



# UETCTM News

## Final Meetings for the School Year

Due to problems regarding finding a site for this month's meeting, UETCTM will instead hold a meeting in April. Please check the [website](#) later this month for information on the date and place of this next meeting.

The last meeting during the school year will still be held on Monday, May 4. The location of this meeting is yet to be determined.

## MATHCOUNTS Hosted at Northeast State

Northeast State Technical Community College held a MATHCOUNTS competition this past February. MATHCOUNTS is a nationwide program that builds skills and promotes strategic problem solving. It challenges students to sharpen their analytical abilities through creative classroom materials and promotes extra-curricular math clubs. MATHCOUNTS also provides the opportunity to bring middle school students together to prompt the lively exchange of mathematical ideas through competition.

For more information on this program, information on how to get involved in the program, and pictures of the local competition, please see the "Information on MATHCOUNTS" article in this issue.

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## The Process Standards Make the Difference

### by Pam Stidham

What should the teaching of mathematics include? What standards should be taught in all mathematics classrooms? The answers which first come to mind will probably include Number and Operations, Algebra, Geometry, Measurement, and Data Analysis and Probability. But how should these standards be taught?

In 1989 the National Council of Teachers of Mathematics introduced the document, *Curriculum and Evaluation Standards for School Mathematics*, which later became known simply as the “Standards”. This document was designed to create a coherent vision of what it means to be mathematically literate in a world that relies on calculators and computers to carry out mathematical procedures and in a world where mathematics is rapidly growing and is extensively being applied in diverse fields. In 2000 NCTM published an updated document entitled *Principles and Standards for School Mathematics* which stated that ambitious standards are necessary to achieve a society that has the capability to think and reason mathematically. The Principles and Standards document answers the question of what the

teaching of mathematics should include and how it should be taught.

Ten standards, descriptions of what students should be able to know and do, are presented in the Principles and Standards document. They specify the understanding, knowledge, and skills that students should acquire from prekindergarten through grade 12. These ten standards are divided into 2 categories, the content standards and process standards. The Content Standards - Number and Operation, Algebra, Geometry, Measurement, and Data Analysis and Probability – describe the content that students should learn. Teachers are familiar with these standards as state standards and assessments emphasize these areas. The Process standards – Problem Solving, Reasoning and Proof, Communication, Connections, and Representation – emphasize the ways of acquiring and using content knowledge. The process standards describe to us how we should teach mathematics. The process standards are equally as important as the content standards but tend to be less familiar and often not emphasized in mathematics classrooms.

Problem solving means engaging in a task for which a (cont. on p.5 )

# Information on MATHCOUNTS

Strong mathematical skills are vital to a student's overall education and intellectual development. MATHCOUNTS helps shape student career choices and influences the way math is taught by providing quality curriculum materials to America's middle school math teachers. The program motivates students to do well in math and recognizes and rewards them for achievement.

## Program Information

Analogous to school athletics, the MATHCOUNTS program involves coaching "Mathletes" through the fall season. This prepares teams and individuals for the written and oral components of the competition. In February, up to eight students are selected to represent their school at a local competition. The top finishers then progress to the state level. Results at the state competition determine the top four individuals who earn the opportunity to represent their state, U.S. territory or overseas teams at the national finals.



Since its inception in 1983, over five million students have participated in MATHCOUNTS. More than 6,000 schools in all 50 states, the District of Columbia, Guam, Northern Mariana Islands, Puerto Rico, the Virgin Islands, and the Department of Defense and State Department schools worldwide register annually for the competition phase of the program. Each year over 500,000 middle school students participate in MATHCOUNTS activities in their schools. MATHCOUNTS is one of the country's largest and most successful partnerships in education. It has twice received presidential citations recognizing it as an outstanding private sector initiative and was presented with a Special Recognition Award at the Fourth National symposium for Partnerships in (cont. on p.7)

## The Governor's Academy

The Tennessee Governor's Academy for Mathematics and Science (TGA) is recruiting current high school sophomores to apply for admission. Each applicant must be at least 15 years of age and be a rising high school junior. Applicants must also have been Tennessee citizens on or before Dec. 1 of their sophomore year, and have completed at least two years of college-preparatory science and math classes. There is no tuition to attend TGA. Students will receive room and board, as well as educational supplies and the use of a laptop computer during their time as TGA students.

TGA was founded by Gov. Phil Bredesen and is administered by the University of Tennessee, Knoxville. The Knoxville-based academy furthers Bredesen's vision of making the state of Tennessee a leader in science and math education by taking innovative approaches to teaching while exposing students to hands-on research experience.

Next year's class will include approximately 24 high school rising juniors chosen from throughout the state, based on their achievement in science and math, as well as their creativity, curiosity and desire to be part of what TGA Executive Director Vena Long calls "the scientific life."

"We are looking for students who have more than just a technical proficiency in math and science," said Long, who also serves as the associate dean for research in UT Knoxville's College of Education, Health and Human Sciences. "TGA students need to have a love for learning."

The experience at TGA is unique. Students learn in a cohort setting. They live in cottages on the campus of the Tennessee School for the Deaf (TSD) on the banks of the Tennessee River. In addition, students take part in research work in labs on the UT campus and at nearby Oak Ridge National Laboratory. Other partners in TGA include UT, the Tennessee Department of Education, the State Board of Education, TSD, and Oak Ridge Associated Universities.

The application can be found online at the [TGA Web site](#). Note: the application deadline has been extended to March 13 rather than March 4.



Press Release

## **The Process Standards Make the Difference (cont.)**

solution method is not known in advance. Problem solving is not reading a word problem and choosing the appropriate operation to find the answer. Problem solving requires that students rely upon what they do know to discover a way to find the solution. Multiple strategies may be needed, such as trial and error or working a simpler problem and looking for a pattern to help solve a more difficult problem. Problem solving involves constantly reflecting and monitoring strategies and should be an integral part of all mathematics learning.

Reasoning and Proof should be recognized as a fundamental aspect of mathematics. Being able to reason is essential to understanding mathematics. It involves making and investigating mathematical conjectures which often require students to work together to explore, understand and explain their thinking to prove or disprove a conjecture. Reasoning and proof should be a consistent part of students mathematical experiences starting in elementary school and not just “doing proofs” in a high school geometry course. Reasoning mathematically is a habit of mind that must be developed through constant use.

Communication is an essential part of mathematics. It is a way of sharing and clarifying mathematical understandings – putting one’s thinking into words so that others can analyze and evaluate those ideas. Students can gain insight to their own thinking and enrich their mathematical vocabulary by presenting their ideas to others. Writing about mathematics can help students clarify their ideas. Classroom discussions strengthen mathematical understandings as well as clear up misunderstanding and students learn to become critical thinkers by engaging in “math talk”.

Connections involve understanding how all mathematical ideas are related and build on one another. It is the context in how mathematics should be presented - the “hook” on which students can hang their understanding. Making connections is the opportunity for students to realize and understand how mathematics is used in the real world. It answers the question students frequently ask, “When am I ever going to use this?”. Through connections students can learn to value mathematics education and recognize (cont. on p.6)

## The Process Standards Make the Difference (cont.)

the need to take more and challenging mathematics courses.

Representation can be used to model and interpret mathematical ideas. Some forms of representations, such as diagrams, graphs, and symbolic representations, are frequently used in the study of mathematics. Drawing a picture can help students clarify their thinking by making abstract ideas more concrete. Many representations can be used to help students understand important mathematical properties and process – i.e. the use of arrays to illustrate multiplication and the commutative property. New forms of representation associated with today's technology necessitate that even greater attention be given to this area.

Teaching so that all students learn mathematics with understanding requires emphasis on both the content

standards and the process standards. A classroom in which the process standards are emphasized will look differently than the classroom many of us experienced as learners. Students will be actively engaged, working independently and in small groups, discussing and extending their mathematical thinking while discovering the beauty of mathematics. Teachers will become the facilitator of learning and will no longer be “the sage on the stage”. The content standards provide a good curriculum. The addition of the process standards makes a great curriculum. The process standards make the difference!

*Pam Stidham is the mathematics coordinator of Kingsport City Schools*



## Information on MATHCOUNTS (cont.)

Education. President George W. Bush as well as former Presidents Reagan, Bush and Clinton have all greeted MATHCOUNTS' national competitors at the White House.



### Getting Involved

Volunteers – parents, teachers, and professionals from business and industry – are the key to the program's success. The MATHCOUNTS Foundation recognizes volunteers' need for both a fixed structure and reasonable flexibility.

MATHCOUNTS' volunteers appreciate its regular cycle, clearly defined procedures and nationally supported activities. At the same time, they enjoy unlimited opportunities to personalize and enhance the program at

every level.

MATHCOUNTS provides a unique opportunity for you to stimulate students' interest in math, play an integral role in preparing students to enter the workforce equipped with enhanced mathematical skills, be proud that you help instill the highest values of learning and accomplishment, interact with young people as they learn that mathematics can be a challenging, fun and rewarding activity, and provide additional resources for teachers to demonstrate how math is used in every day life.

Each year, thousands of individuals and organizations contribute their time, talent and resources to support MATHCOUNTS programs in their communities. Exactly what a volunteer decides to do and how much time he or she contributes is strictly up to the individual. Opportunities for involvement in MATHCOUNTS are limited only by an individual's or organization's creativity. Typical volunteer activities for individuals include visiting your neighborhood school to encourage participation and deliver registration materials, coaching a school (cont. on p.8)

## Information on MATHCOUNTS (cont.)

program or serving as an assistant coach, volunteering at a local or state competition, and serving on a committee to organize a MATHCOUNTS program. Volunteer opportunities for organizations usually involve adopting a school program by sponsoring a school's participation in the competition, providing spirit-building t-shirts, or planing a dinner or other special event. Organizations or companies can also get involved by contributing funds or donating services to a local or state program which goes toward printing and postage, awards, lunch, refreshments, transportation or lodging or by challenging employees to become volunteers, coaches, tutors, or school recruiters.

Get started by visiting the MATHCOUNTS' "Volunteer Network" at <http://mathcounts.org>. Program coordinators and schools can post volunteer opportunities with their program or search for interested volunteers in their community. Let your interest and availability be known!

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## Mark Your Calendar NCTM Conferences

### **Annual Meetings & Exposition**

Washington D.C. - April 22-25, 2009  
"Equity: All Means ALL"

### **Annual Research Preession**

Washington D.C. - April 20-22

San Diego - April 21-24, 2010

"Connections: Linking Concepts and Context"

Speaker proposal deadline is May 1

### **Regional Conferences & Expositions**

#### **2009**

Boston - Oct. 21-23

Minneapolis - November 4-6

Nashville - November 18-20

(In Conjunction with TMTA's  
annual meeting)

Events Taken from  
NCTM Newsletter (45.6)

## Doctoral Opportunities at ETSU

Currently East Tennessee State University has two doctoral programs which may interest UETCTM members.

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### Ph.D. in Early Childhood Education

ETSU has recently started a doctoral program in early childhood education housed in the department of Human Development and Learning (HDAL). Graduates of the Ph.D. in Early Childhood Education will be competent, have an in-depth understanding of Early Childhood, and have the ability to conduct independent, original scholarship that makes a scientific contribution to the field.

Further information and an application are available on the department's [news website](#).

### Ph.D. in Educational Leadership

ETSU's department of Educational Leadership and Policy Analysis (ELPA) offers a a doctoral program in Educational Leadership. This terminal degree program is designed for students already holding a Master's or Specialist degree and seeking advanced knowledge and skills in educational leadership and research. It culminates with a research project reported in the form of a doctoral dissertation. Various concentration areas serve teachers who seek greater knowledge related to educational leadership, teachers seeking initial administrative licensure, teachers or administrators seeking further knowledge and skills related to school administration, and professionals seeking knowledge and skills related to leadership positions in higher education, public agencies, or private sector areas related to education.



Further information is available on ELPA's [website](#).

## Franklin Math Bowl Needs Test Writers

The Franklin Math Bowl is a middle school math contest held on a Saturday in the early part of November on the ETSU campus. It is co-sponsored by the ETSU math department and UETCTM. Each year we have a test for 6th, 7th, and 8th grade math plus Algebra I. The test consists of 25 multiple-choice questions. Sample tests can be found on the Franklin Math Bowl web page at <http://www.etsu.edu/math/fmb/>. We need some volunteers to write tests. (Or if you don't think you could write a test, at least contribute some questions.) Obviously we can't use middle school teachers who prepare their students for the test, but anyone else is eligible. Typically we ask writers to have their tests written by early September.



If you would be willing to help, have further questions, or want to see test writer guidelines, please contact Daryl Stephens, director, at 423-439-6973 or by email at [stephen@etsu.edu](mailto:stephen@etsu.edu). Thanks in advance for your help!

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## Request for Article Submissions

We are always looking for people to contribute articles to our ongoing "Math Perspectives" series. Every month, we would like four people to write for the series: a preservice undergraduate student, a preservice graduate student, a current classroom teacher, and one of our local math coordinators. Each person will voice their opinions, concerns, or observations upon a particular aspect of teaching mathematics. There are no set topics for this series yet, so the topic of each contribution is up to its author.

If you or someone you know would like to contribute to this column, please contact the newsletter editor, Ryan Nivens.

## UETCTM Membership Application

Complete & return to Floyd Brown with a check for \$10 made payable to UETCTM. Completed Application and check may be mailed to Floyd Brown, Science Hill High School, Mathematics Dept., 1509 John Exum Parkway, Johnson City, TN 37604

Name: \_\_\_\_\_

Home Address: \_\_\_\_\_

\_\_\_\_\_

Home Phone: (\_\_\_\_) \_\_\_\_\_

School: \_\_\_\_\_

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**ETSU**

**Department of Curriculum and Instruction**

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