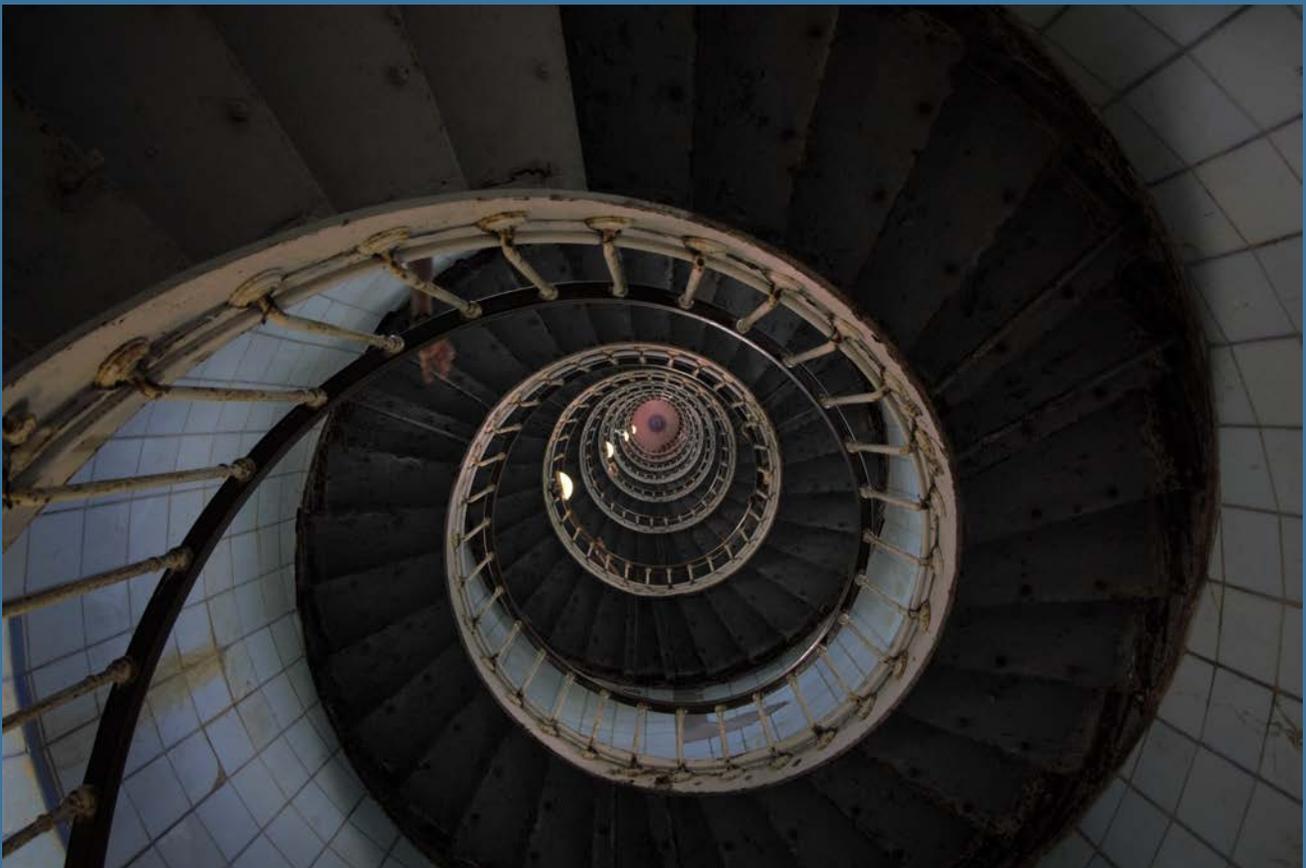


# UPPER EAST TENNESSEE COUNCIL OF TEACHERS OF MATHEMATICS



## IN THIS ISSUE:

The Power of a Mistake Heather Miller	2
Repetition and Routines Autumn Harris	3
How to Build Stamina in Problem Solving Stacy Reed	5
Growing Your Toolbox Rachel Brock	6
Bringing Math to Life Mary Hensley	8
The Benefits of Productive Struggle Mary Johnson	10



## MEETINGS FOR 2020-2021:

Meetings begin with refreshments and informal networking at 4:00, followed by announcements and a brief business meeting, then sessions for all levels concluding at 6:00.

The next meeting will be held on February 16, 2021 at Daniel Boone High School.

## OFFICERS FOR 2020-2021:

President:

Pam Stidham (Kingsport City Schools)  
pstidham@k12k.com

Vice-President:

Tina Hill (Wahington County Schools),  
dbhsmathteacher@gmail.com

Secretary:

Jill Burgner (Washington County Schools),  
burgnerj@wcde.org

Treasurer:

Julie Tester (Kingsport City Schools),  
jtester@k12k.com

Past-President:

Jamie Price (ETSU), pricejh@etsu.edu

NCTM Representative and Newsletter Editor:

Ryan Nivens (ETSU), nivens@etsu.edu

Assistant Editor:

Jamie Love (ETSU), lovej2@etsu.edu

Webmaster:

Daryl Stephens (ETSU), stephen@etsu.edu

**NCTM**  
VIRTUAL



**2020**  
CONFERENCE

Re-imagining Mathematics. Re-configuring the World.

**Wednesday to Saturday  
November 11-14, 2020**

**NCTM is committed to bringing the math education community together for engaging content that will help transform the learning and teaching of mathematics, and we have created a wonderful opportunity to do so! Join your colleagues for the NCTM 2020 Virtual Conference **November 11-14** and share in the excitement and love of math.**

**The content you count on NCTM to provide will be in both prerecorded and live sessions each day. Our exciting online platform will provide opportunities for networking, small chat rooms, discussions with exhibitors and much more.**

**The sessions cover topics in four strands:**

- **Access, Equity, and Empowerment**
- **Deep Mathematical Learning through Effective Teaching**
- **Actualizing Change**
- **Professionalism and Lifelong Learning**

**<https://www.nctm.org/virtual2020/>**

# The Power of a Mistake

by  
Heather Miller

While sitting in front of a classroom of first graders during my math block this year, I made a mistake. Now I have made a plethora of mistakes in my two years of teaching, but this mistake was noticed. Immediately, my students recognized my error. They were in shock that their teacher made a mistake. To them, I was all-knowing until this point in time. In turn, this moment in my teaching career was monumental for my students and their view of math. Not only did this small moment influence my students, but it changed me as well.

Before this moment, my students wanted to always be correct. During our whole group instruction time, their minds were laser focused - only desiring the correct answer, while not justifying their work. I had one student in particular that would just sit and stare until I would help him. If he did not get the answer right, a meltdown would occur. My other students did not value exploring multiple strategies and did not enjoy listening to their peers explain their thinking.

This mindset was unintentionally fostered by me. Looking back, I was dictating learning and not facilitating learning in my classroom. Being a new first grade teacher, this math curriculum was brand new to me. I was trying to teach to the book instead of effectively guiding learning in my classroom. With the lack of engagement, I was quick to teach and lacked facilitating math discourse with my students. I did not expand on students' understandings, instead I unintentionally spoon fed them. Eventually, I saw the disinterest in my students' eyes. I even

tried to implement more games and partner work within my math curriculum, but my students still wanted to be "right". When I tried to discuss with them, they would just all stare at me blankly. I felt stuck, and did not know what to change.

Mistakes are powerful. The mistake I made, in the midst of feeling stuck, was just what I needed. I had to admit to my students that I was incorrect, and they caught my error. We were able to engage in constructing viable arguments and critiquing the reasoning of their teacher. They loved being right! It empowered those students who felt the need to only reach the right answer. I used this moment to teach a valuable lesson. Mistakes guide learning. You have to model with mathematics, discuss your thinking, and defend your reasoning. By doing so, you own your work and are willing to adjust your reasoning and understanding.

After this lesson, I saw a change in the students who were so afraid of messing up. They were willing to discuss their thinking, start on the problem, and defend their answer even if they did not reach the correct solution. My students started sharing strategies with one another. I was no longer begging for my students to discuss math. It took a vulnerable moment from their teacher to model the correct way to approach solving math problems. Not only did my students change, but I did as well. I realized that I needed to truly facilitate learning in my classroom to reach all of my students.

Reading the book *Beyond Answers* by Mike Flynn opened my eyes even more with mathematical practice three (constructing viable arguments and critiquing the reasoning of others). By promoting this mathematical practice in my classroom, I want students to feel comfortable participating in mathematical discourse with their teacher and peers. By doing so, a norm will be created that it is okay to

disagree and sometimes be incorrect. I desire for my students to feel comfortable in vulnerability. I long to be a teacher that “keeps the ownership of ideas with the students and merely act as the facilitator to help keep the discussion going and bring in a variety of ideas” (Flynn, pg.79). With this academic discourse, you can teach students that mistakes are powerful. ■

## Repetition and Routines by Autumn Harris

Are you a mom? Do your kids say “Mom, Mom, Mom” over and over again? Does it get your attention? Are you a teacher? Do your students call out your name over and over again? Does it get your attention?

The same is true with MATH. When you repeat steps verbally, have repetitive math songs and dance, and offer a classroom full of daily routines your students develop a better understanding of number sense. They also gain confidence in mathematics, and are able to create mental structures that help them recall information.

I quickly learned in helping my students learn math that it was important to offer repetition and routines for them. Children love repetition and my students will often ask to complete repetitive songs, dances, and math tasks we have completed time and time again. The routine of knowing what to predict will happen next helps them feel confident. Having a daily math routine allows the class to know what’s expected next of them. Oftentimes,

early finishers are preparing for the next task, helping students to finish the task we are on, or even already working on the next task in our routine. Routines help the class go more smoothly and the students know the expectations.

Repetition in the classroom helps to strengthen the brain and allows students to recall information quickly. I have noticed in my math class that when students are introduced to a math video to help them learn math facts, they are able to recall the information very quickly and then apply it to the daily activities we are completing. I also feel students become confident and are more freely active to participate in the class because they are able to recall the information quickly.

In my class I learned to focus on a few things to help me use repetition and routines; chunking, spacing, mindset, and a fun environment. When we “chunk” information, we can practice our skills and make more connections. We “chunk” our math facts by using fun, engaging, repetitive videos and my students are given more ways to learn those facts to help them make real-life connections. When I work with “spacing” I help my students use the repetitive skills over a course of time, not over and over again. We make our repetitive routines more like a game, than a monotonous task. We also space it out and work on it all week, but then build on it by doing each week over time, which helps them recall it and commit it to their long-term memory. Teachers must have a great “mindset” to make the learning experience right for the students. If you as a teacher don’t have a positive attitude towards the learning, your students won’t either. Lastly, make math “fun.” Students will be more receptive to the learning if it is fun, engaging, and positive. Make the students laugh and have fun, all while learning math. ■



**As NCTM kicks off its next 100 years, the St. Louis Annual Meeting & Exposition will bring together members of the math education community from around the globe – classroom teachers; school, district, and state mathematics education leaders; administrators; mathematics teacher educators; mathematicians; and researchers – in a setting that encourages conversation, collaboration, and the sharing of knowledge.**

**You'll see and hear new ideas and approaches that will help you move forward and provide more and better mathematics instruction for each and every student.**

**Wednesday to Saturday  
April 21-24, 2021**

**America's Center Convention Complex  
701 Convention Plaza  
St. Louis, Missouri**

**<https://www.nctm.org/stlouis2021/>**

# How to Build Stamina in Problem Solving

by  
Stacy Reed

Ok class, I want you to find a way to represent .1 using Base 10 Blocks. Students are given Base 10 Blocks along with a visual representation of what block represents a place value of one, ten, and hundred. Students will work in a group and record their findings on a graphic organizer. As students work in groups, you become the facilitator and decide when to offer suggestions. The students are problem solving and creating their own understandings. How does a teacher create a classroom conducive to problem solving?

Classroom environment is a main factor in promoting problem solving. Students that feel safe in sharing their ideas will contribute to their group and be receptive to their peers' ideas. Math Talks is a strategy used to build an environment that "No answer is wrong." Students share their process of how they created the product. Students begin to see math as not always being a "One Method Only." Once this idea has been planted, kids that have never shared their ideas are becoming active participants in discussions. Building this shared unity in math opens the doors to constructive dialogue between students.

The activities should be purposeful in building stamina in problem solving. 3-Act Tasks are activities that allow students to explore, discover, and evoke curiosity. In Act 1, students start with a picture or video that introduces a problem or the question to be answered. Act 2 provides students with information that will assist them in answering the problem. Act 3 provides the solution.

During the tasks, students report the process through the use of a graphic organizer. During Act 2 is when students are building stamina for problem solving. Another activity to encourage problem solving stamina is to use the backwards method. Give students the solution or the representational model and have students create the expression or problem. Both activities provide students the opportunity to use math dialogue with peers along with building problem solving stamina.

When you talk to other math teachers, the same topic of problem solving is always prevalent. The math classroom is no longer a "sit and get"; it has become exploratory and students creating their own understanding. How many times have you heard a student ask why this formula or algorithm? This question opens the door for teachers to become facilitators, and students to build problem solving. ■

## NCTM Trial Memberships

**NCTM understands that these are difficult times and that teachers are looking for support and resources they can trust. Pass along this link to them and they will receive free trial access, including the publications and resources that come with an Essential Membership.**

**<https://www.nctm.org/trial-membership/>**

# 2021 NCTM Annual Meeting & Exposition in Atlanta From Critical Conversations to Intentional Actions September 22 - 25, 2021

## Strands:

- Broadening the Purposes of Learning and Teaching Mathematics
- Advocacy To Make an Impact in Mathematics Education
- Equitable Mathematics Through Agency, Identity, and Access
- Building and Fostering a Sense of Belonging in the Mathematics Community
- Effective Mathematics Teaching Practices

<https://www.nctm.org/annual/>

## Growing Your Toolbox by Rachel Brock

Imagine someone is asked to complete a big home construction project. Will they want a large toolbox or just a couple tools? I think most would choose a large toolbox in an effort to have as many resources as possible to solve the many challenges that might arise. It's not as efficient to get into the middle of a project only to re-do it or make multiple trips to the store.

When it comes to math, students need a large toolbox that contains several strategies and ways to analyze problem. Whenever introducing a new strategy for solving a math problem, try introducing it to students as a new tool for their toolbox. Talk about all the tools that come in a toolbox and why they are useful for construction projects, then relate those tools to some real world math problems. In

order to effectively problem solve real world math, people need multiple strategies and perspectives, otherwise known as tools!

Some students express concern that a particular strategy does not come as easily to them as another. Make an effort to explain that strategy as an extra tool in their toolbox. They might need it someday. Teachers can discuss how certain math problems require a very specific set of tools or strategies, while some have multiple strategy options. Teachers can also instruct students on how to choose tools that work best for each individual student. The priority is to discuss and educate students on two different things: 1) Efficiency 2) Accuracy. Students should strive towards both. Using both efficiency and accuracy means that students are finding the correct answers as quickly as they can.

The more tools we have in our toolbox, the more opportunities we have to be both efficient and accurate. Strategies are not equally effective for all students, but teachers can give students the tools to choose which one works best for them. Teachers have the opportunity not only to give students new tools, but to teach them how to use those tools well. ■



**2021**  
**NCTM RESEARCH CONFERENCE**  
April 19–21, St. Louis

Linking Research  
& Practice



**The NCTM 2020 Research Conference, St. Louis, has been postponed from October 19-21 until April 19-21, 2021 in conjunction with the postponement of the NCTM Annual Meeting & Exposition to April 21-24.**

**In these changing and challenging times, the NCTM Research Committee is working hard to recraft and 2021 Research Conference to better support the individual, community, and collective needs and opportunities of the mathematics education research community. There is a clear desire to use this experience to strengthen the connections and collaborations within the community, to increase active engagement during and after the conference, and to collectively better understand current challenges and opportunities. The potential exists to increase the connections between research and practice at all levels and positively influence the impact mathematics learning has for each and every student.**

**Submissions are now being accepted at [nctm2020.exordo.com](https://www.nctm.org/researchconf/) until **October 30, 2020** with the review process to follow immediately after.**

**<https://www.nctm.org/researchconf/>**

# Bringing Math to Life by Mary Hensley

When I was in middle school and high school I was the math student that was constantly asking, “When am I ever going to use this?” Now, the most common question I get asked as a math teacher would have to be, “But when am I ever going to use this?” When students know and understand why they are learning something, it tends to stick with them. When I say “why” I don’t mean “Because the Tennessee standards say so” because most students are not motivated by this alone. Students want and need to know that in order to be a successful car designer or manufacturer it is important to be able to figure up the cost of the needed materials. If you are going into a medical or veterinary field it is important to be able to figure out the correct dosage of medications. The best way that I have found to do this is to create real-world situations for the students in my classroom by implementing project based learning with an emphasis on STEM (science, technology, engineering, and math). By using this method, students are not only becoming more interested in my math class, but they are also becoming more interested in STEM careers which are dominating the fastest growing and highest paying occupation lists across the country.

One might be thinking, “How do I get started? How can I implement this in my math classroom?” If you are new to project based learning, I would recommend checking out Learning Blade (<http://learningblade.com/>) for ideas. The Learning Blade website offers several

helpful resources including videos, lessons, discussion starters, and hands-on activities that often require the students to build or create objects. However, what Learning Blade is most known for is bringing real-world situations into the classroom. Learning Blade gives students a topic, such as “dolphin rescue”, and then shows the students different careers affiliated with the topic and allows the students to see how science, technology, engineering, and math are used in the different careers. They also include reading material for English and social studies on the different topics presented. For example, one career presented under the “Dolphin Rescue” topic is Marine Biologist, which includes “A Day in the Life of a Marine Biologist” (English), “Lessons from Gulf Oil Spill” (math), “Jacques Cousteau” (social studies), and “An Underwater Laboratory” (science). On the website, there are twelve major project topics, and under each topic there are ten STEM careers for the students to research and learn about.

If you are feeling more creative, try brainstorming different projects to do in your classroom. The students and parents love it when I pull in people from the community to talk to the students. Last year we were discussing plants (biotic and abiotic factors in the ecosystem) in science and creating scaled drawings in math, so we decided to bring in someone from Evergreen Home & Garden Showplace to discuss plants and landscaping. After the students listened to the speaker and touched the plants and learned about landscaping, they were told that they were going to be agricultural landscapers for Sullivan County. They were split into groups and each group was given a different area around our school property that they were to landscape. They had to go outside and measure where they were landscaping to make sure their plants would fit, research the plants they wanted to

purchase to make sure they had a good mix of annuals and perennials and biotic and abiotic factors, create a scaled drawing of their landscaping design, all while keeping up with their overall cost. Project based learning does not have to be some elaborate project that takes weeks to complete; it just needs to be an authentic real-world experience or issue that needs to be solved.

If you are on the fence about project based learning, let me assure you that students love it. I have had several students that have learned about new careers or decided on what career

they want to pursue based on different projects. Students have told me that it makes math (and other subjects) more interesting and meaningful. Several of my students have told me that completing projects makes them feel empowered and excited about their future. I encourage you, as an educator, to not be overwhelmed by implementing group projects in your classroom because the payoff is immense. If you have the chance to make math relevant to your students, why wouldn't you? ■



NATIONAL COUNCIL OF  
TEACHERS OF MATHEMATICS  
CELEBRATING 100 YEARS

**NCTM's 100 Days of Professional Learning continues to be a success. Individual sessions have had as many as 1,000 participants and thousands of viewers on Facebook Live, bringing the energy every session to think, share, discuss, and learn. The sessions are posted on [nctm.org/100](https://www.nctm.org/100) for reference and for those who were unable to see them live. The session recordings will become available to members only in the fall, so ensure that your membership is current.**

**The Zoom rooms used for the sessions are limited to 1000 participants. In the event that we reach capacity and you are unable to enter the session, you can watch the session on Facebook Live or view the recording the following day.**

**<https://www.nctm.org/online-learning/>**

SPECIAL ISSUE CALL FOR MANUSCRIPTS



## Digital Equity and the Digital Divide

Submission Deadline: **January 1, 2021**

Targeted Publication Date: **October 2021**

**More than ever, access to technology and the knowledge to use it are important for mathematics teachers and their students. However, access to technology is not always equitable. The digital divide refers to the gap in opportunity to have access to digital resources as well as how those digital resources are used to support learning. Addressing the digital divide can help move us toward digital equity, in which both access to technology and the knowledge of how to use the technology are present for all members of the community.**

**The Editorial Board of 'Mathematics Teacher: Learning and Teaching PK-12 (MTLT)' invites submission of manuscripts that address digital equity in mathematics classrooms to be considered for publication in a special issue of MTLT. A full description of the special issue, with potential topics, can be found at [https://pubs.nctm.org/view/journals/mtlt/mtlt-overview.xml?tab\\_body=SubmissionGuidelines](https://pubs.nctm.org/view/journals/mtlt/mtlt-overview.xml?tab_body=SubmissionGuidelines).**

# The Benefits of Productive Struggle by Mary Johnson

A student once gave me a piece of artwork that said, “Hey math teacher! I am not your therapist! Solve your own problems!” She was a delight to have in class, but she really struggled. This was her way of communicating that she was not a fan of math class, and that she found the content difficult. She had very low confidence in herself when it came to math. This is often the case with students, especially girls.

Part of the problem is that students are accustomed to instant or quick solutions. From video games rather than board games, texts and emails rather than “snail mail”, and online quizzes with instant feedback, students are not familiar with working towards a solution. We are taught as educators to use appropriate wait time after posing a question to our students. However, teachers also need to enact appropriate wait time to answer students.

Teachers need to implement the concept of “productive struggle” in their math classrooms. A quick Google search will turn up an abundance of research on the topic, relating to the benefits of this practice to higher achievement scores. Many thesis papers have been written on the topic. But to break it down into simple terms, students need to be given time to struggle with math problems.

My experience in teaching sixth grade math is that when I assign class work, very often students have not yet even had time to read and process the directions, before hands go flying! “Mrs. Johnson! Mrs. Johnson! Mrs.

Johnson!” So without even realizing that it had a name, I instituted “productive struggle time” in my classroom.

Once I assign problems for the class to work on, I start a timer for 15 minutes. Students are not allowed to ask questions for 15 minutes (sometimes longer, depending on the assignment). It usually becomes a funny comedy act, because many will try to break this rule and I will have to bring out either 90 year old Mrs. Johnson, who left her hearing aids at home, or Sleepy Dwarf Mrs. Johnson, who is taking a nap. At times, even Dancing Star Mrs. Johnson makes an appearance, and she is too busy working on her dance moves to stop and answer.

In addition to the 15 minute wait time, students must also bring me proof that they have looked at their notes/example problems, and also made 3 attempts at solving the problem themselves. I ask them not to erase their attempts so that I can analyze their mistakes. When working with a student, we start with the directions and I help them break down the question into smaller parts, and focus on the parts they know, decoding the parts that they are confused about. I usually never answer their questions directly, but rather guide their thinking until they come to the correct conclusion. And of course, once they do, give them praise for persevering!

If I had a dollar for every time a student worked out a problem on their own, had their very own “light bulb moment” with a smile shining ear to ear, or exclaimed that they now think math is fun, I could totally retire! Those moments with your students are why we do what we do. Math is very often the most feared and most disliked subject. That is because students lack confidence in

themselves. But once you start allowing students to struggle, only to find the solutions on their own, their confidence soars! And it is SOOO worth it!!

The second group of people you need to get to buy into productive struggle time is the parents! Productive struggle time (in my experience) can often be perceived as “Mom! Mrs. Johnson refuses to help me in math!” So every year during open house, I explain the concept to parents. I also send home a note explaining the concept along with the benefits. These proactive measures will go a long way to preventing misunderstandings in the future.

If you are interested in learning more about

implementing productive struggle time into your routine, there are a vast number of resources on the web demonstrating this concept. Here is a link to a NCTM conference presentation on the subject:

[https://www.nctm.org/uploadedFiles/Conferences\\_and\\_Professional\\_Development/Institutes/Supporting\\_Students\\_Productive\\_Struggle/ProductiveStruggle\\_Keynote-Smith\\_Slides.pdf](https://www.nctm.org/uploadedFiles/Conferences_and_Professional_Development/Institutes/Supporting_Students_Productive_Struggle/ProductiveStruggle_Keynote-Smith_Slides.pdf)

This presentation gives you examples on questioning strategies and gives you more details on the benefits. I promise that the effort you put into learning and implementing this strategy will pay off greatly! And what teacher could not use an extra payday?? ■

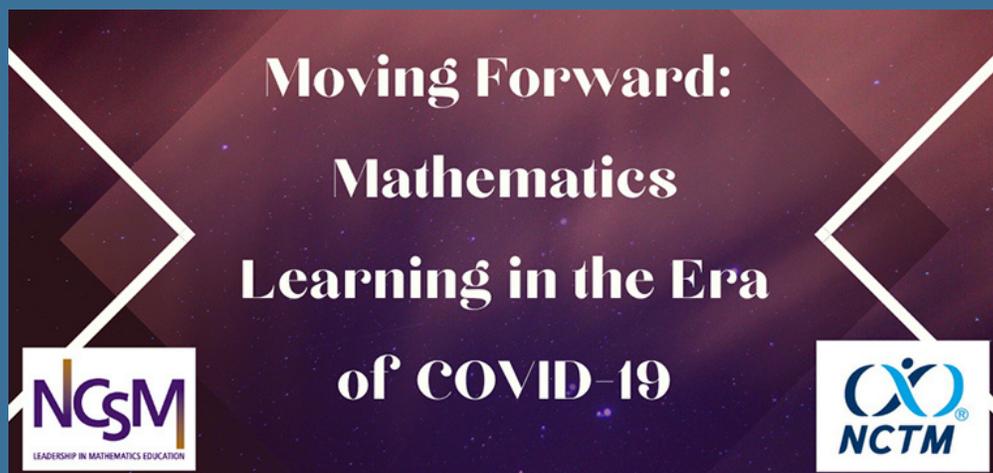
## **NCTM — Now More Than Ever**

**For the past 100 years, NCTM has supported the math education community, not just during unprecedented times like these but 365 days a year.**

**There has never been a more important time to renew your membership. You'll not only guarantee your continued access to NCTM's many resources, but you'll also remain a vital part of NCTM's vibrant worldwide community. Even if your membership does not expire this month, you can renew now and encourage others to join NCTM as well.**

**We are stronger together so we hope that you will renew today. If you know others that would benefit from membership, please urge them to join NCTM as well. Thank you for your continued support!**

**<https://www.nctm.org/membership/>**



**"We live in uncertain times. Public health is at the forefront of our minds, and our schools have been disrupted in ways we have never seen. Although no one can predict how education might look in the coming months, it is in the best interests of our students to strategize how we might best meet their needs in the upcoming months."  
-NCSM and NCTM 2020**

**NCSM and NCTM have published a joint document to provide guidance for mathematics teachers and leaders at all levels to make informed decisions for next steps due to COVID-19. Moving Forward presents considerations, questions, and potential solution processes to educators and school leaders to address the challenges induced by the COVID-19 pandemic of spring 2020.**

**<https://www.nctm.org/Research-and-Advocacy/Moving-Forward---NCSM-and-NCTM-Joint-Statement/>**



**Upper East Tennessee Council of Teachers of Mathematics  
Membership Application for 2020-2021**

Complete the application and return to the address below with a check for \$10.00 made payable to UETCTM.

Sevier Middle School  
C/O Julie Tester-UETCTM  
1200 Wateree Street  
Kingsport, TN 37660

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

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

\_\_\_\_\_

\_\_\_\_\_

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

District: \_\_\_\_\_

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

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

\_\_\_\_\_

\_\_\_\_\_

School Phone: (\_\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_

Email Address: \_\_\_\_\_

UETCTM may be asked to share your information with other math organizations (NCTM, TMTA, etc.) that promote mathematics education.

Please check the following statements if applicable:

Please check if you do NOT want your information to be shared.

I am a current member of NCTM.

I am interested in leading/presenting a session at UETCTM.

I am interested in holding a leadership position with UETCTM

Membership dues are for July 1, 2020-June 30, 2021.