MCTM NEWS

Mississippi Council of Teachers of Mathematics

Fall 2011

Contents

2011 T³ and MCTM Regional Conference "Completing the Square"

September 16-17, 2011
Brandon Middle School

Message From The President

I hope everyone is off to a great fall semester and school year. Your MCTM board is excited about this year's fall conference to be held in Brandon, MS. We are also continuing our partnership with Texas Instruments by once again holding our annual conference in conjunction with a T^3 regional. Through TI's generosity, we have been able to attract top T^3 instructors as well as reduce our conference cost. The board recognizes that budgets are an issue all over the state, and, at the suggestion of our conference chair, the conference registration fee has been lowered. I sincerely hope that this lower fee plus the Friday afternoon/Saturday format will allow more of you to attend. In addition, there will be several sessions on the Common Core Standards, something I know is on the forefront of many of your minds. LaVonda White and her team have done a terrific job of planning what appears to be a phenomenal conference.

This year, MCTM has awarded two grants ($500 each), a graduate scholarship ($1000), and 5 partial scholarships for TI-Nspire™ summer workshops. As president, I think it is vital that our organizational mission and activities include giving back to our membership. Feel free to pass along other ideas for ways the organization can help you.

As always, current conference information may be found at www.mctmonline.com, and I encourage you to check out the website. I look forward to seeing you in September!

Jason Ross, MCTM President

Grants, Scholarships, and Awards

This year, MCTM had awarded two grants at $500 each, a graduate scholarship for $1000, and 5 partial scholarships for TI-Nspire™ workshops. The recipients of these awards and scholarships will be announced at the MCTM Annual Conference in September.

Need more Information?

Find out more information about MCTM awards, grants and scholarships online. Also, keep up with the latest MCTM news and conference information by visiting our site: http://www.mctmonline.com.

Mark Your Calendars, Day Planners, and Phones

Annual Conferences

- The 2011 MCTM Annual Conference will held **September 16-17, 2011** in Brandon, MS.
- Algebra T^3 Institute will be **September 16, 2011** in Brandon as a pre-conference event.
- Register for the MCTM conference and by clicking here. See page 3 for more conference information.

2011 REGIONAL T³/MCTM ANNUAL CONFERENCE

COMPLETING THE SQUARE

September 16 - 17, 2011
Brandon, MS.

Registration

www.mctmonline.com
Early Registration ends September 1

Speaker Proposals

www.mctmonline.com
Deadline for submission is June 1

Conference Location

Brandon Middle School
408 S. College Street
Brandon, MS 39042

Day 1

Friday, 9/16/11
Pre-Conference Algebra Institute
9 am - 3 pm
Conference Registration 3:30 pm
Sessions 4:00 pm - 7pm

Day 2

Saturday, 9/17/11
Registration 7:00 am
Sessions 8:00 am - 3:00 pm
Lunch Provided

CEUs available through
Mississippi College
.5 CEU - $5
1 CEU - $10

DIRECTIONS:

***From 1-20 West**
-Take 1-20 East
-Exit 56 to US-80 East
-Turn right onto
S. College Street

***From 1-20 East**
-Take 1-20 West
-Exit 59 to US -80 West
-Turn left onto
S. College treet

Brandon Middle School is on the right

Parking lots on both sides of the street

Conference Hotel:

La Quinta Inn and Suites
215 Dande Drive
Brandon, MS 39042
601-591-1045 *Ask for MCTM rate

Additional Hotels:

Sleep Inn & Suites
333 Airport Road
Pearl, MS 39208
601-896-9638

Candlewood Suites
3810 Flowood Drive
Flowood, MS 39232
601-326-3600

Holiday Inn Express Hotel & Suites
112 Ridge Way
Flowood, MS 39232
601-992-7773

Jameson Inn
434 Riverwind Drive
Pearl, MS 39208
601-932-6030

For further information contact:

LaVonda White
lwhite@rcsd.ms

MCTM Membership Application

Yes, I want to become a member of the Mississippi Council of Teachers of Mathematics. My $10.00 dues are enclosed.

☐ New member

☐ Renewal

Name

Mailing Address

City (County) State Zip

Home Phone

School District

School Name

School Phone

E-mail Address

Mail to: Jennifer Wilson
MCTM Treasurer
5369 Clinton-Tinnon Road
Jackson, MS 39209

Step 1: Understanding the Problem

By Angela T. Barlow, Julie C. Riales, & Sydney M. Holbert

Mrs. Hernandez wanted to engage her students in problem solving. She spent some time looking through websites trying to find what she considered an appropriate problem for her students. She finally settled on a problem and could hardly wait to share it with the class.

She started the lesson by telling the students she had an interesting problem for them to try and she just KNEW they would be able to solve it. Then, she read the problem aloud to her students and asked if there were any questions. No one said anything so she told the class to get started and feel free to talk with a partner. What came next was not what Mrs. Hernandez expected. In her mind she had anticipated the students talking to one another, brainstorming ideas, drawing pictures, etc. in efforts to figure out the problem. Instead, Mrs. Hernandez saw many students sitting with blank stares on their faces and other students with their hands raised in the air. One student asked, "What are we supposed to do?"

While Mrs. Hernandez' situation is fictitious, it is one that many of us can identify with. We want our students to engage in problem solving but we are easily frustrated when they do not know what to do. It is tempting to tell them what to do but then that would rob them of the problem-solving process. So what should we do?

In 1945, George Polya introduced his 4-step problem-solving process (see figure 1). The first step of this process involves understanding the problem. According to Polya, "It is foolish to answer a question that you do not understand" (p. 6). While this seems to be common sense, often students take actions to indicate that they do not take this message to heart. We have all seen students "pick the numbers out of the problem and do something with them." Does this indicate that the student values understanding the problem? Sometimes, students read a key phrase, like "in all," and tell you that this means they should add the numbers. Do these students think understanding the problem is important? Yet, good problem solvers spend a large part of their time understanding the problem, recognizing that the process of interpreting and modeling the problem is key (DeMatteo, 2010).

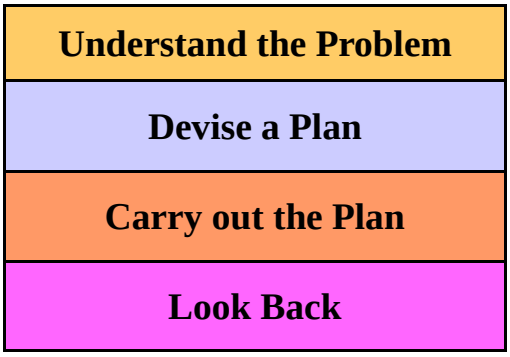

Figure 1. Polya's Problem-solving Process

So, how does a teacher like Mrs. Hernandez support her students in understanding the problem? How does she provide this support without robbing them of the problem-solving process? The purpose of this article is to help you answer these questions and provide a vision of what "understanding the problem" looks like in a classroom.

Supporting Students in "Understanding the Problem"

Recognizing the importance of the first step of the problem-solving process, we would like for you to consider two instructional strategies that support students in "understanding the problem." These strategies include conducting class discussions of the problem and stopping after a few minutes to share observations. Each of these will be described in the paragraphs that follow.

Class Discussions of the Problem

To support understanding the problem, students benefit from class discussions about the problem. These discussions are *not* about what the answer to the problem might be but are instead about what the students know from the problem. Students benefit from these discussions as they force the students to think about the problem and listen to other students' ideas.

Consider the vignette in Appendix A. In this elementary classroom, the teacher begins the class discussion of the problem by simply asking, "What are some things we know about the problem?" As students share their ideas, the teacher records the ideas for other students to see, regardless of whether the idea is useful to solving the problem or not. Typically, when students first engage in these types of discussions their ideas are limited to restating information taken from the problem. With experience, students begin to share ideas that demonstrate a deeper understanding of the problem, as seen later in the vignette when a student recognizes that the answer must be an odd number.

Stopping to Share Observations

A second strategy for supporting students in understanding the problem is to stop the students from working after three or four minutes and ask them to share additional ideas that they know about the problem. This is particularly useful in for moving students forward in identifying more insightful observations about the problem. By allowing the students to listen to fellow students, you are supporting them in understanding the problem without robbing them of the problem-solving process.

As an example, consider the vignette included in Appendix B. In this high school classroom, the teacher asks the students to share additional observations after having worked in their small groups for 5 minutes. Although the teacher in this vignette selected four students to share, she could have just as effectively asked each group to share one idea. Either way, students have the opportunity to benefit from other students' ideas and then return to working on the problem.

Conclusion

As teachers, we want our students to engage in problem solving, recognizing the powerful learning that will result. We struggle, however, with getting our students to think about problems and we find ourselves in a situation similar to that of Mrs. Hernandez. Recognizing the role that understanding the problem plays in problem solving, we have provided two instructional moves that support the students in understanding the problem without robbing them of the problem-solving process.

In each of the sample vignettes, the teacher has utilized questioning techniques to facilitate not only students thinking about the problem individually but also students listening to one another as a means for better understanding the problem. When employing these strategies, it is important to be sure to focus the discussion on the problem and *not* on sharing possible solutions as solution sharing will come later in the lesson. With time spent understanding the problem, students will be better able to devise and carry out a plan and, in turn, become successful problem solvers.

Appendix A

> Eric loved to count. One day Ms. Fox dumped some cubes on Eric's desk. As might be expected, Eric began to count the cubes. He reported the following to Ms. Fox. "When I count the cubes by two, I have one left over; when I count by three, I have one left over; when I count by four, I have one left over; and when I count by seven, I have none left over." From this information find out how many cubes Eric has. (Olson, 1999)

After asking students to read the problem silently, Ms. Cook read the problem aloud to the class.

Mrs. C.: What are some things that we know about the problem? Bradley?

Bradley: Eric LOVES to count!

Mrs. C.: Yes, he does. What else do we know, Evan?

Evan: When he counts the cubes by two, he has one left over.

Abby: He also has one left over when he counts by three.

Jimmy: AND when he counts the cubes by four.

Heather: When he counts the cubes by seven, he doesn't have any left over.

As the students share their ideas, Ms. Cook records each statement on chart paper.

Mrs. C.: Is there anything else that you know about the problem? (No one answers.) Ok, that will get us started. Now what are we trying to figure out?

Abby: We want to know how many cubes are on Eric's desk.

Mrs. C.: Nice. So I'm wondering . . . if I find a number that fits the first clue, but doesn't fit the second clue, can that be the answer? Think about that for 30 seconds in your head. *Thirty seconds later* . . . Now talk about that with your partner. *Thirty seconds later* . . . What do you think? Evan?

Evan: No, that cannot be the answer. The number that is the answer has to fit all of the clues.

Mrs. C.: Do you agree or disagree with that?

Class: Agree!

Jimmy: The answer has to fit all of the clues. It can't fit just one or two clues.

Mrs. C.: Interesting. Is it possible that Eric has 13 cubes on his desk? Think about that in your head for 30 seconds. *Thirty seconds later* . . . Now talk about that with your partner. Could 13 be the answer? *One minute later* . . . Could Eric have 13 cubes on his desk? Jon

Jon: No.

Mrs. C.: Why not, Jon?

Jon: Because it does not fit ALL of the clues. It only fits three of the clues.

Mrs. C.: Do you all agree or disagree?

Class: Agree!

Mrs. C.: Alright. Let's get started working on this problem.

After 4 minutes of working on the problem . . .

Mrs. C.: You are all working very hard. Let's share some things that you have figured out so far. Some of you may have an answer already, but don't tell the rest of the class your answer yet. Just share something that you noticed.

Heather: The answer is not 25 because when you count by 7 there are cubes left over.

Mrs. C.: Ok. Someone else – Bradley?

Bradley: There's no way the answer is 20 because when you count by 2 you don't have 1 left over.

Sam: The answer has to be an odd number.

Mrs. C.: Interesting. Why is that, Sam?

Sam: It's odd because one of the clues says that when Eric counted the cubes by 2, he has 1 left over. So it has to be odd.

Mrs. C.: Thank you all for sharing your groups' observations. I hope it has helped you if you were stuck. You will have another 6 minutes now to continue working.

Appendix B

> How many times does the paper wind around the cardboard roller on a 300-sheet roll of bathroom tissue? Each sheet is 4.4 inches long, the diameter of the full roll is approximately 4.2 inches, and the diameter of the cardboard roller is approximately 1.6 inches. (NCTM, 2007)

Ms. Johnson asked the students to read the problem and then talk to their neighbors for one minute, sharing ideas about the problem.

Mrs. J.: Now that you've had a little time to think, let's make a list of what we know from the problem. What's something that you know about this problem, Jill?

Jill: There are 300 sheets of tissue in the roll and that each sheet is 4.4 inches long.

Mrs. J.: Ok, let's start our list with that information (records information in list form). Keisha, do you have anything to add to our list of what we know?

Keisha: Well, the cardboard roll has a diameter of 1.6 inches.

Bryan: And the diameter of the full roll is 4.2 inches.

Mrs. J.: Interesting. What else do we know? Smith?

Smith: The number of sheets it takes to go around the tube gets bigger as it grows.

Mrs. J.: Interesting. Can someone who thinks they know what Smith is saying repeat his idea? Jan?

Jan: Well, I think he is saying that every time the toilet paper goes around the roll, the distance around the roll is getting bigger.

Mrs. J.: Ok. Thanks. Let's go ahead and start working for a few minutes and we will share some more ideas in just a few minutes.

After 5 minutes of working on the problem . . .

Mrs. J.: Let me ask everyone to stop for just a minute. I would like for a few people to share something that they have figured out so far. Keisha?

Keisha: If the tissue wraps around just once, a little over 5 inches will be used.

Mrs. J.: How do you know that, Keisha?

Keisha: I know that the circumference of the cardboard roll is the diameter, 1.6 inches, times pi.

Mrs. J.: Dwayne, what do you think about what Keisha said?

Dwayne: I agree with what Keisha said, and we also think that the number of times that the tissue will wrap will have to be less than 300.

Mrs. J.: Why do you say that, Dwayne?

Dwayne: We only have 300 sheets of tissue, and each sheet is only 4.4 inches long. It will take more than one sheet just to wrap around the cardboard roll the first time. Each wrap will use just a little more, so it has to be less than 300 wraps.

Mrs. J.: That's an interesting observation. Class, what do you think about Dwayne's prediction?

Mary: I agree with Dwayne that it will have to be less than 300 wraps. Using a diameter of 4.2 inches for the full roll, gives a circumference of just over 13 inches for the final wrap.

Mrs. J.: Interesting. I think I'll take one more idea. Louis? What is something you and your partner realized?

Louis: It makes sense that it will be less than 300 wraps. And we can figure out how many inches are used on the first wrap and on the final wrap. All of the other wraps will be somewhere in between those.

References

DeMatteo, R. W. (2010). Informing practice: A model approach to problem solving. *Teaching Children Mathematics, 16,* 132 – 135.

National Council of Teachers of Mathematics (NCTM). (2007). *100 favorite calendar problems poster*. Reston, VA: Author.

Olson, M. (1999). Problem solvers: Counting cubes. *Teaching Children Mathematics, 5,* 406.

Polya, G. (1945). *How to solve it*. Garden City, NY: Doubleday.