
Upper East Tennessee Council of Teachers of Mathematics

NEWSLETTER

VOLUME 18 ISSUE 3

NOVEMBER 2017

Upcoming
UETCTM
Meeting:

Feb. 27, 2018
Daniel Boone High
School
Gray, TN

Announcements

Mergers and
Acquisitions!

Illuminating
Resources!

(see pg. 2 & 3)

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*This holiday season,
enjoy more*



Mergers and Acquisitions (of Knowledge & Contacts)!

CURRENT MEETINGS: Making all the right connections.

Annual Conference for Middle Level Education

An excellent opportunity for networking, one-on-one discussions with education leaders, practical help with assignments, standards and more.



Philadelphia: Nov. 6-8

Click [here](#) for more details.

2017 Central Appalachia STEM Summit: Bridging STEM with the Liberal Arts!

A forward-thinking exploration of the critical connections between STEM and the liberal arts within multiple contexts, including economic development and Appalachian community vitality.



Abingdon, VA: Dec. 4-5

Click [here](#) to register.

NCTM Regional: Mathematics Education Meets Excellence

Make F2F connections with the people, resources and habits of mind that lead to greater success.



Chicago: Nov. 29-Dec. 1

Click [here](#) for details.

MERGING JOURNALS: Your input requested!



NCTM's three journals are merging into one cutting-edge digital publication dedicated to more frequent, relevant and timely content, embracing the latest technology to promote engagement and provide rapid delivery of grade-band specific high-quality classroom resource materials. NCTM is requesting reader input—yours would be great! For more details, [click](#) here.

A Brighter Year with
a Leading NCTM Resource!

ILLUMINATION NS

NCTM's powerful one-stop resource makes for a brighter year ahead! Explore some of the highlighted programs below and click [here](#) for more information.

600+ Lesson Plans: Expand your possibilities, and enhance your teaching with a large selection of K-12 lesson plans, searchable either by Principles and Standards and or by Common Core Standards. Comprehensive plans include discussion questions, assessment options, extensions for students and reflections for teachers.

100+ Brain Teasers: Intriguing and informative, these brain teasers are a great way to get students thinking and talking about mathematics.

Calculation Nation: This vast resource of online math strategy games hones learning skills and keeps thinking sharp. Supplementary lesson plans offer pathways for integration into the classroom.

100+ Web Interactives: Increase active learning through virtual manipulatives, learning games and teaching resources.

Mobile Interactives: Optimized for desktop and tablet, these go-to interactives are especially designed for maximum usage.

Mobile Apps: Five engaging online learning games (Pick-a-Path, Deep Sea Duel, Okta's Rescue, Concentration and Equivalent Fractions) are ready to download to your device today.

Bright Ideas eNewsletter: Discover new interactives, brain teasers and other great news. The *Bright Ideas* newsletter is also the hub where teachers share their success stories. (You can share your stories, too!)

It's Only Numbers Until It's Concrete

By
Melanie Barkley

As educators, we are often too quick to pat ourselves on the back when we see a student write the correct answer on his paper. The problem with this “atta boy” praise is that it can be misleading. After talking to the student about the answer, we may find that he followed a pattern or formula to discover the answer. The student also may have even guessed and figured it out. Now go back to that pat on the back. Did the student show complete understanding of the skill? Could he reteach this skill to another student? This scenario could be possible in early elementary grades throughout high school.

Research completed by Jerome Bruner supports the idea of using manipulatives for the instruction of mathematics. This research promotes the idea that it is important for children to experience different stages in order to develop an understanding of mathematical concepts. These stages are: concrete, representational, and abstract.

The concrete stage deals with students manipulating objects (cubes, rocks, buttons, etc.) to discover and explain the answer to a problem. The representational stage is the time when students use pictures to represent the concrete objects from the previous state. In the abstract stage, students express their thinking using mathematical symbols. This is the stage when equations and formulas are written to explain an answer. Rushing children through the first two stages to get to the abstract stage of writing the equation or answer may limit students’ knowledge of a concept.

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“Atta boy” praise for correct answers can be misleading.



This way to guesswork

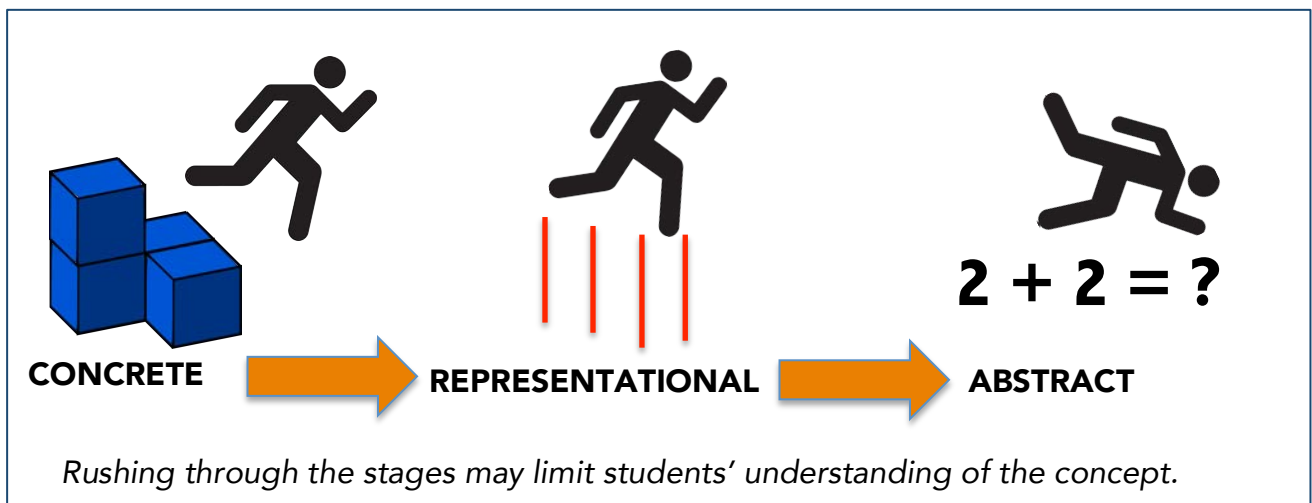
It's Only Numbers Until It's Concrete

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A child may see the symbol numeral "5" and say the correct word "five." Did this demonstrate understanding of the value? A child may see the expression $2 + 2$. He immediately responds, "Four!" Is this a true comprehension of the concept of addition? In both of these situations, the child provided the correct answer, but did not justify his understanding of the concept. Children need to be able to justify answers by first using manipulatives and later using pictures. As a participant in the MathElites program, I became very aware of this first-hand about myself.

My instructor initiated a discussion of a new number system. "This can't be too difficult," I found myself thinking. Suddenly, I discovered that the only way I could solve problems with this new number system was to touch and move the cubes with my own hands. At times, I could solve a math problem by looking at the pattern of answers from other problems, but without touching and moving the cubes I could not explain my answer. **Yikes! Suddenly I found myself feeling like that six-year-old child who does not understand why we cannot say twenty-ten instead of thirty.**

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It's Only Numbers Until It's Concrete

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The use of the cubes gave me security and confidence to help me explain my thinking. My students deserve that same security and confidence.

The concrete stage is vital for children to gain a true comprehension of mathematical concepts. Using physical objects to explain his or her reasoning allows a student to demonstrate his argument for the answer. Manipulative use is also helpful in the understanding of mistakes. How can we as educators expect our students to be problem-solvers

if they do not make and learn from mistakes? Touching and moving manipulatives involves different senses. This, in turn, will help the understanding of a concept to be permanent.

Writing the correct answer to a problem is important. Writing and verbalizing ideas about solving the problem are much more important. Using math manipulatives is a powerful way to encourage children to be confident problem solvers and to have ownership in their learning. ■



"The use of cubes gave me security and confidence to help me explain my thinking. My students deserve that same security and confidence."



Math, Music and Movement

By
Anna Adams



Music is all around us and is heard throughout our daily lives. We hear music on the radio, on television shows, movies, social media

and even as jingles on commercials. Music is created for people of all ages and can be enjoyed by most everybody. So... what does this have to do with math? Well, most people would agree that it is much easier to remember the lyrics (or tune) to a song than it is to remember important educational facts. Let's take the best of both worlds and use music to teach math. Unfortunately, I cannot take credit for this brilliant idea, but I can demonstrate how I use music to engage students and teach important math concepts in my kindergarten classroom.

In my classroom, music is played from the very first day of school until the last day of the school year. I use music to engage students, get them moving, and to help teach important concepts. My students have always loved singing along and showing off their best dance moves. My goal for this article is to demonstrate how and what music I use in the classroom that will hopefully help in your classroom.



Shapes: In kindergarten, students have to recognize flat and solid shapes and their features. They also have to be able to sort objects based on different attributes including by shape. There are two songs on shapes that my students beg me to play throughout the year: ***Shapes by Greg and Steve*** and ***3D Shapes I Know by Harry Kindergarten***.

To use the song *Shapes* by Greg and Steve, I give everyone a paper shape to hold (squares, triangles, circles and rectangles). Students sort themselves into their shape groups and sit down together. As the song plays, each group of shapes has to stand up or sit down based on what the lyrics tell them to do. After the song is over, students switch shapes and play again using their new shape. To make it more challenging, students do not have to get in their shape groups. This song is great for getting students to listen, pay attention and know what shape they are holding in their hands.

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Math, Music and Movement

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The song *3D Shapes I Know* by Harry Kindergarten is a song that I play every single day during my unit on solid shapes. The tune is very catchy, there is a YouTube video, and it is a great review of the solid shapes. Typically, after listening to it a few times, students will learn the lyrics and sing it as if it were the top radio hit! Sometimes, the song will turn into a dance off and or a sing off. Regardless, the students will know the song and even better, they will know the 3d shapes!

Counting: Kindergarten sets the foundation for counting. As a standard, students have to know how to count to 100 by the end of the year. I have found that repetition and counting every day using different songs helps the students learn number order.

The two songs that I use most for counting are ***Let's Get Fit* by Jack Hartman** and ***Chicken Count* by Jack Hartman**. In *Let's Get Fit*, students begin at number one and count all the way to 100. Every group of ten has a movement that students will do until they reach the next group of ten.

For example, from the number 80 to 90, students jog in place, and from 90 until 100, they are clapping their hands up high. In the song *Chicken Count* students count to the number ten using two numbers at a time in a rhyme-sing way. This song has a catchy tune and silly lyrics all about chickens that get the attention of most five year olds. I love both of these songs because they get students to move around and sing-count their numbers on a daily basis. These songs work great as brain breaks but also teach academic content.

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"Typically, after listening to the song for a few times, students will learn the lyrics and sing it as if it were the top radio hit!"

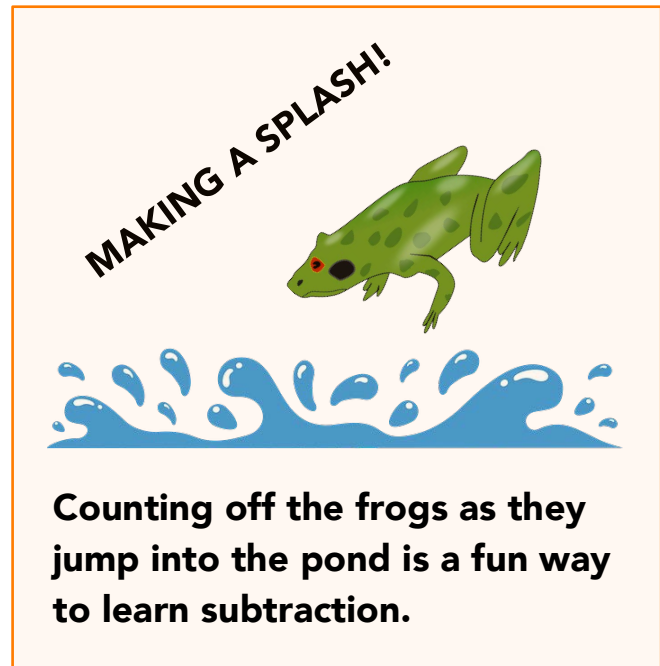


Math, Music and Movement

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Subtraction: Students should know how to subtract through ten using different methods by the end of kindergarten. Subtraction is one of my favorite units to teach because I get to incorporate many fun activities without the students even knowing that we are doing math. Typically, I will introduce subtraction using two different nursery rhymes: **5 Little Speckled Frogs** and **Who Stole the Cookies from the Cookie Jar**.

The first nursery rhyme is *5 Little Speckled Frogs*; this song is about frogs jumping into the water one at a time until all of the frogs are gone. Our class sings this song, and with our fingers count off the frogs as they jump into the pond. Following, students make a flipbook and sing the song while flipping the frogs behind the log one at a time. This is a nursery rhyme that kids learn quickly, and it demonstrates a fun way to use subtraction. Another fun song and activity that students love is *Who Stole the Cookies from the Cookie Jar*. We read the nursery rhyme book and then watch the video on YouTube. Following, I give every child a paper cookie jar with a handful of



miniature cookie cereal. We roll a die on the smartboard, and students use their cookies to create a subtraction problem. Then we sing the song *Who Stole the Cookies* as we eat the cookies that we subtracted. Both of these nursery rhymes are great ways to teach subtraction and the students are always engaged throughout the lesson.

Comparing Numbers: Students must have strong number sense and understand place value (and order) when comparing

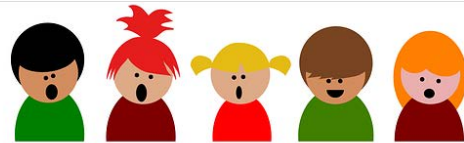
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Math, Music and Movement

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numbers. They have to recognize the difference in numbers through concrete and abstract methods. As students begin to switch to a more abstract understanding of comparing numbers, I incorporate the song ***Alligator Chomp*** by **Jack Hartman**. I use the open version so I can use my own numbers, but there is a version that already incorporates numbers into the lyrics. To use this song, two students come up to the front and hold a sign that has a number in numerical form and displayed in a ten frame. We say the numbers together and chomp the biggest number when the song tells us to do so.

The song goes through numerous rounds, and different students hold the signs between each round. The students love this song because they get to become alligators and they get to be the center of attention when they come to the front. This song has a country music tune that gets the students clapping and their shoes tapping. While I use signs, it could easily be adapted to just numerical form, ten frames, base-ten blocks, and more.



“Students have so much fun singing along that they do not realize they are learning academic content.”

Overall, music is a fantastic resource in the classroom that can be used for teaching (almost) anything! I recommend using upbeat and engaging songs that allow students to get their wiggles out while singing along. Students have so much fun singing along that they do not realize they are learning academic content. However, before playing all of this music in your classroom, I must warn that it can and will be stuck in your head. Moreover, you may receive a parent note that the music has been stuck in their heads. That is how you know you have successfully incorporated music into your classroom. ☺ ■



Is Math Necessary in Early Childhood Education?

By
Kimberly Campbell

The basic foundation for future life skills are being set from preschool to the end of elementary school. These grades are considered Early Childhood. Math skills, which are taught in early childhood education, are designed to provide the necessary foundation children need to succeed in elementary school and beyond. The lessons taught in early childhood should be focused around the basic skills that will build up to advanced mathematics in high school and college.

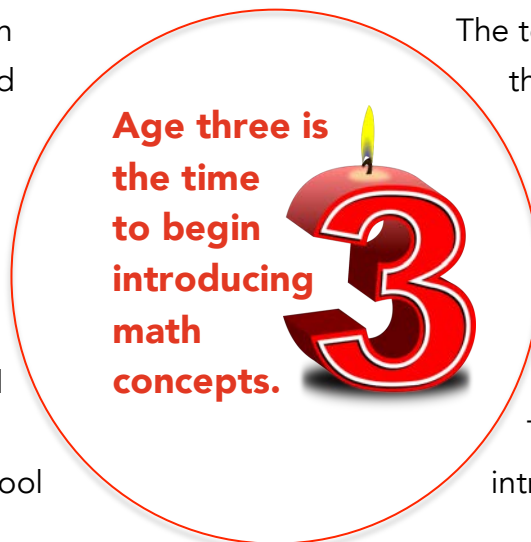
Simple mathematical skills need to be introduced in early grades. Introducing basic math terms in early childhood assists the child in further understanding mathematics. This makes elementary education a little easier for the child to grasp. Three years of age is a good time to begin introducing math concepts to children.

Children are prepared when the foundation to understanding math terms and concepts is set early. That way they are ready to apply the information in a classroom setting. This way, the concepts are already introduced and understood.

The teacher can then focus on the application of the ideas.

Preschool children can gain a basic idea of math practices even though they may not yet be ready to learn the practice of the math skill.

They will at least be introduced to the concept.



Number sense is the first vital math skill a child needs to develop. It is best if developed before reaching kindergarten. In order to understand number relationships children must learn to count forwards and backwards early in childhood. Number sense is necessary to the understanding of mathematics. It is a

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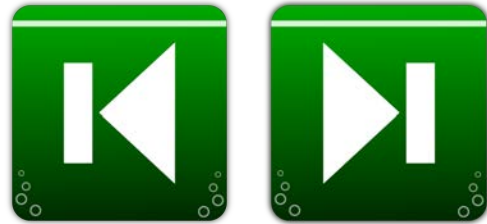
Is Math Necessary in Early Childhood Education?

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vital skill that teachers should focus on in early childhood education.

If learning to count is taught before a child reaches kindergarten then the kindergarten teacher can focus on the basics of counting forward and backward. When teachers focus on number sense they are providing math skills that are needed for concepts and calculations in the future.

Children learn visually. They can build relationships between numbers and represented items. The use of mathematics can be made real to a child's mind by using representation or pictures to clarify the relationship between counting and items represented. If this skill is introduced before elementary school, children will be prepared to expand their mathematical skills. This style of teaching will allow children to make connections between the real world and the math skills that are needed in order to be academically successful. If children don't make these connections they may



Children need number sense before learning how to count forward and backward.

become confused about the information provided in the classroom.

Preschool math definitely provides academic building blocks. The basic math skills provided in early childhood education are the building blocks for a child's entire academic career. If students did not learn the simple skills like math concepts, number sense, and simple ideas of adding they would not be properly prepared to move into elementary education. Therefore, math is essential in early childhood education to ensure the child's academic success. ■



Motivation

By
Sheila Lowe

Anything is possible, Anything can be.

—Shel Silverstein

Make each day your masterpiece.

—John Wooden

Reflection is an essential aspect of teaching. Teachers reflect on lessons, procedures, and behaviors. A few summers ago I thought about how the previous group of students struggled with motivation in math class. They just didn't seem to see math as an important part of their lives. A few students had even admitted some of these feelings to me toward the end of the year during our discussion. I was so perplexed and frustrated that I began to make it a goal of mine to focus on student motivation.

After reading several articles and watching some video clips, I decided to begin the year with an activity that would help students to see the need for math in their lives and their futures.

When the new year began, on the first day of school, I gave them a homework assignment on index cards. I asked them

to list two things. The first was, "What do you love to do?" and the second was, "What do you want to do when you grow up?" This was their first assignment, and they thought it was the usual "get to know you better" activity they are often asked to do at the beginning of each school year. When they brought their information back, I revealed the true purpose of the assignment.

When students shared the things they loved to do, we made a list of all the math that was used/needed in the activity. For example, one of my boys shared that he loved to play video games, and that he wanted to design and make them when he was a grown up. That opened the door for a serious discussion/list about all the math that is involved in making video games and graphic arts education.

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Motivation

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Another student shared that she loved her dog and wanted to be a veterinarian when she grew up. We discussed and listed many aspects of math that would be needed for her to accomplish her dream. After only a few students had shared their information, the class became eager to find math in each area that was mentioned.

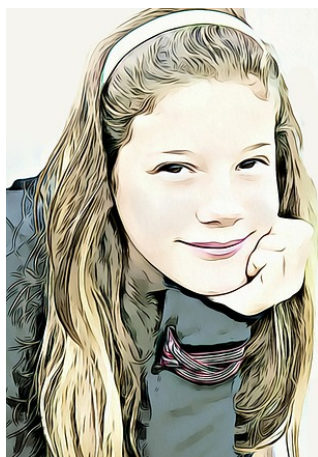
Our discussion went deeper into their daily lives, and they began to find math in so many areas. It was amazing! We loved our assignment with our loves, dreams, and math so much that we put the cards

on our bulletin board to remind us during the year to stay focused and learn as much math as we could because we would need it!

They began to see math in so much of their lives, and they embraced the challenges instead of dreading them.

I begin every year with this activity and know it makes a difference.

My students know to finish the chant; when I say, "MATH IS...." they say... "EVERYWHERE!" ■



"They began to see math in so much of their lives, and they embraced the challenges instead of dreading them."



Are You a Rock Star?

By
Leanne Potente

Growing "Good" Student Behaviors



Many students never think about school once the bell rings at the end of the day. While this behavior may have worked for them in early elementary school, by middle and high school this has created some big problems. By high school they have experienced failure so many times they have given up. Many don't know how to be a responsible student or how to turn this around. Here is where Rock Stars are born!

Rock Stars is a homework and motivation program. It was developed from a need to help our students learn "good" student behaviors. **Our class is 100% special education resource Algebra 1 students. Most have experienced little to no success in school.** They believe they "can't learn." Rock Stars have several goals: constant, predictable structure, success, "easy" good grades, and confidence building.

These kids crave structure and sameness. They don't do well with change (even something simple like a new poster on the wall upsets some kids.) For this reason, Rock Stars follows the same format every week. Material included each week is always review material. They have seen these types of problems before. Since they experience some success they begin to become more confident and more willing to try in class. The review of previous material keeps it fresh in their minds. The repeated practice helps them remember what to do for each type of problem. With the ability to have their problems checked as many times as they want they can make 100 on each Rock Star if they want. As we move through the first month of school our students begin to feel successful and show some change for the better.

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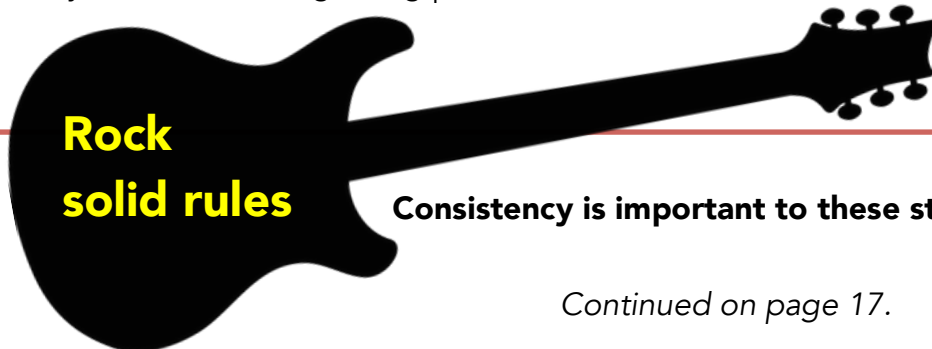
Are You a Rock Star?

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Rules for Rock Stars are simple and never change. Remember our students like things to stay the same.

I cannot stress how important consistency is with most students. They find comfort in knowing what to expect.

- ✓ Rock Stars are given out on Fridays and are due at the beginning of class the following Friday.
- ✓ Students may have their Rock Star checked as many times as they want prior to date due. It is returned with correct and incorrect problems marked.
- ✓ Students can redo incorrect problems and have it rechecked as many times as they want until the due date. They can make corrections on their own or work with us if they want help with a problem. (We have an hour of Tribe Time where students can get tutoring or attend club meetings as well as eat lunch. We are available every day to work with students during Tribe Time.)
- ✓ Since Rock Stars are homework, they are NOT worked on during class.
- ✓ If the student gets at least 9 (or 4 on later Rock Stars) problems correct on the Rock Star, they earn a Star on the "Walk of Fame" bulletin board.
- ✓ Eight Rock Stars are given each 9-week grading period. If the student earns at least 6 stars during the grading period, they earn the reward for that period. They start over each grading period.



**Rock
solid rules**

Consistency is important to these students.

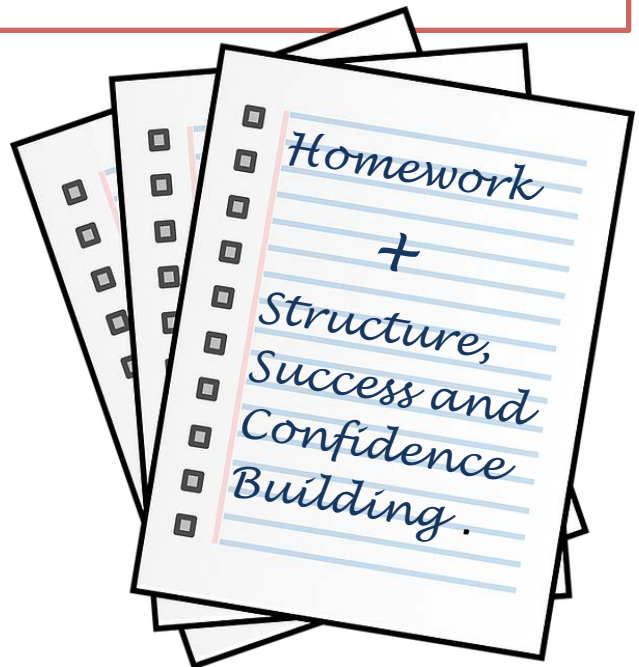
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Are You a Rock Star?

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- ✓ Rewards vary from pizza, ice cream sundae bar, game day, or other things. Rewards are given during Tribe Time lunch, not class time.
- ✓ Rock Stars count 50 points each week for a total of 400 points in total for the grading period. This can be the difference of having a passing or failing grade. Late Rock Stars are reduced by 10 points.
- ✓ Missing Rock Stars or failing grades give students automatic tutoring during Tribe Time. Students are released from tutoring once they are no longer have missing Rock Stars or have a failing grade average.

We are very deliberate in creating each week's Rock Star. We begin the year with 10 problems. We select problem types from the most missed problems on our weekly assessments. As we move to more complex concepts, we reduce the problem total to 5 each week. Many of our early, basic concepts are embedded within solving more complex concepts. Our goal is for students to feel success and gain confidence. With new confidence, they try more problems on their own before coming to us for help.



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Are You a Rock Star?

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This past year we saw quite a few Rock Stars born in our classes. We saw kids turning in homework, even after having kept up with it for a whole week. We saw kids who tried in class. They volunteered to work problems on the board or spoke up to explain how they solved a problem. These are the "good" student behaviors we want to nurture and grow in our students. We are looking forward to finding many more Rock Stars in our classes in the years to come. ■



**They believe they "can't learn."
With Rock Stars they learn they can.**



"That New Math"

By
Erik Heller

"Ugg... I hate this new math! Why can't you just teach math the way we learned it when I was in school?"

"Common core math sucks! Why change something that worked fine for me?"

"Why does my son/daughter need to learn this skill? They aren't going to use this once they've graduated high school."

If you are a teacher, and you've heard any of these phrases, or a version of them, go ahead and raise your hand. Of course nobody sees you raising your hand as you're reading this on your own, but I can imagine the plethora of hands that would go up across the East Tennessee region. It seems like ever since Tennessee won the Race to the Top grant and established Common Core standards across the state, parents have been getting more upset with how math is taught to their sons and daughters.

Every week a new picture of an elementary math problem pops up on social media that parents decree as obscene, and a terrible way to learn math. They want their children to know the "proper" way to do math, aka the way they learned to do it. My response to these parents is the famous Grace Hopper quote: "The most damaging phrase in the language is: it's always been done that way."

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**"The most damaging phrase in the language is:
It's always been done that way."**

—Grace Hopper

"That New Math"

(continued)

Looking at the way people who make these comments think, you see a fixed mindset about math. They either liked math or didn't, they were either good at math, or they were bad. These people learned math using a procedural method. A formula was shown to them, and they were required to learn how to use that formula. They know the U.S. algorithm for the four operations: plug numbers in, carry or borrow, stick a zero in the multiplication answer when you switch to the next place value, etc. As a teacher I have found that the majority of parents who complain about "new" math are unable to explain why they're doing what they do when they complete a math problem.

That leads us to how students are learning math today. What some parents fail to see is that their students are learning the traditional algorithms in math. However, before they get to the procedural math, they are looking at the concepts behind the procedures. They are using strategies that help make mental math easier as they grow their mathematical thinking. They are using manipulatives and other visual



**Finding the *WHY*
behind the *HOW*.**

methods so they can see what is happening within the problem. Once students have mastered the concept behind the skill, then the procedure is taught. Even while the procedural algorithm is being taught, skilled teachers continuously tie it back to the conceptual learning students have already mastered. When students have mastered the traditional algorithms, they can complete their work quickly and efficiently, while also explaining what they are doing within their work. Why would parents not want their children to be able to do that?

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"That New Math"

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When we look at math and how it is taught, a comment a professor recently made jumps out at me. He asked the class, "Why would you use a rotary phone in today's society when the latest smart phone is so much better?" I feel this perfectly sums up the issues we see with how parents view math education. We all know somebody who whines and complains about smart phones.

"Why can't we just go back to the days before smart phones?" these people might ask. Why would you take a far superior piece of technology, and replace it with an older version? The same can be said about our math instruction. We could just teach procedures for math and call it a day. Or we can dig into what is happening, look at the concept behind the procedures and create a much more prepared individual for the advancing society we live in. The choice seems pretty simple to me. ■



VS.



"Why would you take a far superior piece of technology, and replace it with an older version? The same can be said about our math instruction."

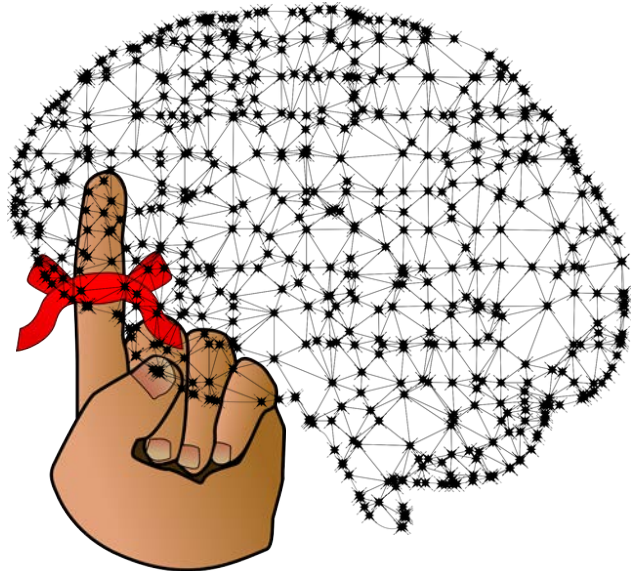


Making Connections Through Discovery

By
Stephanie Greenwell

Some students perform operations because that is just simply what they were told. They lack the understanding of why they performed those operations. In multiplication, they know that $4 \times 5 = 20$, but do they know that 4 rows of five chairs each is 20 chairs? When solving an equation, they know to add the opposite, but can they explain why they perform this operation? All students are different and learn differently. When any student makes a meaningful connection to a concept, they will remember not only how to solve problems, but the logic behind solving the problems.

One of my favorite units to teach is square numbers. My first year of teaching, my students and I went over what it meant to square a number and to find a square root. I showed them a square made with blocks, and we solved multiple practice problems finding the two (positive and negative) square roots of a number. We progressed to equations, such as $x^2 = 64$. To solve the problem, we found the square root and found the answer, $x = \pm 8$.



When students make a meaningful connection to a concept, they will remember not only how to solve problems, but the logic behind solving the problems.

I felt they were understanding what a square root is and how to find a square root. Then came the word problems. I saw that some of the problems gave the area of a square and asked the students to find the length of one side of the square. At this point, I thought this would be simple. I would show them the square made of blocks again, remind them of the relationship between the area of the

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Making Connections Through Discovery

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square and the side of the square, and they would all understand. That is not what happened. I showed them the block square I had made, talked about the relationship between area and a side length, gave them a word problem to find a side length of a square when the area is given, and they all divided by four. I went over how to solve problems like that one again and gave them another problem; again they all wanted to divide by four. At this point, I decided we needed to have a lesson in area and perimeter. We talked about the area formula ($A = l \times w$). We once again looked at the block square. I was coming to realize that holding up this square to my students was not working.

Over the years of teaching square numbers, I have come to realize that before my students can grasp the concept of finding the square root of the area to find the length of a side, they need to interact and make concrete connections to the concept. That first year I did try to physically show my students what a square number looked like, but they did not



Partners looking for patterns made the difference.

discover this on their own and a strong connection was not made. The next year, I introduced square numbers differently. I gave each student their own set of blocks. I had them create several squares, each with different side lengths. The students recorded the area and side length for each square. I asked them to look at the table for patterns and discuss their ideas with a partner. We then discussed as a class the patterns they found on the table. Most groups said that if you squared the side length, you found the area. Then I
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Making Connections Through Discovery

(continued)

posed the question, "What if you only had the area? How would you find a side length?" My students and I discussed that because we are dealing with the area of a square, we would have to find the square root of the area to find the length of a side.

During this unit, I engaged the students by using real-life problems and having the students use blocks and other square objects, such as cheese crackers to build squares. This time when I gave my students word problems that involved finding a side length from the area of a square, most students correctly solved the problem. That was not, however, the most effective part of the lesson. The most successful part was that my students knew why they found the square root of the area and could explain how they found the solution. My students had made connections to the concept and understood what they needed to do to solve a problem.



Using real-life problems and real-world objects helped students digest concepts.

I learned a lot of lessons from my first year of teaching, but one of the best concepts I took from my first year is that for students to learn, they need be involved in their learning. Since that first year, I have strived to help my students make a connection to each lesson. When students discover math concepts instead of being taught formulas or algorithms, they are more likely to retain the concept and apply the concept in many different styles of problems. ■



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