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The Summation

KANSAS CITY AREA TEACHERS OF MATHEMATICS

VOLUME 18, ISSUE 1 WINTER 2018

SPECIAL POINTS OF INTEREST:

- **NCTM - Regional Conference**
- **Math Contest**

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NCTM—for All
-Rita Barger

NCTM Regional Conference Coming to KC in November

Once every 10 years or so, NCTM schedules a regional conference right here in Kansas City. This is good news because it provides access to leaders in mathematics education from across the nation at little or no cost to us. If you find our KCATM annual conference exciting and full of great ideas, you have to attend this regional. You will have access to close to 200 different presentations in a two-day period, November 1-3, 2018.

The conference will be held at Bartle Hall, opening on Thursday night with Dr. Christine Darden, one of the computer programmers portrayed in "Hidden Figures" film will kick off the event. In addition to presentations on Friday and Saturday, you'll have the chance to explore the exhibit hall and interact with the latest tools and products for mathematics education.

Start now talking to your principal, your instructional coach, your director of professional development, your colleagues and friends. This is one major conference that doesn't require airfare or hotel expenses.

The only cost is registration (and possibly parking and a meal or two). No matter what level you teach, early childhood through college, we guarantee you'll leave with new ideas for your classroom and you'll feel energized and excited about teaching mathematics.

Because of this Regional Conference, KCATM will not be holding our annual conference in 2018. We will return in the fall of 2019. If you have any questions, feel free to send me an email (bargerr@umkc.edu); I have attended NCTM conferences 26 out of the last 28 years, and I've never been disappointed.

Message from our President

-Sarah J. Hicks PhD

Happy New Year! I hope you got to rest and relax during winter break, and I wish you the best as we continue to teach this second half of the year. As we strive to help our students develop a conceptual understanding (why) of mathematics with procedural fluency (how), the ability to reason and apply mathematics (when), and all while developing a positive mathematics identity and high sense of agency, we need to support one another. I would like to draw attention to some opportunities for you and your students as we aim to achieve these goals: the KCATM math contests, NCTM and KCATM memberships, and the upcoming National Council of Teachers of Mathematics (NCTM) Regional conference here in Kansas City.

Presidents Message continued

—Sarah J. Hicks, Ph.D.

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KCATM Math Contests.
For Elementary and Middle School students, we host 39th Annual contest with written exams and a mathletics contest. Online registration for these contests will begin in February at kcatm.net. These contests will be held at Olathe East High School on March 24th. Please see our website study materials from past exams.

For High School students, we organize an online math contest! We recognize high school students are often involved in many outside of school activities and it is hard to add one more weekend event to their schedule. Therefore, they can participate by locating the contest exam online at kcatm.net and return it to Mr. Mike Round via email within the given time frame. We hope students will challenge themselves with the problems. They can also collaborate with peers or seek help from more knowledgeable others – much like the work of mathematicians. They may even learn some math while participating!

Joint NCTM and KCATM membership.
Our KCATM group is an Affiliate of the NCTM organization. You can become a member of KCATM for $10/year or $25 for 3 years and an e-member of NCTM for $84/year. With a KCATM membership, we will send you newsletters each semester and you can attend our annual conference at a discounted price. With a NCTM –membership, you will have online access to one journal. KCATM newsletters and NCTM journal article authors describe grade-targeted classroom tips and activities, practical ideas, teaching concepts and issues, effective practices, and product reviews.
Please consider registering at kcatm.net and/or nctm.org. Any individual who joins or renews their NCTM membership online will be given the option to select an Affiliate to receive a rebate. Please select our KCATM group as an Affiliate when you join or renew your NCTM membership!

NCTM also offers a Pre-K-8 school membership. NCTM's Pre-K–8 School Membership was created to meet the unique needs of elementary schools, middle schools, and K-8 combined schools. Knowing teachers in these schools have more than mathematics on their plate, a Pre-K–8 School Membership allows teachers to become full members of the NCTM community and enjoy the benefits of NCTM membership, including NCTM's school journals and access to ready-to-use lesson plans and activities, through a manageable school-based membership package. For $165.00, your school receives one FREE print journal subscription of *Teaching Children Mathematics* (Pre-K – Grade 6) or *Mathematics Teaching in the Middle School* (Grade 5-Grade 9) AND five FREE e-memberships for teachers in your school. You can find more information at: http://www.nctm.org/Membership

NCTM Regional Conference in Kansas City.
Finally, mark November 1-3, 2018 on your calendars now for the NCTM Regional Conference; we are promoting and supporting this conference in lieu of our annual KCATM conference this fall 2018. The conference is an excellent way for you to acquire innovative ideas you can immediately put to use, hear updates on classroom best practices from recognized innovators, participate in discussions about the latest education resources, and share classroom knowledge with like-minded peers. You will also have time to explore the exhibit hall and interact with the latest tools and products for mathematics education. The opening speaker will be Dr. Christine Darden, one of the computer programmers portrayed in "Hidden Figures" film. I am including a link to more information about Dr. Darden.
https://www.nasa.gov/centers/langley/news/researchernews/rn_CDarden.html
Sarah J. Hicks, Ph.D.

DESE– All

—Jan LaFevers

Interview with Chip Sharp-

Mathematics Director for Department of Elementary and Secondary Education
Phone: 573-751-1395
Chip.Sharp@dese.mo.gov

Mr. Chip Sharp has been in the business of education professionally for thirty years. What you will find with our new director of mathematics in the Department of Elementary and Secondary Education is that he has focus on the needs of teachers and students. When asked, what he was hoping to have the most influence on with his new position?

Chip Sharp said-"My first goal is to do no harm. I also hope to support the resources that DESE has worked to develop with Missouri teachers to provide better opportunities for teachers to ask themselves and their colleagues how to continue to improve instruction.
Finding ways to share PD opportunities for all teachers is also something that is a goal. Many districts, especially those serving rural areas, do not have the substitutes or resources to give teachers access to activities that would help them improve. There has to be a way to grant greater access."

KCATM-Describe one of your most memorable educational turning points.

CS- *"After my first year of teaching, I had the opportunity to participate in a multi-year PD project. This was after the NCTM's first Standards document had been published and we were able to immerse ourselves in the practices and thinking generated by that document. We had a national author, Lyle Fisher, as our primary facilitator. He really gave me a vision of instructing students in a completely different way."*

KCATM-What are you most proud of as an educator?

CS- "While many of my years in education have not allowed as much classroom experience, one of the things that I am most proud of is the number of students who went on to become teachers (many math teachers). I hope I was a part of that process.
I have had so many wonderful opportunities to both participate and meet with other teachers that to name one would be difficult. My mother, who was truly a master teacher, taught mathematics for 39 years. One of the things that I found most amazing was her dedication to learning. She was very active in taking PD to continue to improve even through her last years of teaching. That mindset is incredibly important."

KCATM- What is your advice for classroom teachers in regards to meeting standards?

CS- "First work to understand the intent and purpose behind the set of standards. This may take some time and trial and errors. Reflecting on what the standards mean we can give up, change, and hopefully improve can be especially challenging.
Don't be overly worried about changing expectations as those will continue to evolve and change. Be willing to ask the difficult questions to yourself about what role you played in the success and difficulties that your students experience. Teaching continues to be the best predictor of student success, and that to me means we must continue to work at being better. No matter how

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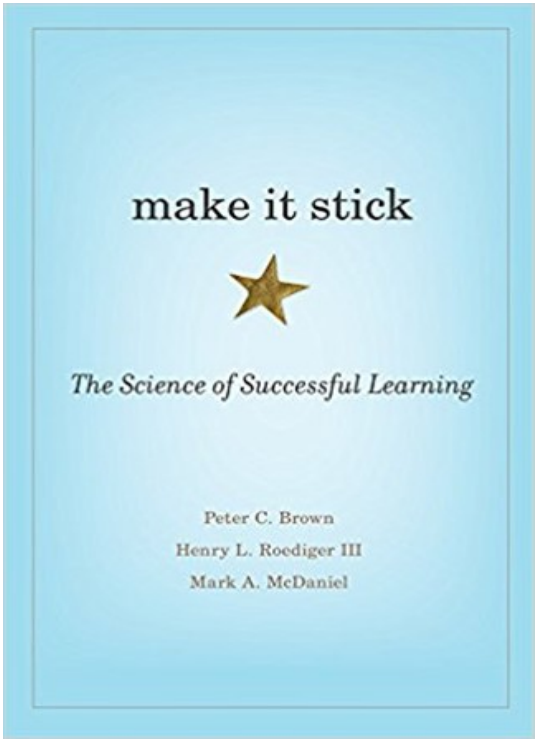
Book Review—

—Gretchen Boxdorfer Gretchen Boxdorfer is an undergraduate student at Rockhurst University. She is studying to be a secondary mathematics teacher who plans to student teach Spring 2019.

Make it Stick– by Peter C. Brown



The book "Make it Stick: The Science of Successful Learning" is written by Peter C. Brown, Henry L Roediger III, and Mark A. McDaniel, all of whom are either successful businessmen or psychological researchers. The three combine their brainpower to create a comprehensive and informative yet simple guide to teaching for learning in the long-term. The book offers eight chapters, each geared toward a different aspect of learning. Each chapter cites research studies, presents tips for better learning, and offers case stories to help apply the learning to the reader's life. Overall, the book is very helpful both as a learner and as a future teacher.

The first chapter, "Learning is Misunderstood", the authors debunk many commonly held myths about learning. Perhaps the most shocking is that re-reading notes is an ineffective way to study. I cannot begin to count the number of times that teachers, parents, and advisors told me to use this form of learning as a way to study and review for my tests throughout my academic career, and lo-and-behold, this technique creates "illusions of knowing" (p. 15) that trick our brains into thinking we know the material, and yet we are just familiar with the format of the text itself. This study habit stops us from forming new connections, because re-reading the same material only leads us to make the same applications as the first time we read it. Throughout the rest of the chapter, the authors present many similarly praised techniques that actually do not benefit learning. In the following chapters, they begin to offer alternative forms of learning that are much more effective.

One interesting study cited in the book was conducted in a gym class of eight-year-olds. The class was split into two groups: one of which practiced tossing beanbags into a bucket placed three feet away, the other of which practiced tossing beanbags into buckets placed two feet away and four feet away (alternating between the two). After twelve weeks, the students were tested on their accuracy of throwing from a three-foot distance. One would think that the students who practiced at this exact distance would do better, but in reality, the students who mixed up the distances of their throws greatly outperformed those who did not. The authors use this as an example of how "varied practice" (p. 51) is much more beneficial than "massed practice" (p. 47). Massed practice is the repetition of a single skill that happens on repeat. Varied practice is the process of practicing a skill in a variety of ways, better preparing the learner to transfer the skills to other situations later on. Brown, Roediger, and McDaniel stress the importance of varied practice in the classroom so that students can apply their knowledge to a variety of situations rather than just one specific problem.

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One of my favorite parts of the book is Chapter 4, "Embrace Difficulties". In this chapter the authors discuss the importance of struggling through learning, rather than just studying what comes easily. I find this concept to be very true, as I hold the belief that I learned the *most* in classes that I had the *most* trouble with. Subjects that come less naturally to me required a greater amount of work, and therefore I spent more time really getting into the material, and it sticks with me to this day. One thing I have always been interested in, though, is

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Book Review continued

—Gretchen Boxdorfer

whether learning incorrect information can affect your ability to later learn the correct information. For example, trying a math problem which you have never learned to solve before – if you do it incorrectly the first time, will you be able to learn the correct answer afterward? Or will this incorrect solution stick with you? This chapter addresses this concern. Studies have shown that so long as corrective feedback is given after the problem is attempted, the correct answer will stick with students in the long run. And really, the solution will stick with them deeper as they have worked through their learning, rather than having the information spoon-fed to them. The book addresses "the myth of errorless learning", (p. 90) a technique first tried by B. F. Skinner that consisted of teaching small amounts of information immediately followed by a quiz, which was for a time believed to be the most effective form of learning. However, this information is kept only in the short-term memory and is not effective for learning long-term. The idea of "desirable difficulties" (p. 86) stresses the importance of wrestling with concepts and information to really learn and understand the material.

The chapter that may be viewed as most helpful to individual learners is probably Chapter 7, "Increase your abilities". Brown, Roediger, and McDaniel (2014) explain the science behind ongoing learning and offers suggestions of how we can make this increase of ability happen in our own lives. They discuss "neuroplasticity" (p. 166), the idea that our brain is constantly changing and growing, rather than a fixed entity. Neuroplasticity is an uplifting idea, stating that no matter who you are or where you come from, you can learn through a little bit of hard work. The authors also bring up the idea of praising students for their "hard work" rather than their "intelligence", to keep them motivated to work toward something that they can control (work ethic), rather than getting discouraged by something that is out of their direct control (IQ). This is a very helpful application as a future teacher.

The last chapter ties the entire book together in a summative report of how to make learning stick. This information is not only presented for students, but for lifelong learners and teachers as well. Brown, Roediger, and McDaniel (2014) offer tips for both inside and outside of the classroom. This book is great for a

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Book Review Continued from page 5

diverse audience because of the wide variety of information and perspectives it presents. Whether you are involved in education as a student, as a teacher, as a parent, or in no formal way at all, this book is worth the read. The science is presented in an academic yet very accessible way, making the book comprehensible for anyone who may be interested. The featured stories help put the research into context and offer a connection for readers to better remember the information as they read along. Learning is something that everyone has in common in one way or another, so no matter your interests, the book is absolutely worth the read.

Brown, P. C., Roediger, H. L., McDaniel, M. A. (2014). *Make it Stick: The science of successful learning.* The Belknap Press of Harvard University Press: Cambridge, Massachusettes.

Developing a KCATM Contest Passion

The winter has been harsh in Kansas City, but spring is just around the corner. With spring comes one of my passions – the KCATM Math Contest. From the mid-90's, I began to take my high school team to this annual contest, so I felt it necessary for me to start volunteering to help with the contest. Little did I know I would become the contest chair of all 3 levels of the contest: elementary (4-5), middle school (6-8), and high school (9-12). My roles have included registering students, organizing the day with room locations and sponsor duties, and writing tests – all levels for a few years. Phew, thank goodness for volunteers!

Because the KCATM Board is so supportive, the day runs smoothly with the near 1000 attendees. Monica McWhorter and our KCATM President, Dr. Sarah Hicks, have moved registration to online and do a great job trying to answer questions in emails. I must still close the registration and get everyone in their testing rooms.

For many years the high school contest was run

by Pat Flynn (Olathe) and then by Adam Wade (Blue Valley) who wrote exams and ran the contest simultaneously with the other grades. The past 2 years, Mike Round (actuary, UMKC Adjunct, and doctoral student) revamped the high school contest making it an online test to fit the needs of our busy 9-12 students. The 20 questions are made available 2 weeks prior to our contest date (March 24th) and have a 2 week window to mail in or deliver a hard copy of their answers to KCATM or Mike Round.

I want you to be assured that every teacher/sponsor who has worked with their students to bring a team to our contest has been **very much appreciated each and every year**! This contest could **NOT** be run without those who have volunteered to be present the day of the contest! If I don't recognize the face, I definitely recognize the name of our teacher sponsors, AND **I SINCERELY THANK YOU!!!** I would also like to personally thank Dr. Rita Barger and Tom Sullivan for their endless time and energy to help with registration, medals, food, etc. **Their commitment to KCATM has been extraordinary over the years!**

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good we are now.

Sometimes people try to make standards to justify what they have always done. While for some this may be accurate, but all too often we rename practices without really changing or implementing the standards with fidelity."

KCATM- What do you wish would change in our classroom curriculum?

CS- *"I would like to see more classrooms fit the ideals of the new Missouri Standards as well as the Math Practices.*

While it would be a challenge to teach in ways that are different than how many of us were taught, I believe these lead to greater opportunities for more students to learn and know how to use mathematics. I would also like for classrooms to be flexible and use how students are doing to change instruction to match what students need to reach these ideals."

KCATM- What would you like to stay the same over time?

CS- *"The level that most teachers care about their students. If there are places where instruction needs to be improved, it is not because the teachers do not care rather they haven't had the opportunity to experience and practice how to teach differently."*

KCATM- How would you suggest educators become more involved with learning what they need to know about our state curriculum?

CS- *"Find as many ways to be involved, like being a part of KCATM. Finding ways to participate in as many PD opportunities as possible. Challenging ourselves to learn more is the best way to practice the joy of learning that we want our students to feel in math classrooms."*

KCATM- Who, or what, has inspired/ supported your success as an educator?

CS- *"I have been very fortunate to have been a part of many projects where I had access to some big and deep thinkers. I would have to say my mother would be one, she taught me that no matter how great of a teacher you might be there is always more to learn. From the Kansas City area, I would have to say Mary Beth and John Swartz, Shirley Hill, Rita Barger, Vena Long would be on the list. This is such a small part of my list. Everyone that I might include treated me as a learner, they challenged me to drive and understand further. They always modeled what a great teacher should act like and amazingly they were always humble, seeing themselves as a math teacher.*
When I was a beginning teacher, I was so fortunate to have a mentor that challenged me to make the changes that I saw were needed. He gave me the support with administrators to do the learning activities supported in the Standards (which are largely foundational to the Standards we are working with today). That support gave me the space to learn and also challenge my students in a way that promoted greater learning and engagement. He also listened, prodded and generally helped me to become better.

The power of working with others to improve our craft was one of my greatest lessons."

KCATM Math Contest Continued from page 6
—JoAnn Hiatt

It is time to search for new blood, a new energy to help with the contest. One way you can begin to develop your passion (as I did) is by volunteering to write one or more exams. We definitely always need volunteers to write exams!! KCATM pays $75 per exam and would need to be completed by February 16th. The individual exams are 40 multiple choice questions, whereas the Mathletics Team *(3 students)* exams are about 17 short answer questions varying from I minute to 3 minutes per problem depending on the level of the question. I am listing the exams and my contact information hoping we will have many volunteers. You will not be turned away, as we would love to have tests for the future. Your leadership is necessary for this contest to continue for years to come! **We will celebrate its 40th year in 2019!** I have been more than blessed with friends and colleagues throughout the metro area over the years!

Again, I thank you!

Sincerely, JoAnn Hiatt, Belton HS/FC
jhiatt@bsd124.org

Brain Teaser —for All

-Rita Barger

Last issue's brain teaser asked you to find a way to arrange the 10 digits, 0, 1, 2, …, 9 in a triangular arrangement such that the sum of any two side-by-side numbers, modulo 10, equaled the number below and between the numbers. Correct answers were submitted by Rui Guo. Here are two correct answers:

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7  2  3  8          1  6  9  4
 9  5  1            7  5  3
  4  6               2  8
   0                  0
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For this month, I'm going to use a brain teaser that I found in another publication, *Mension* 46 (2), February 2018, p. 20.

Twice 8 are 10 of us, and 10 are three.
3 of us are 5. What can we be?
If this is not enough, I'll tell you more.
12 of us are 6, and 9 but 4.

What are "We"?

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.

www.kcatm.net

2018 KCATM Math Contest

Saturday-March 24, 2018

4th Grade – 8th Grade

Olathe East High School
14545 W. 127th St., Olathe, KS 66062

Registration ONLINE only! Deadline: March 16th

Students MUST compete in the grade level they are in school, regardless of their acceleration. See the KCATM website: www.kcatm.net for contest information

Cost: $40 per grade level or $10 per student

Multiple teams from schools will be accepted, however one MATHLETICS team per school can compete. Each school membership includes one free KCATM membership.
Online Registrations only. NO late registrations are accepted.
Online credit card payments are preferred, but credit card, cash, or school purchase orders (PO's) are welcomed payments the day of the contest.
Checks, with a copy of your online registration, can be mailed to Dr. Sarah Hicks, KCATM President, Rockhurst University, 1100 Rockhurst Rd, Kansas City, MO 64110.

ELEMENTARY and MIDDLE SCHOOOL

Coordinators: JoAnn Hiatt and Monica McWhorter

Grades 4-5
WRITTEN EXAMS: 4 students
Number Sense, Geometry & Measurement, Algebra

Grade 6
TWO testing divisions
WRITTEN EXAMS: 4 students
Number Sense, Geometry, Pre-Algebra, Algebra

Grades 7, and 8
TWO testing divisions
WRITTEN EXAMS: 4 students
Number Sense, Geometry, Probability and Statistics, Algebra

HIGH SCHOOL

Coordinator: Michael Round

3rd Year - 2018

- **ONLINE contest**
- **No fee**
- **2 levels: 9/10 and 11/12**
- **20 problems**
- **2 week window**
- **Goal: Engage students in learning & doing mathematics**
- **TOP individual students will be recognized at the banquet.**

MATHLETICS TEAM EVENT

Teams must have EXACTLY 3 students from the same school to compete.

Grade 4 – Large Gym (8:00)
Grade 5 – Large Gym (9:30)
Grade 6 – Large Gym (11:00)
Grades 7 and 8 – Large Gym (12:15)

Registration is available online at www.KCATM.net mid-February! :)

Riding Bikes and Learning Math —

—Dr. Larry Campbell

Have you ever noticed that we really can't *teach* a child to ride a bicycle? We can give them all the tips we want ahead of time (sometimes too many!), but we pretty much have to put them on the bike and let them *learn* the process. No other way around it, really.

Naturally, we usually try to maximize the environment for that learning: training wheels, holding the back of the seat for a while, making sure the learning surface is level, etc. But, when the (bike-tire) rubber hits the road, they pretty much have to learn for themselves, while we cheer them on.

I'm going to say this carefully, because the analogy is not perfect, but when we look at the entire educational process from K – 12, isn't it true that a lot more of that process is like learning-to-ride-a-bike than we tend to acknowledge – *especially* with the 'bigger picture' skills?

When a child falls off a bike early in the process, we don't give them a C+ in 'bike riding' – we understand that the falls are a relatively necessary part of the entire process. However, we aren't always that enlightened in the educational process, and my own discipline – mathematics – can be the worst.

Mathematics, like death, gets a bad press. :) One reason is that it's so widely misunderstood. In elementary school, we often work with times tables (ugh), moving decimal points, fractions, etc. But (again, I tread softly) those things aren't really *mathematics.* They're *arithmetic*. Arithmetic is an important tool for mathematics, but it's only one tool, and it's not what mathematics is about. In the same way, hammering and sawing are VERY important skills for the carpenter, but it's not what building is about!

(Incidentally, be careful before you quibble and say "well, carpenters don't have to do much hammering and sawing by hand anymore, so those skills aren't AS important", because that is the EXACT situation in arithmetic. No one *has* to do times tables and long division by hand anymore -calculators are our 'power tools'- but doing mathematics is perhaps MORE important than ever.)

To oversimplify a little, mathematics is about using tools to tackle and solve real-world problems, in the same way that carpentry is about using tools to build useful and beautiful things. The tools change, but the big picture doesn't. Indeed, I have said repeatedly in teacher workshops that I'm worried, metaphorically, that we're teaching our children to hammer and saw (and pass the hammering and sawing standardized tests!) and NOT teaching them to build things. We're giving C+ grades to kids in hammering without any connections to, say, table-building, or even letting them TRY to build a table (which is often the best way they learn hammering and sawing, isn't it?) !

Which, in the end, brings us back around to learning to ride a bicycle. Learning to tackle and solve real-world problems, using appropriate and available tools, is a life-long process, and – like a bicycle - one learns by practice. And it can be as fun as bicycle riding! And, yes, I actually DO have my own list of suggestions that help maximize that learning environment, but they must wait for a future column.

We can't teach future bike riders by teaching pedaling in 1st grade and steering in 2nd. (And if we tried, they'd think bike-riding is boring!) Again, I'm being general, but it is the same with our future problem solvers. We MUST 'put them on the bicycle' earlier (brain teasers, puzzles, strategy games, etc). AND, we must allow them to 'skin their knees' in the process.

MCTM Connection– Jan LaFevers

For those of you that didn't make it to the MCTM fall conference, you missed a great opportunity to network and meet other math educators from around the state. No matter what level you are working with at this point in your career, there is a chance for you to learn and grow with other like minded educators.

I was fortunate enough to reconnect to many of my colleagues from southwest Missouri. To learn that ***Dr. Larry Campbell*** has published a book about his travels along the Missouri River and has another book being released this summer, is very exciting. Dr. Campbell is in the KC area (Overland Park) doing an evening class for KU/Osher Lifelong Learning Institute **(Feb 15, Feb 22, Mar 1, 7 - 9 pm.)** It will be a lot of his 'usual' stuff . Not necessarily designed for teachers, but could be helpful (especially as sources for fun problems.) Below is the link to the course.

https://www.enrole.com/kupce/jsp/course.jsp?categoryId=10037&courseId=OSH087

I would like to encourage each of you to at least follow MCTM on facebook or Twitter. These platforms allow you to have access to resources and feedback on curriculum, practices and changes from around the state. KCATM is an affiliate with MCTM and NCTM, which means that we can share and guide you to what you are interested in learning or what you are needing more of in your classroom. Speaking of needs, KCATM would love to hear from you as to what you are needing in Professional Development. Email **newsletter@kcatm.net** KCATM can help you.

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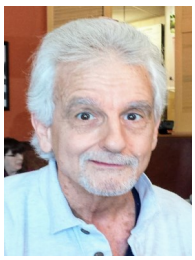

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Shout out to my eagle eyed co-editors! Rita Barger, Sharon Erikson and Teresa Sullivan :)

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