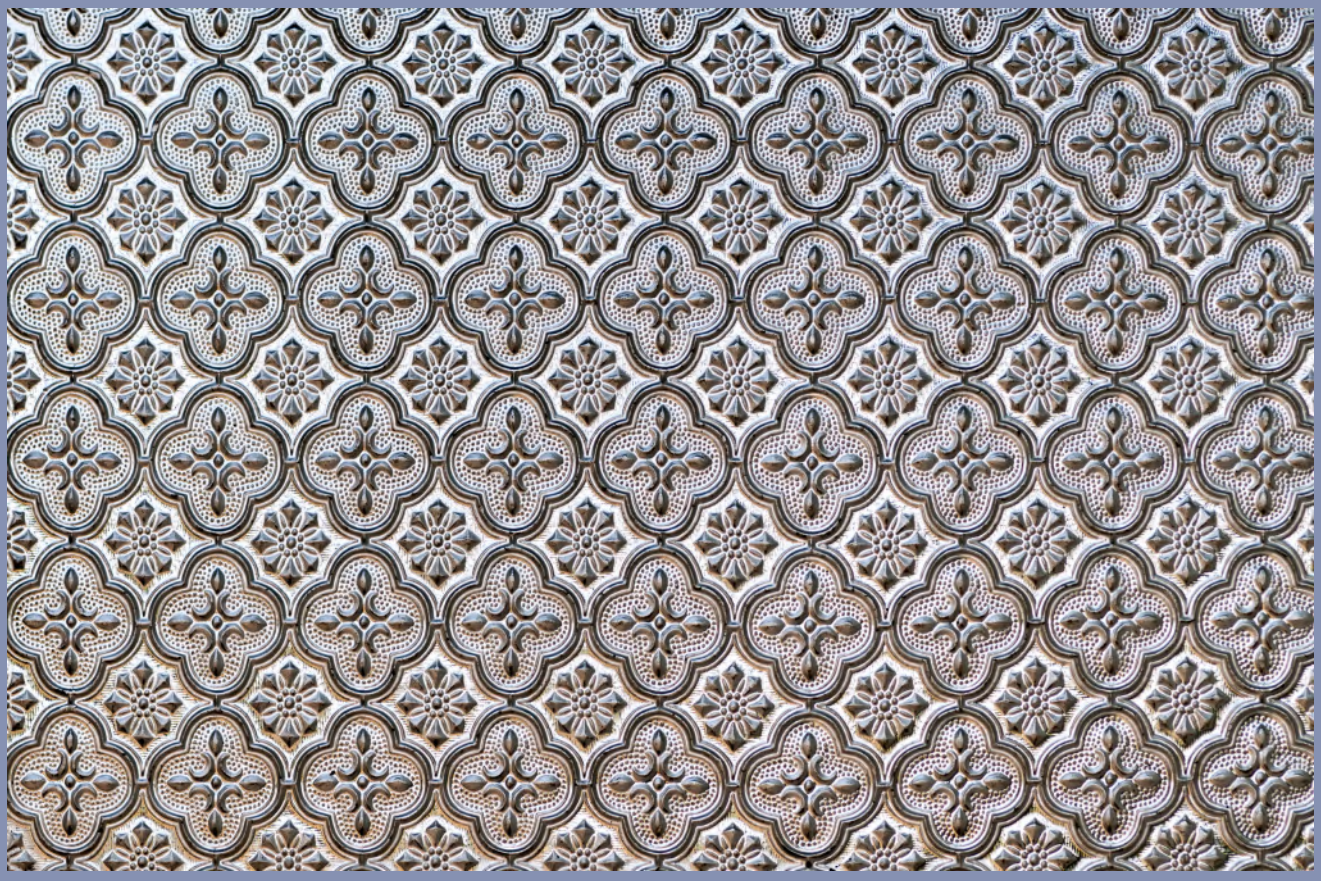
VOLUME 21, ISSUE 7 - MAY 2021

UPPER EAST TENNESSEE COUNCIL OF TEACHERS OF MATHEMATICS



IN THIS ISSUE:

MEETINGS FOR 2020-2021:

Please check the UETCTM website over the summer for updates on the schedule for the 2020-2021 school year. Have a great summer!

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

Be Intentional
by
Karen Matherly

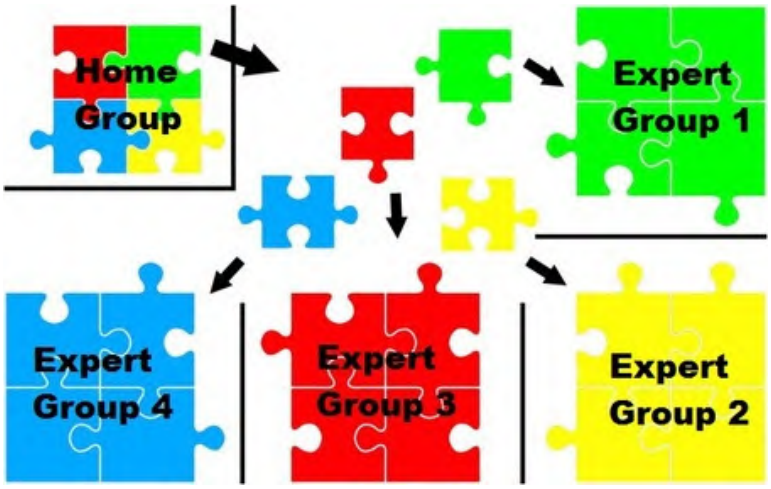
When it comes to grouping, most teachers fall into one of two categories: those who like group work and those who do not. Those who dislike group work often say things like, “I don’t like group work,” “My students are off task,” “One person does all the work,” “There’s no ‘I’ in T-E-A-M,” and “It didn’t work that time I tried it.” Those who do like group work say things like, “I love group work,” “Every student is accountable for his part,” “Each member gets to teach,” “Kids are social butterflies,” and “Teamwork makes the dream work!”

Over the years as an 8th grade ELA, History, and Science teacher, I did not always use group work with my students. But somehow the turn and talk method morphed into larger groupings. Groups of students sitting together discussing a concept turned into assigned individual roles such as a leader, timekeeper, recorder, and presenter. Then I really started to mix things up when I gave them clock buddies. Now they could take what they were learning and share it with someone outside of their group. With all of these strategies in place, one would have expected to see exponential growth in their students, but I found that that was not the case.

After more years than I want to admit, I began to feel like I was wasting my time. All the usual complaints were proving true. Students WERE off task, some DID do all of the work, and others came away from a ‘productive discussion’ with NOTHING (except maybe the latest rumor or a date). These were good strategies! Why were they not working? The push for group work had led me to use strategies that served no purpose to my students, and although I had given it my all, nothing had been intentional. I was just placing them in close proximity of one another and expecting a miracle to happen.

So why did I continue to persevere with this whole group work thing? Because I love group work! I know when I work with a team of people on something the final result is better. I come away with a deeper understanding, I have heard multiple perspectives, I have less anxiety, and I am more motivated to learn. There is also a plethora of research that indicates group work is effective; however, it must be implemented intentionally.

On my quest to become a better facilitator of group work, I stumbled upon the Jigsaw (puzzle) method. My mind was blown immediately, and I wondered why I had not heard of this sooner. It made perfect sense. All Home Groups work on the same topic/concept/scenario/standard, but each member of the group is given a different piece of the topic or problem to solve or learn about. Groupings of four to six students work best, and each student within the group is assigned a number 1 through 6 depending on the group size. Teachers strategically assign numbers within groups based on the performance levels of the students and the difficulty level of the tasks.



Students begin by working independently on their task for a designated amount of time, then move into their Expert Groups. Expert groups are formed by placing all the 1s, 2s, 3s, etc. together in a different area of the room. Here is where these individual ideas begin to mesh, where differentiation comes into play, where mistakes in thinking are corrected, and where experts emerge. After students have clarified their thinking and time has expired, the experts return to their home groups ready to teach the rest of their team and add their piece to the puzzle. The Jigsaw method requires students to take responsibility for their learning and gives every student something to contribute.

According to the study in Pedagogy in Action the overall benefits of the Jigsaw technique include:

- Students are directly engaged with the material, instead of having material presented to them, which fosters depth of understanding.
- Students gain practice in self-teaching, which is one of the most valuable skills we can help them learn.
- Students gain practice in peer teaching, which requires them to understand the material at a deeper level than students typically do when simply asked to produce on an exam.
- During a jigsaw, students speak the language of the discipline and become more fluent in the use of discipline-based terminology.
- Each student develops an expertise and has something important to contribute to the group.
- Each student also has a chance to contribute meaningfully to a discussion, something that is more difficult to achieve in large-group discussion.
- The group task that follows individual peer teaching promotes discussion, problem-solving, and learning.
- Jigsaw encourages cooperation and active learning and promotes valuing all students' contributions.
- Jigsaw can be an efficient cooperative learning strategy. Although the jigsaw assignment takes time in class, the instructor does not need to spend as much time lecturing about the topic. If planned well, the overall time commitment to using the jigsaw technique during class can be comparable to lecturing about a topic. https://serc.carleton.edu/NAGTWorkshops/teaching_methods/jigsaws/how.html

The Jigsaw method is engaging and effective, but it can be time consuming depending on what one is trying to achieve. Because I do not use it every day, I have also implemented a system where groups are awarded points for attendance, homework, meeting goals, having materials, extra effort, being on task, etc. In my classroom, students are arranged in groups of 3-5 and share a table. Each member of the team (group) is given a role such as captain, coach, facilitator, or scorekeeper. Team members' roles switch weekly, and students are placed into new groups at midterm. I intentionally chose the team theme because I am competitive and believe that healthy competition can motivate most students.

Teams compete within their class and classes compete against each other. No one wants to let their team down and everybody wants to win. Accumulated points can be redeemed by all teams at midterm, and the class with the most points has a much greater reward redeemable at the end of the nine weeks.

Grouping and cooperative learning was working very well for me---and then I became a math teacher. Mid-year I went from teaching 8th grade history and science to 8th grade

math. Immediately, my students were saddened by the idea of not working in teams anymore. They would miss the competition and the rewards they had grown used to. I was experiencing the very same feelings because I would be giving up something I had enjoyed and had worked persistently to get good at. After all, there are no tables in math class, and certainly it is no place for group work. Or is it?

It did not take long to find research that indicates collaborative group work is effective in the math classroom. As I am nearing the end of MathElites, I am excited to see how using group work in math is possible! We have worked on problems independently, in expert groups, and in a whole class setting. Already I realize I will be able to implement 3 Act Tasks using the Jigsaw method. I know with more practice and experience I will be able to create my own Jigsaw lessons. I am thrilled to be able to continue with group work and even more excited for my students!

The key to effective group work in any classroom is to be intentional. One must spend a couple of weeks establishing routines, rules, and roles. I always start off the year having them work on a simple group activity. Afterwards we discuss what it sounds like to be respectful, what someone did that helped them, or something they did not appreciate. We make a list of what good teamwork looks like and sounds like, and it serves as a reminder for the rest of the year. This year, group work may look different. Students may be learning remotely or they may have to practice social distancing. Because this experience has been conducted under similar circumstances, MathElites has shown me it is still possible to collaborate and work together even during a pandemic. ∎

Bibliography:

1. https://learn.teachingchannel.com/video/middle-school-lesson-idea
2. https://strategiesforspecialinterventions.weebly.com/jigsaw1.html
3. https://serc.carleton.edu/NAGTWorkshops/teaching_methods/jigsaws/how.html

September 22 - 25, 2021, Atlanta

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/

Math Homework: To Give or Not to Give by Kimberly Hawk

I just completed my first year teaching math, which makes me no expert, but what I learned during that year was that there were many standards and lessons to be taught, in a *very* short amount of time. Using the instructional focus document (which is a great tool and I'm so thankful to whomever wrote it) I would come up with what I felt was a solid lesson, based on previous knowledge, only to find out about half way through, many of the students were not fluent in some of their basic math skills. For example, I would spend time reviewing how to add and subtract fractions and mixed numbers, even drawing pie charts as a demonstration, which I never expected to do in 8th grade.

I came up with a plan to review basic fluency skills that students would need prior to a new standard, during students' intervention time. I also began assigning homework 2-3 nights a week, where students were to complete problems that we had began to work in class, but simply ran out of time. This homework plan should help me to make up for the lost class time, so I thought. Truth was I was getting further from the pacing guide each week, even by assigning homework and I knew I needed to find another game plan.

I found that some of my studentsenjoyed the homework and the productivestruggle, but for some of my students, they didnot. Homework was revealing to them whatthey already perceived "this is too hard for me"or "I'm not smart enough." I did not want to give homework to begin with because I didn't want parents frustrated with their children and have the stress of trying to figure out what it was that the problems were asking in the first place. As you could imagine, I was at a loss. I really needed time during intervention for small group instruction to guide students that were needing to go deeper with more complex problems as well as reteach some standards to students that needed further instruction. Time was really against me and I was feeling more and more like a failure.

It was late into January before I had discovered that the GO MATH website, which was a companion to the student math books our district had adopted, contained skills practice and fluency worksheets before every module/standard taught that coincided with the basic fluency skills that students would need to be familiar with before that particular lesson. This broke it down step by step as a review or reteaching of skills before the practice problems. I could hear the words of Marsha Tate rang in my ears "worksheets don't grow dendrites" and I desperately wanted my students to learn, grow dendrites, and problem solve. So what was I to do? I knew the students needed to be fresh on these skills and increase their fluency, yet I didn't have the time in class or intervention to devote to this, with the pacing guide knocking on my door.

So when I learned during Math Elites that students learned best when the curriculum pace was fast and when early learning homework was given, I knew right away that I would include skills fluency practice worksheets and Kuta Software worksheets as part of my homework assignment. I feel like I have finally given myself permission to give homework in math class without the guilt or frustration! I can't wait to go back to school.... and I plan to give homework on the very first day! (Whether virtually or hand out packets). ∎

When students struggle productively, outcomes improve.

Supporting students' productive struggle in a post-Covid learning environment is an essential teaching practice in addressing unfinished learning as described in the American Rescue Plan. By engaging in productive struggle, students learn to persevere through challenging problems to reach successful outcomes. They remain engaged in finding the pathway to solutions, building their understanding of math, and learning to make deeper connections between mathematical concepts.

NCTM's one-day virtual professional development workshops align with ESSER Funding uses and support teachers in facilitating effective, productive struggle in the classroom.

Math Discovery
by
Shirley Greene

Math, it was a subject I always dreaded during my school days. I vividly remember agonizing over problem solving in elementary school. Those fearful feelings of mathematics never left during my middle or high school years, either. When I decided to become a teacher, I knew in my heart that I did not want my students to have those same distressing math experiences that I had. Things had to be different, I had to help make a difference!

Months ago, I registered for the Math Elites course offered through ETSU and Eastman. The last two weeks, I have been learning new ways to problem solve and how to make math more exciting inside my classroom. For example, implementing the Three Act Tasks into my lesson plans eliminates the cookie cutter way of problem solving and allows students to roll up their sleeves to get messy in problem disentangling. First, present a problem or turn it all the way around and give them the answer! Next, let the students look for the resources they need to solve the presented problem, or arrive at the given answer. Lastly, guide the students to work on the conflict/problem and find a solution/answer. I am assured they will be begging for a sequel!

The Math Elites course has allowed me to gain awesome tips and tricks for math in my classroom. In fact, one of the core teaching strategies includes that students should be allowed to wonder and experiment in the wonderful world of math. Second, teachers should always be open to the multiple ways a student may arrive at the correct response. Third, educators should never deny young minds their wondering questions. Lastly, class discussions and cooperative learning are keys to success. With all these key ideas and more, it should be an exciting, wonder-filled, problem solving year in our third-grade classroom this year! ∎

Experiential Learning
by
Jenny DeWeese

Over two decades of teaching at the elementary education level, I have observed and taken part in a transformation of curriculum development as it relates to math. Specifically, moving away from the traditional "pencil and paper" and toward activities that utilize experiential or hands-on learning. Initially, as a young teacher, this was difficult as I wanted to maintain structure and control in order to provide feedback/ grading through worksheets, but as I began to understand the value of self-guided exploration, the opportunity to teach and guide young students' learning improved.

Experiential learning can be considered practical or "hands-on" study sessions task the children to work through questions or challenges staged by the instructor. These learning opportunities are often self-guided, allowing students to work at a pace that is suitable for their level of understanding. Furthermore, these active learning moments place the ownership into the hands of the students, which may improve self-confidence

and efficacy with regard to mathematics. Lastly, these sessions allow for creativity with regard to problem-solving, providing opportunities for children to explore multiple ways to determine a solution or answer.

Most often, we begin our math session with a traditional teacher-led introduction to the topic. Once the concept has been defined a and clarified, I demonstrate a method of problem-solving to the class before asking them to visit math centers in order to work through the task in small groups or independently. Finally, we reconvene as a class to provide examples of our work within the centers. ∎

TENNESSEE MATHEMATICS TEACHERS ASSOCIATION

The Tennessee Mathematics Teachers Association will award a $1,000 mini-grant to a Tennessee classroom teacher to be used for technology or manipulatives.

In order to be eligible:

- **Your school or district must demonstrate financial need;**
- **You must attend this year's TMTA Fall Conference to receive your award**
- **You must report about your use of the minigrant (speaking at the next TMTA conference, speaking at a similar conference, or submitting a written report for publication in the TMTA Bulletin)**

Application deadline is September 1.

https://tmta.wildapricot.org/Grant

Don't Just Tell, Show
by
Elly Farrey

My students struggle with math. Honestly, I do not know of any school or any teacher whose students do not struggle with math. I am a person who, instead of waiting for someone else to solve a problem, looks for solutions myself. In Tennessee, the sixth-grade math standards heavily emphasize mathematical modeling, and evidence of learning includes the student's ability to draw and interpret diagrams. I have read many books, visited many websites, listened to many podcasts, purchased many lessons, and have attended conferences just to learn how to help my students understand math better. I knew modeling math was beneficial for them, and I already drew models of the math in my classroom as a matter or routine, but still something was missing. When I was asked to pilot a new curriculum at our school, I was excited because I knew it would teach students to model their math, and hopefully deepen their comprehension.

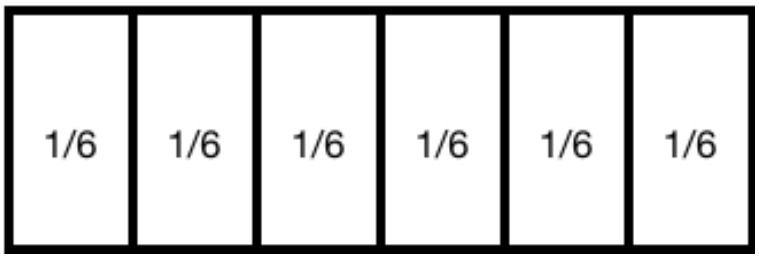
I knew the curriculum was going to be challenging and different from anything my students had seen before, so I spent the first week creating a culture in my classroom where student input was valued and mistakes were "*expected*, *respected*, *inspected*, *and corrected*." We made math pictures with tiles and looked for patterns, we made posters about what "Real Mathematicians" do, we talked about making mistakes, and how students are *rarely* completely wrong. We watched videos from YouCubed, and students were shown that math is a skill that anyone can learn. When our curriculum came in, our first unit was geometry. Normally, sixth-grade students do not even see geometry until almost the end of the year. I was glad to see we were starting the year, reviewing basic operations by finding the area of quadrilaterals and practicing fraction operations by using the area of triangles. We not only reasoned mathematically, we reasoned visually about area. By the thirteenth lesson of our first unit, students were finding volume, and identifying nets and their corresponding polyhedra. By the end of the first unit, they had held nets in their hands, examined them closely, found volume and surface area, and drawn accurate, scaled diagrams of nets.

Along the way, students' attitudes toward math were changing. When I gave students their project for our first unit, a tent design, they spent several days on it and wanted to make them perfect. I created an account for my class on SeeSaw, and students displayed their projects and commented back and forth to each other, encouraging slower, deeper thinking, hard work, and saying how much they liked their designs.

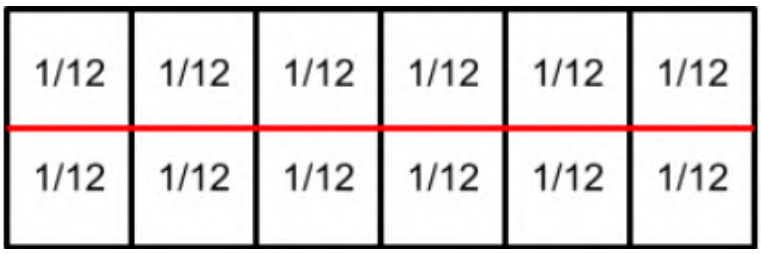
When we learned about ratios, we diagramed them and talked about "equal parts." We tasted ratio mixtures made with drink mix. We mixed colored water to learn about equivalent ratios. What students found exciting was, we were not just talking about math in a story problem, they were seeing math, experiencing math, and *doing* math.

When we began fraction operations, modeling helped students to understand *why* ⅘ (10) = 8. This question from our book had a surprising reaction: "Explain why 1/6 : 2 is equal to 12." I allowed time to think, and students offered their best guesses. Several students volunteered mathematical answers, but we had to *explain* why this statement was true. We added context by telling a story

about the problem, and drew a picture. "Suppose you (the student) made a pan of brownies and cut it into sixths.



Your older brother/ sister (whatever the case may be) walks into the kitchen, and before you can even try the first bite, demands that you give up half the brownies. You are crushed. You wanted all six brownies, until you realize you can just cut the pan of brownies in half again. Now, we have ⅙ : 2 = 1/12. There are now 12 brownies in the pan. You have six brownies, and your sibling has six brownies."



Lightbulbs went on all over the room. One of my students, who up to that point, had done almost nothing all year, perked up and started asking questions. "Mrs. Farrey, what if we divide it into thirds? What will happen then? Will we get 24?" He spent the next two weeks looking for ways to diagram fraction multiplication and division and bringing me his ideas. He was so excited about this example, that I became excited too, and looked for more ways to "show" math to my students. We used diagrams like this all the way through our fractions unit.

Students began developing a framework for problem-solving because they were more able to visualize the problems they were given. Because they finally understood and had a helpful strategy, my struggling students were doing similar work to my advanced students. Students became more independent and did not want my help as often. Modeling our thinking allowed opportunities for number talks, discussing appropriate strategies and tools, connecting geometry with ratios, fractions, and decimals, and gave students a place to start when solving problems. Because students were learning to model their thinking, I was able to see where their misconceptions were, and it was easier to help them. Students gained confidence in their abilities and became proud of their accomplishments.

The power of modeling mathematics cannot be underestimated, and teaching and learning math this way was not easy. It requires that teachers "get out of the way," and not help their students as much as they might want to. Students had to get used to not knowing the answer, and they also had to accept that I was not going to *tell* them the answer every time. My students' adaptability and willingness to persevere inspired me, and their determination to succeed was encouraging. In exchange for their hard work, students learned that math is useful and logical, gaining knowledge they can use outside the classroom. Finally, if there is any advice I would give another teacher, it would be students are far more capable than they, or we, realize, and we must give them a chance to *show* us. ∎

2022 NCTM Annual Meeting & Exposition in Los Angeles

#NCTMLA22

September 28 - October 1, 2022

Join the National Council of Teachers of Mathematics, the public voice of mathematics education, in Los Angeles.

NCTM's Annual Meeting & Exposition is the premier professional development event for mathematics educators, from PreK-12 teachers to university professors.

This event will feature hundreds of education sessions and provide a full range of program content, including learning opportunities, networking, and collaboration.

Speaker proposal submissions open in July 2021.

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

Molding Mathematicians by Stephanie Robinette

Every educator, when they've been teaching long enough, can recite their academic standards by heart. This is because every decision we make for planning, instruction, and assessment comes from these grade level expectations. We also know that these standards are a vertical progression of skills and expectations, which means that we have a tremendous responsibility in laying the foundation for students to be successful in mathematics when they leave our classrooms and venture on into the grades to come. However, what educators don't always realize is that there is a separate set of standards that should be integrated into our instructional practices to help our students become more mathematically prepared. These Standards for Mathematical Practice help our students to develop various approaches, practices, and habits to develop mathematical fluency, procedural skills, and conceptual understanding that provide processes and proficiencies that are needed to solve high-level mathematical tasks that our Tennessee academic standards require.

These eight Standards for Mathematical Practice are not practiced in isolation. Rather, they are intertwined within classroom activities and discussions. Students, while practicing these standards, persevere in solving problems, use various reasoning, both abstractly and quantitatively, construct arguments and critique reasoning of others, model their thinking, choose appropriate tools when solving, attend to precision, make sense of structure that is present within mathematics, and look for and express regularity in repeated reasoning. All of these standards, when implemented purposefully within our math blocks, can help mold our students into becoming more successful mathematicians that have a strong foundation in the processes and proficiencies needed throughout all grade levels. Every teacher has a responsibility to purposely plan for instruction where these standards can be practiced and perfected.

MP1: Make sense of problems and persevere in solving them. This standard sets the stage for how our students see problem solving. Students should analyze a problem and mindfully devise a plan for solving. This standard also requires that students persevere, which means that when they are stuck or make mistakes, that we encourage them to use and find resources to try again. Students should also monitor their progress and make changes to their course of action as needed. Teachers can support students in making sense of problems and preserving by asking questions to help students make sense of their task, find a starting place for a solution through questioning, and cheer them on as they persevere in finding a solution.

MP2: Reason abstractly and quantitatively. Students who can reason abstractly and quantitatively can make sense of quantities and their relationships in problem situations. These students can both decontextualize, or abstract a given situation, and contextualize, or use symbols to make meaning of the manipulation process of mathematics. We support our students by helping them attend to the meanings of quantities, symbols, and operations. This means allowing students to

have flexible strategies in solving problems using ways that make sense to them.

MP3: Construct viable arguments and critique the reasoning of others. When students justify their reasoning, they learn to be more mindful mathematicians. They also understand that their choices that they use to solve should be more intentional. When providing opportunities for students to discuss their thinking and listen to the reasoning of others, students can strengthen their collective understanding of their own reasoning and the reasoning of others. In a classroom, students learn to rely more on each other rather than the teacher. The teacher becomes a facilitator of the discussion providing questions and opportunities for learning when needed. When we create a culture where students listen to one another and question the reasoning of others, everyone learns to share responsibility for learning.

MP4: Model with mathematics. Modeling *with* mathematics means to take a contextualized situation and abstract the math from it to get a better understanding of the situation. For our students, this means providing them authentic tasks where students learn to mathematize situations that are not necessarily mathematical in nature. Students can mathematize the world around them when given these rich and meaningful contexts. Students begin to trust mathematics and understand that their assumptions and approximations may need revision later.

MP5: Use appropriate tools strategically. With so many tools and strategies available to solve mathematical problems, it's easy to see that students could get lost in the endless possibilities that can be used to solve. Teachers need to build lots of opportunities in our instruction where students have the opportunity to become familiar with the readily available choices they have, learn when certain tools are more appropriate than others, and develop ways to use them strategically. A large part of this standard includes supporting students' metacognition. Asking questions about how and why they use specific tools or strategies can help them develop success and emphasize flexibility in finding solutions.

MP6: Attend to precision. Clear communication, using symbols and understanding them, and being precise in their mathematical work is what is important when students are working to attend to precision. We have to be purposeful and clear in how we communicate with our students to help them understand and develop math language. Asking purposeful questions can help to guide their thinking. It's important to remember that accuracy doesn't just mean solving quickly. It means that students are also working efficiently with skills. Developing our students' appreciation and dedication to precision will help to prepare them for future success in mathematics.

MP7: Look for and make use of structure. Looking for and making sense of structure allows our students to have a greater understanding of our number system, operations, or any other mathematical ideas they encounter. Allowing time and guidance for students to explore and understand the structure of mathematics helps them to generalize mathematical ideas. It's important to remember that students will differ in their abilities to see and make claims in mathematical structures. Our job is to meet them where they are to extend their thinking in making sense of our number system.

MP8: Look for and express regularity in repeated reasoning. As students being to solve a series of related problems, they begin to develop strategies and shortcuts that make sure of the regularities that are seen in problem solving. Teachers should engage students by stimulating their general interest in what regularity is and why it exists in mathematics. Through repeated reasoning, students will discover that the same relationships occur, and they can create a rule or shortcut for calculating a solution. With this standard, teachers become a facilitator of learning by providing problems that have repeated reasoning and capitalizing on students' observations that are made while solving.

Our job as educators is to plan for instruction in our grade level that fosters what these standards require for our students to become more mathematically proficient and precise in solving higher level thinking. Sometimes this looks like cheering from the sidelines while our students investigate and make sense of numbers. Sometimes it means asking questions and letting students answer, critique the answers that others give, and then answer again. Sometimes it looks like challenging them to prove their thinking and then solve it another way. Whatever academic standard we are teaching, it's important to realize that we are facilitators of learning. We must support our students in becoming more independent and critical thinkers and learners by integrating these standards into instruction where they become actively involved in the thinking and practice of mathematics. ∎

.

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.