www.kcatm.net

KANSAS CITY AREA TEACHERS OF MATHEMATICS

The Summation

VOLUME 15, ISSUE 1 FALL 2015

SPECIAL POINTS OF INTEREST:

- **Changes in the Classroom**
- **Resources**
- **Conference**
- **Contests**

INSIDE THIS ISSUE:

The Only Constant is Change

-Cindy Bryant

CindyBryant, cindy@learnbop.com
is Director of Learning at LearnBop

The Greek philosopher Heraclitus coined the phrase, "The only constant is change." And teachers know this better than anyone as they experience minute-by-minute changes daily in their classrooms based upon changing schedules and their students' needs and behaviors. As a result, they become masters at making snap decisions and changing course midstream to accommodate these changes.

Teachers learn early in their career effective strategies and practices for organizing and managing their classroom and minimizing frustrations that changes often bring on. But probably the most frustrating changes that teachers face are the changes are those related to changes in standards and assessments. Often, just about the time teachers are feeling comfortable with the implementation of existing standards and assessments, they're presented new ones to implement. These changes don't just bring frustration and anxiety to teachers, it directly impacts student.

As teachers work diligently and painstakingly to phase out existing standards and phase in new standards, it often creates the "perfect storm" for turning to quick fixes and tricks to help students remember mathematical information or a procedure just long enough to pass assessments. Because of time constraints and the pressure for students to perform well, teachers often feel forced to "cover" content.

Covering content usually means that the students are sitting in their seats listening to the teacher work alone. Contrary to this practice and as noted in the literate students who can think critically to reason and solve problems, this is the case.

Jo Boaler (2008), Professor of Mathematics Education at the Stanford Graduate School, says one of the most important parts of being mathematically literate is the ability to reason and offer justifications for problem solutions. Now, now more than ever, with the increasing demands in the workplace for mathematically literate students who can think critically to reason and solve problems, this is the case.

Rather than letting the frustrations of the ever changing standards and assessments landscape render us a helpless slave to the covering content master, let's not relinquish opportunities to allow our students to engage in the learning and understanding of mathematics. In doing so, we are also using our most important tool in the battle for equity for all students.

Yes it will require more time and effort, but affording our students opportunities to engage in the learning of mathematics, the greater likelihood of them developing the critical thinking and problem solving skills that are not only associated with higher test scores (Wenginksky, 2004), but also skills they can use throughout their lifetime.

"The only constant is change" and what better way can we prepare our students and equip them with the critical skills they'll need as they face and deal with constant changes they'll encounter throughout their lifetimes by engaging them in the doing and learning of mathematics?

See resources on next page

The Only Constant is Change Links

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http://www.k-5mathteachingresources.com/
http://illuminations.nctm.org/
http://illuminations.nctm.org/games-puzzles.aspx
http://www.comap.com/modelingHB/Modeling_HB_Sample.pdf
http://www.edutopia.org/blog/growth-mindset-common-core-math-cindy-bryant
http://www.edutopia.org/blog/mathematical-habits-of-mind-cindy-bryant
www.learnbop.com
LearnBop Guides http://go.learnbop.com/math-resources
Effective Practices for Learning Mathematics
Building a Strong Math Program
National Council of Supervisors of Mathematics http://www.mathedleadership.org/
National Council of Teachers of Mathematics http://www.nctm.org/
The role of productive struggle in teaching and learning middle school mathematics http://repositories.lib.utexas.edu/handle/2152/ETD-UT-2011-12-4527
The Teaching Channel
https://www.teachingchannel.org/videos/teaching-higher-order-thinking-skills

Note from the President— by Sarah J. Hicks, Ph.D.

Sarah Hicks, sarah.hicks@rockhurst.edu, is an assistant professor in the College of Health and Human Services at Rockhurst University in Kansas City.

I hope your academic year is off to a good start. Hopefully, at this point, you know your students by name and have formed classroom routines for learning.; you have found and continue to find ways to work productively with students in the classroom, which is demanding work. Therefore, in this issue of the Summation, our Kansas City Area Teachers of Mathematics (KCATM) newsletter, please consider the shared stories, resources, brain teaser, and opportunities for continuing professional development.

We want you to know KCATM as a LOCAL group with which to gather and converse about mathematics education**.** To continue to get to know and support one another, please join us for our Annual Conference, which will be held Saturday, November 7, 2015 (you can find more information and a registration form at our website: http://kcatm.net).

We wish you the best as you continue to serve and work as a mathematics teacher. Cheers to another academic year!

Editor's Corner— Jan LaFevers

When I started my teaching career I was certain that I was going to be in the classroom until retirement. Better yet, I wanted to be in a kindergarten classroom. I love children and people in general and the idea that with teaching I can share not just knowledge and the love of learning, but time too. So, what happened? CHANGE happened and for the better purpose of me, as an educator, being where I needed to serve a greater cause. I am perpetually thinking about change and how any given situation will turn out for the better with small changes.

After being in my own classroom for over ten years I experienced plenty of change in curriculum, administrators, and student population. Like most people, I do not voluntarily change my routine or focus unless I recognized the need. Well, technology has dictated the "need" for constant change and learning to adapt to new systems. Transitioning from the standard text book with nice neat orderly chapters, practices, review and assessments, to no paper.

It is KCATM's hope that this newsletter will become the resource that the reader needs for support in adapting to those changes. If you would like to contribute or need a specific type of resource, please contact me.

Jan LaFevers, Newsletter Co-Editor
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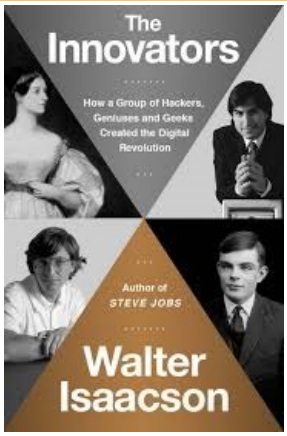
Book Review- "The Innovators" by Walter Issacson



Review by Teresa Sullivan
Resides in Fairway, Ks
Retired Computer Programming Professor

"How a Group of Hackers, Geniuses, and Geeks Created the Digital Revolution" published by Simon & Schuster, 2014.

At 488 pages, this is not the book to carry on your next trip. However, I did and found it a fascinating read. Having spent the last 50 years, on and off, in the computer business, I found the book extremely riveting. And, to endear the book to my heart, he begins with a woman, Ada, Countess of Lovelace, and ends with a woman, Ada Forever.

In between, Isaacson writes the tale of the many men and women who were the innovators in the computer revolution. Although I was already familiar with many of the names, I still found his descriptions of the players and the hardware to be very exciting. He seeks to weave together both" personal and cultural forces" and shows "what a difference personalities make" (a Henry Kissinger quote).

You will learn that the digital revolution is composed of many different ideas supplied by many different people. You will laugh at the antics of John Mauchly and his friends building remote control devices to launch fireworks for parties. You will read how Bill Gates called Paul Allen to help him when his collaborator, Kent Evans, was killed in a climbing accident. Throughout the book, there are photos of the many brilliant mathematicians and scientists involved in the development of the computer. You will find this book difficult to put down. And, you will want this book for your reference shelf.

Brain Teaser —for All

—Rita Barger

Please send your answers to me at bargerr@umkc.edu. I would like to list names of those who solve the teaser and post solutions in the next newsletter.

Brain Teaser

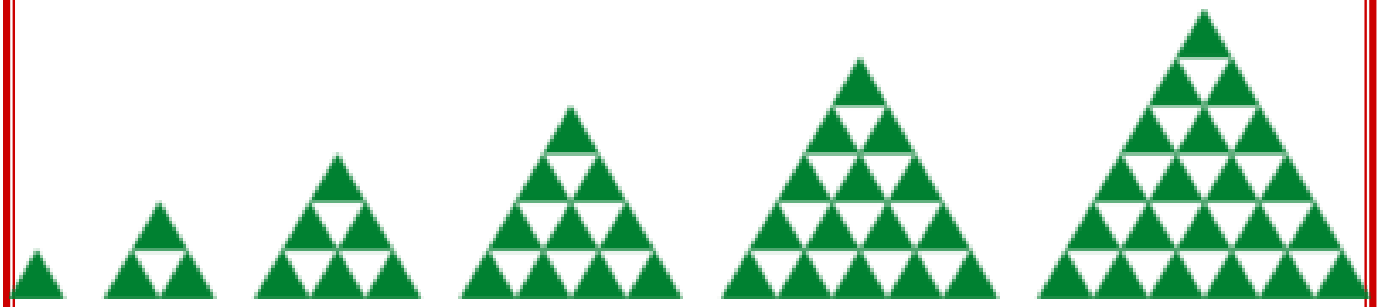
Last issue's brain teaser asked you to use critical thinking to determine how many students take ONLY math. The statistics were:

In a particular college, the course taking for 105 freshmen was as follows:
40 take chemistry (but not necessarily ONLY chemistry)
47 take physics (but not necessarily ONLY physics)
20 take math and chemistry (but not necessarily ONLY math and chemistry)
15 take chemistry and physics (but not necessarily ONLY chemistry and physics)
10 take math and physics (but not necessarily ONLY math and physics)
8 take all 3 subjects
10 take none of these subjects

The correct answer was 23. No one sent me a solution, but I'm sure several of you worked the problem. I hope at least some of you will send me the answers to this issue's brain teaser when you work it. I would like to recognize you in this article.

For this month, I want you to consider the triangular numbers – numbers that can be represented by dots in a triangular shape. The first four triangular numbers are 1, 3, 6, and 10. I want you to figure out the sum of the first 12 triangular numbers?

Have fun. As always, please send your answers to me at bargerr@umkc.edu. I would like to list names of those who solve the teaser in the next newsletter.



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Around the World with Math

—Rita Barger, Ph.D. and Joann Hiatt

Rita Barger, bargerr@umkc.edu, is an associate professor (mathematics education) and former chair of the division of Teacher Education and Curriculum Studies *at the University of Missouri—Kansas City (UMKC).*

JoAnn Hiatt, is a National Board certified mathematics educator at Belton High School.

Several years ago JoAnn Hiatt and her math club at Olathe East High School put together an event for the elementary feeder schools. They brought the students to the high school for an afternoon of mathematics.

As the elementary students arrived at the high school they were met by Tour Guides (members of the National Honor Society), given their "passports" and taken to the commons area. There they were organized by grade level and taken on a "trip" to eight different locations around the globe. At each location they learned a little about the country – its language and culture – and participated in a mathematical game or activity related to that country. Multiple rooms were used for each country so that like-age students could be grouped together, and so that the groups could be small enough for all students to be actively involved. Math club members were in charge of the activity and National Honor Society student volunteers assisted in each room.

Groups spent about 25 minutes in each "country" before moving to their next stop. They left with a variety of mementos of the day including their passports, airplanes, line art, and origami photo albums.

One stop was Cairo Egypt, where the students learned how to say hello and goodbye in Arabic. "Marhaba" meant hello and "Ma'as salaama" meant goodbye. Checkers, the oldest game in the world dates back over 4000 years. According to inscription in the temples of Thebes, the Egyptian kings took time out from building the pyramids to play the game. The students were divided into two teams where they used teamwork and strategy to play a giant game of checkers.

A second stop was Athens Greece. In Greek, hello is "geia sou" and goodbye is "adio." Since Chemistry originated in Greece, at this stop the students used red, yellow, and blue food coloring to make their own orange, purple, and green. They were given specific instructions for measuring milliliters of each color to create their final results.

A third stop was Mexico City where they learned "hola" for hello and "adios" for goodbye. Line art, or Guilloches, originated in Mexico and means fine, interwoven geometric patterns of lines or ornaments, so at this stop the students made line art snowflakes.

Another stop was Nigeria Africa where students learned and played the game of Igba-Ita as well as learning Nigerian Pidgin where "how now" means "hello" and "a go dey see yu now" means "goodbye." Igba-Ita is a game of chance and the name means "pitch and toss."

A fifth stop was Paris France where the metric system originated in the 18th century. Here the students learned "bonjour" and "Au Revoir" for hello and goodbye. The Paris stop was also the snack stop. Each student measured pre-established amounts of four types of food (goldfish, M&Ms, cheese puffs, cheerios, pretzels, and cinnamon toast crunch) of their choice to put in their sandwich bags and then enjoy.

Another stop was Tokyo, Japan where the students enjoyed origami. Each student made a photo album with a foam cover and an origami swan. Here they learned that "konnici wa" meant "hello" and "sayonara" meant goodbye.

In Braisilia, Brazil, students learned that the current (at that time) World Volleyball Champions came from Brazil. The rules of their volleyball game included passing the ball and answering mathematics questions. In Brazil, "hello" is "tudo bam" and "goodbye" is "tchau."

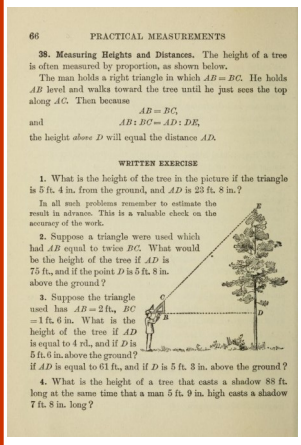
The final stop was Kitty Hawk, North Carolina where on December 17, 1903, the Wright brothers made the world's first flight in a power-driven air machine. That plane flew 120 feet in twelve seconds. In this room, students were given an airplane pattern and allowed to build their own planes. They went into the hallway and flew their planes across a 10' by 8' USA map that was placed on the floor and then used the scale on the map to determine how far their planes had traveled.

Transitional Classroom

—Jan LaFevers

jan.lafevers@gmail.com
KCATM Newsletter Editor
UMKC Adjunct Faculty

Who knows better about transitions than a Middle School teacher? What better age group to work with when making changes in curriculum? My belief is that there is no better time or subject than middle school mathematics to explore and learn the best of what mathematics can teach the middle school brain. Transitioning from a carefree childhood to the responsibilities of adulthood just lends itself to adapting to the reality of change.



66 PRACTICAL MEASUREMENTS

38. Measuring Heights and Distances. The height of a tree is often measured by proportion, as shown below.

The man holds a right triangle in which $AB = BC$. He holds AB level and walks toward the tree until he just sees the top along AC. Then because

$$AB = BC,$$

and

$$AB : BC = AD : DE,$$

the height *above* D will equal the distance AD.

WRITTEN EXERCISE

1. What is the height of the tree in the picture if the triangle is 5 ft. 4 in. from the ground, and AD is 23 ft. 8 in.?

In all such problems remember to estimate the result in advance. This is a valuable check on the accuracy of the work.

2. Suppose a triangle were used which had AB equal to twice BC. What would be the height of the tree if AD is 75 ft., and if the point D is 5 ft. 8 in. above the ground?

3. Suppose the triangle used has $AB = 2$ ft., $BC = 1$ ft. 6 in. What is the height of the tree if AD is equal to 4 rd., and if D is 5 ft. 6 in. above the ground? if AD is equal to 61 ft., and if D is 5 ft. 3 in. above the ground?

4. What is the height of a tree that casts a shadow 88 ft. long at the same time that a man 5 ft. 9 in. high casts a shadow 7 ft. 8 in. long?

Many of us have already journeyed into the infinite possibilities of what technology has to offer us in the classroom. Yet I still hear educators make the statement that students have to have paper to work through the math problems. If we consider that educators have been adapting how they teach the ever consistent mathematics, then we can understand that it is not the mathematics that has changed, it is the purpose of what we are using the mathematics for that we need to focus on now.

A hundred years ago proportions and the idea of Pythagorean's theorem was taught for the purpose of measuring and building structures. Now in 2015 our students are needing to learn the idea of proportions for understanding graphs on a coordinate plane in graphic design. The fun part is using new tools such as GeoGebra https://web.**geogebra**.org to have students create and submit work. Better yet is when you have a team of creative and talented students that want to create a tutorial either with a Youtube video (http://www.youtube.com/watch?v=DRRVu-RHQWE) or GoAnimate (https://**goanimate4schools**.com/). I have found it best to give students some choice in how they can prove that they understand the concepts.

For the students that really do need to practice writing out their solutions to math problems, there are infinite applications and software that allows them to use any device as a notepad. What I found to best fit the needs in a classroom was Microsoft Office One Note. This allowed for the old fashioned write in a white space to show your work practice time. This is also how I was able to provide students with the worksheet of practice problems to write on with a stylus or finger. What my colleague and I did spend time on was reformatting the worksheets so that students had the space to adequately show understanding.

Without any hesitation, I find myself using examples from 1915 Essentials of Arithmetic by George Wentworth and David Eugene Smith. (https://archive.org/details/essentialsofarith00went) along with cartoons and videos from You Tube (https://www.khanacademy.org/math/geometry/right_triangles_topic/pyth_theor/v/pythagorean-theorem-1)
to teach Pythagorean's theorem to accommodate the diverse learners in a classroom. What better way to show adaptations to change?

https://apps.dese.mo.gov/ModelCurriculum/findunit.aspx
http://community.ksde.org/Default.aspx?tabid=5276
www.**powtoon**.com/

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Active Learning Classrooms

—Greg Owsley and Sarah Hicks

Greg Owsley , gowsley@rockhursths.edu, is the STEAM Director at Rockhurst High School in Kansas City, MO.

Institutions of higher education have been discussing how and where people learn. These conversations have included questions such as: how have new technologies, diverse learners, and new design methods created new opportunities for new learning spaces? How can and will new learning spaces actively engage diverse students in the learning process? As a result, institutions have invested in and have begun evaluating active learning environments. Active learning classrooms are designed to foster interactive, flexible, student-centered learning experiences.

Locally, Rockhurst High School (RHS) share innovative changes occurring in the secondary classroom and invite further conversation related to this topic, Mr. Greg Owsley, co-author of this article and the STEAM Director at Rockhurst High School, agreed to be interviewed and responded as described below to the following questions.

Why active learning classrooms at RHS?

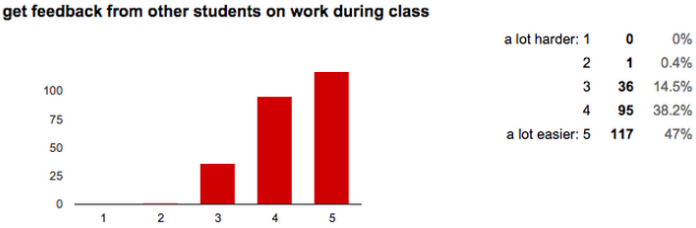
RHS was in a fortunate position to receive a generous donation for STEAM education, and through that donation we wanted to spend the money in a way that impacted all students and all disciplines. We reviewed research regarding the science of learning and how to create a more engaging learning environments. As a result, we asked ourselves how can we model some of the STEAM values in our classrooms and decided to invest on active learning classrooms.

What are your active learning classrooms like?

For example, mathematics teachers who facilitate group work learning activities have new spaces (as pictured below) to maximize the effectiveness of the learning activity by helping students give one another feedback during the learning process. As Mr. Curran, a fellow math teacher, describes, "In the active learning classroom, the students are more willing to talk with one another because there is no real barrier between those in the group."

How have these classrooms begun changing classroom teaching and learning experiences?

We surveyed 253 students and learned that students feel more comfortable in these classrooms. They also interact more with each other (see representation below). This data supports the school's greater mission of forming men for others by fostering life-long relationships while learning.



For updates about how teachers and students are teaching and learning in active learning classrooms as part of STEAM efforts, check out the Rockhurst High School blog at http://steam.rockhursths.edu/

Sarah J. Hicks, Ph.D., sarah.hicks@rockhurst.edu, is an assistant professor in the College of Health and Human Services at Rockhurst University in Kansas City.

Conference Opportunity

- Rita H. Barger, Ph.D.

Putting It All Together!

Saturday November 7, 2015

Featured Topic: High Yield Routines

The authors of this top-selling NCTM book will be offering three feature sessions each focusing on a particular grade band. If you're a primary, elementary, or middle school teacher, you'll want to attend this session with Ann McCoy, JoAnn Barnett, and Emily Combs to learn how to make the most of common classroom

UMKC Education Building

On-site registration begins at 8:00 a.m.

All sessions will be 30 or 60 minutes in length.

Questions: Call or email Dr. Rita Barger:

816-235-5655. bargerr@umkc.edu

Announcements

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KCATM 37th Annual Math Contests –

Who: Elementary, Middle and High School Students

When: April 2, 2016

Where: Olathe East High School

14545 W. 127th St., Olathe, KS 66062

Email your school registration forms by March 14, 2016

NO LATE registrations will be accepted due to the placement of students in testing rooms.

Entry Fees:
SCHOOL/TEAM registration: $40 per grade per school. (This includes ONE free KCATM membership per school.) Please limit the # of students to a max. of **7 per grade which includes the school's Mathletics team.**

SCHOOL OPEN Registration: If your school has fewer than 4 students per grade level, you may pay $10 per student. Please adjust this for accuracy at the time of payment on the day of the contest.

INDIVIDUAL students: Students may register **without** a school sponsor at a cost of $10 per student. Please include the attending school and current grade level. Parents will be asked to help proctor exams.

See http://www.kcatm.net/contest.html for additional information

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For more information about membership with KCATM, go to www.kcatm.net or contact Rita Barger at bargerr@umkc.edu.

Next 2015 Board Meeting

Nov. 7, 2015 after conference