



Message from the President

KCTM Members,

I am very excited to write my first “Letter from the President” for the KCTM Newsletter. For the past four years I have worked on the KCTM Board as the Middle School Vice-President. My work on the Board has been rewarding and I have learned so much from my colleagues. My experience with KCTM has spanned fourteen years. Regardless of who is on our Board, the true measure of this great organization is our members. I remember the first time I affiliated myself with KCTM was at the state conference in 1999. I cannot remember where the conference was held, but I do remember the passion that so many of the members had for providing the best math education to students. These individuals have become the ones that I go to when I need advice on a lesson or for good mathematical humor! KCTM members strive to provide the best mathematics education in the state of Kentucky. I am honored to be the KCTM President.

Any organization needs a group of individuals who are willing to provide leadership. The KCTM Board has been fortunate to have four individuals over the past two years that have given their time and talents to our Board and now have moved to new positions on the Board. I want to thank Seth Hunter for his vision and leadership over the past two years as our KCTM President. Julie Dunn as President-Elect and Conference Chair who managed to provide our organization with top quality conferences full of research-based, cutting edge pedagogy and nationally-known keynote speakers. Beth Noblitt as Past-President who has provided guidance and support as new people have come onto the Board. Finally Barbara Jacobs for being not only a Treasurer, but overseeing our Teacher Support Grants process.

We have accomplished several tasks as a Board over the past few years, including opening lines of communication with a website, Facebook page and podcasts of KCTM happenings. We have also collaborated with the Parent Teachers Association to create public service announcements to create awareness of the importance of learning mathematics. Now, we partner with the Greater Louisville Council of Teachers of Mathematics (GLCTM) to host the NCTM Regional Mathematics Conference in Louisville, Kentucky on November 6-8, 2013. KCTM is excited about our partnership with GLCTM to bring such an important mathematics conference to our region. Louisville will be the host for one of only three sites that NCTM has chosen for Regional Conferences in Fall 2013. It is an honor for KCTM to help with this conference and a wonderful opportunity for our members to participate in high quality professional development so close to home. With approximately 250 sessions focusing on a variety of topics, there should be a plethora of information to help mathematics teachers improve their pedagogy. More information about the NCTM Regional Conference can be found in our newsletter. Please consider attending this conference and possibly volunteering to help welcome fellow mathematics teachers and professionals from across America to Kentucky!

Jamie-Marie Wilder

President, KCTM

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2013 NCTM Regional Conference (Hosted by KCTM & GLCTM)



The time is quickly approaching for the NCTM Regional Conference to be held in Louisville, Kentucky on November 6-8, 2013 at the Louisville International Convention Center. There are over 250 sessions and six major focus strands. Within each focus strand, there is a nationally-known educator in the field to discuss the latest information on that topic. Below is a listing of the focus strands, description of the focus strand and the featured speaker.

Now is the time to share this opportunity with colleagues and make arrangements to attend! For

more information about registering, accommodations, or volunteering, go to the following website: www.nctm.org



THURSDAY, NOVEMBER 7, 2013

Mathematical Learning Trajectories: Mathematical learning trajectories provide descriptions of children's developmental thinking within a particular content domain. These trajectories speak to the types of instructional tasks teachers can use to support students' ascension through the trajectory. Sessions included in this focus strand will provide an overview of learning trajectories, detailed descriptions of specific trajectories, and related instructional tasks.

Featured Speaker for Mathematical Learning Trajectories: Doug Clements

CCSS: Standards for Mathematical Practice: The Common Core State Standards not only focus on content, but habits of mind as well. Like the NCTM standards, the Standards for Mathematical Practice (SMPs) are about the thinking and processing that we want all of our students to be doing. This strand will help you better understand what the SMPs look and sound like in the classroom when students are engaged in problem-solving.

Featured Speaker for CCSS: Standards for Mathematical Practice: Mike Shaughnessy

Special Education: This strand is intended to support teachers who work with the spectrum of students who struggle with mathematics. These sessions offer a variety of approaches and assessment strategies to assist special education teachers, Title 1 teachers, and regular classroom teachers who instruct students with a wide range of abilities. This strand is appropriate for teachers of students with special needs.

Featured Speaker for Special Education: Anne Foegen and Barbara Dougherty

FRIDAY, NOVEMBER 8, 2013

English Language Learners: The sessions in this strand focus on engaging English Language Learners of all ages and levels of English proficiency in meaningful mathematics. Ideas for differentiating instruction, utilizing effective assessments, and guiding students to construct a conceptual understanding of mathematics will be shared.

Featured Speaker for English Language Learners: Jennifer Bay-Williams

Developing Mathematical Promise, Talent, Creativity, and Giftedness: Quality education must capture mathematical passions and imagination and develop the potential of a wide range of mathematically promising students. Join us in this strand for a discussion of these issues, suggestions for students' development, and a look at critically needed development and dissemination of research to prepare the STEM leaders of tomorrow.

Featured Speaker for Developing Mathematical Promise, Talent, Creativity, and Giftedness: Linda Jensen Sheffield

Exploring Fractions: Assist your students in deepening their fraction knowledge by engaging in a variety of sessions in the Exploring Fractions strand. The sessions include foundational fraction concepts, fraction division, interpreting students' thinking about fractions, exploring fractions through interactive activities, and initial decimal concepts.

Featured Speaker for Exploring Fractions: Fred Dillon

Mathematical Fluency in Addition and Subtraction

Bonny Bailey, KCTM Elementary School Vice-President

Being mathematically fluent is an essential skill for all students. It paves the way for higher order thinking and more complex mathematics. Students who can efficiently and accurately perform basic math facts have more of their working memory available to conquer rigorous problems. The intention is not to replace understanding with rote memorization, but to equip our students with the tools they need to gain understanding. Most students need more than Mad Minutes and flash cards to attain comprehension. It is imperative to teach students efficient strategies such as composing and decomposing numbers, fast 9's, doubles, doubles +1, etc. so they are equipped to be successful. The Common Core Standards set out a clear progression for the teaching of mathematical fluency. Young mathematicians need experiences and scaffolding to become quick and accurate with basic facts. According to the standards, students should master and know by memory, all addition facts to 20 by the end of second grade. The focus then becomes on applying this fluency to more advanced computations and utilizing standard algorithms in higher grades. The CCSS progression for basic math facts is below and includes ideas for implementation.

Kindergarten: *K.OA.5 Fluently add and subtract within 5*

First Grade: *1.OA.6 Add and subtract within 20, demonstrating fluency for addition and subtraction within 10.*

Students need time to concretely explore numbers before moving onto pictorial representations or abstract symbols. 5 and 10 are benchmark numbers that increase students' ability to visualize combinations and advance their foundational knowledge of number. One way to achieve this is through subitizing activities. Combining and partitioning activities on the five frame and ten frame are an effective means to achieve this goal. Emergent and perceptual mathematicians can begin by placing counters on the five frame to make combinations such as 1 red counter and 3 yellow counters to prove the number 4. When students are ready to move on to visual representations, the teacher may flash a five frame card with combinations such as 1 green dot and 3 red dots. Ask the student "How many red dots did you see? How many green dots? How many do we have altogether? How many empty squares do you see? How many more to have 5?" The goal is for the student to become fluent in visually seeing the combinations and partitions of the number 5 and 10 with automaticity and without counting on from one. Students who use 5 and 10 as reference points are less likely to rely on more arduous sequences of counting when adding and subtracting. Dot cards, part-part-whole cards, dice, an abacus and dominos are all excellent resources to use when teaching this standard.

Dot Card Matching

- Arrange dot cards in an array.
- In partners, have students take turns flipping over two cards, state the numbers represented, and the sum. If the sum is the target number of 10 or 5 the student keeps the pair.

Dot cards can be purchased, made with plates and stickers, or printed from digital media. There are many great subitizing activities in print and online:

Wright, Robert J., Garry Stanger, Ann K. Stafford, and Jim Martland. *Teaching Number in the Classroom: With 4-8 Year Olds*. London: Sage Publications, 2006.

Dot Card and Ten Frame Activities: http://www.edplus.canterbury.ac.nz/literacy_numeracy/maths/

Mathematical Fluency in Addition and Subtraction, contd.

Second Grade:

2.OA.2 Fluently add and subtract within 20 using mental strategies.

Mental math is the way most of us do math in our daily lives. Quickly and accurately being able to add up items in the checkout line is an essential life skill. However, it isn't enough just to have students drill and drill with worksheets and flashcards. It is important to give them efficient strategies. Some strategies include:

- Adding zero
- Adding 1 more
- Adding 2 more
- Commutative property
- Adding 10- Both adding the number 10 and looking for the 10 by decomposing numbers. Example: $16 + 4$. 16 is 10 and 6. 6 and 4 are 10. 10 and 10 are twenty.
- Adding 9- Look at 9 as adding 10. Example $7 + 9$ becomes $6 + 10$
- Adding 8- Look at 8 as adding 10. Example $6 + 8$ becomes $4 + 10$
- Doubles
- Doubles +1
- Adding 5- This is also actually looking for the 10. $5 + 7 = 5 + 5 + 2 = 10 + 2$
- Mastering these strategies covers almost all of the addition facts!
- The empty number line is also an effective strategy for addition and subtraction of basic facts and larger numbers.

Using a twenty frame card (a card with two ten frames) encourages students to build on what they already know and apply that knowledge to understand properties of operations and structuring numbers.

Flipping For Fluency

- Students will work in groups of three.
- One student is the flipper, one student is the responder, and one student is the checker.
- Supply students a stack of twenty frame dot cards.
- Student one flips the card, student two quickly answers how many more to make 20, and the third student checks the answer by proving it with counters.
- If student 2 is right, s/he wins that round.
- Students take turns being each job.

There are many games teachers can use to engage students in learning and mastering their basic math facts. The most important thing to remember is to not sacrifice higher order mathematics at the expense of drilling computation. Both aspects of math can be learned simultaneously. Math facts can be practiced while steeped in thought provoking, problem solving activities. We can't just hand out some flash cards and worksheets and hope kids get it. We have to equip them with strategies to be successful and the opportunity to use them.

Creating High-Quality Standards-Based Extended Response Questions (ERQs), Craig Schroeder, KCTM Middle School Vice-President

As we move forward with the KCAS and enter our second year of state testing, we continue to find ways to prepare our students not only for these tests, but also for real-life mathematical challenges they will face. Writing exceptional Extended Response Questions (ERQs) is not an easy task. The new testing protocol will require individual districts to create and use their own ERQs at the high school level, if they wish, in conjunction with the state-required multiple-choice questions. If you are like me, tested or not, these questions are the summative assessment tool that incorporates mathematical application of targeted standards. Whatever your reason for creating and using, I have outlined below some tips and ideas as you create these ERQs.

1. Read the standard, carefully.

If you want to assess a standard, make sure you have read it and understand its scope and magnitude. Check standards that are similar in both the grade prior and grade after your targeted grade to verify you are covering the scope of the standard at your grade level.

2. Stick with one standard.

If you try to assess too many standards in one ERQ, your ability to determine your student's knowledge of each standard will become muddled. The standards are complex on their own, so try not to mix in multiple standards.

3. Pick a standard that is hard to assess with multiple-choice items.

There are certain standards that lend themselves to ERQs and more importantly cannot be assessed with multiple-choice accurately. For instance if you want to find out if a student can solve a system of equations using the substitution method, this is much better left to a short answer or ERQ. A multiple-choice question for this standard would allow for guess and check or any other method to be used. If you used a multiple-choice question that asked for a step in substitution you would only be assessing part of the process. While writing your standards-based tests, these standards that can only be assessed with ERQs will be evident to you.

4. Ask an open-ended question, but keep the parts as independent as possible.

That may be a little blurry. What I'm trying to say is that if a student doesn't understand part A of a three part question, he should still be able to share his knowledge or complete parts B and C. If the answer to part A has to be correct in order to get part B or part C, then you might get a lot of false negatives on parts B and C. This is hard to do and was a staple of the old ORQs. It's not a good item

5. Start from scratch.

We all have our favorite ORQs that we want to keep using. Please don't. The curriculum has changed and so has the expectation for the question. It is much better to be creative and generate a new question focused solely on the standard you wish to assess. Modifying old questions often results in assessing multiple standards or possibly one that isn't on grade level.

6. Pick something that students can relate to.

The bane of my existence was a flour barrel question we used for an ORQ. I'm not even sure I've ever seen a flour barrel and I know my students haven't. Make it something common and culturally relevant to your area and socially relevant to your students. I've seen some recently with Napoleon Dynamite, but even that is old. Try to include Psy, Lady Gaga, or LeBron James and your students will you're your ERQ more relevant and interesting. (I just felt old trying to be cool there.)

7. Run it by a colleague.

Some of us are fortunate enough to have other teachers that teach the same grade level, but many of you may not. Have another math teacher look it over (post it on a blog or Twitter if there is no one in your building) for feedback before you use it. Ask them what standard they think it addresses. Sometimes this other vantage point will allow you to catch an error in wording or content.

8. Grade with a fine-tooth comb.

I always grade extremely difficult on my own ERQs. Whatever you allow during the year and give credit for, you should expect on the state test. Don't slack on the grading thinking they will do it perfectly next time. You will get what you demand.

I hope these suggestions will help you in developing quality ERQs for your students. Find a real-life problem they can relate to, one that assesses one standard, and one that helps your students apply their knowledge. Good luck to everyone!

Teach to Derive Formulas rather than Memorize

Leanne Faulkner, KCTM College Vice-President

How many times have you heard students complaining about having to memorize formulas? Many kids have disabilities that cause them to either not memorize things or like me easily mix you formulas. In my problem solving class for teachers, the book has a great chapter about ERP (Easier Related Problems) (Crossing the River with Dogs, by Johnson, Herr, & Kish). If you can remember how to solve something, do a simpler but related problem.

My example from my student life is because of a transpositional problem (similar to dyslexia but only turn certain things around), I was always mixing up the rules for $x^a x^b$ and $(x^a)^b$. So I taught myself to relax and work the following problems to remember what to do with the exponents.

$x^2 x^3 = (xx)(xxx)$ so there are 5 x's so add the exponents.

While $(x^2)^3 = (x^2)(x^2)(x^2)$ many more x's so I remembered 2+2+2 is repeated addition so I multiply the exponents.

In my math for elementary teacher's class, I have a very structured lesson for finding the sum of the interior angles of a convex polygon.

Construct a convex triangle, quadrilateral, pentagon, and a hexagon. This can be done on paper or in sketchpad.

- Construct all the diagonals from one vertex.
- What shapes do the diagonals divide the figure into?

Name of polygon	Number of sides	Number of triangles that can be drawn from one vertex	Sum of the measures of the interior angles
Triangle			
Quadrilateral			
Pentagon			
Hexagon			
n-gon	n		

I used to have a more discovery lesson but time constraints and the fact I want them to remember the part about building triangles inside of the polygon, I have done a cookie cutter lesson. Students returning from taking their Praxis math content area have said, "I forgot the formula but I remembered constructing the triangles inside a figure and was then able to find the measures of the interior angles of the octagon on the test!"

Instead of mnemonics or other such devices to memorize formulas, try teaching the student to solve an ERP, how the formula was derived, or why it works; students will have a better repertoire of understanding to attack their problems. I always say they might not remember the formula, but if they remember the activity maybe they have enough to discover the formula again.

Changing Attitudes Towards Learning Mathematics

Have you encountered others who say things like, "I was never good in math," or "I'm just not a math person"? The Kentucky Council of Teachers of Mathematics, Parent Teacher Association, and Education Association collaborated in creating different messages to reassert the importance of how we, and others speak, about mathematics.

As a member of KCTM you can access these messages within the [Members Section](#) and freely share with those around you. KCTM will add more resources, in coming weeks, to support parents doing mathematics at home with their young children.

AP Summer Institute: June 23-28 at WKU



Learn how to raise test scores and increase engagement in your Advanced Placement Calculus AB, Calculus BC, or Statistics class during WKU's Regional Advanced Placement Summer Institute. In the past 30 years, The Center for Gifted Studies has trained more than 7,600 educators from six continents. Learn more or download an application at http://www.wku.edu/gifted/ap_institute.php

You can check out other regional AP Summer Institutes by going to: <http://www.advancekentucky.com/trainings/ap-summer-institutes>

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