

April  
2012



## Message from the President

In keeping with the themes of my past correspondences, I wanted to provide you with an update on the progress KCTM is making with regards to the third “big R”, the cultural Revolution, with respect to perceptions of mathematics education.

Kentucky’s Parent/ Teacher Association and KCTM have partnered up to create and disseminate messages to parents or guardians concerning the impact negatively connoted mathematics education related statements might have on a child’s future. At this point, a team of roughly a dozen KCTM members in good standing has been assembled to collect Research pertinent to our task, so that we can offer the KY PTA Research-informed messages, not anecdotes or untested opinions. By the time summer rolls around, our messaging team will share our batch of catchy, Research-informed messages with the KY PTA, and both organizations will then discuss our dissemination strategies.

This effort has occurred in great part because of you and yours; in Response to members’ opinions on the matter, this cultural Revolution became one of my central initiatives. I hope you will be pleased with the work and messages our team will put together.

In closing, I’d like to share with you our members who volunteered to be a part of this endeavor. They have freely given their time, and will give more of their time, for this cause; if you know these folks, please take a moment to thank them.

- Dora Ahmadi, Morehead State
- David Atwood, Whitley County Schools
- Traci Brown, Mercer County Schools
- Karen Campbell, Daviess County Schools
- Ron DeChristofo, Texas Instruments
- Kim and Jim Elam, Rowan County Schools
- Janice Eaves, Owensboro City Schools
- Amy Hunter, Jefferson County Schools
- Amy Kellem, Bardstown City Schools
- Carol Muzny, Kenton County Schools
- Beth Roberts, Henderson County Schools

### Seth Hunter

Math Specialist | Ohio Valley Educational Cooperative | Kentucky Department of Education  
KCTM President

### Inside this issue:

2012 Annual Conference Update, Julie Dunn	Page 2
NCTM Update, Julie Dunn	Page 2
8 Math Practice Standards, Kelly Stidham	Page 3
Sorting Out Multiple Representations Through the Use of Card Sorts, Jamie-Marie Wilder	Page 4
How will the CCSSM affect the teaching of Math for Elementary Teachers? Leanne Faulkner	Page 8

# 2012 Annual Conference Update, Julie Dunn, KCTM President-Elect

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The 2012 KCTM Annual Conference will be held at Griffin Gate Marriott Resort & Spa in Lexington, KY on Saturday, October 27, 2012. Online registration will go live within a matter of weeks. You will receive an email when registration is ready.

**Awards Banquet:** The 2012 Conference Awards Banquet will be held at Griffin Gate Marriott the evening before the conference on Friday, October 26. You may purchase tickets for the banquet when you register for the conference. This banquet will celebrate the 21<sup>st</sup> anniversary of MESA winners. Please plan to join us for this very special time.

**MESA Award Nominations:** Nominations will be open soon for the 2012 MESA Awards. Winners will be recognized at the Conference Awards Banquet. Visit [www.kctm.org](http://www.kctm.org) to nominate an outstanding mathematics teacher (K-16), education professional (administrators, state department personnel, supervisors, etc.), or business/community leader who has supported mathematics education.

If you have any questions regarding our 2012 conference, please email [julie.dunn@shelby.kyschools.us](mailto:julie.dunn@shelby.kyschools.us).

## NCTM Update, Julie Dunn, KCTM President-Elect

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**Priority Recommendations to Implement CCSSM:** With support from the National Science Foundation (NSF), three conferences were held in 2011 to identify actions needed to ensure successful implementation of the Common Core State Standards for Mathematics (CCSSM). These conferences dealt respectively with curriculum, professional development, and assessment. Leaders of the conference projects collaborated to produce a common set of [priority recommendations](#) spanning the three conference themes. These actions are intended to inform the broad mathematics education community as well as agencies, foundations, and other interested parties regarding important steps to achieve the goals of the CCSSM initiative—namely, to improve mathematics learning opportunities for all students.



**Annual Conference in Philadelphia:** Join NCTM in the city of brotherly love to network with peers from across the nation and hear from renowned experts in education. The program will offer more than 700 presentations, including Learn <-> Reflect Strand sessions dedicated to **technology**. And you don't want to miss the Annual Meeting exhibit hall with cutting-edge vendors who bring the latest and greatest innovations to your classroom. In a competitive job market this is one event math educators can't afford to miss. Get the essential information right [here](#) to start your planning and be sure to mark your calendar for April 25-28, 2012! [Register](#) by April 20—this is your last chance to save \$40 off onsite registration rates!

## NCTM Update, contd.

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**Learn Key Strategies for Teaching Algebra—Focus on Your Grade:** Join us in Atlanta, July 31–August 2, for NCTM’s Interactive Institute for Grades 3–8, “Algebra Readiness for Every Student.” The experience will be tailored to your interests—you’ll break into groups with like-minded educators according to your selected strand for sessions and hands-on workshops. Each strand will provide a progression of activities to address algebra readiness. [Register](#) by May 25 to take advantage of our lowest registration rates.

July 31–August 2, 2012 | Atlanta, GA

### Algebra Readiness *for* Every Student

AN NCTM INTERACTIVE INSTITUTE  
FOR GRADES 3–8 WITH EXTENDED ONLINE  
PROFESSIONAL DEVELOPMENT



## 8 Math Practice Standards, Kelly Stidham KCTM High School Vice-President

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It has been a year of transition for educators across Kentucky. As the picture of the Next Generation School comes into focus for educators, it is important that we support the community – especially our students and families – in developing their own clarity and expectations. But how do we help parents and students understand the importance of the 8 Math Practice Standards? How do we explain why our classrooms must look differently in order to help students develop these skills?

This is especially difficult when parents themselves may not feel confident in their own mathematical ability or their ability to support their student’s work. Luckily, there are many resources that schools and teachers can use to help develop more confidence in parents and from there, a more positive attitude about math in our students.

NCTM, even before the release of the CCSS, had provided several resources directly for families. The brochure at the website linked below is an excerpt from the book *A Family Guide: Fostering Your Child’s Success*. The excerpt is available in English, Spanish or French as a pdf and provides parents with tips for helping students develop the critical thinking skills present in the Math Practice standards.

<http://www.nctm.org/resources/content.aspx?id=2147483781>

The Hunts Institute has published a series of videos that illuminate the process of writing the CCSS, how the standards represent a departure from the “traditional” curricula, and the meaning of the standards in language accessible to the non-mathematician. The video linked below provides a brief but meaningful explanation of the 8 Math Practice Standards from two of the authors.

<http://www.youtube.com/watch?v=m1rxkW8ucAI&feature=related>

ACT provides on the Quality Core site a pdf guide for students and their families that provides a brief overview of the program, explains the report they will receive on their own scores and emphasizes that the product is closely aligned with the EPAS system and has the explicit goal of moving students towards career, college and life readiness.

<http://www.act.org/qualitycore/pdf/QCGuideStudentFamily.pdf>

# **SORTING OUT MULTIPLE REPRESENTATIONS THROUGH THE USE OF CARD SORTS,** Jamie-Marie Wilder KCTM Middle School Vice-President

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The Common Core Math Standards are really pushing our content knowledge and teaching practices these days. Gone are the days in which a textbook and some worksheets could suffice as your middle school math curriculum. Many advocate for the use of technology as a means of helping students to attain mastery of certain mathematical standards. However if you are like me, you may have difficulty in finding an open booking in the lab or a lack of technology sources that actually push students' mathematical thought and foster critical thinking skills.

There are specific standards in middle school mathematics that ask for students to compare and contrast a variety of multiple representations. In the sixth grade, students must create, compare and analyze a variety of representations for fractions, graphs and a variety of statistical tools such as tables and displays. In the seventh grade, students must create, compare and analyze a variety of representations in algebra and geometry along with further analysis of statistical measures for characteristics of a population sampled. Finally eighth grade must create, compare and analyze the four views of algebraic linear and non-linear functions. Throughout the middle school years, it is suggested by the Common Core that one Mathematical Practices that is integral in the teaching of mathematics is modeling and multiple representations. (<http://www.corestandards.org/the-standards/mathematics/grade-6/introduction/>)

I am finding that the best way to teach some of these standards is to use card sorts. Card sorts are highly effective when a learning target asks students to compare a variety of representations such as written, graphical, pictorial, symbolic (both algebraic and numeric) and tables. These activities can be easy to create by either using several index cards or by utilizing a word document. Laminating these card sorts can allow you to keep these activities for multiple classes over a period of time. Card sorts are very versatile and can offer the following positives to your classroom instruction:

- differentiates your instruction without pointing out that some students are on different levels of mathematics
- provides both individual and group opportunities to share their mathematical processes used to complete the card sort
- fosters mathematical reasoning by pushing students to compare, order and then defend how they grouped their card sort
- allows for writing to be a part of the math classroom practice as they could be asked to justify their thought processes which can heighten the mathematical knowledge and vocabulary usage

There are a lot of sources for finding card sorts by just surfing the internet. Some sites offer free card sorts while others will require a nominal fee. I have found that the best card sorts could be the ones you or your students create. I have asked my more accelerated students to create card sorts that could help struggling learners. Those students then help the struggling learners with the card sorts. Again, the manner in which you create the card sorts and then employ their usage in your classroom is totally up to you.

At the end of this article, I have attached a very simple card sort that my department created for linear equations and their graphs. Here is how I plan to use it in my classroom:

1. Students match the corresponding graph with the linear equation in the initial card sort.
2. Then I will have students write scenarios to match the graph and the linear equation.

# **SORTING OUT MULTIPLE REPRESENTATIONS THROUGH THE USE OF CARD SORTS, contd.**

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3. Finally I will pull out this card sort again and have student randomly draw a card with an equation and one with a graph and compare and contrast the rate of change and the y-intercept through a writing exercise.
4. If I have students who are well on the road to mastery, then I may try to create a card sort that focuses on non-linear data.

The uses of card sorts are unlimited and the cost is minimal. I have found that my students will sort 30 cards into groups and justify their thinking without returning a word. However if I give them worksheets, they will moan and become less engaged. So I highly recommend trying card sorts to bring mathematical thinking to life in your classroom!

**Jamie-Marie Wilder**

KCTM Middle School Vice-President

See Page 6 for Sorting Cards.

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## **Math Humor**

Math problems? Call 1-800-[(10x)(13i)^2]-[sin(xy)/2.362x].

If parallel lines meet at infinity - infinity must be a very noisy place with all those lines crashing together!

Philosophy is a game with objectives and no rules. Mathematics is a game with rules and no objectives.

If I had only one day left to live, I would live it in my statistics class: it would seem so much longer.

<http://www.ahajokes.com/m020.html>

One day a farmer called up an engineer, a physicist, and a mathematician and asked them to fence off the largest possible area with the least amount of fence. The engineer made the fence in a circle and proclaimed that he had the most efficient design. The physicist made a long, straight line and proclaimed "We can assume the length is infinite..." and pointed out that fencing off half of the Earth was certainly a more efficient way to do it. The Mathematician just laughed at them. He built a tiny fence around himself and said "I declare myself to be on the outside."

<http://www.math.utah.edu/~cherk/mathjokes.html>

Q: What do you get if you divide the circumference of a jack-o-lantern by its diameter?

A: Pumpkin Pi!

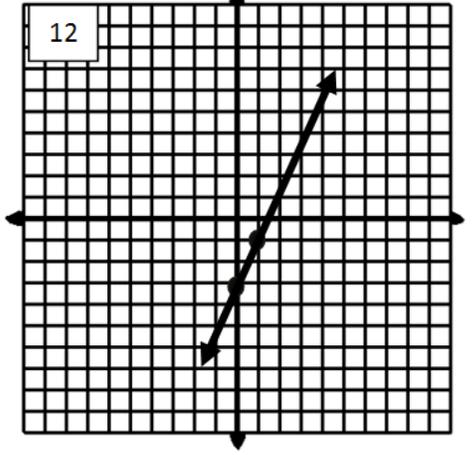
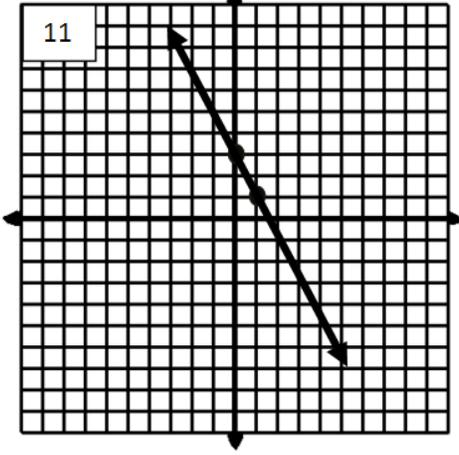
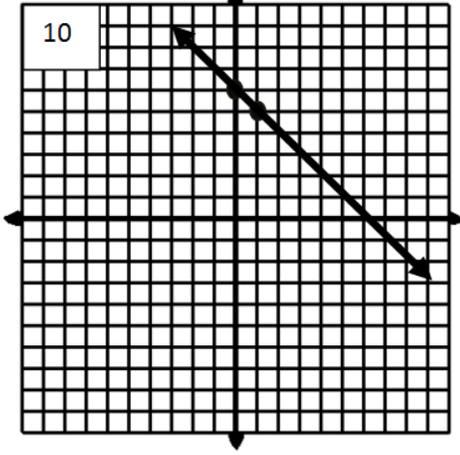
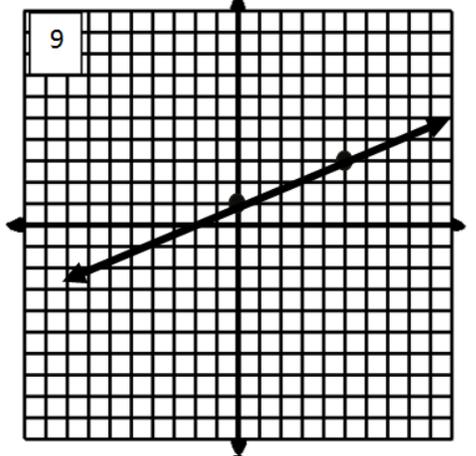
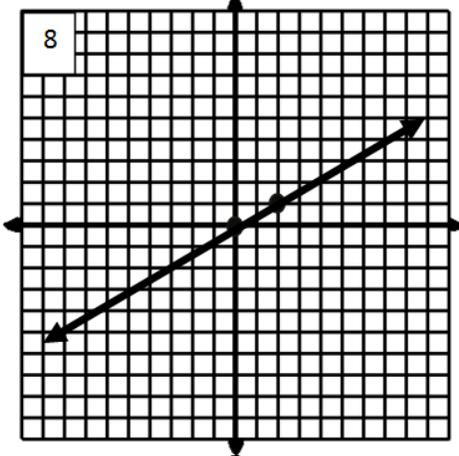
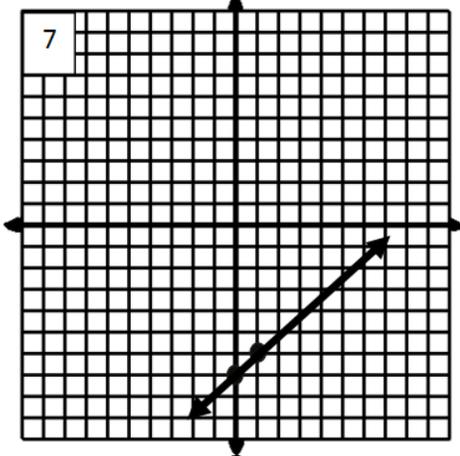
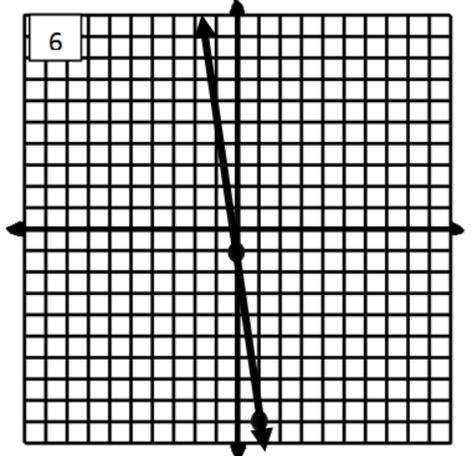
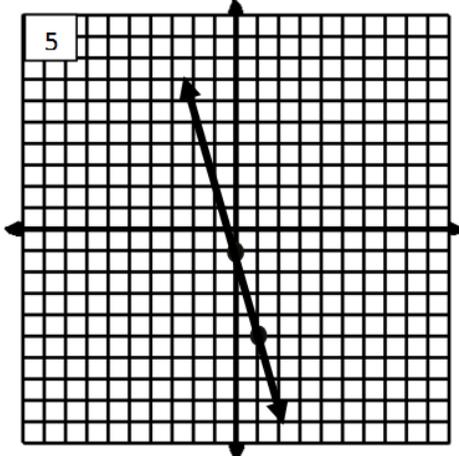
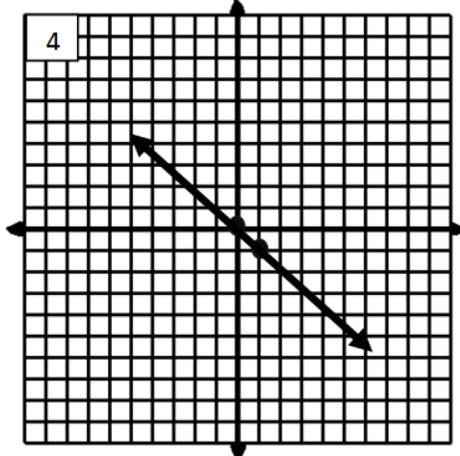
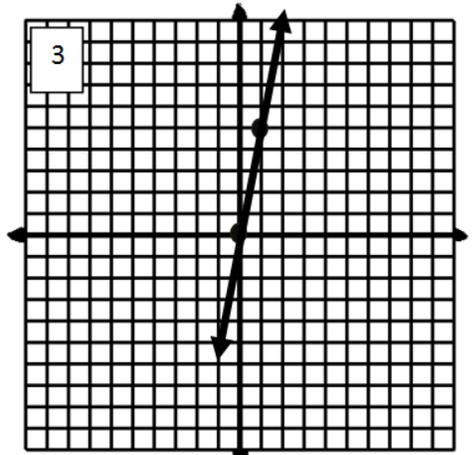
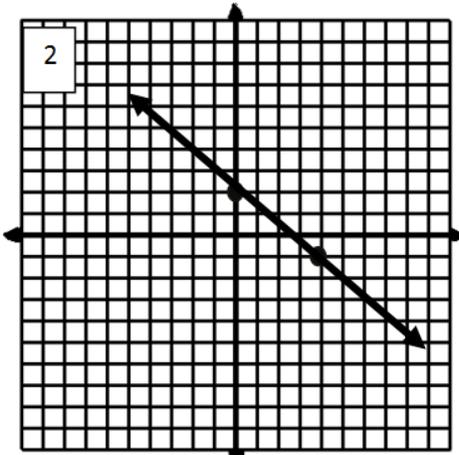
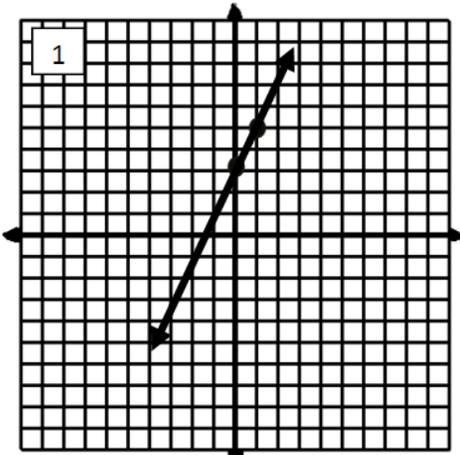
Q: How does a mathematician induce good behavior in her children?

A: 'I've told you n times, I've told you n+1 times...'

It is only two weeks into the term that, in a calculus class, a student raises his hand and asks: "Will we ever need this stuff in real life?" The professor gently smiles at him and says: "Of course not - if your real life will consist of flipping hamburgers at MacDonald's!"

<http://www.math.ualberta.ca/~runde/jokes.html>

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A

$$Y = 5X$$

B

$$Y = X - 7$$

C

$$Y = 1/2X$$

D

$$Y = 2X + 3$$

E

$$Y = -4X - 1$$

F

$$Y = -X + 6$$

G

$$Y = -3/4X + 2$$

H

$$Y = 2/5X + 1$$

I

$$Y = -X$$

J

$$Y = -8X - 1$$

K

$$Y = -2X + 3$$

L

$$Y = 2X - 3$$

# How will the CCSSM affect the teaching of Math for Elementary Teachers?

Leanne Faulkner KCTM College Vice-President

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Most colleges teach 2-3 courses for pre-service elementary teachers. I have revised the order and the content of my course at least 3 times since the summer of 2010. I have finally decided that the best order for my students is the same order that they will teach it, emphasizing the different grade levels and how the grade levels are aligned. I recently gave a talk at the spring meeting of the Kentucky Section of the Mathematical Association about the changes I have made in these courses based on the CCSSM. Hoping that this would start a dialog within the college community about changes that need to be made in how we prepare the pre-service teachers.

At this same meeting the 2010 Distinguished Teaching Award Address was delivered by Dr. Christie Perry (Morehead State University) about the challenges and opportunities offered by the Ky Core Academic Standards. She presented examples of how the Standards for Mathematical Practices give the opportunity for us to stamp out some common misconceptions. I will explain two of my favorite examples. She and 3 local teachers did a survey of 618 8<sup>th</sup> graders and 518 freshmen. Only 8% of the middle school students and 4% and high school answered the question correctly.

Fill in the blanks:  $5 + 8 = \underline{\quad} + 2 = \underline{\quad}$

I do not want to shock you with the numbers of her pre-service teachers missed the question also. Dr. Perry aligned the question to CCSSM 1.OA.7 and in SMP #6 “use the equal sign consistently and appropriately”. Too many students think that the equal sign means to stop and calculate. I like to call this mistake a string of equals that are not equal. My students like to solve multistep problems in a long vertical calculation instead of starting a new calculation for each part of the problem. If anyone knows of a way to break this habit, let me know. After correcting them, they agree they should not do this; however they do it again the next time.

Dr. Perry's other memorable idea was to “Stamp out the FOIL method”. We have all seen students who can foil this and foil that, but give them a trinomial and they will not have a clue how to proceed. Teaching them a “cute trick” to handling the product of two binomials does not prepare them to deal with other products. SMP 7 and 8 and the content standards clearly indicate the students should learn the distributive property with whole numbers and then make use of structure and repeated reasoning to be able to multiply any polynomials in later grades.

Which leads to a discussion of the A-REI.4.a, students are to derive the quadratic formula from completing the square on the general form of a quadratic equation. I was afraid my graduating seniors this year would not be able to do this, so I took time in the senior level analysis course this fall for the derivation of the quadratic formula. I use a smart board so my lessons are saved (even voice recorded) for my students, they actually said they would keep this lesson and play the video recording, so they would not have to teach it. I was appalled that they wanted to take the easy way out not really learn the material.

Another source of information about how pre-service mathematics instruction needs to change in response to the CCSSM is the Conference Board of the Mathematical Sciences (CBMS) second report on the Mathematical Education of Teachers II. Visit <http://www.cbmsweb.org> to see the draft report and you can leave comments on the report until April 28<sup>th</sup>. There are specific recommendations for the education of pre-service teachers for each level. “Prospective elementary teachers should be required to complete at least 12 semester-hours on fundamental ideas of elementary mathematics, their early childhood precursors, and

# How will the CCSSM affect the teaching of Math for Elementary Teachers? contd.

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*(Continued from page 8)*

middle school successors.” These courses must delve deeply into the structure of elementary mathematics for the pre-service teachers to understand the mathematics they will teach to a diverse population. Candidates must also understand where the mathematics is going. The course must address how topics such as place value, the distributive property, fractions, etc. provide the structure for working with polynomials, algebra and proportional reasoning of the middle and high school content. These connections will need to be spelled out for the students, because too many of us were taught with the direct instruction model. This is how you do it, this is when you do it... We were treated like robots to be programmed. I will admit myself I never thought about these connections until years into my teaching when I really began to investigate why my students were continually making the same mistakes. Since many mathematics pre-service teachers were somewhat successful in algebra, they do not always know the common misconceptions that students bring along.

At the fall KCTM conference, I would like to continue this dialog with a panel or forum on what changes are needed for the courses pre-service teachers take. Dr. Carl Lee (my favorite applied mathematics professor at UK) approached me after Dr. Perry’s talk. He asked if I remembered how hard it was to teach math for elementary teachers as a graduate student. Oh yes; I really had never been trained for that type of course. He would like to develop a statewide resource for the teaching of the elementary mathematics course. I invite any who would like to join in this endeavor to contact me (LeanneF@kwc.edu).

**Leanne Faulkner**  
KCTM College Vice-President

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