The TMTA Bulletin

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Inside This Issue

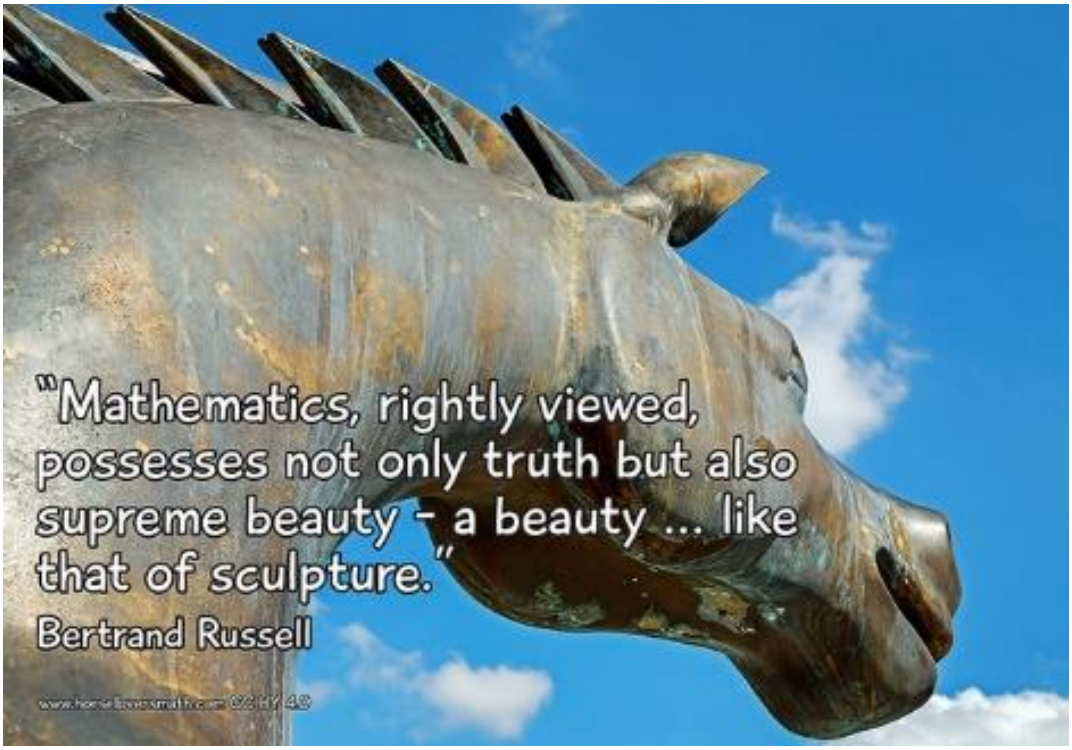
President's Message

CHANGE….

This word is typically not met with enthusiasm. However, as an educator, it is the one thing that is constant. As I look back over the years that I have spent in this profession, many things have changed. From chalkboards, to overhead projectors, then Smartboards, iPads and computers, teaching has changed. New curriculum standards and testing have brought on many new challenges. Each year I choose to embrace them. The year offers me opportunities to grow and work hard to help my students learn. I know not all of them will fall in love with the subject that I have spent years studying, but I do hope that at year 36, they will see that I work hard and continue to challenge myself. I also hope they see me trying new things and that I still enjoy learning. Mathematics is a beautiful language and I want my students to see that.

This fall change comes to TMTA. We will join forces with our state science educators for our state conference. We think this partnership is a great fit and hope that many of you will be able to attend. Look for details to come and I hope each of you have an amazing end to the 2018-2019 school year.

Alice



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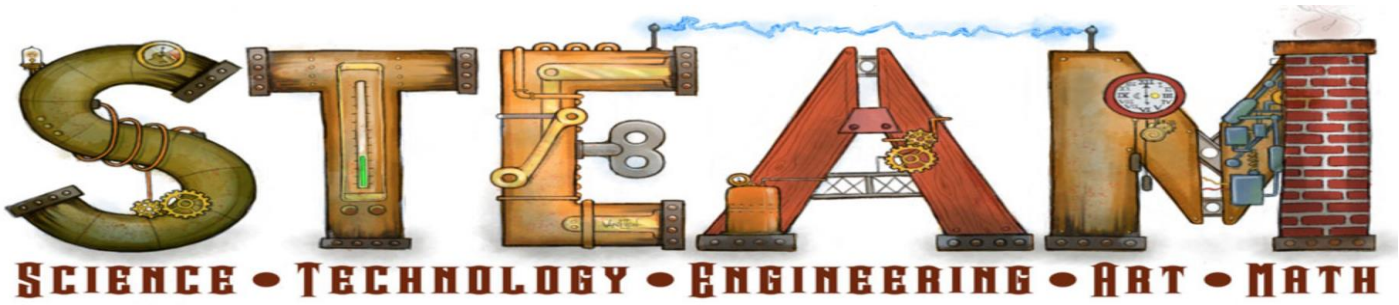
Calendar of Events

NCTM Annual Conference	April 3-6, 2019	San Diego, CA
High School Math Contest	April 09, 2019	
Middle School Math Contest	April 11, 2019	
NCTM Leader's Conference	July 15-17, 2019	Denver, CO
NCTM Regional Conference	October 2-4, 2019	Nashville, TN.
TSTA/TMTA Mathematics Conference	November 21-23, 2019	Murfreesboro, TN



Fall 2019 Science and Math Conference

3D Learning: Full STEAM Ahead

A joint conference of the **TN Science Teachers' Association (TSTA)**
& TN Math Teachers' Association (TMTA)
November 21st - November 23rd, 2019
Embassy Suites Hotel, Murfreesboro, TN

Strands:

Literacy Integration - Formative Assessment - Integrated Learning

Schedule:

Thursday, November 21 Pre-conference **Science** sessions all day
(available for an additional fee, must pre-register)

5-6 p.m. - Opening Session for Science & Math

6-8 p.m. - Exhibits Open

Friday, November 22 Science & Math Sessions - Science Luncheon

Saturday, November 23 Science & Math Sessions - Math Luncheon

SAVE THE DATE!

Watch the TSTA & TMTA web sites for registration & session proposals links that will be available by May 2019

http://www.tsta.wildapricot.org/

https://tmta.wildapricot.org/

TMTA Scholarship Opportunities

Dr. Henry Frandsen Scholarship for Teachers

Criteria:

- Applicants must be committed to teaching mathematics in Tennessee at either the secondary or elementary level.
- Applicants must have declared an appropriate major at their institution
- Deadline May 1st

Past Winners:

1. 2011: Amber Atkins (MTSU) and Emily McDonald (Tenn. Tech)
2. 2012: Melinda Pierce (UT Knoxville) and Brandy Smith (Austin Peay State University)
3. 2013: Taylor Satterfield
4. 2014: Leanna Ruth Murdoch
5. 2015: Elizabeth Barlow (UT Knoxville)
6. 2016: Courtney Wright (MTSU) and Hillary Grant (UT Knoxville)
7. 2018: Allison Brown and Jenna Dula
8. 2019: Now taking applications at **https://tmta.wildapricot.org/page-18062**

TMTA Grant Opportunities

$1000 classroom Mini-grant

Criteria:

- Applicant's school or district must demonstrate financial need;
- Applicant must attend the TMTA Fall Conference to receive your award; and
- Applicant must speak at the next TMTA Fall Conference about your use of the mini-grant.
- Application deadline is May 1.

Past Winners:

- 2013: Tammi Terry
- 2014: Lea Keith
- 2015: Emily McDonald
- 2016: Deana Secrest
- 2017: Teresa Agee
- 2018: Tabitha Rainwater and Dewayne Gleeton/Marvin Jones
- 2019: Now taking applications at **https://tmta.wildapricot.org/Grant**

TENNESSEE MATHEMATICS TEACHERS ASSOCIATION

TMTA TEACHER/SCHOLAR SCHOLARSHIP

The Tennessee Mathematics Teachers Association (TMTA) offers a

$1000 scholarship

for a TMTA member who is:

Currently teaching mathematics in Tennessee

Pursuing either a Masters, Ed.S., or Doctoral degree focused on improving his or her mathematics teaching.

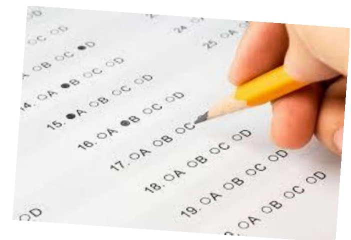
APPLY NOW!!
APPLICATION DEADLINE: MAY 1

For more details and the scholarship application, visit:
https://tmta.wildapricot.org/page-18062

Test Writers Needed!

High school math test writers are needed! Each of the six exams (Algebra I, Algebra II, Geometry, Precalculus, Calculus and Advanced Topics, Statistics) is a 40 question multiple choice test, with each question having five possible responses. Writers should include additional questions for consideration. TMTA will pay a single stipend of $500 to the author once the test has been submitted, reviewed, corrected if necessary, and accepted for use. Qualified applicants should work in a post-secondary setting and have at least a year of experience. A test writer guideline is available for interested applicants.

If you are interested, please e-mail the Examinations Director, David Ray.



Examinations Director
David Ray
Department of Mathematics and Statistics
E-mail: davidray@utm.edu

If you would like copies of some previous tests, these are available on the TMTA website: https://tmta.wildapricot.org/Contests.

My Favorite Lessons

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Magic Ten: Practicing Combinations to Ten with a Card Trick
Pre-k through 2nd (2 day activity)
Laurie A. Penny
NCTM Illuminations

Setup-Opening Activity
Begin by looking at a complete deck of cards with the children (without the King, Queen, Jack, and 10s cards). It is worthwhile to spend a few minutes getting to know what makes up a deck of cards, recognizing and naming the suits and noticing the numbers and pictures. Explain to the children that in this card trick, the ace will represent the number one. You remind your students that they can count the pips on the cards to help determine if they have ten or not.

Demonstrate the trick to the students as in the video:

1. Hold out the shuffled deck, and ask one student to choose any three cards.
2. Ask the student to determine if any two of his cards add to ten. If so, he must return one of the two to you and choose a replacement. Repeat this until the child has three cards, no two of which add to ten. Tell the student you will determine which cards he has. The student can put these three cards aside while you perform the trick.
3. Begin the card trick by simply turning each of the remaining cards face up in front of you, one at a time. As soon as you see any two cards that add to ten, cover those two with the next two cards from the deck.
4. Continue on in this manner, covering pairs that add to ten every time you see them, until the deck is finished. If there are no such pairs, place the next card out to form a new pile. Note: if you are left with only one card in the end, simply make a new pile.
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5. When the cards in your hand have all been turned over, remove the pairs of piles whose top cards add to ten.
6. There should be three remaining piles. Determine the missing cards by finding the addend that goes with the top card of each pile to make ten.

Once you have wowed your students with your magical abilities, it is time to teach the trick to them. Walk them through the steps slowly, having them help you find the pairs to ten as you go. One nice thing about this trick is that if a pair is missed it will not affect the outcome of the trick.

When the students understand how to do the trick, break them up into groups of 2–4, and give each a prepared deck of cards. If some children do not feel quite ready to try the trick on their own (or if you determine they need more instruction), invite them to stay with you and practice. This is also a good opportunity to circulate the room and use the Student Data Chart.

In their groups, one child can be the mathemagician and the other(s) can choose the three cards. Remind children to be sure, there are no pairs to ten in the three cards they choose from the deck. Once those have been hidden away, each child in the group should help go through the process of pairing the remaining cards and revealing the identities of the hidden ones.

Inevitably, a student will ask how the trick works. It is beneficial for all students to understand the mathematics behind this trick. Individual teachers can choose whether they want to explain the mathematics or ask students who are ready for an extension to figure out how the trick works and explain it to their classmates. This trick works because every card in the deck has a partner with which it combines to make ten. By systematically removing (covering) each pair in the deck, the last remaining three cards will be the partners of the cards that were removed, thus allowing the mathemagician to determine the identities of the previously removed cards using simple algebraic reasoning (ex: $4 + x = 10$).

Closing:
Gather students back together to reflect on the activity and share ideas about performing the trick and remembering their math facts. Students who have determined how the trick works can share their findings with their classmates.

The video, worksheets, student data chart, and answer key is available online through NCTM at:
https://www.nctm.org/Classroom-Resources/Illuminations/Lessons/Magic-Ten-Practicing-Combinations-to-Ten-with-a-Card-Trick/

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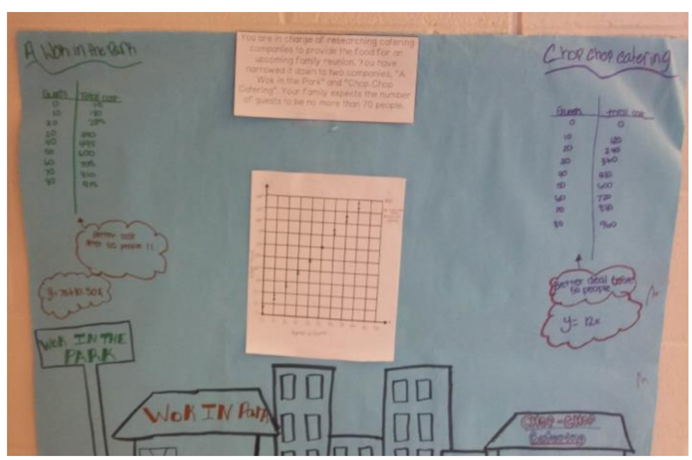
Linear Relationships
Middle School
Candy Favorite
West Creek Middle School



Standards:

8.EE.5 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.
8.F.4 Construct a function to model a linear relationship between two quantities. Determine
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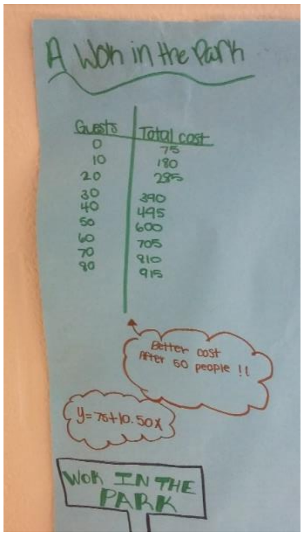
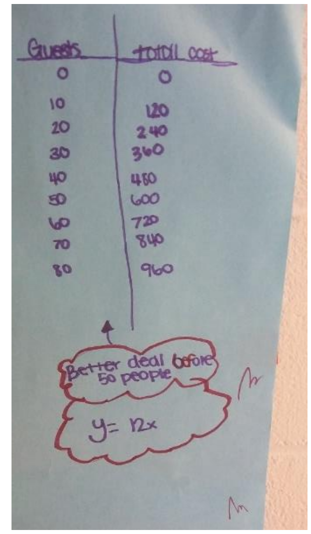
the rate of change and initial value from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or table of values.



This is probably one of my favorite activities to do. I pre-plan twelve different scenarios of restaurants with different base prices and per customer costs. I give each group a first quadrant piece of graph paper and their scenario. There are twelve different scenarios so teams can see other peoples' work but cannot just use their equations to fit their model. Seeing other teams struggle but work together is a great benefit to this task.



Students figure out how much each restaurant would charge for increments of ten people in the parties. They create a graph with both restaurants represented looking at number of people versus cost. Students then have to figure out the equation that models the situation, illustrate their presentation, and made recommendations on which restaurant to choose based on the number of people in your party. I grade the task by a rubric that clearly outlines the key components.

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Advanced Placement Statistics Lesson Plan: One-Proportion Confidence Interval
High School
Darin Clift
Memphis University School

Materials: one thumbtack (NOT pushpin) per student, (optional) sign designating the "true proportion"

Concepts covered in lesson: concept of confidence interval, sampling distribution of proportions, Empirical Rule, law of large numbers, random sampling, bias, experimental design

Previous lesson: sampling distribution of proportions

Prior to lesson: Students should have a grasp of sampling distributions of proportions. I like to start this lesson immediately after the quiz on sampling distributions. After a student turns in the test, I hand them a pushpin and ask, "What is the probability that a pushpin lands 'tack up'?" The student may ask for more information and you may provide as much detail as you want.

During lesson:
1. Guide student discussion with the following questions:
How should we answer this question? What kind of sample should we take? Should we drop the pushpin or toss it? Should we shake it in our palm(s) or not? Should we drop it on the carpet or on the desk? How large of a sample should we take? How large of a sample should we take to guarantee a normal model for the sampling distribution of proportions?

2. Once a procedure has been agreed upon, have each student toss the pushpin in a similar fashion and record the probability of successful tack
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up's. Record responses on the whiteboard and discuss whether the shape resembles what we know of the sampling distribution of proportions.

3. Guide student discussion with the following questions:
What is our answer to the question, "What is the probability that a pushpin lands 'tack up'?" Is it "fair" to use one person's response to answer the question? Should we pool our responses? Would pooling our responses give a "fair" answer? If we knew what the true proportion of tack up's were, how many of our sample proportions should fall within two standard deviations of the true proportions? What should happen if we each reached out two standard deviations from our sample proportions?

4. Have another teacher/ student/ principle/ coach serve as the "true proportion". Invite them to stand in front of the class. Have each student stand in front of the "true proportion" relative to their sampling proportion. Illustrate the Empirical Rule by having the "true proportion" "reach out" two standard deviations and "capture" 95% of all samples. Have each student "reach out" two standard deviations and try to "capture" the "true proportion". Discuss the concept of 95% confidence.

5. Have each student create 95% confidence intervals with their sample proportion and graph the intervals on the board. Discuss the concept of 95% confidence by comparing the number of intervals that overlap on what you might consider the true proportion of tack up's.

Follow up lesson: Give each student a small snack size bag of M&M's and ask for an interval estimate for the proportion of brown M&M's. Graph the intervals on the board, discuss the concept of 95% confidence, and compare with the true proportion of brown M&M's.

Personal Reflections: I love this lesson! It hits on so many topics, engages the students in discussion, gets them up and moving around, and offers the potential for a memorable moment. Giving this activity after a quiz allows for individuated start times for each student depending on how fast they finish the quiz. We all get to the same point in the lesson but the faster kids maybe already have a solid (or terrible) set of data that we can talk about. The guided discussion allows me to question every student in the class about material we have already gone over; it's a great way to review and synthesize. I like the pushpin because we really have no idea what the true proportion really is. The students can guess all they want, but no one truly knows. The discussion on collecting data can get VERY involved if the students discuss from what height they should toss the pushpin or on what surface it should land or whether they should "shake" the pushpin or if it's okay to pool all the responses. The concept of confidence level is hard for the students to grasp but if they have an image of the class putting their arms around their principal/ teacher/ coach (trying to capture them in their interval) then they are more likely to remember the idea- I tell them, "This one is for you kinesthetic learners." I always follow up the next day with a small bag of M&M's for each student and let them estimate the true proportion of browns and have them compare that to the true value- it's a precursor to formal hypothesis testing. They really respond well to this lesson and I hope you have as much success with it as I have.

Puzzlers

Missiles

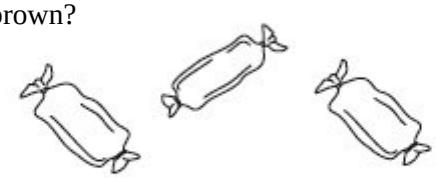
Some senators were sitting around discussing the latest defense department budget. Several of them asked the Vice President how much the latest missile system cost the taxpayers. The VP, who was known to be a clever sort, wouldn't tell them straight out, but instead gave them clues. (Note, the first digit is on the left.)

A. The number is ten digits long (there are no decimal points) and each digit is different.
B. The first, third, and fifth digits are powers of three.
C. The first, second, third, fifth, and ninth digits are odd.
D. The first, second, seventh, and ninth digits are prime.
E. The sum of the seventh and ninth digits is the third digit.
F. The first digit is not one, the second digit is not two, and so on with no digit occupying its numbered place, up to the tenth digit is not zero.
G. No number is adjacent to a consecutive number. So one is not next to zero or two, two is not next to one or three, and so on.

How much did the missile system cost?

Candies

A bowl contains 75 candies, identical except for color. Twenty are red, 25 are green, and 30 are brown. Without looking, what is the least number of candies you must pick in order to be absolutely certain that three of them are brown?



Solutions:
Missile cost:
$3596182074
Candies: 48

Tweet us!

@tenn_math_teach

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If you would like to share information, lesson plan ideas, or tips for instruction, please email Lisa Elliott at Lisa.Elliott@cmcss.net or Jackie Vogel at vogelj@apsu.edu.