



UETCTM News

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MATH FUN

A FIRE IN THE ROOM

A physicist and engineer and a mathematician were sleeping in a hotel room when a fire broke out in one corner of the room. Only the engineer woke up he saw the fire, grabbed a bucket of water and threw it on the fire and the fire went out, then he filled up the bucket again and threw that bucket full on the ashes as a safety factor, and he went back to sleep. A little later, another fire broke out in a different corner of the room and only the physicist woke up. He went over measured the intensity of the fire, saw what material was burning and went over and carefully measured out exactly 2/3 of a bucket of water and poured it on, putting out the fire perfectly; the physicist went back to sleep. A little later another fire broke out in a different corner of the room. Only the mathematician woke up. He went over looked at the fire, he saw that there was a bucket and he noticed that it had no holes in it; he turned on the faucet and saw that there was water available. He, thus, concluded that there was a solution to the fire problem and he went back to sleep.



NEW YEAR, NEW PUZZLE

To celebrate the first UETCTM Newsletter of 2012, have some fun with this puzzle from www.mathpuzzle.com! Here are the rules: You must pass through the operations to get from 2011 to 2012; you may pass through an operation several times, but not twice in a row. Look for the solution in next month's issue!





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President's Message



With such a mild winter this year it feels like spring is almost upon us. I hope you are enjoying the unusually warm weather. This spring we have several meetings and I hope you can attend one or more of them. With the changes in K-12 education lately, staying connected to other teachers is more important than ever. Having a strong network of colleagues is important for keeping your professional knowledge up to date.

Be sure and check out the essays in this issue, as well as the calendar of events. We would like to see our membership rise in the coming years, and hope that you find our meetings, Wikispace, and newsletters helpful. For those of you looking for ways to communicate with the public, consider writing an essay for the newsletter. I'll see you at a meeting this spring.

Ryan Nivens

MATH TRIVIA

- ⌘ *The 21st prime number is 73, its mirror, 37, is the 12th.*
- ★ *In 530 B.C., Pythagoras discovered that the morning and evening stars are one and the same.*
- 😊 *Googol, a one followed by one hundred zeroes, was named in 1940 by a nine-year-old, Milton Sirota, after his uncle, a mathematician named Edward Kasner, asked the child what a good name for such a large number might be.*



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Math You Can Eat

By **Katie Dickerson Walker**

Bristol, TN City Schools
6th Grade Math



It has been my experience that students react positively to hands-on interactions with math. As teachers, we are constantly searching for ways to keep them engaged and involved in discovering answers to problems. There are a few ways that I have found to incorporate food items into our math lessons as math tools. This keeps students very interested and focused!

When discussing Geometry, the terminology and characteristics of certain figures are key to skill mastery. One activity that helps students grasp these concepts is to give them stick pretzels and cake icing to create each geometrical shape. Students start with basic figures like rays, angles, and types of triangles. After their work has been assessed, they are allowed to eat each "math tool". They are then asked to create types of polygons and quadrilaterals as a more advanced form of the lesson. They react positively to this activity and are able to retain the information presented much more effectively. In addition, this exploration reinforces the key concepts of Geometry in a way that the students can relate to, while keeping them engaged and interested in their learning.

Food can also be used in other areas of Math as a "math tool". One example of this is an activity called "M and M ratios". Students are given a pack of M and Ms to use as their data set. The students are asked to count and sort their data. They complete a frequency table using the information they gathered. This reinforces how to correctly interpret and display data, which are important sixth grade skills. Students are then asked to use the table to create ratios based on the different colors of M and Ms. This multi-faceted activity covers a broad range of skills to reinforce mastery.

It is of the utmost importance to keep students engaged and involved in their own learning. This gives them the opportunity to investigate solutions, thus allowing them to have ownership of their own knowledge. Using hands-on activities provides students with various learning styles the opportunity to be successful. This is our ultimate goal as teachers. Using food as a "math tool" or "data set" is one strategy and method that gets us one step closer to reaching that goal.



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Are We Teaching Our Children Too Much, Too Fast?

By **Katina Nantz**

**Hawkins County, TN School District
6th Grade Math**



Having a child that had struggled in first and second grade math, I knew learning how to multiply was going to be a challenge. To better prepare my daughter Hannah, I began to teach her how to multiply the summer before third grade began. We played multiplication games, practiced flashcards, played computer games, modeled problems using manipulatives and slowly she began to grasp the concept of multiplication. When school began, her teacher introduced the class to multiplication. I was excited because I knew she would be able to do this. Hannah struggled, but slowly I could see she was grasping the concept. Then suddenly, the teacher is teaching division. Whoa! She had not mastered a very important skill and now she was expected to learn something new that involved a concept she had not mastered yet. As you can guess, she started falling behind again. She had no idea how to divide and suddenly she was confused on how to multiply, too. Hannah was only one child in the class. I wondered how many others were having the same or worse problem. I talked to her teacher and heard what I expected to hear, "I had to move on in order to stay with my pacing guide and cover all of my state standards". I have often made this statement myself. I knew exactly how she felt. Thus my question is this....are we teaching our children too much, too fast?

Stop and think how many standards you now teach that are new to your grade? Were they bumped down to your grade from a later grade? Chances are, you are saying, "Yes." We have more and more expectations for teachers and for our students. I can remember being in an eighth grade middle school classroom in 1988. I fondly remember my teacher, Mr. Bellamy, teaching us how to divide. Now division is a skill that is expected to be mastered by the time a student enters the fifth grade. According to our current Tennessee state standards, beginning in second grade students extend their knowledge of the properties of numbers to multiplication. In the third grade, students develop an understanding of multiplication and division facts through multiple strategies and representations. By the time students are in the fourth grade, they are using all four operations - addition, subtraction, multiplication, and division - to solve problems using whole numbers, fractions, and



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decimals. Multiplication and division are supposed to be mastered skills by the time a student leaves the fourth grade. Are we teaching our children too much, too fast?

A bombshell was recently dropped on America. The exam that caused the shockwave is the Programme for International Student Assessment (PISA), which is given every three years to 15-year-olds around the globe by the Organization for Economic Cooperation and Development (OCED), a global group that promotes growth and trade. Among the 65 countries that participated, the US ranked a dismal 31st in math. Leading the US was Shanghai at number 1, Singapore at number 2, Hong Kong at number 3, South Korea at number 4, and Taiwan at number 5.

There is a problem somewhere. It could be several things. The problem could be teacher quality. The problem could be that teachers are not setting high enough expectations for their students. The problem could be that we are not reaching students on their level. These are just a few of the many ideas we could express. But, maybe.....we are just teaching our students too much, too fast. That is for you to decide.



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Critical Thinking Skills

By Jackie Strickler

Hawkins County, TN Schools

Algebra I Resource

Grades 7-9



Critical thinking strategies have become common instructional methods in regard to students' educational endeavors. These thinking skills have become major components for attaining skills that produce positive results on end of course exams and classroom tests. As the state standards become more complex, students will need to critical thinking skills to answer questions. According to Mary White (2010), "Using instructional strategies that are designed to require students to analyze information critically is a great way to help them develop sound strategic thinking skills that can serve them well throughout their lifetimes"(para. 1). There are several definitions that can be used to describe critical thinking. The definition I use in my classroom can be described as "thinking outside the box". According to Bonnie Potts (1994), "Although there are some quite diverse definitions of critical thinking, nearly all emphasize the ability and tendency to gather, evaluate, and use information effectively"(para. 1).

There are several common critical thinking strategies that have been proven successful in classroom settings. These strategies include allowing sufficient time for students to reflect on a question, asking open-ended questions, explaining "why", and probing for assumptions. By answering "why", students have the opportunity to understand how and why a concept works. This strategy goes beyond a simple answer that can be used in all subject areas across the curriculum. I have used all of these strategies in the special education classroom for students with learning disabilities. These strategies can be used together to produce an environment that is conducive to learning.

The two strategies listed above that I use the most are explaining "why" and giving students extra time to answer the question. Students are asked to explain their thought processes in arriving at an answer. By doing this, teachers can help diagnose where a mistake is made and give hints in completing the problem. In my opinion, the students are understanding how the concepts are used through this process. By giving students extra time, they can take their time and deliberate their response before answering the question. On the bulletin board, there is saying that goes with this strategy, "Always think, think again, and then answer".



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In my Algebra I class, I teach a three-step process that can be used to solve critical thinking problems. A mentor teacher taught me this process 16 years ago and I am still using it today. First, students sort through the numbers and save only the numbers needed to work the given equation. The second step is to determine the actual question being asked. In this process, the student finds the mathematical equation that will best solve the question. The third step is to compare the actual answer to the answer that would make the most sense. Through this process, the students can actually find their own mistakes and make corrections. These strategies can provide teachers with skills that are beneficial in the classroom. By applying these strategies, I have become very cautious in the time provided for students to answer questions. I have found that this extra time provided a more relaxing atmosphere for the student.



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Use of Small Group Instruction to Differentiate Learning in a 90-Minute

By Sherri Devault
Sullivan County, TN Schools
Instructional Math Coach (7-9)



Math takes time to teach. Teaching math effectively requires time for engagement, direct instruction, independent practice, exploration, and fun. All of these pieces can be achieved in a 90-minute math block if planned carefully and executed using effective classroom management strategies.

The students entering classrooms today come from incredibly different mathematical backgrounds. A four or five grade ability spread is very typical when looking at a group of thirty students in an eighth grade classroom. The teacher is faced with pulling lower achieving students up, maintaining on-level learning, and providing above grade level material for the students that are advanced. A 90-minute block affords the time needed for several activities that address many levels of mastery. An example schedule might look as follows:

10 Minutes- Review of previously learned material (bridge to new concepts)

30 Minutes- Direct Instruction

40 Minutes- Small Group Activities

10 Minutes- Wrap Up or Assessment

Dividing a classroom into four or five smaller common ability groups lends itself to planning activities that are focused specifically on mathematical needs. This group organization would involve planning activities that differ in rigor on the same concept to be completed in a four or five day period. One activity can be directly facilitated by the teacher and adapted to the ability of the group. This small group setting assures the teacher complete awareness of strengths and weaknesses that exist individually. The teacher can address difficulties one on one with students who need that type of setting for mastery.



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Classroom management comes into play when planning the activities that are not directly supervised by the teacher. This works best by having each activity produce something that can be turned in as an assessment. Posting specific instructions and expectations for each activity deters unnecessary interruptions during instruction time. These posted instructions should include where work is placed after completion and a list of acceptable assignments if small group work is finished before the allotted time.

After concluding the cycle of learning stations, students will have had the opportunity to discuss concepts directly with their teacher, identify areas of needed refinement, give and receive peer tutoring, independently practice the skills introduced in whole group instruction, and be formatively assessed throughout the process. A 90-minute math block is necessary for a teacher to effectively teach required material and evaluate individual mastery within the classroom.



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New Tricks for Old Dogs

By **Mona Gordon**

Johnson City, TN Schools

7th Grade Math



With the shift of standards in Tennessee, many veteran math teachers are feeling the same amount of anxiety that novice or beginning teachers often feel. Were we not promised that it would get easier with time? Have you noticed how much energy the students have when the final bell rings compared to the teachers? As a mentor to new teachers, I have found that some of the tidbits that I share with them are just as relevant to veteran teachers who may need to refresh their teaching a bit to “survive and advance” to the next school year.

A few changes can make a big difference in the effectiveness of teaching. First, make sure student engagement is at a high level. If they are engaged in what they are doing, they are less likely to be behavior problems. Next, make sure the tasks the students are asked to do are connected to prior knowledge. If you can get them to make the connection to something they have done before or something they know about, they are more likely to succeed. When teaching the more difficult standards that we are being asked to teach, make sure you model your thought processes. Students need to know how you are thinking when you work a problem. If you only show them how to work it on paper without the thought process that got you there, they will sit quietly and watch. However, when it is time for them to work a problem on their own, they will not know where or how to begin.

Finally, it should be commonplace in a mathematics classroom for students to explain thinking and meaning. In the past, I would call on students until I would find one with the correct answer. Then I would let that student explain how they got their answer. It is just as important to let the students who missed explain how they got their answer. Don't skip this step even when you are rushed for time. Remember that wrong answers are not to be thought of as an interruption of learning; wrong answers are a part of learning, especially in a math classroom!



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Teaching & Learning Elementary Mathematics Conference -St. Louis, MO, May 2-4, 2012

We would like to make all mathematics educators, administrators, and University students aware of this professional development event and available discounts.

Teacher knowledge has a profound impact on student achievement. The National Math Recovery Conference draws on the research and practice of educators, teachers and administrators interested in promoting research-based k-5 programs that address intervention from a one-to-one, small group and whole class perspective.

US Math Recovery is a non-profit organization internationally recognized for its early mathematics learning approach that augments classroom curriculum, giving teachers the tools to identify numeracy problems in their students. Years of both academic and case studies have proven the efficacy of the program.

This professional development event features top notch key-note speakers including Dr. Michelle Stephan, North Carolina University; James Burnett, Origo, Australia; Dr. Charles Munter, University of Pittsburgh; Dr. Fran Roy, Fall River Schools. The conference will feature over 30 break-out sessions and a materials show case to take a look at class room resources. Discounts are available for administrators and full time university students. Please check out our 4-day conference program at-a-glance.

<http://www.mathrecovery.org><<http://www.mathrecovery.org/>>



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Registration is open! Hurry- Space is LIMITED for this new event!

*July 31-August 2, 2012
Atlanta, Georgia*

*Algebra Readiness for Every Student: An NCTM
Interactive Institute for grades 3-8 with Extended Online
Professional Development*

Professional Development for the Whole Year

You need the right tools to build a strong math foundation for your students— and NCTM's Interactive Institute for grades 3–8 offers the latest strategies to give your students the best preparation for high school, higher education, and beyond. Kick off your experience in Atlanta, where you'll participate in face-to-face activities and network with peers from across the country, and then reinforce, expand, and apply what you learn by participating in online keynote sessions and interactive discussion groups throughout the school year.

Reserve Your Room

All two and a half days of face-to-face activities will take place at the Sheraton Atlanta, so you can stroll out of your room and right into the day's first presentation. A special discounted rate of \$159 is available to Institute participants, but you must book your room through NCTM to receive this special rate. The deadline to reserve your room is July 5, 2012, but you must [book your room](#) through NCTM to receive this special rate.

Registration Information

[Register](#) by May 18 to take advantage of our lowest registration rates. [Register online](#) or Call (877) 557-5329 or (972) 349-5855 with your credit card information. Phone lines are open Monday–Friday, 8 a.m. – 6:30 p.m., Central time. Your registration will include 2 ½ days of interactive professional development from leaders in mathematics education, a welcome reception with your fellow participants, free networking lunch during two days of activities, plus online professional development for the whole year!

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 submissions 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.

Another section will be included in the next issue dedicated to mathematics problems. We are looking for submissions on favorite problems focused on various grade bands.

*If you or someone you know would like to contribute to this column, please contact **Ryan Nivens, Newsletter Editor.***

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UETCTM

Membership Application



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Blountville, TN 37617

Membership Fee: \$10
Payable to: UETCTM

Name: _____

Home Address: _____

Home Phone: (____) ____ - _____

School: _____

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School Phone: (____) ____ - _____

Email Address: _____

The Upper East Tennessee Council of Teachers of Mathematics is an organization for anyone involved in mathematics education from preschool through college in the greater Tri-Cities region. We meet six afternoons per year in various locations across the region. The purpose of UETCTM is to promote excellence in teaching mathematics and to share best practices among mathematics educators.