

MCTM NEWS



**Winter
2012**

Contents

- 2 Who is Doing the Math in Your Classroom?
- 4 Polya's Problem-Solving Process: Step 2—Devise a Plan
- 5 2012 MCTM 7th and 8th Grade Math Tournament
- 6 Call for Articles
- 6 MCTM Membership
- 7 Common Core State Standards Transforming Mathematics Education in Mississippi
- 8 Professional Development Opportunity This Summer
- 8 MCTM Awards

Mark your Calendar now!

The 2012 MCTM Annual Conference will be held **September 14-15, 2012** at Mississippi State University. Make plans now to attend!

Message From The President



It is my pleasure to greet you as the president of MCTM. I want to thank all participants who took time from their busy schedules to attend our 2011 fall conference in Brandon. Our conference could not have been the success it was without your attendance. Thank you for your comments and suggestions that will be vital as we plan for another great conference for 2012 in the Starkville area. Dana Franz is our conference chair and she is well underway with planning our next conference. I hope to see you and lots of new faces there.

I would like to extend a big welcome to all new members of MCTM. I hope that you have found and will continue to find our organization to be beneficial and informative. I want to also express my gratitude to our past president, Jason Ross, for his hard work and guidance. Thank you Jason for a job well done!

As we approach the half-way point of the school year, I look back and wonder where the time has gone? It seems like just yesterday the school year was starting and now we are preparing for semester exams. This is the time to reflect on where we have brought our students since school started and to focus on where we want to take them before the year ends. Although our time with our students may seem brief, keep in mind that teachers can have an impression on a child that can last for their lifetime.

I am excited about the opportunity to serve MCTM in this capacity and eager to see what is to come.

La Vonda White
MCTM President

Who is Doing the Math in Your Classroom?

By Roslyn Miller, Editor



Who does an observer of your classroom see hard at work? Fifteen years ago, I would have answered that question with, “Me, the teacher,” and I would not have thought anything was out of place with that answer. I was at the front of the classroom, at that time with an overhead projector, modeling mathematical problems, asking questions to whoever would volunteer an answer,

drawing graphs and diagrams, and trying to keep students listening to me.

Since my beginning years of teaching, I have always sought and collected resources to help me improve my practice. I question colleagues at lunch about how they teach and handle challenging situations; I read *Mathematics Teacher* and order NCTM books when I can afford them; I attend NCTM Conferences and district math teacher council meetings; and I attend optional professional development sessions. I grow by taking advantage of and learning from all of these important resources.

A pivot point that transformed my classroom from a teacher-centered classroom into a student-centered learning environment was a combination of two of these kinds of events. First, the district mathematics facilitator, Margaret DeArmond, would come to the high school where I taught and host casual, optional professional development sessions in which she would present a problem, and we math teachers would discuss the mathematics and best pedagogical practices associated with the problem. She always opened these sessions by enthusiastically exclaiming, “Let’s do some math!” Even after a day of teaching 150 students for seven hours, I looked forward to these sessions because my colleagues and I would work together on solving one novel problem that was new to us. We persisted through trials and errors and discussed strategies until we found a solution. We experienced the thrill of successfully solving a problem together, and we discussed how to support and guide students through the foreseeable difficulties. So, when Ms. DeArmond invited us to “do some math,” I knew I actually was going to be able to actively participate in “doing” mathematics, and it was enjoyable and rewarding.

About that same time, someone had recommended to me Harry Wong’s *The First Days of School*. I wouldn’t have selected the book on my own—it seemed to apply more to elementary teachers, and it sounded like something I should read during the summer. However, based on a colleague’s recommendation and a free loan of the book, I looked through it. There were many helpful directives in the book that I

See **Who is Doing the MATH** | page 3

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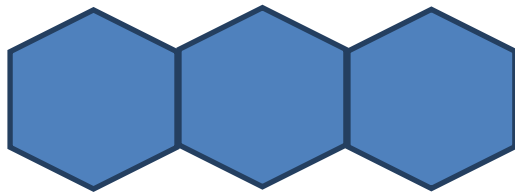
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Who is Doing the Math in Your Classroom? from page 2

2011-2012 Board of Directors (cont.)

applied right away in my classroom, and these improved the learning environment of my classroom immediately. *The First Days of School* helped me to better organize my classroom and teach important procedures to my students, but it was a question Dr. Wong asked that transformed my approach to teaching: “Who is doing most of the work in your classroom?” He maintained that students should be the ones working, and a light bulb turned on for me. For years, I had exhausted myself day after day, doing most of the thinking, talking, writing, and drawing in my classroom. I was the one doing the math while my students mostly watched and listened and answered questions requiring mere recall or computation. At the same time, I was “doing math” after school with my peers and growing in understanding and skills during those encounters. I realized my students should be the ones “doing math” in my classroom, so I changed overnight in how I managed their learning environment.

My students would learn much more if I provided them the structure and resources to enable **them** to “do math” rather than have them watch and listen to me do math. So, instead of telling my students what each symbol in $y = mx + b$ represents, I provided them contexts in which they could discover and discuss patterns, make a (x,y) table and predict how the pattern would continue, and describe a rule (written in both words and an equation) by which they could calculate a result (y) given a step number (x) in the pattern. Students would draw graphs to correspond with the patterns and (x,y) tables, and I asked them to look for relationships then that connect the graphs with the tables and patterns. This resulted in students being able to connect the “zero-step” in the pattern, $x = 0$ in the table, the y -intercept on the graph, and b in the equation. They constructed meaning for themselves when they saw the relationship between the constant rate of change in the pattern, in the table, and the slope on their graphs, and how it turned up as m in their equations. They could use their graphs to determine small values of y , and equations to predict large values of y . They could compare their various graphs and see that the greater the rate of change, the steeper the graph, and other relationships as well.



How many students can sit at a 1-hexagon table? A 2-hexagon table? A 3-hex table? A 4-hex table? A 7-hex table? A 37-hex table? A 100-hex table?

See **Who is Doing the MATH** | page 4

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Polya's Problem-Solving Process:

Step 2—Devise a Plan by Angela Barlow, Middle Tennessee State University, abarlow@mtsu.edu



It's a cold February morning. Some of your students are sleepy with their heads on their desks. Others are chatting with their friends. A few seem to be ready for your lesson as they have their pencils sharpened and ready to go. It's time to start the lesson so you read the following problem to the class.

A customer enters a store and purchases a pair of slippers for \$5, paying for the purchase with a \$20 bill. The merchant, unable to make change, asks the grocer next door to change the bill. The merchant then gives the customer the slippers and \$15 change. After the customer leaves, the grocer discovers that the \$20 bill is counterfeit and demands that the shoe store owner make good for it. The shoe store owner does so, and by law is obligated to turn the counterfeit bill over to the FBI. How much does the shoe store owner lose in this transaction? (Sobel & Maletsky, 1999, p. 66)

Having read your Fall 2011 MCTM Newsletter (Barlow, Riales, & Holbert, 2011), you know how you should spend the next few minutes. You ask questions such as, "What is something that we know about the problem?" and "What other information do we know?" You notice that students who were previously "sleeping" and "chatting" are now participating and offering ideas about this problem. After some discussion, you feel like students understand the problem (Step 1). What will your students propose as you move to Step 2 – Devise a Plan (Polya, 1945)?

Supporting Students in Identifying Strategies

During the "Devise a Plan" stage, the teacher usually asks a question such as, "What strategies do you think we might use to solve this problem?" Students typically answer this question in one of two ways. In some cases, students respond like those in Class A (see Figure 1). Here, the students want to "do something" with the numbers and so they begin by proposing different operations. Compare this with Class B (see Figure 1). These students are identifying "methods of approaching a task that are completely independent of the specific topic or subject matter" (Van de Walle, 2007, p. 57).

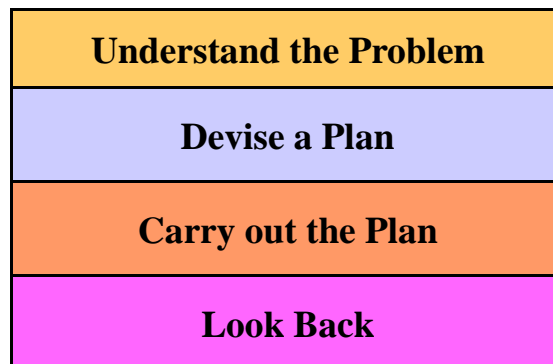


Figure 1. Polya's Problem-solving Process

Who is Doing the Math from page 3

How I spent my time in my class changed from standing still lecturing, drawing, asking questions to no one in particular, and trying to keep bored students' attention to my walking around to each small group, interacting with every student every period, asking specific students questions like, "How did you get that?" "How does the graph relate to the equation?" "How does the equation relate to the table?" "Does that work every time?" "How do you know?"

My students became the ones doing the math in class, and they learned and understood the content at a much deeper level. Since they were getting to discover, document, and describe mathematical relationships with my support and guidance only when they needed it, their engagement in class and with their fellow group members made classroom management more of a "We're all on the same side working for the same goals" rather than "It's me against you trying to get you quiet and to listen to me." My students experienced thinking and communicating mathematically first-hand rather than vicariously.

Be the observer in your own room and ask yourself the questions, "Who's doing the math?" and "Who is doing the work?" If your answer is not "My students!" then consider how you can shift that paradigm to improve student engagement and understanding.

Polya's Problem-Solving Process: Step 2—Devise a Plan from page 4

Class A	Class B
<p>Sam: I think we should add.</p> <p>Tamika: No, we should subtract 20 because he gave the money back.</p> <p>Kayla: I think we should add and subtract.</p>	<p>Mitch: I think we should try to draw a picture.</p> <p>Malaysia: I would like to act it out.</p> <p>Smith: Maybe we could draw a table.</p>

Figure 2. Student plans for solving the Counterfeit Bill problem.

How do teachers support their students in thinking more like Class B? To answer this question, here are 4 instructional strategies to consider.

As strategies are used, identify them.

As you move through the school year, you will notice students using different problem-solving strategies. When this happens, label them. Talk about them. Ask students to talk about them. Labels, such as *guess and check* or *work backward*, give students a means for talking about the strategies.

Make a list of strategies and refer to it often.

Create a chart for your classroom titled, Problem-solving Strategies. As new strategies are identified and labeled, add them to this list. When students stop you and say, "I don't know what to do," you can then respond with, "Is there a strategy on our list that might be helpful?"

Select problems that elicit particular strategies.

Some problems are likely to elicit certain strategies. For example, the Counterfeit Bill problem from the opening paragraph is best solved using an *act it out* strategy. Alternatively, the Digit Problem (Sobel & Maletsky, 1999) featured in Appendix A elicits the *search for a pattern* strategy. So, if you look at your class's list of problem-solving strategies and notice a strategy such as *search for a pattern* missing, don't start the lesson with, "Today we are going to learn the problem-solving strategy – search for a pattern." Instead, start with a problem such as the Digit Problem that students will naturally solve by looking for a pattern. Then, after a student has solved the problem using that strategy, label and discuss the strategy and add it to your chart.

When it's all said and done, talk about the strategies.

As students discuss their solution processes, be sure to include some conversations about the strategies themselves. What strategy did Micah use? Which strategy did you like the best? Why is that? Questions like these draw students' attention to the strategies.

2012 MCTM 7th and 8th Grade Mathematics Tournament

Local tests for the 2012 Tournament will be conducted the last week of January through February 15. Specific dates are determined by Community College Districts.

District tests will be given are scheduled for March 9, specific dates determined by CC Districts.

The State test will be March 31.

Call for Item Writers for 2013 MCTM Mathematics Tournament

Item writers are needed for the 2013 MCTM Statewide 7th and 8th Grade Mathematics Tournament test, according to Teresa Floyd, the Tournament Chair.

Experience teaching 7-12th grades is required, but writers must not be currently teaching or tutoring mathematics in grades seven or eight.

New writers may not have children or grandchildren in grades seven or eight.

Writers must sign a waiver that they have no affiliation or interests that would be considered a

conflict of interest with the 7th and 8th grade statewide testing.



Polya's Problem-Solving Process: Step 2—Devise a Plan

Conclusion

Polya (1945) reminds us, "The way from understanding the problem to conceiving a plan may be long and tortuous" (p. 8). Collectively, however, these instructional strategies will help you and your students along the way.

References

- Barlow, A. T., Riales, J. C., & Holbert, S. M. (2011). Step 1: Understanding the problem. *MCTM News*, available online at www.mctmonline.com/page12/documents/mctmnewsletterfall2011.pdf
- Polya, G. (1945). *How to solve it*. Garden City, NY: Doubleday.
- Sobel, M. A., & Maletsky, E. M. (1999). *Teaching mathematics: A sourcebook of aids, activities and strategies*. Needham Heights, MA: Allyn & Bacon.
- Van de Walle, J. A. (2007). *Elementary and middle school mathematics: Teaching developmentally, 6th edition*. Boston, MA: Pearson Education, Inc.

Be a member of MCTM

Are you actively engaged in mathematics education in the state of Mississippi? Become a part of Mississippi's affiliate of the National Council of Teachers of Mathematics. Benefits include an annual state conference, news and information of interest to Mississippi mathematics teachers, collaboration with other Mississippi mathematics educators to grow in the profession of teaching mathematics, an opportunity for an annual \$1000 scholarship for graduate work, and eligibility for one of two annual grants of up to \$500. Membership is \$10 per year. Download a membership form at mctmonline.com and join today!

Call for Articles



MCTM welcomes submission of articles and learning activities for consideration to be published in the Newsletter. Any topic of interest to Mississippi K-University mathematics educators is appropriate. Submitted manuscripts and activities should be original to the author. If material has been previously published, specific publication information should be included.

Manuscripts, including computer-generated tables, figures, or diagrams should be submitted by email to RMiller@colled.msstate.edu in a Microsoft Word document as an attachment. Photos and scanned art work or student work should be sent in separate attachments as .JPG or .GIF files. If student work or photos of students are submitted, include a statement that permission from the students and their parents to publish the student work or pictures is on file at the school.

If the manuscript includes a reference list, it should be formatted in APA style. See the Winter 2012 Newsletter or other recent issues for examples.

Manuscript authors are encouraged to submit a head-shot photo to accompany article, if published.

Manuscripts are subject to editing prior to publishing.

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The Mississippi Association of Mathematics Teacher Educators supports mathematics teacher educators in providing high quality teacher preparation in Mississippi through professional development and research. Check out the website at www.mamte.com.

Common Core State Standards Transforming Mathematics Education in

Mississippi by Dana Franz, Mississippi State University



It is estimated that by 2018, over half of the jobs available in Mississippi will require some type of post-secondary degree, which

ranks us 47th in the United States for post-secondary jobs. Another way to think about it is approximately every other 6th grader will need some type of schooling beyond high school to be employable in Mississippi. The Common Core State Standards (CCSS) were developed, in part, over concerns about the changing needs of the United State work force.

CCSS has 4 guiding principles: 1) create the next generation of K-12 standards, 2) insure all students are college and career ready in literacy and mathematics no later than end of high school, 3) build upon the educational foundation already in place in the states, and 4) encourage a highly literate population of learners, able to think critically and responsibly thus broadening personal and others' world views to become responsible citizens of the world. The CCSS, along with information about the development of the standards, can be found at www.corestandards.org or you can access information about the CCSS as related to Mississippi at www.mde.k12.ms.us under the tab Hot Topics → Common Core State Standards.

The Mathematical Standards in CCSS have two components: Standards of Mathematical Practice and Mathematical Areas of Focus.



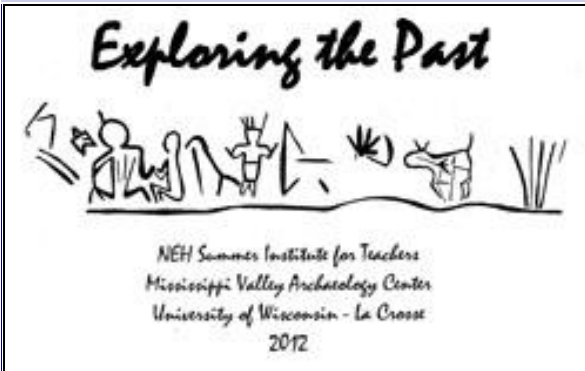
According to the CCSS document, the Standards of Mathematical practice is a combination of the NCTM Process standards (problem solving, reasoning and proof, communication, representation, and connections) and the strands of mathematical proficiency as defined in *Adding It Up*, a report of the National Research Council [adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy)].

The Mathematical Standards are defined for each grade and, unlike the NCTM Standards and the MS Curriculum Frameworks, the standards (Areas of Focus) change from grade to grade. Students will have to use the Mathematical Practices as they solve problems in mathematics. Examples of what the new standards will look like are available in the materials posted on the MDE website.

This is an exciting time to teach mathematics. Our students will be challenged in new and different ways, and teachers will need to employ multiple methods to help our students progress in mathematics. I am sure everyone has begun to explore the new CCSS, and many have already engaged in some training. It is very important we all become students of the CCSS. I would suggest that *starting today* you begin to explore and study the new CCSS. Of course, you will want to begin with the grade you teach, but then examine the grades proceeding and following your teaching assignment. Alignment documents provided on the MDE website are a good reference as you explore the CCSS, but you *must not* rely solely on these documents. Middle School mathematics is vastly different, with far more emphasis on statistics than ever before. The high school courses will also undergo major revisions.

MDE is providing training for all teachers in the state, but also consider taking advantage of workshops offered by one of the Institutes of Higher Learning in Mississippi. Our Mississippi universities are transforming their teacher education programs to meet the new standards, and new partnerships among some of the IHL's are forming. The CCSS totally overhauls school mathematics—be prepared!

Professional Development Opportunity This Summer



Mississippi Council of Teachers of Mathematics members might be interested in a new professional development opportunity the University of Wisconsin-La Crosse will be offering this coming summer: a National Endowment

for the Humanities Summer Institute for Teachers. At first glance, an archaeology related professional development opportunity might not seem to be relevant to mathematics teachers - however archaeologists do use lots of math to record information in the field and when analyzing data. This is probably not an offering that all math teachers will find of interest, but this is a unique opportunity for those who are interested in making connections between math, science and social studies.

Exploring the Past: Archaeology in the Upper Mississippi River Valley

Walking beside thousand-year-old burial mounds, flaking raw stone into tools, learning how potsherds tell us about human behavior, and understanding how humans adapt to complex, ever-changing environments--our 2012 NEH Summer Institute features all this and more.

The Mississippi Valley Archaeology Center at the University of Wisconsin-La Crosse will offer a three-week NEH Summer Institute on July 9–27, 2012. This dynamic learning experience for K-12 teachers will explore how Native Americans and Euro-Americans have adapted to the Upper Mississippi River Valley over the past 13,500 years, and how archaeology leads to an understanding of how human cultures change and adapt through time.

The Institute will feature a one-day excavation experience, field trips to archaeological sites, hands-on laboratory and workshop activities, demonstrations, and classroom activities. Individual projects will help participants tailor the content to their own teaching areas. NEH Summer Scholars receive a \$2,700 stipend to help offset their expenses.

Application and other information on the Institute will be available online at <http://www.uwlax.edu/mvac/neh.htm>. The deadline for applications is March 1, 2012.

Mississippi Council of Teachers of Mathematics MCTM Graduate Scholarship

One of the benefits of membership in MCTM is the opportunity to apply for the annual Graduate Scholarship. The MCTM Scholarship for Graduate Studies is a \$1,000 scholarship available to an MCTM member pursuing graduate work. The 2011 scholarship was awarded to **Brad Johns**, mathematics teacher at Northwest Rankin Middle School at the Fall Conference in September. Congratulations and Best Wishes to Mr. Johns!

MCTM Trust Fund Grants

Also announced at the 2011 Fall Conference were the recipients of the two annual Trust Fund Grants, NCTM members **Felisha Thompson** and **Sandra Higgins**, for projects to implement in their classrooms.

MCTM Teacher of the Year Award

MCTM honors excellence and success in teaching mathematics by recognizing an MCTM member as Teacher of the Year. Recipients of the award are recognized at the Fall Conference and presented with \$100 and a plaque. Eligibility requirements and a nomination form are available online at mctmonline.com. The deadline for postmark of the nomination is August 1, 2012.