
Upper East Tennessee Council of Teachers of Mathematics

NEWSLETTER

VOLUME 17 ISSUE 3

NOVEMBER 2016



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HAPPY HOLIDAYS!



News: Activating engagement! Interactive opportunity!

Moving up with math:

November meeting empowered teachers with a look at new standards and movement in the classroom.

The recent UETCTM November meeting strengthened teacher skills with several important programs, including an examination of upcoming standards and a presentation of a new kinesthetic approach to teaching math. Marcia Wade, a Math and Movement consultant, shared with members strategic movements they could use in the classroom to enhance student math and literacy skills. Engaging and fun, the presentation had attendees moving *and* thinking about news ways to foster excitement and excellence in the classroom.



Making learning child's play: **Minecraft Education Edition now available at \$5 per user**

Art, science, programming—the world of learning hasn't been the same since the introduction of Minecraft, the versatile video game embraced by parents, educators and students. Now, with Minecraft Education Edition, the program is available for \$5 per user, with companion "Classroom Mode" app for teachers. For more information, see <https://www.cnet.com/news/minecraft-education-edition-launches-today-for-5-per-user/?part=propeller&subj=news&tag=link>



2017 NCTM Interactive Institute: **Effective Teaching with Principles to Action**

Date: Feb. 3-4, 2017

Location: San Diego, CA

Using the principles and practices of NCTM's publication "Principles to Actions: Ensuring Mathematical Success," the program will explore planning, instruction and strategies for transforming teaching practices to meet new and rigorous standards.



R students ready for global employment?

With a newly funded grant, ETSU-CUAI project will help integrate coding language R into East Tennessee high school curriculum.

Just as everyone knows about the three “R’s”—reading, writing and arithmetic—most people are also starting to know that the three R’s aren’t enough for students facing a 21st century global economy. The ability to write computer code isn’t simply an advantage, it’s a critical skill. Yet stand-alone high school programming classes are typically accessed only by a select group of students, while broader integration of coding education has lagged behind, particularly here in Tennessee, because of both curriculum and funding demands.

Now, however, the East Tennessee region will take an important step forward in the integration of coding into the high school curriculum, thanks to a recently funded grant project headed by Dr. Ryan Nivens, Associate Professor and Undergraduate Coordinator in ETSU’s Department of Curriculum and Instruction.

R: A premier scripting language with comprehensive applicability.

The innovative project, Integrating Computing into High School Mathematics Curriculum Via Science and Engineering Data Sets, will provide both the training and the technology to empower high school teachers to teach and integrate the open-source coding language R into algebra and statistics coursework. Used extensively across industry as well as the academic sector, R is a scripting language that is a preferred tool in data analysis and the creation of statistical software.

“Here at ETSU, psychology students must learn R for use in research,” Nivens points out. “It’s also used in industrial applications, at Eastman, for example. R is a language with broad-ranging applicability. And of course, it is used extensively in the Mathematics and Statistics department here at ETSU.”

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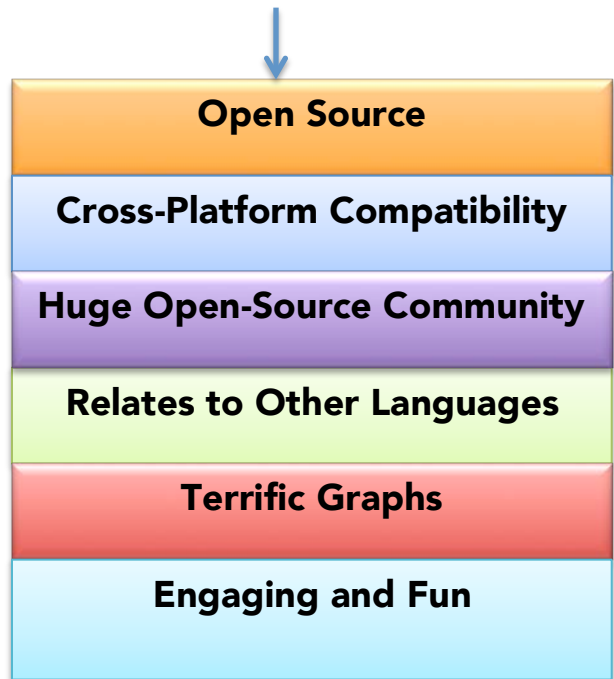
R students ready for global employment?

(continued)

R: Real-world analysis of real-world issues:

Funded by the federal Improving Teacher Quality grant program, the \$75,000 grant will cover professional development for regional mathematics teachers to learn R and to build integrated lesson plans that deploy the language. Once back in the classroom, educators will teach the language and help students to apply R in analyzing real-world situations, from forest and water quality issues to population trends. The grant will also cover needed technology through the purchase of Raspberry Pis, tiny and surprisingly affordable computers that will hold the language and the publicly sourced data sets.

Why more are using R:



Students will apply R in analyzing real-world situations, from forest and water quality issues to population trends.

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R students ready for global employment?

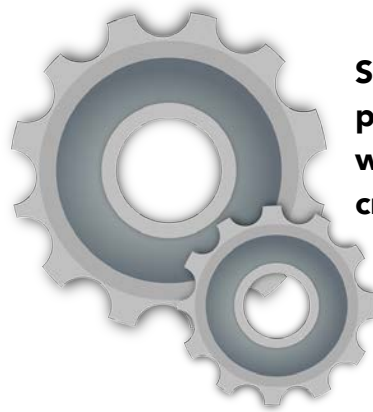
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R: Relevant learning outcomes:

The learning outcomes of the project are three-fold: Students learn a premier coding language needed for academic and career success; mathematics learning is enhanced through technology; and students have the opportunity to apply their learning in real-world problem-solving—the kind of problem-solving which, like coding, is a crucial component in a successful vocational skillset.

Another key advantage: Teachers and students alike find the modular scripting language accessible and relatively easy to learn. Nivens and colleagues Dr. Anant Godbole, Director of the Center for Excellence in Math and Science Education, and Dr. JeanMarie Hendrickson, Assistant Professor of Math and Statistics, laid the groundwork for the project in the summer of 2016 with a five-day workshop, teaching R to 30 teachers from 10 different schools. “People are pleasantly surprised by how quickly they can pick up the basics,” Nivens says.

Are the students of this region prepared the demands of the marketplace? Thanks to their knowledge and skill in R, their readiness will be significantly improved.



Students learn problem-solving as well as coding—both crucial components in a successful vocational skill set.



The Importance of Number Sense

By
Kate Hall

A student with the understanding of number sense realizes what numbers mean, understands their relationship to one another, can perform mental math, understands the symbolic representations of numbers, and can apply understanding of numbers into real life contexts.

Number sense is having the ability to think about numbers flexibly. As teachers, we must help promote student's confidence in working with numbers and make them feel as they are the "boss" of the numbers. Number sense is so important because without it, students will struggle with basic math, and have an even harder time with more complex math.

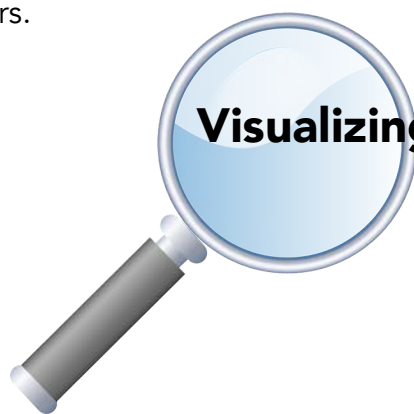
There are many strategies we can use in the classroom to help encourage number sense, according to Marilyn Burns in the book *About Teaching Mathematics*.

Number sense will develop over time, so students will need many opportunities to work with numbers, visualize numbers, and think about relationships among numbers.

One great way to work on number sense is to have students work on problems that have multiple solution paths. It is important that we, as teachers, model different ways to solve the same problem. However, it is just as important that we provide time for students to share with one another the different ways they came up with to solve the same problem.

Another way to help students develop their number sense is by having them work with mental math. Using Number Talks is a great opportunity to work on mental math in the classroom. This helps them visualize numbers, strategies, and work through the solution in their minds. This will help them think more flexibly about solving the problem and use various strategies to solve the problem instead of one fixed method.

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Visualizing numbers and
strategies
through
Numbers Talks

The Importance of Number Sense (continued)

During a Number Talks session or during whole group math time, it is imperative to question students about how they are solving the problem. This is helpful for teachers to see how students are thinking, when they get the problem correct or incorrect. Students should also have discussions with one another about problem solving. This is a wonderful way to encourage math talk, have students question one another, use Accountable Talk, and teach students to defend their answer.

These are easy ways to incorporate daily activities that will help children develop their number sense. It is critical that students can think about numbers in a flexible way. Number sense is vital not only to their understanding of basic math, but will help them be successful with more difficult math. ■



“During a Number Talks session or during a whole group math time, it is imperative to question students about how they are solving the problem.”



Osmo

By
Paula Carroll

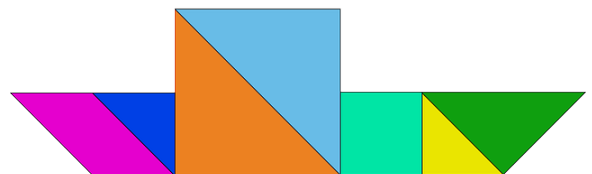
Osmo is a great tool to use in the classroom. It is inexpensive and can be attached to any iPad. It is a hands-on tool that incorporates reasoning skills and automaticity into fluency and fun. It begins simply with using dot cards. The dots can be put in front of the mirror in any order to add up to form the number. In the next move the student has to decide if his number is too big or too small to make the number they wish to pop. From there they have to decide on how many less or how many greater. It is an excellent tool for the students to use their strategies they have learned in another setting to add and subtract quickly. They are also able to see that the dots need to increase or decrease. It is a good team-building activity. By working in pairs the students are able to help each other to the correct answer if one is struggling, but they also have to justify their answers to each other while all the time moving quickly to free the fish.



There is also the Tangrams game that deals with visual perception and spatial relations as well as shapes and sides and edges. The discussions and justifications for placing each piece to their partner will have the students using the vocabulary freely.

Newton is a game that deals with angles and gravity. The students again have to work together to come up with a strategy to hit the dot. This can also involve a strategy of what tool would be the best to use and what kind of angle works the best, etc.

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Tangrams game will have students sharing, learning.



Set up & play:

1. Configure the iPad.
The base is already setup for iPad 2, iPad 3, and iPad 4.
Follow the steps on the red paper band around the base to swap the adapters for iPad Air and iPad mini.
2. Download the games on your iPad, launch safari and navigate to :
www.playosmo.com
3. Launch the games by following the steps within the games to set up your iPad with the base, and enjoy.

Games available through Osmo:

<https://www.youtube.com/watch?v=oOntuJQF03cht>
[tps://www.youtube.com/watch?v=oOntuJQF03c](https://www.youtube.com/watch?v=oOntuJQF03c)

5. Newton – This is a problem solving game. The student guides virtual balls with real life objects.
6. Words – Guess and spell hidden words with physical tiles. You can compete against another student or both students can work together to spell different words.

1. Tangram – 3 levels. Easy gives you the color of the tiles to recreate. When it is correct it colors in the shape. Medium gives you the shape but not the color. Hard is just a shape but lights up as you place the shapes in the correct space together to recreate the shape.
2. Masterpiece – Trace an object. This helps with small motor skills by tracing a picture.
3. Numbers – Put down the numbers to pop the bubbles. It can be in a combination or the actual number. 5+2 for a 7 or 3+4, etc.
4. NEW Coding game –
www.playosmo.com
Teaches logic skills and problem solving, and it helps kids succeed in a digital world. You control Awbie with each coding command. You guide Awbie through his adventure.



Stuck in the Middle with You

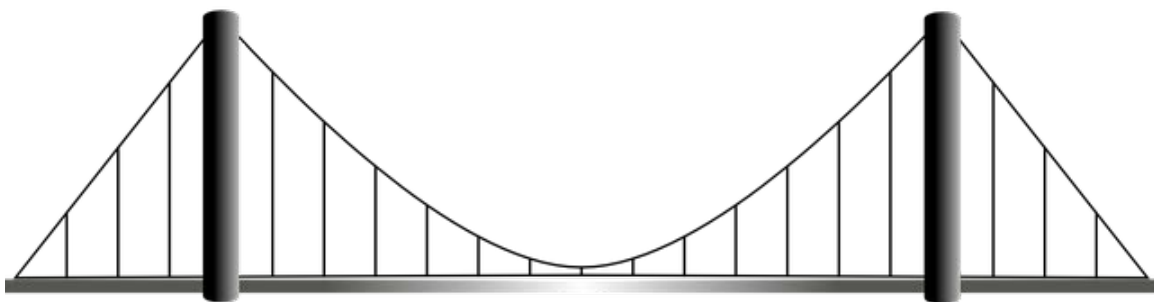
By
Jeffrey D. Alford

INTRODUCTION: Math and the new model.

As the old rock song blares, "Clowns to the left of me, jokers to the right, here I am stuck in the middle with you!" ("Stealers Wheel"). Teaching in the middle grades has never been more challenging. To meet the rigors of new expectations for high school a current middle school teacher is asked to develop a ready for high school student without the benefit of a student being fully versed in the new system that is now in place at the elementary school level. In effect, the middle school manager of young minds is asked to create a bridge not only in what

is to be taught but in how it must be learned. For example, students are no longer simply given a problem and asked to calculate or choose from a list of possible answers. Many questions now are formulated to require the student to give a structured written response as to how they arrived at their conclusion giving justification through graphs, equations or models. Because of this new model for learning a middle school student is assumed to have had the skills and experience in process that would lead them to achieve even though their experience has been completely different.

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"...a middle school manager of young minds is asked to create a bridge not only in what is to be taught but how it must be learned."

Stuck in the Middle with You (continued)

PART I: Math and the marketplace.

What we know about the marketplace into which our students will one day enter motivates us to stay on the cutting edge of teaching methodology. Nancy Gibbs, in a September 21, 2009 *Time* magazine article, reported that "the top 10 jobs in demand in 2010 did not exist six years ago, so 'we're preparing kids for jobs that don't yet exist using technologies we haven't yet invented.'" With many of the jobs we are training our students for not even yet existing, we are asked to provide a platform of education that will anticipate the unknown. We often hear the echo of the phrase that the student "wasn't ready" when they entered your classroom to do the curriculum you are required by law to present. There is a sense to which you feel like you've been set up to fail in order to be the obvious scapegoat of a system gone horribly mad.

Also, competition for jobs will mean that we may be preparing students not only for a job but also the adventure of living in another country in order to have that job. In Jeremy Rifkins' book called *The End of Work*, the author predicted well the natural progression of workplace competition. Our forefathers competed with the guy across the street for the available jobs. The next generation had to compete with the person across the county or even state for a job as communication improved and people through transportation became more mobile. More recently, we have begun to see that automation has removed many job possibilities and the market of the world is our market.

**NEXT: We're
preparing students
for a global market:
But will they go?**



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Stuck in the Middle with You (continued)

There was a time when a majority of Americans worked on farms. Slowly the trend changed as workers poured into factories and then selling on the showroom floor. In the modern age we have moved into selling ideas and information through internet portals. Our students will compete for jobs with people across the globe.

About 5 years ago I met a student who was about a year out from graduating top of his class in a prestigious engineering university. The student was working at UPS loading boxes because he was unwilling to relocate to another country where he had been offered work at a higher salary than he could even make in the United States. His real problem was not ability or training it was geography!

PART II: Math and the millennial generation.

In addition, some students and/or their parents may have little or no motivation to change to a different and more rigorous curriculum. A dad went to encourage his son to make better grades. The son asked "Why?" To which the dad replied, "So you can have a higher class standing and graduate and get good scholarships to the better schools." "But why?" asked the son. "So you can get a good paying job and be productive," cried the dad. "But why?" retorted the son. "So you can put away some money, and retire and not have to work anymore." "But Dad," replied the son, "I don't work now!"

The "millennial" generation has been much maligned for their greed and lack of a work ethic, but we must be careful and admit that perhaps we led them there. While it is true that the trend of today appears to be that there are fewer people working than that are not working (47% to 53%) the real challenge seems to be in how to engage the student and their parents into an understanding that the jobs that existed for the low or non-educated person will become fewer and fewer.

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Stuck in the Middle with You (continued)

A practical frustration born out of this shift in education is that the parents' skills in helping their students achieve becomes even more limited since the strategies and methodologies being applauded and espoused are not in their frame of reference. Parents and students alike will argue the validity of the curriculum and the school system, school and teachers' effort to fulfill the law. This obvious friction might make a teacher shy away from the potential conflicts and give only tacit effort towards the changes.

With all of this "new" it is easy to see how any educator might look for a different career direction. Three teachers gathered together at one lunch with one arguing that the problem was ignorance while another took the position that it was apathy. To which the third educator cried that he didn't know and didn't care! But while discouragement can and does come there are hopeful days ahead if we don't jump ship nor mutiny.

PART III: Math and new methodologies.

All shareholders in the process, especially parents, students and teachers, must learn how to bridge this great divide to give students a fighting chance at success. This calls upon our state leaders to give the process time to work adding year by year the accountability factors as everyone gets more familiar with the process and goals.



If someone plants a seed and digs it up every few days to check the roots they will not see that plant last long much less be fruitful. If our new curriculum truly is an end game then we should treat it more like a stew than a microwave. A measured response toward integration makes more sense than microwaving it like instant oatmeal. Keep adding year by year the accountability factors as everyone gets more familiar with the process and goals.
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Stuck in the Middle with You (continued)

Leaders must allow for teachers and students trying these new approaches to have their moments of failures and success in order to long term achieve. Likewise, this calls upon administrators in local school districts and principals to give time and training to teachers to make the transition. Having said that, teachers should be given the respect that they too are individuals that have insights into student learning and achievement which may not completely agree with certain trends in teaching methodology. Many methodologies which are espoused are relatively congruent with the culture in which they are employed. Germany and Japan we are not. (W. Edwards Deming's observations in post WWII Japan are notable when many successful strategies in those countries' business practices did not translate into effectiveness in the culture of America.)

We can borrow many things from other cultures but not in total. It seems incongruent that a culture which has led the world in numerous areas including sending men to the moon and back and to this day have countries like China copying our inventive technologies for their own profit could be considered so terrible. With high stakes testing comes many pressures. A learning curve where students, teachers and parents struggle to make sense of new expectations and methods will cause anxiety which can be relieved if given time in a safe and secure environment of positive cooperation.

More specifically teachers need not fear a change in curriculum or emphasis on a particular model or strategies of teaching. A combination of strategies, involving old and new can be and must be forged through the fiery crucible of trial and time.

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Stuck in the Middle with You (continued)

For example, pre requisite skills which would or should have been taught earlier to prepare the student for the next level of grades but were not provided due to the transitional differences in curriculum must be identified and then taught in a succinct, efficient way with a view towards future usage. Fractions, as an opportunity, may be re-taught while relating it to the use in proportions and slope in the new paradigm.

Teachers are creative and smart enough to design lessons that pull together several skills that will build the platform for new methods. This allows the teacher to continue to use old methods to bridge to a new approach and also help the students to bridge that same divide with an approach they are more familiar with.

PART IV: Math and making technology count.

A word of caution could also be given about embracing all things because they are new. Toward the other extreme there may be the sense that certain methods or strategies that you have used in the past are of no relevance or use and this is not always so. We often hear of creative teachers that integrate technology into their classrooms as if phones and computer tablets will rule the day.

**NEXT:
Smartphones—
Maybe not so smart?**



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Stuck in the Middle with You (continued)

A 2015 study on cell phone use in the classroom by the London School of Economics found that schools that gave up their Smartphones during school time, had their congregate scores rise by 6.4 percent; concurrently, underachieving students rose by 14 percent. Using appropriate tools strategically is one of our mathematical practices which means we must model for our students when these powerful tools are useful. For example, while working on estimating imperfect square roots students are given ways, without technology, to arrive at more and more precise estimates. One student returned after a night's homework to report, "Oh, I didn't use a calculator. I just asked Siri!"

"You do not have to feel like you're going into battle with somebody else's armor."

One veteran teacher I know made a keen observation. She noted that back in the day schools purchased and promoted the use of newspapers for teachers. Instead of using for the context of learning you would find, she said, some lazy teacher with feet propped up reading the paper while kids did a worksheet or worse. Today, she noted, you find a teacher on their Smartphone absorbed and distracted while students run an app or worse. Authentic learning is a shared process with teacher, student and perhaps even with parents. Face it: Some people like using the technology and do very well with it because it is their preferred method. You do not have to feel like you are going into battle using somebody else's armor. Be yourself, but neither be afraid of learning a new app or teaching in a way in which you are less familiar. A possible strategy is to begin a segment using your familiar approach and add in one to two new lessons each week to two weeks.

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Stuck in the Middle with You (continued)

If you and your students discover together the burdens and benefits you will both be better for it. In a span of 2-4 years your approach would be transformed. Thus, a sixth grader following a strand of common core thought could embrace that more readily if all teachers are onboard in a more intentional coordinated way.

This also speaks to greater collaboration among grade levels as more and more school systems are moving away from using a common book and having teachers pull from multiple sources. A common language and process is often lost but can be regained through intentional planning and learning

PART V: Math and making the most of opportunities.

But a depth of proper prerequisite understandings only provides a beginning place. Teachers must well communicate and parents and students must buy into the new standards, approach and expectations. Like a three-legged chair, if one or more legs is shortened it will not sit well. Indeed, it may sit level but be below the seeing eye level of the bounty at the table that is now out of reach. You may follow the curriculum in spirit and everyone feels happy and the classroom grade looks good only to find out that the student does not achieve on annual testing and is not ready for the next course in the curriculum thread.

Like the old TV westerns where the hero would be chasing the villain and would straddle a fresh horse for a little while, the hero knew he had to jump fully to get the most out of the new ride. You will know when it is time to lay aside some things in order to take hold of the new as each year brings more students versed in the new curriculum model. Celebrate the success of past strategies and integrate their best into what you are doing when appropriate but be committed to blending into the new focus while maintaining your core values.

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Stuck in the Middle with You (continued)

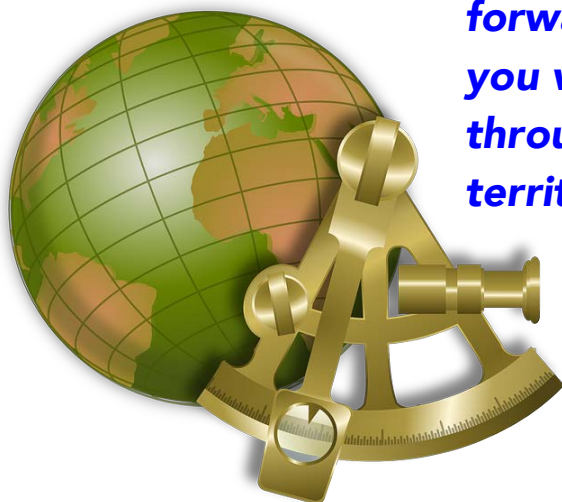
In a game where a team gets far behind they make adjustments for the second half. In that period of pause a second half strategy is defined, the status of key players game readiness is evaluated based on strengths, weaknesses and injury. In the middle we have the fantastic challenge of helping students and parents evaluate where they are and define and design a plan of adjustment to become high school ready. Yes, it is a daunting task, but be encouraged. In the end you have what it takes, and your students look forward to seeing how you will guide them through this new territory of learning.■

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"Your students look forward to seeing how you will guide them through this new territory of learning."

UECTCM Leadership 2016-2017

President

Andrea Fissel
Johnson City Schools
FisselA@jcschools.org

President-Elect

Amanda Cole
Kingsport City Schools
acole@k12k.com

Past President

Lawrence Nussio
Hawkins County Schools
lawrence.nussio@HCK12.net

Newsletter Editor & NCTM Representative

Ryan Nivens
Department of Curriculum
and Instruction, ETSU
Box 70684 Johnson City, TN 37614-1709
Phone: (423) 439-7

Secretary

Pam Stidham
Kingsport City Schools
pstidham@k12k.com

Web Master

Daryl Stephens
ETSU Math Department
Box 70663
Johnson City, TN 37614
Phone: (423) 439-6981
stephen@etsu.edu

Treasurer

Amy Glass
Hawkins County Schools
amy.glass@hck12.net



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Complete application and return to Amy Glass with a check for \$10 made payable to UETCTM. Mail completed application and check to:

Amy Glass
UETCTM Treasurer
712 Whippoorwill Court
Mount Carmel, TN 37645

Name: _____

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School: _____

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