchlinski at 763-475-3168 or tmuchlinski@earthlink.net or visit the MCTM web site (www.mctm.org) membership page to make your change. Student MCTM members and members in transition are encouraged to provide a permanent address. Newsletters mailed to student members will not be forwarded. Thank you for helping us stay in touch! FYI: In an effort to be cost effective, MCTM sends newsletters at USPS bulk rate. As a result, delivery times may vary between postal districts.

MCTM's *Electronic Times* is sent out approximately every six weeks by the Publicity Committee. Do we have your correct email address? Contact Tom Muchlinski with changes.

Please submit items for publication in the April issue of *Mathbits* to tlgonske@nwc.edu by March 17, 2010. Email or call 651-631-5228 with any questions. - Teresa Gonske, Editor
