

# Texas Mathematics Teacher

Volume LVIII Issue 2

Fall 2011

*Find the Mathematics...*



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*... in public places*

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**Student Activity**  
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**Geometry Scavenger Hunt**  
*see page 17*

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and Quotes**  
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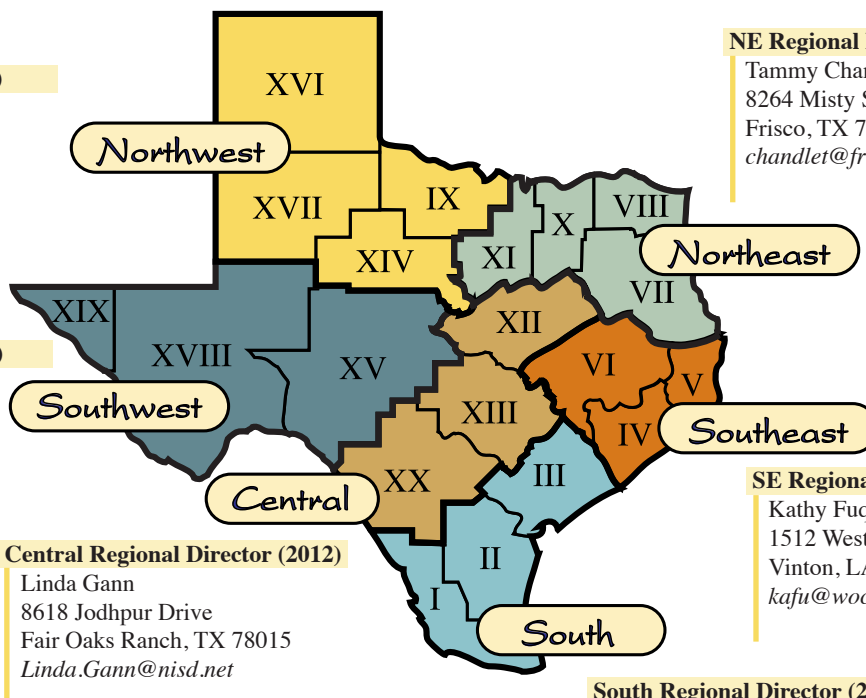
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Appointed Offices

Liaisons



# Texas Mathematics Teacher

A PUBLICATION OF THE TEXAS COUNCIL OF TEACHERS OF MATHEMATICS

Volume LVIII Issue 2

Fall 2011

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All applications (including TCTM membership) are available online at  
<[www.tctmonline.org](http://www.tctmonline.org)>.



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Cover photo and above photo by Geoffrey Potter, 2011



# Letter from the President

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Dear TCTM Members,

Challenges! This year we are faced with many challenges in math education. In addition to the state assessment changes, we are also faced with trying to do more with

less money. Budgets are smaller, and demands are greater. Even the weather continues to present us with challenges. With all the challenges, it is difficult to concentrate on what we do best which is make sure students are engaged in worthwhile mathematics.

What are you doing to be sure that students are engaged in worthwhile mathematics? Do you do the following?

- Have students involved in solving challenging problems.
- Have students routinely use higher-level thinking.
- Intervene when students struggle with a concept.
- Use multiple sources to assess student knowledge.

In order for students to be engaged in worthwhile mathematics, we need to be sure that we continue to be engaged in worthwhile mathematics ourselves. For me one of the places to do that is at a math conference. Attending a math conference always increases my pedagogical and content knowledge and recharges my batteries.

For a local math conference near you look at the Lone Star News on page 5.

For information about the Conference for the Advancement of Mathematics Teaching (CAMT) go to [www.camtonline.org](http://www.camtonline.org). The conference is July 18-20, 2012 at the George R. Brown Convention Center in Houston.

For information about the National Council of Teachers of Mathematics (NCTM) Annual Meeting and Exposition go to [nctm.org](http://nctm.org). The conference is April 25-28, 2012 at Pennsylvania Convention Center in Philadelphia.

Try not to let all the challenges overwhelm you. Keep in mind what Winston Churchill said during World War II – Keep calm and carry on.

Feel free to offer comments, concerns, and suggestions to me.

Sincerely,

Nancy Trapp  
TCTM President 2010-2012



Website: [www.tctmonline.org](http://www.tctmonline.org)

Facebook: *Texas Council of Teachers of Mathematics*

Twitter: [TCTM\\_Updates](https://twitter.com/TCTM_Updates)

## Affiliate Groups

These are local affiliated groups in Texas. If you are actively involved with them, please send future meeting and conference information to Cynthia Schneider at <[cschneider@austin.utexas.edu](mailto:cschneider@austin.utexas.edu)> so we may publicize your events. Contact information for each group is available on the NCTM website, <[www.nctm.org](http://www.nctm.org)>. Contact information for regional directors is located on the inside front cover.

**NORTHWEST REGION**      *Service Centers 9, 14, 16, 17*  
Angie Watson, Regional Director

### Texas South Plains CTM

Seventeenth Annual Panhandle Area Mathematics and Science Conference was held on September 24, 2011, in Canyon, TX. Contact: Treasure Brasher, <[tbrasher@mail.wtamu.edu](mailto:tbrasher@mail.wtamu.edu)>

**SOUTH TEXAS REGION**      *Service Centers 1, 2, 3*  
Shere Salinas, Regional Director

### Coastal CTM

Held their annual conference on Friday, June 17, 2011, in Corpus Christi. Contact: Faye Bruun, <[faye.bruun@tamucc.edu](mailto:faye.bruun@tamucc.edu)>, or see <[ctm.tamucc.edu](http://ctm.tamucc.edu)>.

### CTM @ Texas A&M University at Corpus Christi (Student Affiliate)

Contact faculty advisor Faye Bruun, <[faye.bruun@tamucc.edu](mailto:faye.bruun@tamucc.edu)>

### CTM @ Texas A&M University at Kingsville (Student Affiliate)

Contact NCTM Representative: Susan Sabrio

### Rio Grande Valley CTM

The 46th annual conference was held on Saturday, November 19, 2011, at the University of Texas - Pan American, Edinburg, Texas, from 8:00 a.m. to 4:00 p.m. Contact: Nancy Trapp <[ntrapp@otxb.com](mailto:ntrapp@otxb.com)> or see <[www.rgvctm.org](http://www.rgvctm.org)>.

**SOUTHWEST REGION**      *Service Centers 15, 18, 19*  
Veronica Hernandez, Director

### Greater El Paso CTM

The annual fall conference Connections: Linking Concepts and Context was held on Oct 22, 2011 in partnership with a regional meeting of the Texas Association for the Gifted and Talented. For future event information please contact: GEPCTM President, Glen Torguson at <[gtorgu@sisd.net](mailto:gtorgu@sisd.net)> or Membership VP, Craig Rhoads at <[crhoad@sisd.net](mailto:crhoad@sisd.net)>

## STATEWIDE

**Texas Association of Supervisors of Mathematics (TASM)** meets in the fall and spring in Austin and at CAMT. Membership is required to register for this meeting. For membership and registration information, please see <[www.tasmonline.net](http://www.tasmonline.net)>.

**The Association of Mathematics Teacher Educators of Texas (AMTE-TX)** holds its annual meeting at CAMT. For more information contact the current president Colleen Eddy at <[leadership@amte-tx.org](mailto:leadership@amte-tx.org)>.

**NORTHEAST REGION**      *Service Centers 7, 8, 10, 11*  
Tammy Chandler, Regional Director

### East Texas CTM

If you are interested in helping re-start this organization, please contact Martha Godwin at <[mgodwin@qcisd.net](mailto:mgodwin@qcisd.net)>.

### Greater Dallas CTM

Holds two mathematics contests (W. K. McNabb Mathematics Contests) for students in grades 7 - 12 - one in the fall (early Nov.) and one in the spring (early April). A banquet in May is held for the winners. Contact: Richard Newcomb, <[RNewcomb@cistercian.org](mailto:RNewcomb@cistercian.org)>.

**CENTRAL TEXAS REGION**      *Service Centers 12, 13, 20*  
Linda Gann, Regional Director

### Austin Area CTM

The spring meeting is scheduled for Tuesday May 8, 2012, beginning at 5:00 p.m. Contact AACTM President Daniel Ritchie, <[dritchie40@gmail.com](mailto:dritchie40@gmail.com)>, or AACTM Treasurer Kelly Meshell, <[kmeshell@austinisd.org](mailto:kmeshell@austinisd.org)> for registration.

### Alamo District CTM

South San Antonio ISD hosted an 'Academic Arama' on November 6, 2011, for ADCTM. Contact : Evelyn Trinidad (210) 977-7365.

### Central Texas CTM

CTCTM will hold a spring mini-conference on February 18, 2012, in Waco at the Region 12 Service Center. Contact: Rachelle Meyer <[Rachelle\\_Meyer@baylor.edu](mailto:Rachelle_Meyer@baylor.edu)> or see <[www.baylor.edu/soe/ctctm](http://www.baylor.edu/soe/ctctm)>.

**SOUTHEAST REGION**      *Service Centers 4, 5, 6*  
Kathy Fuqua, Regional Director

### Fort Bend CTM

Holds a short meeting in August, a fall mini-conference, a spring mini-conference and an end-of-year banquet to serve the districts of Alief, Fort Bend, Katy, and Stafford. Contact: Alena McClanahan, <[alena.mcclanahan@fortbend.k12.tx.us](mailto:alena.mcclanahan@fortbend.k12.tx.us)>.

## NATIONAL

**National Council of Teachers of Mathematics (NCTM)** Annual Meeting and Exposition will be held in Pennsylvania, PA on April 25-28, 2012.

## Hot News

For additional information, refer to the websites listed

### Assessment Updates

Current information about the State of Texas Assessments of Academic Readiness (STAAR) program is posted on the following TEA Student Assessment websites:

- For State of Texas Assessments of Academic Readiness (STAAR) Resources go to

[www.tea.state.tx.us/student.assessment/staar/](http://www.tea.state.tx.us/student.assessment/staar/).

- For the House Bill 3 Transition Plan go to

[www.tea.state.tx.us/student.assessment/hb3plan/](http://www.tea.state.tx.us/student.assessment/hb3plan/).

- For the TEA Update on End-of-Course Assessments from the TASA Midwinter Conference, February 2011 go to

[www.tea.state.tx.us/student.assessment/tac/](http://www.tea.state.tx.us/student.assessment/tac/).

- An additional TEA Student Assessment Update PowerPoint presentation from the TASM meeting at CAMT 2011 is available at

[www.tasmonline.net/Meetings.html](http://www.tasmonline.net/Meetings.html).

- To receive immediate updates from student assessment, sign-up for the listserv at

[miller.tea.state.tx.us/list/index.html](http://miller.tea.state.tx.us/list/index.html).

Contact us by e-mail at [student.assessment@tea.state.tx.us](mailto:student.assessment@tea.state.tx.us).

Contact us by phone at 512-463-9536.

### Curriculum Updates

#### Mathematics TEKS Review

Representatives from the Mathematics TEKS Review Committee and Experts presented draft recommendations and answered questions at the State Board of Education (SBOE) at the SBOE meeting on September 15, 2011. As part of the review, the Mathematics TEKS Review Committee included recommendations to the SBOE regarding how to incorporate personal financial literacy into the revised TEKS. The Review Committee's final recommendations will be posted on the TEA Mathematics TEKS website at [www.tea.state.tx.us/index2.aspx?id=2147499971](http://www.tea.state.tx.us/index2.aspx?id=2147499971). The SBOE discussed the Mathematics TEKS Review Committee's recommendations for changes to the Mathematics TEKS at their November meeting. If the current timeline continues as planned, schools will implement new Mathematics TEKS in the 2013-2014 school year.

#### 2011-2012 MSTAR Universal Screener

The winter administration window for the MSTAR Universal Screener was January 2 - 31, 2012. The spring administration will be April 2, 2012 - May 9, 2012. Schools may participate in the winter and spring screeners even if they did not participate in the Fall 2011 screener.

The MSTAR Universal Screener can be accessed through the Texas Math and Science Diagnostic System (TMSDS) at [www.tmsds.org](http://www.tmsds.org). A new data file must be uploaded in order to receive usernames and passwords for the 2011-2012 school year. The TMSDS representative at each regional education service center (ESC) can provide assistance with the upload process and/or assistance may be requested at [TMSDS@region10.org](mailto:TMSDS@region10.org).

The MSTAR Universal Screener is a formative assessment

system administered to students in grades 5-8 to inform instructional decisions. The purpose of the MSTAR Universal Screener is to help teachers make two important decisions within the Response to Intervention (RTI) process: (1) are students on-track or at-risk for meeting expectations in algebra and algebra-readiness, and (2) what is the degree of intensity of instructional supports or supplemental interventions needed for students who are at-risk for not meeting expectations in algebra? Results can help teachers identify students who are in need of additional instructional support in their development of knowledge and skills that relate directly to algebra readiness. Teachers will be able to monitor students' risk status by administering comparable forms of the MSTAR Universal Screener in fall, winter, and early spring.

Please contact [TMSDS@region10.org](mailto:TMSDS@region10.org) or [mstarscreener@tea.state.tx.us](mailto:mstarscreener@tea.state.tx.us) with questions.

#### Advanced Quantitative Reasoning Course Available

At its January 2011 meeting, the State Board of Education approved for second reading and final adoption 19 TAC Chapter 111, Texas Essential Knowledge and Skills for Mathematics, Subchapter C, High School, §111.37, Advanced Quantitative Reasoning (One Credit). TEKS may be found at

[ritter.tea.state.tx.us/rules/tac/chapter111/ch111c.html#111.37](http://ritter.tea.state.tx.us/rules/tac/chapter111/ch111c.html#111.37)

#### Professional Development (Contact your ESC for more information)

- ESTAR (Elementary Students in Texas Algebra Ready)
- MSTAR (Middle School Students in Texas Algebra Ready) Academy I (face to face plus online follow-up modules in Project Share)
- MSTAR Academy I (Part B) Completion
- MSTAR Academy II (focus on Tier II Intervention)
- MSTAR-GATAR (Geometric Approach to Algebra Readiness)
- Algebra I EOC Success Academy
- Geometry EOC Success Academy
- Algebra II EOC Success Academy

#### MSTAR Intervention Sample Lessons Now Available

MSTAR Intervention Sample Lessons for grades 7 and 8 are now available for download in Project Share [projectsharetexas.org](http://projectsharetexas.org). Please join each of the MSTAR INTV courses in Project Share in order to download the lessons.

MSTAR Intervention lessons target struggling Tier 2 students. The intervention lessons provide a concrete structure to help students learn the foundational skills necessary for success in increasingly complex mathematics curricula.

Each intervention lesson contains several aspects of research-based intervention strategies and lesson design. Additional activities are included for students who need further practice. Please note that these lessons are designed for Tier 2 Intervention and NOT for Tier 1 (core) instruction.

For information about Response to Intervention (RtI) in mathematics as part of the Texas Algebra Ready (TXAR) Initiative, please go to

[txar.org/intervention/rti.htm](http://txar.org/intervention/rti.htm)

and

[txar.org/intervention/rti\\_resources.htm](http://txar.org/intervention/rti_resources.htm).

Note: For a more complete understanding of the three-tier model of instruction for mathematics, it is highly recommended that educators complete the MSTAR Academy Professional

Development Series. This professional development series is available through online courses via Project Share. The course catalog overview is available at [projectshare.texas.org/](http://projectshare.texas.org/). Please contact your ESC for details.

○ **MSTAR INTV: Facts & Patterns: Mult. & Div.**

[www.epsilen.com/crs/1012499](http://www.epsilen.com/crs/1012499)

○ **MSTAR INTV: Equivalent Fractions**

[www.epsilen.com/crs/1011427](http://www.epsilen.com/crs/1011427)

○ **MSTAR INTV: Proportionality**

[www.epsilen.com/crs/1116059](http://www.epsilen.com/crs/1116059)

○ **MSTAR INTV: Ratios and Rates**

[www.epsilen.com/crs/1012676](http://www.epsilen.com/crs/1012676)

○ **Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST)**

[www.paemst.org](http://www.paemst.org)

- Nominations (K-6) Due April 1, 2012; Applications (K-6) Due May 1, 2012
- 2011 Texas Secondary Mathematics Finalists – were honored by State Board of Education in January 2012
  - Cynthia Knowles, Pre-AP Geometry teacher at Eisenhower Senior High School in Aldine ISD
  - Dixie Ross, AP Calculus teacher at Pflugerville High School in Pflugerville ISD
  - Jill Stevens, high school mathematics teacher at Trinity High School in Hurst-Euless-Bedford ISD

○ **TEA Mathematics Webpage**

[www.tea.state.tx.us/index2.aspx?id=3449](http://www.tea.state.tx.us/index2.aspx?id=3449)

○ **Project Share**

[www.projectshare.texas.org/](http://www.projectshare.texas.org/)

○ **TXAR Webpage**

[txar.org](http://txar.org)

○ **iTunes University**

[www.tea.state.tx.us/itunesu](http://www.tea.state.tx.us/itunesu)

○ **Contact Information**

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Student Assessment Division • Texas Education Agency*

## New TCTM Grant Coming

The TCTM Board is revamping the way we fund opportunities for Texas teachers. Please check online at [www.tctmonline.org](http://www.tctmonline.org) for the new guidelines and application procedures.

# CAMT Board Update

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The CAMT Board meets twice annually outside the conference in order to make plans and re-evaluate how we do things in order to make the CAMT experience the best it can be for all teachers. Those meetings typically occur in August, right after one conference, and in January, to make last-minute decisions for the coming conference.

The CAMT Board met in Houston on August 26-27, 2011, to debrief CAMT 2011 and continue planning for CAMT 2012.

CAMT 2011 was held July 18-20, 2011, at the Gaylord Texan Resort in Grapevine. We literally packed the house with about 5600 attendees, almost 700 speakers, and over 1000 sessions over the three days. In addition to the new venue, there were also several other noteworthy CAMT “firsts”!

From a technology perspective, this was the first CAMT without overhead projectors! The CAMT Board decided last year to provide document cameras and LCD projectors in each of the session rooms. We also made available an online searchable program. For several years, a downloadable PDF of the conference catalog has been available on the CAMT website, but CAMT 2011 was the first conference to include a searchable online program. Using the tools on the CAMT website, you could search for speakers or session titles, and make a plan for attending the conference.

At the August 2011 CAMT follow-up and CAMT Board meeting, there were also some important items of business that were addressed.

About 800 conference attendees responded to the post-conference evaluation that was sent out to all registered attendees. The Board spent some time studying the feedback provided in this evaluation. Some of the comments were site-specific, including problems with parking, lines to check in and out of the hotel, and prices of food available onsite. Some of the comments were also specific to the program, including feedback on certain outstanding speakers. Several respondents also indicated that they felt like they spent a lot of time in line waiting to get into sessions. The CAMT Board takes all of this feedback very seriously, and we use it to make future CAMTs better than ever. We do strive for continuous improvement, and your feedback is essential to that process. On behalf of the entire CAMT Board, thank you to those who responded to the post-conference survey!

Looking forward to CAMT 2012, we will be returning to Houston on July 18-20, 2012. CAMT 2012 will be at the George R. Brown Convention Center in downtown Houston, and our conference hotels include the Hilton Americas adjacent to the convention center and the Hyatt Regency. Our ticketed session keynote speaker will be Dr. Debbie Silver, a native Texan and longtime classroom teacher and Louisiana PAEMST award winner. Dr. Silver will inspire the ticketed session crowd with her message, “Be a Teacher, Be a Hero.” If you haven’t heard her speak before, you are in for a treat.

There is an abundance of changes impacting Texas mathematics classrooms – from new STAAR assessments to reductions in state funding and revised mathematics TEKS on the horizon. The CAMT 2012 theme, Navigating a Sea of Change, will take all of these changes into account. There are six strands in the CAMT 2012 program:

- Special Populations (Bilingual/ELL, Gifted/Talented, Special Needs, etc.)
- Curriculum and Assessment (STAAR, EOC, TEKS Revisions)
- College and Career Readiness
- Problem Solving and Critical Thinking in Geometry and Measurement
- Problem Solving and Critical Thinking in Numerical and Algebraic Reasoning
- Problem Solving and Critical Thinking in Probability and Data Analysis

With these strands, there is sure to be something of interest and importance to everyone.

The CAMT Board is also excited to be bringing back the Administrators’ Conference! While there are no plans to include focused pre-conference sessions, the Board acknowledges that there is a need to help our campus and district leaders navigate the changes we are all experiencing. The Texas Association of Supervisors of Mathematics (TASM) will take the helm at the Administrators’ Conference, which will look slightly different than in years past. The Administrators’ Conference will occur on one day during the conference instead of the day or two prior. Details will be available when registration opens in Spring 2012.

Don’t forget to follow CAMT on Twitter, #CAMTTweets, and to *like* the CAMT page on Facebook! These are the best ways to keep current with important events, such as registration windows and event information, related to the conference. See you in Houston in 2012!



*Paul Gray, Ed.D. • <pgray73@sbcbglobal.net>  
CAMT Board President • Houston, TX*



# Voices from the Classroom

The official 2011 CAMT hotel had an unmistakable Texas motif. Under its cavernous glass dome, the climate-controlled air carried a steady rotation of country music, including Taylor Swift's top-10 country hit "Mean" (which was released -- on 2011 Pi Day! -- from her 2010 multiplatinum album *Speak Now*). By the fourth time I heard it, I noticed its potential to be rewritten about how the statistical mean is generally an inappropriate summary of highly skewed data. Feel free to sing this with your students next time you discuss examples such as housing prices or household incomes!

"Mean" (lyric © 2011 Lawrence M. Lesser)

You.....with your words like mean and mode and symbols  
that you use against me.

Mu.....stands for a population mean and  $\bar{x}$  for the  
sample.

Who.....knows what symbol to use for other measures of  
data location.

You.....pickin' each time the mean.

But it can get pulled off with just one single point,

And you don't know what you don't know....

Sometimes, data have a real asymmetry

Or values that are really quite extreme.

In those cases, better use the median

If what's typical is what you need--

That's not gonna be the mean!

That won't be the mean with outliers, just forget it,

Do you see just what I mean and mean and mean and  
mean.....

Sometimes data have a real asymmetry

Or values that are really quite extreme. Yeah, yeah.

In those cases, better use the median

If the middle is what you need--

Not gonna be the mean!

○  
*Larry Lesser • Mathematics Education Professor  
The University of Texas at El Paso • <Lesser@utep.edu>*



Change the world.  
**Teach!**

UNIVERSITY of HOUSTON | EDUCATION

**UH 4-8 MMT  
& iSMART**

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Certification Program.**

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<http://www.coe.uh.edu/academic-programs/uh4-8mmt>

**Texas Area Middle School Math & Science Teachers:**

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Reflective Teaching (iSMART) Online M.Ed. Program**

Email: [ismart@uh.edu](mailto:ismart@uh.edu)

<http://www.coe.uh.edu/academic-programs/ismart>

**UNIVERSITY of HOUSTON**

**COLLEGE OF EDUCATION**

# NCTM 62nd Delegate Assembly

April 13-15, 2011

Indianapolis, Indiana

People with a vested interest in mathematics education converged on Indianapolis for the sixty-second annual NCTM Conference. Their goal was to improve the quality of mathematics education and to insure equitable learning opportunities for all students. Even knowing from previous experiences that educators from across the nation care about their students and want what is best for them, the members of TCTM who attended were impressed with the dedication and commitment exuded by those they met.

Kathy Gillespie, NCTM Representative, and Nancy Trapp, TCTM President, attended the Southern Regional Caucus. Initially, there were no resolutions to discuss. One group wanted to draft a resolution stating that parents should be responsible for their children's education. The Texas delegation and the Louisiana delegation made reference to the fact that there was already a similar resolution on file. After much discussion the caucus decided not to present a resolution for consideration.

The NCTM Delegate Assembly was similar to the regional caucus in that there were no resolutions presented. There were several presenters who spoke about the value of NCTM and the goals of the organization. These speakers were reiterating the importance of the organization and its goals.

The conference was interesting in that many of the presentations addressed the Common Core State Standards (CCSS) and how to use them. Several times people would mention that Texas was no longer the leader as far as textbook development because Texas did not adopt the Common Core State Standards. On the other hand, people would also mention that Texas was a leader as far as assessment standards. In general, it appears that every

state has basically the same problems and is looking for a genuine solution. The sharing of ideas and the networking that took place was very valuable for those attending the conference.

The Secretary of Education, Arne Duncan, was a featured speaker. He spoke of the value of mathematics education to America. He made several references to his hometown of Chicago and how important education was to that area. Throughout his speech, he made reference to President Obama's education plan and how important it is to the future. The question and answer portion was interesting in that Mr. Duncan touted the President's plan in almost every response. As is usual in an audience like this, some of the attendees were delighted and some were not. The fact that the Secretary of Education would make the effort to address educators at their own conference was impressive.

Although the conference brought about no new resolutions, the overall experience was beneficial for all who attended. Networking and discussion with peers from all over the United States allowed those attending from Texas to realize that educators everywhere seem to face similar problems while striving to ensure the best education possible for their students.



*Kathy Gillespie • NCTM Representative  
Motley County ISD • <kgillesp@motleyco.org>*

## 2011 NCTM Affiliate Leaders Conference

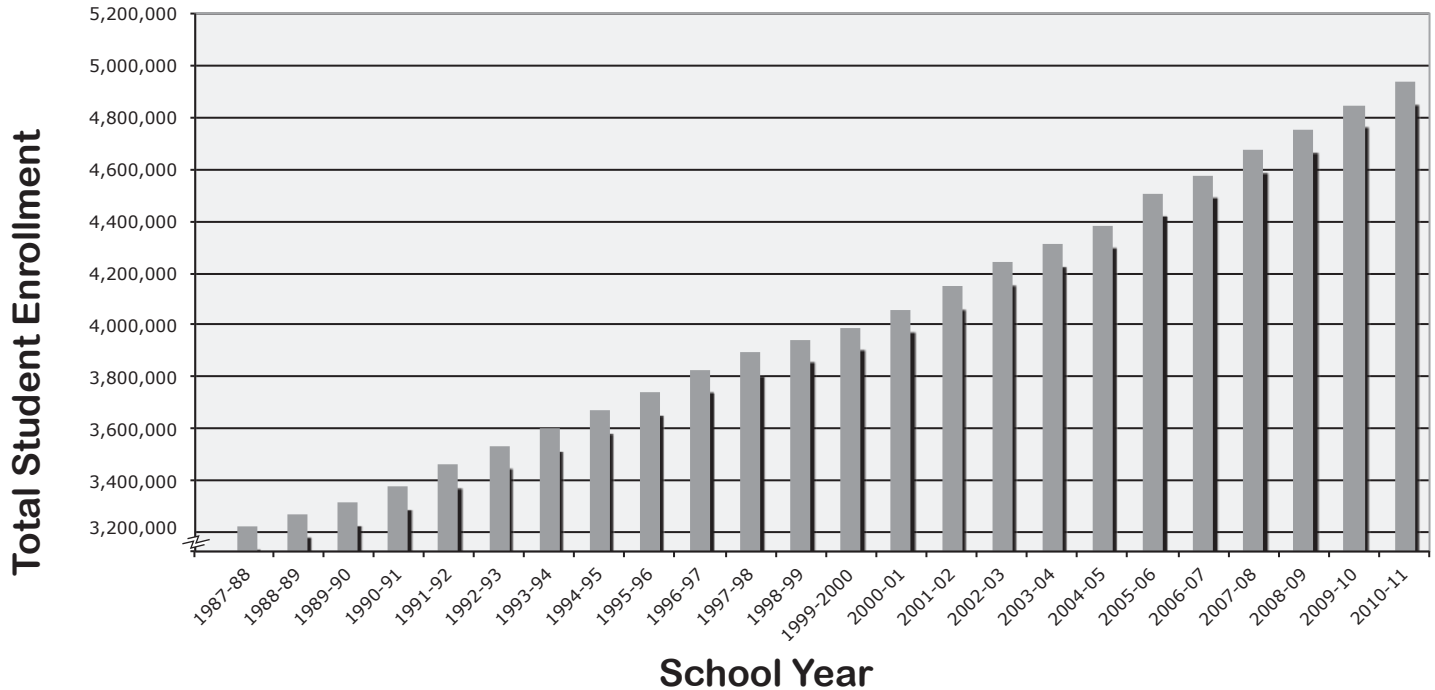
### Texas Affiliate Leaders with NCTM President Mike Shaughnessy



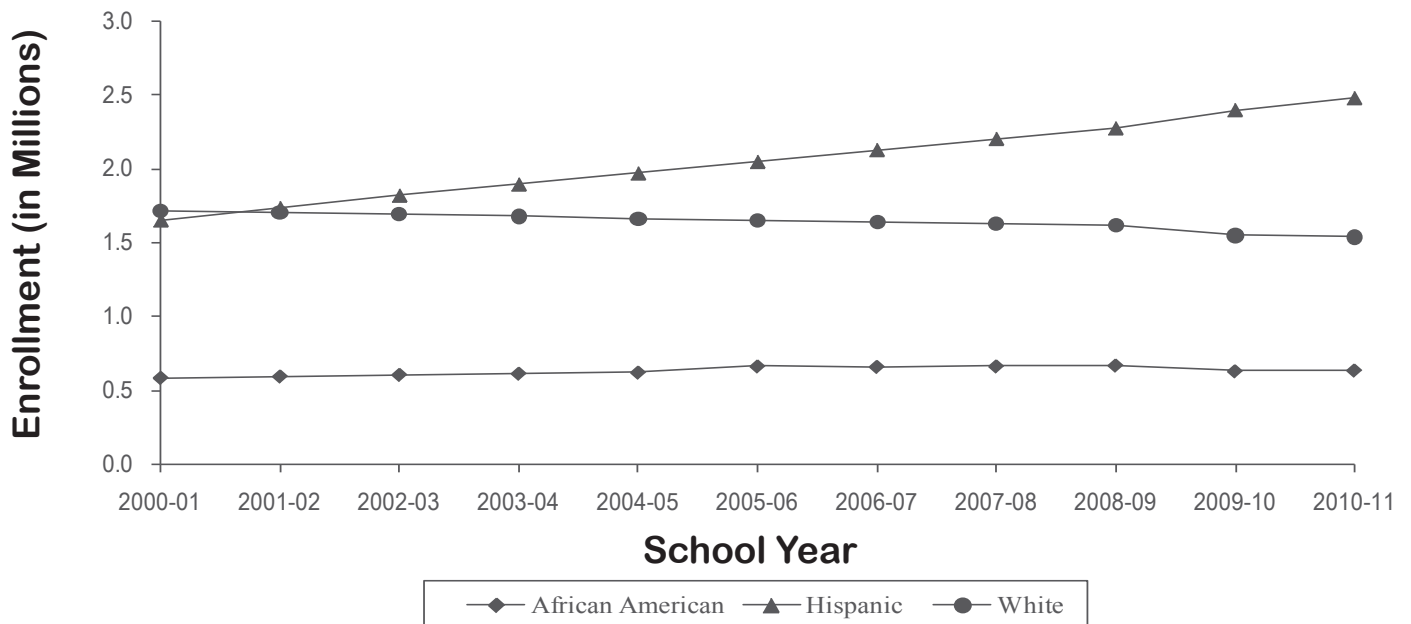
*From Left to Right:  
Pam Johnson, Nancy Trapp, David McReynolds,  
Mike Shaughnessy (back row), Faydale Curtice,  
Aaron Wernet, Martha Godwin, Shere Salinas*

## Texas K-12 School Enrollment 1990-2007

Texas public school enrollment during the 1987-88 school year was 3,224,916 students. By 2010-11, enrollment had risen to 4,933,617 students. Over the 24-year period, total enrollment increased by 1,708,701 students, or by 53 percent of the 1987-88 enrollment.



## Enrollment by Race/Ethnicity, Texas Public Schools, 2000-01 Through 2010-11



NOTE: Racial groups (African American and White) do not include students of Hispanic ethnicity.

These factoids came from data found in the publication *Enrollment in Texas Public Schools 2010-11* (October, 2011) by the Division of Research and Analysis, Department of Assessment and Accountability, Texas Education Agency. See [http://www.tea.state.tx.us/acctres/enroll\\_index.html](http://www.tea.state.tx.us/acctres/enroll_index.html) for the complete report.

## 2011 President's Grant Award

Eight \$600.00 President's Grants were awarded this past summer by TCTM. We would like to extend our congratulations to each of the following recipients. All recipients volunteered two hours of their time at CAMT and attended the annual TCTM reception as guests of TCTM. If you have been teaching for five or more years, look for the President's Grant application online. The President's Grant is intended to encourage experienced teachers to attend CAMT by helping cover part of the expenses associated with attending the annual conference.

### Jodi Childress

South Ward Elementary  
*Longview ISD*

### Leslie Erwin

Rogers Middle School  
*Pearland ISD*

### Maya Issac

Newton Elementary  
*Newton ISD*

### Cindy Pleasant

Brownsboro High School  
*Brownsboro ISD*

### Robin Ereman

Brownsboro High School  
*Brownsboro ISD*

### Tracie Ezell

Dew Junior High  
*Dew ISD*

### Jeanette Kohne

T.H. Ereckson Middle School  
*Allen ISD*

### Trena Tillery

James Poole Elementary  
*Harmony ISD*

## 2011 Mathematics Specialist Scholarship Award

Two Texas students were awarded the \$2000 TCTM Mathematics Specialist Scholarship for 2011-12. We would like to extend our congratulations to each of the following recipients. Each scholarship awardee attend a Texas college or university - public or private - and works as a student teacher in order to pursue teacher certification at the elementary, middle or secondary level with a specialization or teaching field in mathematics.



### Stephanie Erin Campbell

*Texas A & M University - Commerce*



### Andrea Pikas

*Sam Houston State University*

## TCTM Leader Spotlight

Each year since 1995, TCTM has accepted nominations for two awards for leaders in our professional community. The TCTM Leadership Award is presented to a TCTM member who is nominated by a TCTM affiliate. The second award, the E. Glenadine Gibb Achievement Award, is presented to someone nominated by a TCTM member. The following individuals have been honored and we wish to acknowledge their former and ongoing contributions this year in the leader spotlight. **If you wish to nominate someone for 2013, please download the forms from our website. Please submit your nomination by Dec. 31, 2012.**

Our prior awardees are:

Year	Leadership(local/state)	Gibb (state/national)
1995	Mary Alice Hatchett	Iris Carl
1996	Betty Forte	Cathy Seeley
1997	Diane McGowan	Pam Chandler
1998	----	----
1999	Linda Shaub	Eva Gates
2000	Lloy Lizcano	Bill Hopkins
2001	Susan Hull	Pam Alexander
2002	Janie Schielack	Judy Kelley
2003	Bonnie McNemar	Dinah Chancellor
2004	Dixie Ross	Jacqueline Weilmuenster
2005	Barbara "Basia" Hall	Barrie Madison
2006	Nancy Trapp	Lois Gordon Moseley
2007	Kathy Hale	Cynthia L. Schneider
2008	Jim Wohlgeheagen	Juanita Copley
2009	Jane Silvey	Jo Ann Wheeler
2010	Elaine Young	Paula Steffen Moeller

## 2011 TCTM CAMTership Awards

Seven \$600.00 CAMTerships were awarded this past summer by TCTM. We would like to extend our congratulations to each of the following recipients. All recipients volunteered two hours of their time at CAMT and attended the annual TCTM reception as guests of TCTM. If you have been teaching for five or fewer years, look for the CAMTership application online. The CAMTership is intended to encourage beginning teachers to attend CAMT by helping cover part of the expenses associated with attending the annual conference.

### Scott Berger

Clear Lake High School  
*Clear Lake ISD*

### Bethany Jones

Sparks Elementary  
*Frisco ISD*

### Becky Puckett

Fort Davis Jr/Sr High  
*Fort Davis ISD*

### Tisa Smith

South Ward Elementary  
*Longview ISD*

### Kimberlyn Brunet

Travis Middle School  
*Amarillo ISD*

### Christina Korenek

Ninth Grade Center  
*Weatherford ISD*

### Heather Upchurch

Christie Elementary  
*Frisco ISD*

# 2011 TCTM Leadership Award



This year, TCTM is pleased to honor Beverly Burg Anderson for her leadership in the South Plains region and across the state of Texas.

Beverly Burg Anderson is an independent mathematics consultant who shares her years of experience with students throughout Texas. She began her teaching career at Aransas County ISD, Rockport, Texas as a 6th grade mathematics teacher. She taught there for four years until she married her husband and moved back to the Texas Hill

**Beverly Burg Anderson**

Country where she grew up. She then left the education field for a short period and worked as a Deputy Tax Assessor-Collector for Blanco County and a Deputy Purchasing Agent for Sul Ross State University, Alpine, Texas.

Beverly and her husband then moved to the Texas South Plains where she got a teaching position of 7th-12th grade mathematics at Meadow, Texas. For 12 years, she was actively involved in all aspects of the school, serving on district committees, was National Honor Society sponsor, class sponsor, and developed UIL math, calculator, and number sense teams. While at Meadow ISD Anderson attended Texas Education Agency mathematics trainings and soon was conducting mathematics professional development workshops for Region 17 Education Service Center (ESC-17) in Lubbock, Texas.

In the early 1990s, ESC-17 formed a Mathematics/Science Cooperative for their school districts, and Anderson was hired

as the first K-12 mathematics/science specialist. She formed the mathematics and science professional development programs and for more than 17 years provided staff development and leadership in mathematics to teachers and administrators, while she continued to grow professionally. Being a lifelong learner, Anderson brought back many new instructional strategies and mathematics content to Region 17 teachers. She also participated in many grants with local universities and school districts and was on advisory committees to pursue such grants. In 1993 she was on the original organizing committee that formed the Panhandle Area Math and Science Conference held in Canyon, Texas every September. Throughout her years at ESC-17, Beverly took part in many TEA trainings, served on advisory and educator committees, suggested school districts as pilot sites, and participated and supported the math and science programs implemented by the State Initiatives Department.

Anderson is currently a member of the National Council of Teachers of Mathematics (NCTM), National Council of Supervisors of Mathematics (NCSM), Texas Council of Teachers of Mathematics (TCTM), and Texas Association of Supervisors of Mathematics (TASM) and has made presentations at national, state, and local math conferences. She served as the Northwest Regional Director for TCTM. She served on the Program Committee for CAMT 2011. Her mantra has always been building relationships for "People don't care how much you know until they know how much you care."



# 2011 E. Glenadine Gibb Achievement Award



TCTM is pleased to honor Dr. Jennie M. Bennett for her leadership at both the state and national levels.

Dr. Bennett retired in May 2007 from Hartman Middle School in the Houston Independent School District. She has extensive and diverse experiences in many facets of education. She has supervised K-12 mathematics teachers, regularly provides professional development for teachers and administrators, and has taught students experiencing difficulties in mathematics, especially students whose first language is not English.

She served as director of the Houston Urban Systemic Initiative through the National Science Foundation. She was director of the Marguerite Ross Barnett Bridge Program in the Office of President at the University of Houston, where she established and directed an award-winning program for African American and Hispanic middle and high school students in mathematics and science. At the same time, she taught undergraduate mathematics methods and graduate multicultural courses at the University of Houston and University of St. Thomas.

She is author of "The Missing Link: Connecting Parents of Mathematically Promising Students to Schools: Developing Mathematically Promising Students," and "Transforming Policy to Enhance the Lives of African American Mathematics Students." She co-authored the Texas Curriculum Guidelines for Mathematics, Grade 1, and in 1996-97 she chaired the Math Curriculum

Development Committee of the Texas Education Agency for grades 3-5. She has been a textbook author for Silver Burdett & Ginn and is currently an author for Houghton Mifflin Harcourt Publishing. Dr. Bennett served as the lead evaluator for the review of the mathematics curriculum for the State of Louisiana.

Dr. Bennett holds a doctorate of education in Educational Leadership and Cultural Studies, a master's degree in Curriculum and Instruction, and a Bachelor of Science degree in Elementary Education all from the University of Houston. She currently serves as Chair on the National Council of Teachers of Mathematics' (NCTM) Mathematics Education Trust Board. Prior to that she was elected and served on the Board of Directors of the NCTM, the world's largest mathematics organization, and Vice President of the National Council of Supervisors of Mathematics.

As a partner of the consultant firm, NUMBERS Mathematics Professional Development, she states, "God has placed me on this Earth to share with mathematics educators and students activities that I used with my culturally diverse students who came to me with a variety of challenges. These students' level of understanding increased their mathematics achievement and improved their attitude towards mathematics."

Additionally, Dr. Bennett is a 15 year breast cancer survivor and founded Reconstruction of a Survivor, a non-profit breast cancer foundation that provides scripture-guided support group sessions to women diagnosed at any stage of breast cancer.



# PAEMST

## Presidential Awards for Excellence in Mathematics and Science Teaching

The 2011 PAEMST awards recognized outstanding grade 7 – 12 science and mathematics teachers whose innovative methods bring teaching to life in the classroom. In 2012, the PAEMST program will recognize outstanding mathematics teachers in grades K – 5.

The Texas finalists in secondary mathematics are Cynthia Knowles of the Aldine ISD, Dixie Ross of Pflugerville ISD, and Jill Stevens of Hurst-Euless-Bedford ISD. Cynthia Knowles is a Pre-AP Geometry teacher at Eisenhower Senior High School in Aldine ISD and has 14 years of teaching experience. Dixie Ross is an AP Calculus teacher at Pflugerville High School in Pflugerville ISD and has 27 years of teaching experience. Jill Stevens is a high school mathematics teacher who teaches AP Calculus, International Baccalaureate courses, and Algebra II at Trinity High School in Hurst-Euless-Bedford ISD and has 35 years of teaching experience.

A state panel of master teachers, specialists, and administrators reviewed the applications and chose the

outstanding mathematics teachers for the National Science Foundation to consider for state finalist status. After an initial selection process at the state level, a national panel of distinguished scientists, mathematicians, and educators recommends a finalist to receive the national award. If chosen as a national winner, the state finalist will receive \$10,000 and an all expense paid trip for two to Washington D.C. for ceremonies that include recognition from the president of the United States at the Capitol.

Currently, outstanding certified mathematics and science teachers in grades K – 6, with five years or more of teaching experience, are eligible to apply. If you would like to nominate an outstanding mathematics or science teacher, nomination forms and applications are available at <http://www.paemst.org>. Nominations are due by April 1, 2012, and applications are due by May 2, 2012. □

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Director of Mathematics • Texas Education Agency

## Recommended Readings and Resources

*Visible Thinking in the K-8 Mathematics Classroom*  
by Ted H. Hull, Don S. Balka, and Ruth Harbin Miles

This book will help you, your students, and your schools understand what is meant by ‘visible thinking’ and why it is a valuable tool for today’s classroom. Each chapter offers grade-specific instructional strategies for expanding students’ comprehension through visual thinking. You will learn how modifying ‘traditional’ problems will open the door to student thinking and allow sense making and communication to walk in or should I say RUN in.

All three authors are well known to Texas educators and are well aware of the needs of Texas math classrooms. Ted is a fellow Texan and has firsthand experience with

2011, ISBN: 978-1-4129-9205-3 (paperback)  
Publisher: Corwin and NCTM

Texas math classrooms. Together, they have written a must have book to complement their other publications: *A Guide to Mathematics Coaching: Processes for Increasing Student Achievement* and *A Guide to Mathematics Leadership, Sequencing Instructional Change*.

Mary Alice Hatchett • [mahat@earthlink.net](mailto:mahat@earthlink.net)  
Independent K-12 Mathematics Consultant • Georgetown, TX

# Legislative Update and Advocacy

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At the State Board of Education meeting in November 2011, the Board discussed the timeline of TEKS revisions and textbook adoption. The Texas Education Agency provided the Board with several possible scenarios for re-synching the revision and adoption timelines. In the January 2012 meeting the Board will decide on whether to continue with the Mathematics TEKS revision timeline and conduct first reading of the draft revisions for mathematics, or delay first reading to a later time. If first reading occurs in January, second reading and final adoption will be scheduled for April 2012. The Board was also concerned about the indication from some of the writing team members that

there were still some issues on the vertical alignment of the mathematics TEKS. The Board will decide at the January board meeting how to address this concern.

The current timeline calls for implementation of the revised TEKS in the Fall 2013. More information about the TEKS revision process can be found online at

<http://www.tea.state.tx.us/index2.aspx?id=2147499971>.



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Research Associate • Charles A. Dana Center,  
The University of Texas at Austin

## Applications

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### 2012-13 Mathematics Preservice Teacher Scholarship

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There are ten \$2000 scholarships available for 2012-13. Any student attending a Texas college or university - public or private - and who plans on student teaching during the 2012-13 school year in order to pursue teacher certification at the elementary, middle or secondary level with a specialization or teaching field in

mathematics is eligible to apply. A GPA of 3.0 overall and 3.25 in all courses that apply to the degree (or certification) is required. Look for the scholarship application online at [www.tctmonline.org](http://www.tctmonline.org). **The application must be postmarked by May 1, 2012.**



### 2012 President's Grant to CAMT

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There are eight \$600 President's Grants available for 2012. The President's Grant is intended to support mathematics educators with a district or campus affiliation with more than five years of teaching experience in Texas to attend CAMT. The \$600 grant is intended to defray part of the costs to attend the state conference. If you plan to attend CAMT, have more than five years teaching experience in Texas and are currently affiliated with a campus or

district, look for the application online at [www.tctmonline.net](http://www.tctmonline.net). The application must have been postmarked or submitted electronically by March 15, 2012. Those selected will be required to volunteer two hours at CAMT and attend the TCTM reception to receive their check. Look online after April 1 to see who was selected.



### 2012 CAMTerships

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There are eight \$600 CAMTerships available for 2012. The CAMTership is intended to encourage beginning teachers to attend CAMT by helping cover part of the expenses associated with attending the annual state conference. If you have been teaching five or fewer years in Texas and are attending CAMT, look for the CAMTership application online at [www.tctmonline.net](http://www.tctmonline.net). The

application must have been postmarked or submitted electronically by March 15, 2012. Those selected will be required to volunteer two hours at CAMT and attend the TCTM reception to receive their check. Look online after April 1 to see who was selected.



### NCTM Membership

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#### What's an easy way to support TCTM?

#### Join NCTM or renew your NCTM membership!

Sign up for your NCTM membership and use the link on the web form to indicate TCTM as the affiliate you wish to receive a rebate! Go to [www.nctm.org](http://www.nctm.org).

TCTM will receive \$5.00 if you are joining NCTM as a new member, and \$3.00 if you are renewing. In the past, the state affiliate only received the rebate if the NCTM membership flowed through the

state treasurer. Now you can sign up directly with NCTM and give back to your state affiliate. However, you may only choose one state affiliate for the rebate (it will not be split).

Please remember, you cannot join your local affiliates from the NCTM website. You must join the local affiliates directly by the process they have established. You may join TCTM by either attending the CAMT conference as a paid participant, or by using our membership form found online at [www.tctmonline.org](http://www.tctmonline.org).

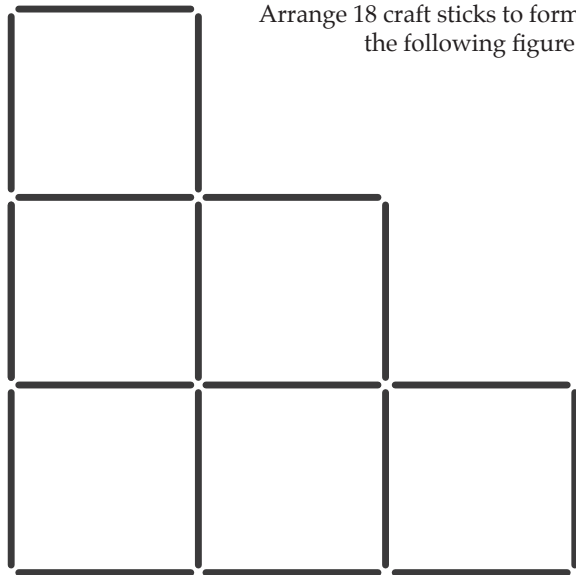


# Puzzle Corner

## Sticks #17 Puzzle

We are interested in how your students responded to this problem and how they explained or justified their reasoning. Please e-mail copies of your students' work, include your name, grade level, campus name and district name to Mary Alice Hatchett, Director of Publications, *Texas Mathematics Teacher*. Selected submissions will be acknowledged and published in subsequent issues.

Please prepare a sketch of your solution



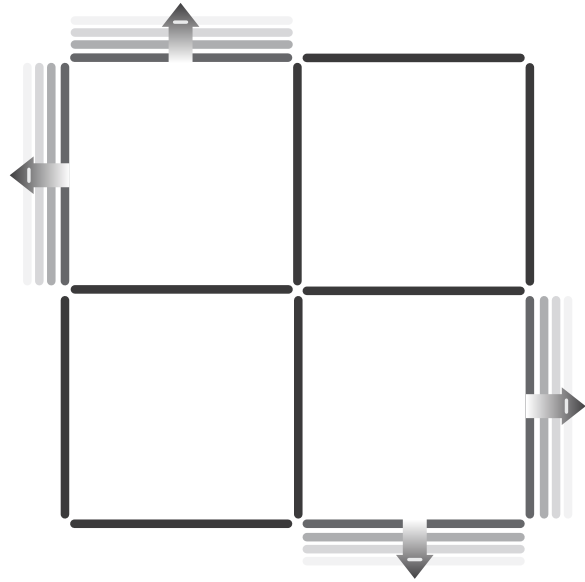
Arrange 18 craft sticks to form the following figure.

**puzzle:** Remove six sticks to leave three congruent squares.

## Sticks #16 Answer

Arrange 12 craft sticks to form the original figure.  
Remove four sticks to leave two squares.

Shown is a diagram of a solution.



## Quotes for Thought

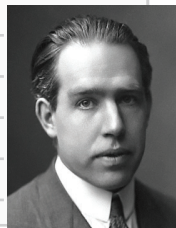
**“One’s work may be finished some day, but one’s education never.”**

Alexandre Dumas  
French playwright  
and novelist  
(1802 – 1870)



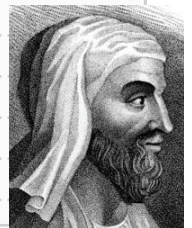
**“Every great and deep difficulty bears in itself its own solution. It forces us to change our thinking in order to find it.”**

Niels Bohr  
Danish physicist  
(1885 – 1962)



**“The mind is not a vessel to be filled, but a fire to be kindled.”**

Plutarch  
Greek historian,  
biographer, and  
essayist  
(46– 120)





## Find the Mathematics... in public places

The shape of a hanging chain from two different points is called a catenary curve. Each link settles in to an equilibrium angle relative to its neighboring links; imagine that you could invert that chain to form an arch in equilibrium. A 75 ton, 18 foot tall arch spanning the Town Lake and Boggy Creek Hike and Bike Trail in Austin is such an arch pictured on the cover of this issue. It is known as the Big Arch.

This five-block arch was designed and built in 1992, by David Santos, with iron work by Joe Perez. Santos carved a breathtaking relief on the keystone panel representing Tejano cultural icons: ancient warrior, European explorer, and modern man looking towards three symbols - a pre-invasion pyramid, the State of Texas, and the United Farm Workers eagle.

Of interest is how these five gigantic limestone blocks are held together. There are no nails, mortar, concrete or pegs holding things together! There are five –almost hidden – marbles wedged between two of the blocks that adjust the tension contributing to the stability of the arch.

Here are some questions/ideas to think about:

- There are five blocks weighing 17 tons. Each of the two large bottom blocks is about double the size of any of the other three smaller blocks. About how much does each block weigh?
- The structure is around 18 feet tall, from the ground to the tip of the metal cactus. If the cactus is about 40 inches tall, how tall is the arch?
- Looking at the face of the arch, the sum of the widths of the left pillar, the arch opening, and the right pillar are about the same measurement from edge to edge as the height of the arch and they are each very close to being the same measurement. To the nearest foot, how wide is the archway?

- Superimpose a Cartesian plane on the cover picture. Make sure the arch is above the x-axis and that the y-axis passes through the midpoint of the keystone (the top center stone). If doing this with a graphing calculator, determine a function that will closely follow the curve of the arch. If doing this with graph paper, sketch the curve. The top three stones are trapezoids. How can you use the information from the graph paper or the calculator to determine the area of each trapezoid?
- The arch thickness is about 3 feet 4 inches. Approximate the volume of each block.
- Could you build a scale model of this arch using styrofoam blocks that would not collapse and is not held to gather with glue, toothpicks, or anything else? Try it!

### Additional resources:

Barkow, Denise. An Analysis of Bending Wood by Using Kerf Cuts. *Mathematics Teacher*, Vol. 94, No. 8; November, 2001, pp 636-638.

Buerman, Margaret. The Algebra of the Arches. *Mathematics Teaching in the Middle School*, Vol. 12, No 7; March, 2007, pp 360-365.



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## Geometry Scavenger Hunt

Find and identify the eight 2-D shapes hidden throughout this issue. Submit, by email, the name of the shape along with the page and quadrant number where you located the shape to Mary Alice Hatchett by March 1, 2012 at <mahat@earthlink.net>. All correct entries will be entered into

a drawing for a \$100 NCTM gift certificate. **The winner will be notified by March 15, 2012.**



# Low-Tech, Low-Cost, High-Gain, Real-Time Assessment?

**It's all in the cards, easy as ABCD!**

## BACKGROUND

During my years teaching high school in Houston, I tried experimenting with a class set of small (about the size of typing paper) dry erase memo boards and markers I would pass out to my students each period. Then I could pose a question (e.g., “Draw an isosceles obtuse triangle” or “Sketch the graph of  $y = -x^2$ ) and pan the room and instantly see not only what fraction of the class was obtaining the correct answer, but also see who was not and what types of errors they were making. I can't say the experiment was a complete success because marker pens would often need to be replaced and there were always a few students in each class who had to be reined in for drawing unrelated doodles. Still, there was a noticeable shift in energy during those class sessions by having everyone involved in exchanging feedback with me in real time.

When I began my university position in 2004, my class sizes were twice what they were at the high school and I searched for ways to make these larger classes interactive and engaging for all students, not just for those who were raising their hands to answer questions, for example. Classroom voting has recently provided an attractive option for this purpose and there have been many articles, books, and symposia on the topic. An excellent collection of resources for classroom voting in mathematics and statistics is [mathquest.carroll.edu/resources.html](http://mathquest.carroll.edu/resources.html).

I began hearing about electronic clickers (also known as classroom response systems, personal response systems, audience response systems, or student response systems) and became intrigued by their potential for interactive learning and assessment, but without some of the challenges that I faced with the markerboards in my high school classroom. I even co-supervised a master's thesis (Dashley, 2010) that explored the relationships between using electronic clicker devices, making predictions, and certain probability misconceptions. Mateo (2010) shares the (mostly positive) results of introducing this technology in large introductory statistics classes.

Further background appears in Caldwell (2007).

However, I was personally wary about the dependence on classroom scheduling (not all classrooms are equipped for it) and technology platform (with its inevitable setup and troubleshooting) as well as asking financially-strapped students (especially in my high-poverty geographic region) to pay as much as \$35 or more for an electronic “clicker” device that they might not use in any other class.

By attending a faculty development workshop in August 2010 by the University of Arizona's Dr. Ed Prather, I learned an elegant low-tech solution: color-coded ABCD voting cards made of paper (you can see one at [astro.wvu.edu/r/download/23080](http://astro.wvu.edu/r/download/23080)). These cards were a low-cost solution – obtainable from the campus copy center for roughly only 1% of the cost of an electronic clicker. Prather did not merely talk about the published research (e.g., Prather & Brissenden, 2008) behind the technique, but motivated us all to experience it in a concrete way so that we would leave ready to do it the next day. And indeed, I began implementing it in my fall 2010 course, which started less than a week later!

## IMPLEMENTATION

The key idea (Prather and Brissenden, 2008) is to include several opportunities each class period for students to register their answers or votes by holding up their cards anonymously (by holding the card below their necks, it's not easy to see how others are voting) and simultaneously (all vote on the count of 3, so no one is influenced by how their neighbor might be voting) on pre-written or improvised questions from the instructor.

On the syllabus and first week of class, I make it clear students are responsible for coming to each class ready to use the card they obtain by folding into quadrants the 35-cent color copy they make on regular paper from a pdf file (available at a URL I provide on the syllabus).

The use of these cards serves several roles in the classroom: it gives the students feedback on their understanding, gives the teacher feedback on student understanding (which in turn allows the teacher to make on-the-spot adjustments to how to allocate class time and what examples to discuss next), and reinforces student engagement since every student has to answer, not just the one that is called on.

By a quick visual pan of the room, I very efficiently assess if student understanding on a question is what I think it is (every week, there's a surprising result in one direction or another that I would have never noticed in a timely manner) and make an informed decision about whether to move on, to back up, or (without revealing the correct answer yet) to have students "turn to your neighbor and try to convince him/her that you're right" before doing a re-vote and followup discussion. Students are reminded that even if they have the same answer, they might both be wrong and they need to discuss their reasoning.

While the card may seem to be limited only to four-choice questions, there are creative ways to extend the capacity of the card. Holding the card fully opened, but upside down could be a choice (E), and showing the instructor the blank white side of the full page could be a way of saying "my mind is blank – I have no idea" or "I don't understand the statement of the question".

By a quick visual pan of the room, it is efficient to assess if student understanding on a question is on target (and every week, there's a surprising result in one direction or another that would have remained unnoticed that day) so that the author can make an informed decision about whether to move on, to back up, or (without revealing the correct answer yet) to have students turn to their neighbor and "try to convince them that you're right" before doing a re-vote and followup discussion.

## QUESTION DESIGN

While any question, numerical or conceptual, that can be made into a multiple-choice question can be used with these cards, I tend to use them more with conceptual questions that could be efficiently posed without reading a long "setup". Here are examples of

questions I ask using ABCD cards:

- "What is the most useful way to report annual average household income?"
  - (A) mean,
  - (B) median,
  - (C) mode,
  - (D) maximum
- "What does 'chance of rain 60%' mean?"
  - (A) rain will occur 60% of the day
  - (B) at a specific point in the forecast area, there is a 60% chance of rain,
  - (C) 60% chance that rain will occur somewhere in the forecast area during the day,
  - (D) 60% of the forecast area will receive rain.
- The type of statistical study reported in this news clipping is:
  - (A) survey,
  - (B) randomized experiment,
  - (C) observational study,
  - (D) case study,
  - (E) metaanalysis

It is also possible, however, to ask questions that are more procedural or numerical. In these cases, it is recommended that to make best use of class time, the problem should be streamlined with simple numbers and efficient statement of the problem. Also, instructors should choose answer choices carefully to catch common misconceptions and confusions and make sure that it is not easily possible to get the right answer for a wrong reason. For example, if you are asking students about quantities such as mean, median, mode, range, etc., a dataset such as {1, 2, 3, 4, 4, 16} would be far superior to {3, 4, 5, 5, 8} (Lesser, 2011).

Another use of the cards would be for questions that could be posed in the moment. While working through or discussing an example, it is easy on the fly to assess "what if" questions such as "If I changed the units of X from inches to feet, this would make the correlation between X and Y: (A) increase, (B) decrease, (C) stay the same, or (D) no idea". Or, "If we deleted the outlier from the dataset, the correlation would: (A) increase, (B) decrease, (C) stay the same, or (D) no idea."

Yet another use of the cards would be for questions designed to assess whether students have a particular misconception, such as this one used in (Dashley, 2010) to assess the presence of what is known as the representativeness heuristic:

Which outcome of 6 coin tosses is most likely?

- (A) H H H T T T
- (B) T T H H T H
- (C) H T T H H H
- (D) A and B are equally likely
- (E) all of the above are equally likely

Research (e.g., Shaughnessy 1977) shows that misconceptions can be particularly resistant and that the best chance to change them is if students can actively identify and confront them by making a prediction about a scenario, discussing it, and then having to reconcile their reasoning with the new information and solution. A useful, if not familiar, example to classroom teachers is offered by Goldman (1998) in which a series of graphs on the Texas Instruments graphing calculators can be displayed one at a time by “pausing” the graphing with the ENTER key so that another question can be posed to the students.

Voting cards can even be used for purposes not directly related to content, such as to get to know students’ overall backgrounds, to form groups spontaneously, to vote on the best day to schedule a test or review session, to offer feedback on the difficulty of an assignment, to offer feedback on whether the teacher is going at the right speed on that day’s lesson (choices: “too fast”, “just right”, “too slow”).

## EFFECTIVENESS

While I thought it was clear that this was one of the most effective bang-for-the-buck strategies I have incorporated into my teaching, I wanted more than my anecdotal gut impression. On November 17, 2010 (about three months into the intervention), the students in my two introductory statistics sections were given an anonymous written survey by a third party -- the director of my university’s teaching center -- while I stepped out of the room.

The questionnaire asked students for their levels of agreement/ disagreement towards statements that the use of ABCD cards in the author’s class: (1) “helps me feel more engaged during class”, (2) “gives me helpful feedback about whether I am understanding ideas correctly when they are presented during class”, and (3) “allows Dr. Lesser to more effectively prioritize which topics, examples, and activities to choose during class to better meet the students’ needs.”

The three statements each used this Lickert scale: 1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4 = somewhat agree, 5 = agree, and 6 = strongly agree. All students present (N = 49) completed the survey (with no student leaving any items blank) and here is the distribution of responses:

Survey Statement	#1 (students feel engaged)	#2 (feedback for student )	#3 (feedback for professor)
1’s	0	0	0
2’s	0	0	0
3’s	0	0	0
4’s	1	4	3
5’s	18	15	15
6’s	30	30	31
mode	6	6	6
median	6	6	6
mean	5.6	5.5	5.6
standard deviation	0.5	0.6	0.6

All three items yielded fairly similar distributions of ratings, with a mode of 6, median of 6, mean of at least 5.5, and standard deviation of about 0.6. Of the  $49 \times 3 = 147$  total ratings for the three questions combined, 62% were ‘strongly agree’, 33% were ‘agree’, 5% were ‘somewhat agree’, and none of the 147 ratings involved any of the three levels of disagreement. This degree of positive response was striking, especially considering that I had learned about the innovation less than a week before this course began.

The survey also gave students the option to write comments, and 30 of the 49 students (61%) surveyed did. All comments were positive, and had these themes (in descending order of frequency) about card use:

- 1) Makes class lively, dynamic, interesting
- 2) Inexpensive (especially compared to electronic clickers)
- 3) Gives feedback
- 4) Students plan to use it in their future teaching
- 5) Useful, practical, convenient, efficient
- 6) Removes peer pressure or embarrassment from wrong answers
- 7) Gives everyone an equal chance to participate

That semester's anonymous end-of-course university student evaluations offered further reinforcement, not only in the overall rating of the instructor, but also in the specific question most related to classroom voting, namely "varied use of questions".

	Q#9 (varied use of questions, etc.)	Q#11 (overall rating of instructor)
Very Poor	0	0
Poor	0	0
Satisfactory	2	2
Very Good	7	2
Excellent	50	54

## DISCUSSION

While the benefits seem consistent with the findings of Prather and Brissenden (2008), and the teacher and students certainly uniformly perceived it as useful, it might be interesting to conduct an experiment to measure learning outcomes for voting and non-voting classes. The limitations of this, of course, are that instructors do not generally have the luxury to assign students randomly to courses, it is hard for instructors to otherwise teach identically to both sections, and it could even be arguably unethical (in the sense of Holcomb, 2002) to deprive one section of this promising, easily-implemented technique.

After the semester was over, I discovered a number of sources of clicker questions for statistics on the internet, such as:

[www.derekbruff.com/resources/crs\\_stats\\_questions\\_2008.pdf](http://www.derekbruff.com/resources/crs_stats_questions_2008.pdf)

[www.ou.edu/statsclickers/clickerQuestions.htm](http://www.ou.edu/statsclickers/clickerQuestions.htm)

Lesser and Winsor (2009) discuss the balance of not overestimating what English Language Learners know (since some may periodically feign understanding by nodding to avoid unwanted attention to themselves) and not underestimating what ELLs know (since some may come across as hesitant and uncertain simply because of intonation or cultural patterns). The participation and privacy allowed by the cards may be a great way to avoid both of these pitfalls because each student is forced to participate, but in a way that does not make any one student stand out from the others.

Perez et al. (2010) bring up an interesting point about the value of anonymity of ABCD cards. They found in an experiment that if students the class response to the question were displayed (as a bar graph), students were 30% more likely to change their answer to the modal response if they had not already selected it.

In closing, we note that the most important thing is that there is real-time assessment of student learning, and teachers may have different reasons for preferring different technologies. Some teachers have found that websites like [www.Pollevywhere.com](http://www.Pollevywhere.com) (free for classes no bigger than 30) allow students to text responses using their cell phones and the results show up on the browser you project in the classroom. In some schools, however, this may violate a blanket ban on the use of cell phones.

Posner (2011) lists a number of factors that we can consider when deciding whether to use texting, clickers, or ABCD cards: cost, hardware, Internet, reception, access, vulnerability to cheating, recording results, anonymity, capacity for improvisation, flexibility in format of questions/answers, how/whether answers are displayed/recorded or embeddable in a course management system, etc.

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# TCTM Communications

## Follow TCTM on Twitter!

Did you know that we now have an official Twitter account? Find out the latest about TCTM and other information just for Texas mathematics teachers!

[twitter.com/TCTM\\_Updates](https://twitter.com/TCTM_Updates)

## Follow TCTM on Facebook!

Like the Texas Council of Teachers of Mathematics page on Facebook.

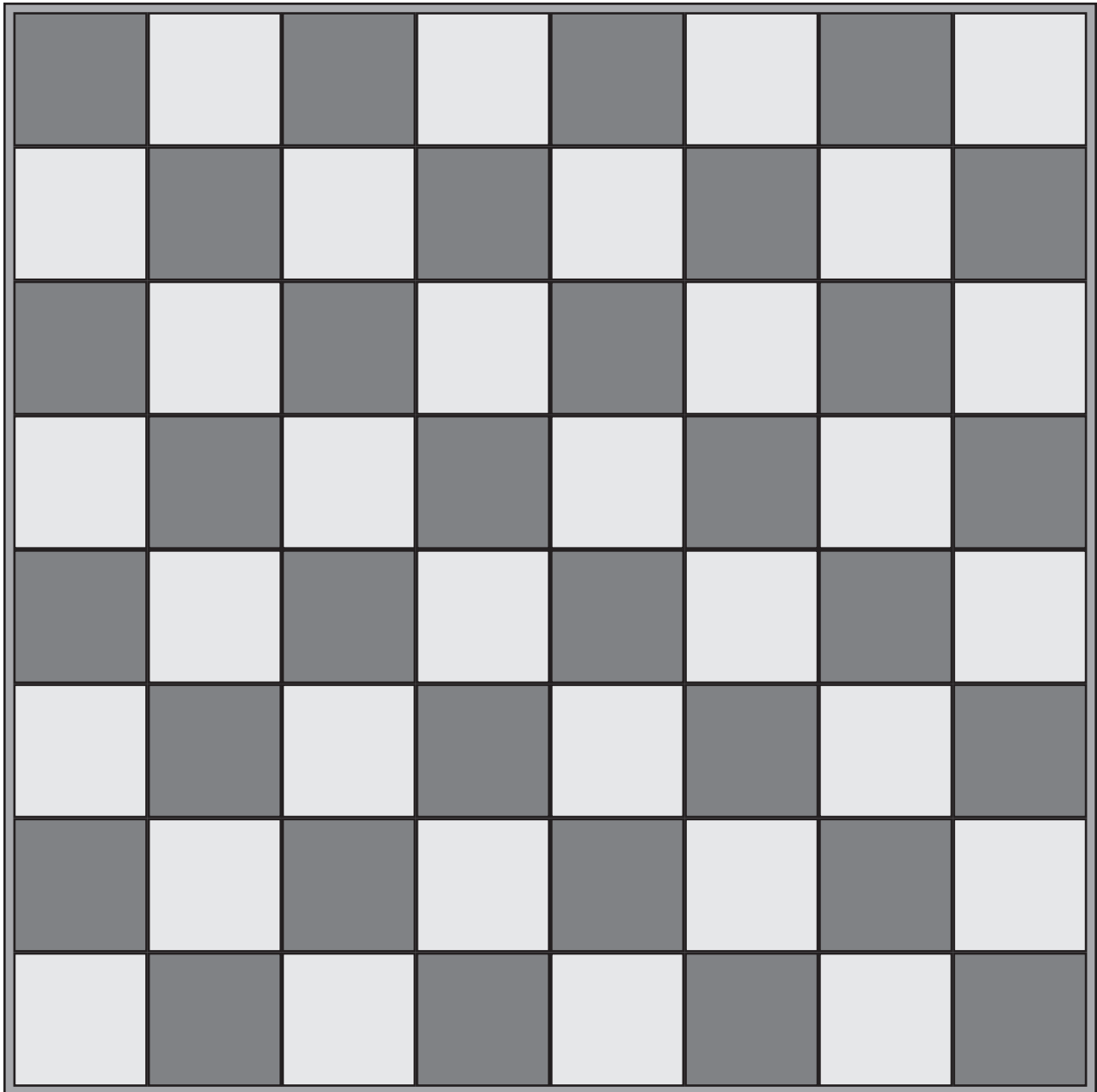
## Snail Mail!

The journal is sent to the address you indicated on your membership form or the address that was used when you registered for CAMT. Please update your mailing address if it is not correct. If you have an e-mail address, please be sure it is on file and up-to-date with TCTM. If you do not have an e-mail address, please let us know. You may update your information with the membership chair Martha Godwin at <[mgodwin@qcisd.net](mailto:mgodwin@qcisd.net)>.



# Student Activity: Checkerboard Squares

How many squares are there on a standard black-and-white 8 by 8 checkerboard?



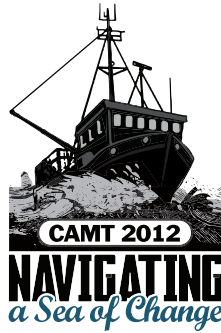
ANSWER:  
 $1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 = 204$

# CAMT 2012

**CAMT 2012: Navigating a Sea of Change**  
**George R. Brown Convention Center**

**July 18 – 20, 2012**  
**Houston, TX**

The Conference for the Advancement of Mathematics Teaching (CAMT) 2012 will be held July 18-20, 2012, at George R. Brown Convention Center in Houston, Texas. Take advantage of Early-bird registration discounts before May 15.



## This year features

Debbie Silver is the keynote speaker.

The creators of Flatland  
 <flatlandthemovie.com> will premiere their  
 new movie, Sphereland at CAMT.

For more details, visit the CAMT website at  
 <www.camtonline.org>.

The Administrators' Conference is back!  
 After pre-registering online, join us July 18 at  
 the Hyatt in Houston. Registration to CAMT  
 is complimentary to administrators attending  
 the Administrators' Conference.

# CAMT 2012 Volunteers

## Dear Members of TCTM, It's time to VOLUNTEER!

We believe that there is an opportunity for everyone to find their niche in helping CAMT to be a success for everyone involved – here's how you can join in on the efforts (we would love to have over 250 volunteers ready to go!). We are looking for fellow mathematics educators to assist us with supporting participants in areas such as the following: Registration, Exhibits, Speaker Check-In, or Transportation. Come work "behind the scenes." We need you! Please e-mail, telephone or fax your name and contact information (be sure to include contact information for the summer) to Martha Godwin, along with which of the following dates you are available to volunteer. Martha will respond via e-mail or home phone with a specific scheduled time and location.

Thank you for making every CAMT a wonderful experience!

### Volunteer Information

		I am willing to volunteer on July		17 <sup>th</sup> PM	18 <sup>th</sup> AM	18 <sup>th</sup> PM	19 <sup>th</sup> AM	19 <sup>th</sup> PM	20 <sup>th</sup> AM	20 <sup>th</sup> PM
Name:	Last		First		Middle					
Address:	Number and street								Apt. number	
	City					State		Zip Code		
	Contact:	( )		( )		Email Address				
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Affiliation:	District or Professional Affiliation								ESC	

Please submit your form to Martha Godwin,  
 by mail: **Martha Godwin**  
**P.O. Box 82**  
**Queen City, TX 75572**

or by email:  
 <mgodwin@qcisd.net >



## Differentiated Algebra II

The typical mainstream high school algebra curriculum is based on solving equations with pencil & paper. That is, we teach symbol manipulations first so that we can teach students how to solve equations. Once students can solve equations, we then teach applications & problem-solving that requires students to apply symbol manipulation and equation solving. The thinking is that learning happens as students practice symbol manipulations and equation & problem solving. In fact, learning (creation of memories) does take place, but there are serious issues with long-term memory and understanding through this kind of learning.

### MEMORY CONSIDERATIONS

Students can, and do store abstract concepts and procedures in working memory, but then commonly purge working memory after the chapter test. Working memory is not designed to function as long-term memory. One problem with using working memory (often required in the equation-solving curriculum and pedagogy) is that students must review before each test/exam to put the abstract concepts and procedures back in working memory. Likewise at the beginning of a sequential course, and when students take a college math course. This is a problem because working memory is limited and there is very little in the structure of the equation-solving curriculum that will help students store the abstract concepts and procedures in long-term memory. Long-term memory requires the algebra currently being taught to be connected through a common algebraic theme and to related real-world contextual situations.

### UNDERSTANDING ALGEBRA

There are three ways that students can develop understanding of the abstract concepts and procedures. They are: early use of dynamic visualizations in all lessons, adding meaning through contextual situations (to model the math we are about to teach), and finally, through guided-discovery pattern-building activities whereby students generalize the algebraic concepts and procedures being taught. One might think that reasoning would produce understanding, and it does in limited cases where the students are already interested in algebra; however, neuroscientists agree that the brain operates primarily by pattern generalization – not reasoning. Where does this leave your academically weaker students?

### FOUNDATIONS FOR COLLEGE MATHEMATICS 3E IS DIFFERENT

*Foundations 3e* is based on function representation and function behaviors so that every algebraic concept or procedure can be taught with connections to function representation, function behaviors, and to algebra previously taught. The visual representation of functions is prevalent throughout every algebraic concept or procedure lesson. The graphing calculator is used as a pedagogical tool to process dynamic visualizations of all algebra and to facilitate guided-discovery pattern-building activities. Contextual situations that model the algebra to be taught are used when possible to teach an algebraic concept or procedure. The ancillary activity book contains many pattern-building activities that lead students to a generalization of the algebra being taught (or about to be taught); the same is true for some section exercises.

**Neural response** teaching methods are implemented through a **function approach** in the Algebra II-level textbook *Foundations for College Mathematics 3e* written by Ed Laughbaum who is a nationally recognized expert in remedial algebra education. Foundations has been adopted in over 170 high schools in the USA to teach **RBP** differentiated Algebra II to seniors who had difficulty in traditional main-stream algebra, but still have aspirations of college success, and to juniors who had difficulty in traditional main-stream Algebra I.

See [www.redbankpublishing.com](http://www.redbankpublishing.com) for sample sections, rationale, TOC, etc.

Mention this advertisement for a free examination textbook.

# About This Publication

Since 1971, the Texas Council of Teachers of Mathematics (TCTM) has produced the journal *Texas Mathematics Teacher* for our members. Our mission is to promote mathematics education in Texas. In the journal we accomplish this by publishing peer-reviewed articles by leading authors, state updates from the Texas Education Agency, and local news from around the state. TCTM is committed to improving mathematics instruction at all levels. We place an emphasis on classroom activities that are aligned to the Texas Essential Knowledge and Skills and the NCTM *Principles and Standards for School Mathematics*.

The *Texas Mathematics Teacher* seeks articles on issues of interest to mathematics educators, especially K-12 classroom teachers in Texas. All readers are encouraged to contribute articles and opinions for any section of the journal. Teachers are encouraged to submit articles for Voices From the Classroom, including inspirational stories, exemplary lessons, or management tools. More specific guidelines for submissions may be found below.

In 2004-05, our publication took on a new look. Original artwork on the cover is another appealing change for our readers. We publish the journal twice each school year, in the fall and spring semesters. Next year, we plan to provide our publication in a web-based format as well as print. You will be given the option to decide if you wish to continue

to receive the print version or not. Our current website archives the more recent journals in PDF format. Please see

[<www.tctmonline.net>](http://www.tctmonline.net)

if you wish to view prior issues.

Our current Editorial Board consists of Cynthia Schneider, Mary Alice Hatchett, Geoffrey Potter, Larry Lesser and James Epperson. Larry and James serve as expert advisors; Cynthia is the editor. Mary Alice does many jobs, including requesting articles, serving as an elementary expert, and communicating with authors. Geoff is the layout and graphic designer; he manages to fit all the text into the limited number of pages we have to work with. The TCTM Board wishes to thank them for their leadership in improving the *Texas Mathematics Teacher*.

The Editorial Board wishes to acknowledge the contributions - time, effort, and expertise - that our volunteer reviewers make to our final journal. Those that reviewed for the journal and deserve our thanks for their support last year, in 2010-11, were:

Adam Hile, Ann Roman, Christy Reves, Cindy Schimek, Edith Hays, Jacqueline Moreno, Jim Wohlgehagen, Julia Hahn, Leslie Koske, Linda Gann, Linda Sams, Marsha Lilly, Mayen Nelson, Norm Jost, Paul Gray, Sana Brennan, Shannon Hernandez, Sharon Benson, Sheree Will, Susan Bohan, Susan Hemphill, and Veronica Hernandez.

## Advertising Guidelines for Texas Mathematics Teacher

All advertising is subject to the approval of the publisher. The journal staff shall be responsible for ascertaining the acceptability of advertisements. All advertisements should be sent "copy-ready" by the closing dates of September 1 for the fall issue and January 15 for the spring issue. Position preference, such as right-hand pages or first half of issue will be honored on a first-come basis. All advertisements must be pre-paid by the closing date with a check made payable to

TCTM, and mailed to our current treasurer, Martha Godwin. Rates for *Texas Mathematics Teacher* per issue are: full page \$500.00, half page \$300.00, quarter page \$200.00.

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*Texas Mathematics Teacher* (ISSN# 0277-030X), the official journal of the Texas Council of Teachers of Mathematics (TCTM), is published in the fall and spring. Editorial correspondence should be mailed or e-mailed to the editor.

This journal is funded by the Texas Council of Teachers of Mathematics and printed at The University of Texas at Austin, which does not imply endorsement by the University or by the Charles A. Dana Center.

### Call For Articles

*Texas Mathematics Teacher* seeks articles on issues of interest to mathematics educators, especially K-12 classroom teachers in Texas. All readers are encouraged to contribute articles and opinions for any section of the journal.

Manuscripts, including tables and figures, should be typed in Microsoft Word and submitted electronically as an e-mail attachment to the editor with a copy to the director. No author identification should appear on or in the manuscript. A cover letter containing author's name, address, affiliations, phone, e-mail address, and the article's intended audience should be included. After refereeing, authors will be notified of a

publication decision.

Teachers are encouraged to submit articles for *Voices From the Classroom*, including inspirational stories, exemplary lessons, or management tools. If submitting a lesson, it should include identification of the appropriate grade level and any prerequisites.

Items for *Lone Star News* include, but are not limited to, NCTM affiliated group announcements, advertisements of upcoming professional meetings, and member updates.

Businesses interested in placing an **advertisement** for mathematics materials should contact Mary Alice Hatchett. Advertisements do not imply endorsement by TCTM's board, editorial staff or members.

Deadline for submissions:    Fall, July 1                      Spring, January 1

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# TCTM 2011-12 Mission, Focus and Goal Statements

**Mission** of the Texas Council of Teachers of Mathematics:

*To promote mathematics education in Texas*

To support this mission, TCTM has five **focus areas**:

Recruit and Retain  
Mathematics Teachers

Curriculum and  
Instruction Support

Advocacy

Promote  
Communication  
among Teachers

Serve as Partner  
Affiliate for NCTM

TCTM activities will align to the five strategic goals. **Goals** of the organization include six strands:

## Administration

- Streamline online membership registration through CAMT

## Publications

- Survey membership to identify what they want in the *Texas Mathematics Teacher (TMT)*
- Review and refine the *TMT* journal and the TCTM website
- Improve the review protocol, establish criteria for reviewers
- Provide tips for new teachers in the *TMT* and on the website

## Service

- Increase the donations toward Mathematics Specialist College Scholarships
- Staff CAMT with volunteers as necessary
- Advertise affiliated group conferences on the TCTM website, in the *TMT* and at CAMT

## Communication

- Maintain an e-mail list of members for timely announcements
- Communicate with affiliated groups in a timely manner

## Membership

- Encourage affiliated groups to include TCTM registration on their membership forms

## Public Relations

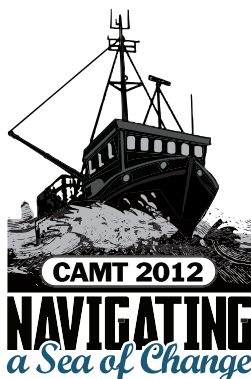
- Sponsor and staff the TCTM booth at CAMT
- Follow NCTM Advocacy Toolkit (2004) for increased voice of TCTM membership on issues relevant to our mission

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The Administrators' Conference is back! After pre-registering online, join us July 18 at the Hyatt in Houston. Registration to CAMT is complimentary to administrators attending the Administrators' Conference.



## This year features


Debbie Silver as the keynote speaker.

The creators of Flatland <[flatlandthemovie.com](http://flatlandthemovie.com)> will premier their new movie, *Sphereland* at CAMT.

For more details, visit the CAMT website: <[www.camtonline.org](http://www.camtonline.org)>.

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