



UETCTM

Newsletter

April 2015

VOLUME XV ISSUE 6

SCHOLARSHIP OPPORTUNITY FOR FUTURE TEACHERS

This program will provide participants with three years of support. Students will major in Mathematics, with a concentration in either Computational Applied Mathematics or Statistics. Alternatively, students may choose a major in a STEM discipline while minoring in either Mathematics or Statistics.

Participants will engage in activities with an emphasis on data science (Big Data) as they complete their major or minor requirements.

Students will typically enter the program as rising sophomores. The required minimum grade-point average is 3.3. The program will start with an immersion in computational science, to be completed over the summer of this year.

Then, from the fall semester onward, and for the next three years, students

will attend a weekly seminar that alternates among mini-workshops,

visiting speakers, career planning, team-building, and a variety of other activities.

All participants must attend an organizational meeting on May 8, and they must complete computing proficiencies during the summer. Completion of Calculus I (MATH 1910) with good scores or Advanced Placement Calculus is required. Students will be expected to graduate after three years of support.

For the three years of the program, the total scholarship amount for each student is \$16,500.

The application process is by electronic submission only. Paper applications are not accepted. A Google account (such as Google+ or gmail) is needed.

<http://www.etsu.edu/cas/math/ssstem.aspx>

ELEVATING MATHEMATICS MATH COMPETITION

April 21st @ ETSU
Teams for grades 4-6, Registration \$25
For more info, [click here](#)

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Preparing the Next Generation

by Keith Vannoy

With all the changes in technology, it is only natural for education to evolve. I have experienced firsthand how technology has changed higher education. When I chose to change careers and pursue my Master's to become a teacher, I decided to give online classes a try. Although I was skeptical at first I have grown to appreciate the new opportunities that are created by the internet for education. I have two wonderful children and online classes provided me the opportunity fit school into my already busy schedule with work and family.

Students who choose to further their education after high school will be faced with not only the traditional classroom, but will encounter the online classroom environment. As a middle aged adult I had difficulty adjusting to the lack of structure provided by the traditional classroom setting. I often found myself procrastinating, thinking that I had plenty of time to complete assignments, since I didn't physically have to be in class. Thinking back to my

undergraduate years, I remember the feeling of freedom associated with choosing my classes, arranging them to somewhat meet my time schedule, and for the most the able do choose what I wanted to do. I don't think I would have survived the additional freedom that the online environment allows. This said 20 years later, I can say that I would recommend online classes to anyone that needs the flexibility to work, raise a family, and juggle school all at the same time, as long as you can be disciplined to set some time aside to actually work on school assignments.

I now have a son of my own, who is a junior and will be making the decisions on college soon. As a parent of a high school student and a high school math teacher, I have begun to wonder if our students are truly ready for the new challenges that online classes present. Is high school preparing students for what they will face both academically and technologically at the college level? I look at my son and the seniors that I teach and see students that are ready to be done with high school, but are they really prepared for the freedom college gives them? They will no longer

have a teacher to remind them to study, make sure they are on task, administration to ensure they are attending class, no one will be there to tell them to get up, and give them extra attention or additional instruction as needed. The online environment could make these challenges even more detrimental, since most online classes are facilitated by an instructor that the students never see.

With this in mind, I was given the opportunity to work with our local community college to allow seniors, who would need to take remedial math in college, take remedial math online in high school. This also opens up opportunities for some students who may not have thought college was an option for them. This presented me as a teacher with new challenges. I, as the instructor/facilitator, am now in a position to help transition students into college classes, by instructing and guiding students to manage their time. In this situation the instructor/facilitator for the online class is no longer just a name on the screen, but someone who can assist, guide, tutor, teach, and be present to ensure each student is working as they should. I have

found myself in each of these roles as needed by the class and individual students. I have also begun to loosen up, allowing students some flexibility in completing assignments and in the classroom. I feel that my new role is more than teaching students how to understand the math, but to also teach them how to manage their time and prepare them for when no one will be around to tell them what to do next, all while providing a safety net that would not be available otherwise.

After teaching this way for the past year, I have spent time this summer reflecting on what did or did not work and what I need to change to make the program better for the students. My goal is to prepare each student not only academically, but also emotionally for the challenges that they will face after graduation. I look forward to the new challenges that I might face as we continue to work toward preparing students for the new style classrooms that they will face in their futures. I also challenge other teachers of seniors to not give up and think of ways to prepare students for their next adventure, even if that means it has nothing to do with the subject you teach.



Math Isn't Just Black and White

by Nicole Verdino

If you walk into my classroom you would think that the Crayola factory exploded on my kids' papers, but if you look a little closer you would see that there is colorful organized chaos happening on their papers. Color coding notes is a technique I used while I was in college and I decided to implement it in my geometry classroom. Color coding has changed how my students organize their notes but it's more than just color on paper. Below is a list of helpful tips, tricks, and benefits of color coding your class' notes.

Tips and Tricks:

- Be consistent with your color.
- Color coding is more than just highlighting a word here and there. Color coding helps students follow their notes with ease. When you choose a color for a certain vocabulary word, every time you reference that word or symbol it

should stay the same color, even as you move to a new example. For example if you highlight volume in blue, then every time you reference volume it should be blue. This will help students notice patterns in problems as well as help them find easy references within their notes.

-Provide highlighters.

As a high school teacher my students don't always come to class prepared so I can't expect them to bring highlighters every day. In the front of my room I have a bin of highlighters. Every day I tell them they need a certain number of different colors (it varies every day). They are responsible for getting their colors and returning them to the bin at the end of every class. By supplying highlighters I know that all students are prepared and everyone will be able to follow along.

-Don't make your paper look like a messy rainbow (it's okay to have white space)

-Color coding is used to highlight important information and make connections through color. Coloring everything on the paper does not help make connections; it makes it look messy. Only use color when you think it will be helpful. Highlighting every word doesn't help your students stay organized because it makes everything blend

into a colorful mess. Use your color meaningfully. Now I am guilty of using 6 colors during one lesson but all of those colors had a meaning. I didn't just pick out random colors without any purpose. If you develop and explain meaning behind your color then it is okay to use a variety of different highlighters during one lesson.

Benefits of color coding:

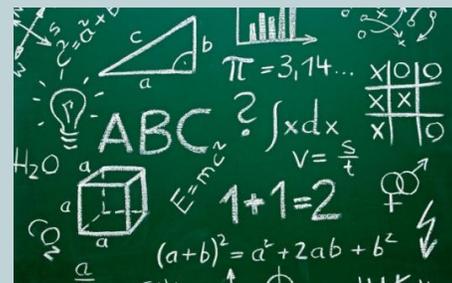
- Helps kids stay organized and focused.

- When you are teaching a lesson and using color coding your students will be engaged the whole time. The students are required to stay focused in order to not miss a color or a written note. When the students are actively engaged in the learning process they will be more involved in classroom discussions and ask more in depth questions. I have noticed when my students color code their notes they are able to articulate their questions and refer to a certain example in front of the class with ease and confidence.

Peer Tutoring:

- The students are able to help each other and follow their process through the colors of the lesson. As I walk around the room I can overhear my students explaining their solutions paths effectively and clear as they use the colors as

a roadmap to the problem they are explaining. The colors make it easier for the student who needs help to follow the thought process of the peer tutor and make sense of the problem.



Counting Primes

by Adam Hall

Towards the end of the orientation luncheon for Mathletes, I was given a packet titled "Counting Primes" and told to work on it with a partner for the remainder of the afternoon. The first page of the packet was very confusing to me. At the top of the page in big bold letters was the words "Counting Primes". However, there was nothing on that first page about prime numbers. Integers were there. Factors, number lines and even a question that begins with the fear-inspiring word *prove*. But no primes. And so I forgot all about primes and focused my attention on trying to prove that two consecutive integers couldn't possibly share any factors.

Arriving at the second page with my partner I felt good about the packet. It had my attention. We were flying through the questions. I was thinking about things that I hadn't thought about in years. This was fun. Halfway down that second page I finally ran into the word *prime*, too. There was a blank number line with directions to label it with integers (up to 32) and then circle all the primes I could. That was followed by directions to pick six primes at random and multiply them together. Well. That escalated

quickly. I picked **23, 13, 7, 31, 3** and **2**. The product came out to be 389298. The next direction was to add 1 and then list the factors. At this point, I had multiplied quite the pile of primes together, but I had yet to put 2 and 2 together and figure out where this was headed. I was just enjoying the journey. Unfortunately, I didn't have a calculator with a "factor()" operation. As my phone struggled to load Wolfram Alpha, our orientation came to an end. It was time to head back to school to make sure my students, who had been left with a substitute for the evening, hadn't set the classroom ablaze or some equally terrifying act of mischief. The poor "Counting Primes" packet was quickly forgotten and would end up sitting in a folder in my car for who knows how long. Years? Centuries? Millennia?

As it turned out, it was only a couple months until the official Mathletes class started and I found myself sucked back into the mystery and awe of "Counting Primes" – although it sure felt a lot more like "Multiplying Primes" or "Prove That Consecutive Integers Don't Share Factors". In the comfort of my living room, I loaded Wolfram Alpha and proceeded to factor 389299. To my surprise, it was prime. Being mathematically curious I wondered if adding 1

would always create another prime, but I quickly realized that hypothesis was wrong after I looked at the example in the packet. $2 \times 5 \times 7 \times 19 \times 23 + 1 = 3 \times 3 \times 3 \times 11 \times 103$. Again I felt confused because I still wasn't seeing the big picture. There didn't seem to be a pattern here.

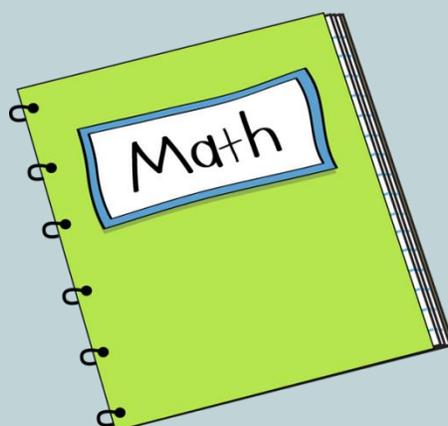
The next set of questions had me comparing the prime factors of 389298 and 389299. The only common factor was 1, and that number isn't a prime. I was then told to divide (by hand) 389299 by my original prime factors. Great! Long division! What else is this packet going to throw at me? After some initial mistakes with the long division I eventually sorted out that the remainder for all of these was going to be 1. Hey! That makes sense! All of the prime factors I was dividing by would have gone perfectly into 389298, so obviously the remainder will be 1 if I try to divide them into 389299. Cool. Finally it was time to tackle the last page of the packet.

The first question at the top of the last page read "Why do the two integers $P_1 \times P_2 \times P_3 \times P_4 \times P_5 \times P_6$ and $P_1 \times P_2 \times P_3 \times P_4 \times P_5 \times P_6 + 1$ have no common prime factors?" After thinking for a moment I realized this was just a generalization of the last question I had solved. They couldn't share any factors because

the only factors of $P_1 \times P_2 \times P_3 \times P_4 \times P_5 \times P_6$ were P_1, P_2, P_3, P_4, P_5 and P_6 . None of these go into $P_1 \times P_2 \times P_3 \times P_4 \times P_5 \times P_6 + 1$ since they all would have a remainder of 1. I was ecstatic to finally feel like I was understanding where this packet was going. Next I was asked to consider a finite set of primes: $\{P_1, P_2, P_3, \dots, P_n\}$ and determine a prime that wasn't in the list. Well that's simple: multiply them all together and add one. Either that number will be a prime not in the list, or any of its prime factors would work also.

The last question in the packet was "Does the set of all prime numbers contain a finite or infinite number of elements?" I was really happy by the time I got to this question because the answer was blatantly obvious after all of the questions I had trudged through before it. Of course there is an infinite number of primes, since we can take any list that supposedly contains all primes and find others not in the list using the methods I've discussed earlier. I think the reason I enjoyed this packet so much was because it reminded me of what math is all about. It's so much more fun to discover mathematics on your own. I feel like the "Counting Primes" packet did a great job of pointing

me in the right direction without telling me exactly where to look and what to see. I had to do some pretty intense thinking on my own to figure out exactly what I was supposed to be doing. This same idea is also one of the main things I've taken home from my time at Mathletes: "Who is doing the thinking in the classroom?" I feel like my past three years of teaching I've had a hard time letting students think for themselves. It is very hard to let go and let them struggle. But if someone had told me exactly how to count primes, I wouldn't have gotten to live the joy of figuring it out on my own. I am determined to try hard in the coming year to let kids struggle a little more. I feel like I owe it to them to provide an opportunity to experience what I think mathematics is all about. To facilitate learning without spoon-feeding. As John Dewey said: "We only think when we are confronted with problems."



My First Struggle

by Karen Sizemore

A scared second grader, a purple workbook page with many eraser marks, and tears. That is what I think of when I recall the first struggle I experienced in my educational experience. When I look back at this experience, I have mixed feelings. I feel fright, confusion, embarrassment, and anxiety but also wonder.

I was in a 2nd grade math class and the topic that day was subtraction with regrouping. We were all sitting around Mrs. Cochran's desk, with our desks in a semicircle, our math workbooks out and our eager minds ready to learn. The lesson that day was trading tens for ones. Until this point in my school experience, nothing had been hard for me. I had learned to read early, never struggled in anything and had always been at the top of the class. But.....this day was a different story. I was about to discover that just because most lessons are easy for one student, they may not be easy for all. Teachers should never just assume that a student knows the topic or is understanding the concept and I am so glad that Mrs. Cochran took the time to notice me that day.

I had my workbook open, my pencil ready to write, and my

brain in learning gear. Then Mrs. Cochran started her lesson by giving examples on the chalkboard. I looked at her as if I was in a strange foreign country and she had suddenly started speaking Japanese. I didn't have a clue what she was talking about! I looked around me to see if anyone else had confused looks on their faces and to my surprise they didn't. My stomach got jumpy, my palms got sweaty and I tried to focus harder and really listen. This feeling of not understanding was new to me and I didn't like it.

Then the moment of dread.....we started our seatwork. I can still visualize that workbook page today. It was lilac purple with subtraction problems on it that were in English but I could have sworn there were Japanese scribbles on the page. I remember looking at it and thinking "What am I going to do?" Finally I knew I had to put something down because she was getting closer to my seat. So, I tried to do the first problem. You can guess what happened next. Mrs. Cochran came by my desk and told me I needed to redo it because I had made a mistake. Out came the big pink eraser and I redid the problem, still not knowing what I was doing. She came around again and still not right. I decided it might just be a hard problem and if I tried another one I might get it

correct. Well.....no luck. Missed that one too! By this time, my paper had white spots all over it because I had erased all the purple off the page.



When Mrs. Cochran came around again, it was evident I was struggling, because my frustration got the best of me and I had started crying. For the first time ever, I didn't understand something in school. This wasn't normal for me! It was supposed to be easy. I was supposed to be in the first group finished so I could read or draw! What was happening? Had I really been transported to Japan? As she came closer to my desk, and saw my anxiety level, she bent down beside my desk and hugged me. I can remember her words clearly, "It's OK. Don't cry. We will work on it together." She then proceeded to ask me if my mom was working that day because my mother was a substitute in the school. I told her yes and she said "Go ahead and put your workbook away. It's almost lunch and we will worry about this later."

When we got back from lunch, Mrs. Cochran told me that

she had talked to my mom and I was going to stay after school with her for a short tutoring session while my mom waited. I felt some relief because I got to wait a few hours to go into the world of the unknown, but I still felt the fear. My fear soon turned to relief and wonder because in my private one on one afterschool session, I learned to regroup! Mrs. Cochran didn't have to stay after and help me, she didn't have to give me another chance and she didn't have to believe in me, but.....she did. I remember walking to the car with mom and telling her that I wanted to be a teacher like Mrs. Cochran one day and help kids learn. She was my inspiration that day.

In education today we hear many strategies and ways to teach. One of these is to help a child master what you are teaching before you move on and that's what Mrs. Cochran did. Another strategy is to give small group or one on one instruction and that's what Mrs. Cochran did. Most importantly is to make the student feel important and thankfully she did this also. The year was 1976 not 2014, but Mrs. Cochran knew what the qualities of a good teacher were.

I am now a 3rd grade teacher and have been teaching 2nd or 3rd for 21 years. I have patterned my teaching after this

wonderful mentor. I try my best daily to make each child feel important, give them the attention they need, help them master skills, help them succeed, and hope and pray they feel loved. I am so thankful that I have the opportunity to make a difference in children's lives daily.



My Choice to Teach

by Jennifer Livesay

It's funny how life can change. Originally I had started out in college with a dream in my head of being an accessories buyer for a major department store. You see, I have always loved accessories ever since Madonna had made wearing 67 bracelets and 14 necklaces at one time popular. Even now I don't feel complete without a bracelet or two on my arm. Have you ever heard of the saying, "Remove one piece of jewelry before leaving the house"? Well, I believe in adding one more piece before leaving the house.

I started out majoring in Fashion Merchandising and Business. Two things brought that to a screeching halt.....Economics and life. Economics was hard. Life was hard. Fulltime college was going to have to wait because fulltime work was going to have to happen. After a year of working fulltime, I decided to reevaluate my major. I had an elective class and for that I decided to take an early childhood class. I loved it and my life was forever changed.

My first year that I had a classroom, I had such a good time. I was in a trailer back behind the school. We had such a good time. I

felt like I really didn't have any type of direction though. My mentor teacher was in a classroom that was in the school and was rarely able to talk to her. I literally flew by the seat of my pants that first year.

When I reflect on that first year, I did a lot of fun things: we tie-dyed shirts, had a class pet, and made huge teepees. But after 15 years of teaching and knowing what I know now, I'm sure that I didn't do a lot of quality teaching. I think about those children and feel like I did them an injustice that year. I know they learned things, but they probably didn't learn as many things as they should have or could have that year.

I often wonder if in this whirlwind of modern teaching if the kids are learning a lot of the things we are pushing at them to learn. We no longer have time to tie-dye shirt, take care of class pets, or take the time out of the day to make large teepees. It feels as if fun has left the building. However, I know for a fact that my students are learning more. So how do we get back that balance of the fun of a first-year teacher and the experience that comes with a veteran teacher?

I often wonder what my life would look like if I would have taken a different path. What if I were traveling around selling

accessories with an arm full of bracelets? Who knowsbut I do know that my arm full of bracelets could never warm my heart the way that my second grade sweeties do when they come to visit me years later. Choice validated.



Organizations we are affiliated with:

National Council of Teachers of Mathematics (NCTM)

<http://www.nctm.org>

Tennessee Mathematics Teachers Association (TMTA)

<http://www.tmta.info/>



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UETCTM

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Payable to: UETCTM

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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. This year we will have a single-day conference in the spring at a day and location yet to be announced. The purpose of UETCTM is to promote excellence in teaching mathematics and to share best practices among mathematics educators.