KATM Bulletin

Kansas Association of Teachers of Mathematics

October 2015

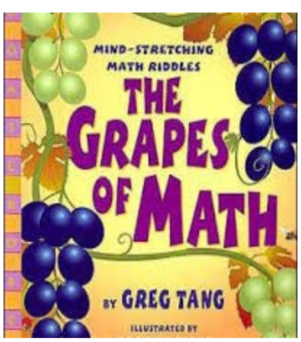
The Year of the Math Geek
Kansas Association of Teachers of Mathematics Annual Conference 2015

October 16, 2015
8:00 am to 3:30 pm
Maize High School
11600 W. 45th Street North
Maize, KS 67101

Join us at our annual conference for Kansas mathematics educators to participate in engaging and interactive sessions. Some topics will be:

- Academic Talk
- Cognitive Engagement
- Reasoning and
- Problem Solving
- Increasing Rigor in the
- Classroom

Keynote Speaker: Greg Tang is NY Times best-selling author of a groundbreaking series of math picture books from Scholastic that includes The Grapes of Math. He's also the inventor of the internationally acclaimed math app Kakooma and the creator of the popular, online math site GregTangMath.com. Greg has been called the "math missionary" for the dedication and passion he has shown in sharing his love of math with students, teachers, and parents.



Visit the KATM website for details on signing up and paying online.
We look forward to seeing you there!
www.katm.org

Inside this issue:

A Message from our President

Hello Kansas mathematicians! My name is Patrick Foster and I'm the president of the Kansas Association of Teachers of Mathematics! Currently, I am the principal at Oskaloosa Elementary School. Feel free to contact me at anytime with questions, ideas, or suggestions for KATM. My contact information can be found at the conclusion of this article.

As we begin another school year, we continue to be in flux across the state in regards to math education and assessment. The recent release of assessment results, newly adopted cut scores to gauge student progress, and school funding all continue to be hurdles for educators in Kansas. Through all of these challenges, members of the Kansas educational community strive to meet challenges and provide quality, rigorous instruction for our students.

As math teachers in Kansas think about how to tackle current issues, I encourage them to use KATM as a valuable resource. Below is a list of things that will help Kansas math teachers:

- The annual KATM Fall Conference will be held at Maize High School October 16! Registration information can be found on the KATM website. For a nominal fee, you can hear keynote speaker Greg Tang and gather a wealth of ideas to help you implement quality math instruction in your classroom.

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- Zone coordinators have been appointed across the state to assist teachers in networking and engaging in professional learning about math. Feel free to contact your zone coordinator and see what's being offered in your region.

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- Join and maintain your membership in KATM. Membership is only $15 for one year and $40 for three years. Being involved in an organization that supports math education will allow you to network, share ideas, gain professional learning, and explore resources.

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- Apply for a scholarship that is offered by KATM. Elementary teachers that win the Cecile Beougher Scholarship will have up to $1000 for professional development or math supplies to be used in the classroom. The Capitol Federal Scholarship is open to K-12 teachers. $1000 can be used to enhance mathematics teaching and learning. Go to katm.org for all of the details.

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- Consider submitting an article for publication in the KATM bulletin. Lesson plan ideas, resource reviews, management tips, games, or great math problems are all welcome.

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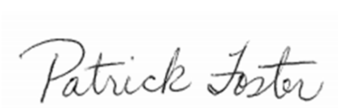
I'm excited about the upcoming school year and what's ahead! Challenges are great, but the teachers across Kansas are talented and persistent! I'm confident that we will meet the challenges before us. Continue to stay active in your profession, let your voice be heard, and take advantage of the resources around you! I'm fortunate to serve as president of great organization! Have a great year and don't hesitate to contact KATM if we can be of service.



Patrick Foster
President, KATM
patfoster@katm.org

In the coming issues—

December 2015—SMP #1 Make sense of problems and persevere in solving them —
Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches. (from corestandards.org)

February 2016—Reason abstractly and quantitatively

April 2016—Look for and make use of structure AND Look for and express regularity in reasoning

Hello Kansas Teachers!

I don't know about you, but I can't believe how quickly the first quarter is flying by and I'm finally starting to feel like my classroom is running the way I want. I'm pleased with the culture of the room, and we're starting to get some exciting math done! And now, with things running so smoothly at school…..it's time to start thinking about the KATM conference! I'm looking forward to another great experience, and hope to see lots of you there! I hope you enjoy what this issue has to offer!

Sincerely,

Jenny Wilcox

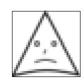
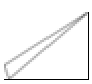
KATM Bulletin Editor

#6 Attend to precision

Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions. (corestandards.org)

The standard in elementary school

The title is potentially misleading. While this standard does include "calculate accurately and efficiently," its primary focus is precision of communication, in speech, in written symbols, and in specifying the nature and units of quantities in numerical answers and in graphs and diagrams.

The mention of definitions can also be misleading. Elementary school children (and, to a lesser extent, even adults) almost never learn new words effectively from definitions. Virtually all of their vocabulary is acquired from use in context. Children build their own "working definitions" based on their initial experiences. Over time, as they hear and use these words in other contexts, they refine their working definitions and make them more precise. For example, the toddler's first use of "doggie" may refer to all furry things, and only later be applied to a narrower category. In mathematics, too, children can work with ideas without having started with a precise definition. With experience, the concepts will become more precise, and the vocabulary with which we name the concepts will, accordingly, carry more precise meanings. Formal definitions generally come last. Children's use of language varies with development, but typically does not adhere to "clear definition" as much as to holistic images. That is one reason why children who can state that a triangle is a closed figure made up of three straight sides may still choose  as a better example of a triangle than  because it conforms more closely to their mental image of triangles, despite its failure to meet the definition they gave.

Curriculum and teaching must be meticulous in the use of mathematical vocabulary and symbols. For example, when students first see the = sign, it may be used in equations like 5 = 3 + 2, or in contexts like 9 + ____ = 8 + 2, in each case making clear that it signals the equality of expressions, and is not merely heralding the arrival of an answer. Teacher Guide information about vocabulary must be clear and correct, and must help teachers understand the role of vocabulary in clear communication: sometimes fancy words distinguish meanings that common vocabulary does not, and in those cases, they aid precision; but there are also times when fancy words camouflage the meaning. Therefore, while teachers and curriculum should never be sloppy in communication, we should choose our level of precision strategically. The goal of precision in communication is clarity of communication.

Communication is hard; precise and clear communication takes years to develop and often eludes even highly educated adults. With elementary school children, it is generally less reasonable to expect them to "state the meaning of the symbols they choose" in any formal way than to expect them to demonstrate their understanding of appropriate terms through unambiguous and correct use. If the teacher and curriculum serve as the "native speakers" of Clear Mathematics, young students, who are the best language learners around, can learn the language from them.

Courtesy of thinkmath.edc.org

Attend to precision

Mathematical Practice Standard

Communicate precisely with others and try to use clear mathematical language when discussing their reasoning.

Understand meanings of symbols used in mathematics and can label quantities appropriately.

Express numerical answers with a degree of precision appropriate for the problem context.

Calculate efficiently and accurately.

Task Elements

Elementary: students are solving problems and carefully formulating explanations to others.

Middle School: students use clear and precise language in their discussions with others and in their own reasoning.

High School: students are examining claims and making explicit use of definitions.

Requires students to use precise vocabulary (in written and verbal responses) when communicating mathematical ideas.

Expects students to use symbols appropriately.

Embeds expectations of how precise the solution needs to be (some may more appropriately be estimates).

Teacher Actions/ Responsibilities

Consistently demands and models precision in communication and in mathematical solutions. (*uses and models correct content terminology*).

Provides opportunities for students to explain and/or write their reasoning to others.

Expects students to use precise mathematical vocabulary during mathematical conversations. (*identifies incomplete responses and asks students to revise their response*).

Questions students to identify symbols, quantities, and units in a clear manner.

Use English Language arts strategies of decoding, comprehending, and text-to-self connections for interpreting symbolic and contextual math problems.

Guided inquiry.

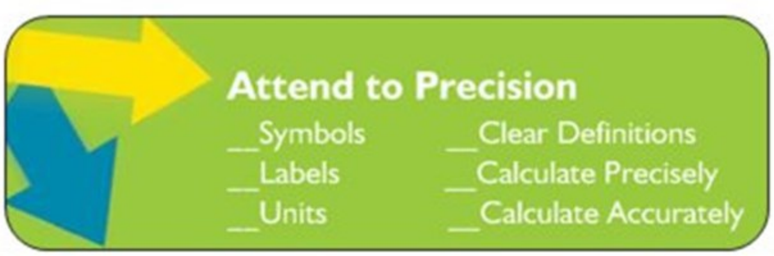
Student Actions/ Responsibilities

Use and clarify mathematical definitions in discussions and in their own reasoning (orally and in writing).

Use, understand, and state the meanings of symbols.

Express numerical answers with a degree of precision.

Express answers within context when appropriate.



Look at this cool idea….print on address-labels and then use to comment on student work!

Oral Language Needs: Making Math Meaningful

by Michelle Pace and Enrique Ortiz

As a Title I kindergarten teacher, I (Pace) have seen firsthand how oral language can create roadblocks for students in all areas of the curriculum, both academically and socially. My experience has placed a major focus of oral language solely on reading skills and standards. At the time of this writing, the state of Florida had recently adopted the Common Core State Standards for Mathematics (CCSSM) (CCSSI 2010), providing an opportunity to address mathematical concepts with more depth and meaning.

As I unpacked CCSSM, I noticed one huge difference between them and the standards I had been folllowing. CCSSM requires students to deepen their learning by communicating explanations of their answers, in oral language and in writing. Additionally, CCSSM presents the Standards of Mathematical Practice (SMPs), which offer a teachers' guide to teaching mathematics with a focus on processes and proficiencies.

Of the eight practices, SMP 6: "Attend to precision" focuses on students' ability to accurately use vocabulary when explaining their reasoning behind an answer. Teachers should strive to include this practice within their lessons to help their students deepen their mathematical understanding through communicating their thought process (CCSSI 2010).

How do kindergarten teachers take a mathematical practice as advanced as "attend to precision" and make it happen in their kindergarten lessons? How do we overcome the major hurdles presented to us by kindergarten students coming from different levels of preparation? We must use oral language strategies to make kindergarten mathematics meaningful.

Building a strong foundation

The American Speech-Language-Hearing Association (ASHA 2013) defines language as an elaborate code made up of socially shared rules that involve the meaning of words, making new ones, putting them together, and finding the best combinations in a given situation; and speech as the oral form of language, which includes articulation (speech sounds), voice (use of vocal folds and breathing), and fluency (the rhythm of speech). Oral language development is one of the most important, yet basic, foundational skills of children:

If children come to school with well-developed oral language, it must be expanded. If children come to school with underdeveloped oral language, it must be developed. Research-based instructional materials must provide instruction and activities to develop and expand oral language, including such opportunities as hearing and using good language models, talking about and discussing meaningful topics, and so forth. The necessity for oral language development and expansion extends from preschool through children's later school experiences. (Education Place 2013, p. 4)

Children enter kindergarten with varied background knowledge and experiences.

The process of teaching children to read includes building vocabulary and creating a foundation of prior experiences for the learner to spring from as he or she enters the world of reading. Students are taught to draw from life experiences and share what they know as they master letters and sounds and create fluency in their decoding skills. So, how do oral language skills affect mathematics success? As the education community makes a shift in standards to CCSSM, in which standards are taught in depth with expected proficiency in concepts, it is time we reflect on and explore how oral language can affect not only reading proficiency but math proficiency as well. Teachers need many strategies in their teaching toolbox. All teachers can benefit from a vocabulary strategy aimed at assisting in their students' oral language development while enhancing mathematical thinking.

Vocabulary strategy

In a recent math professional learning community (PLC), my kindergarten team was introduced to a vocabulary strategy (Clancy 2010), which elicited connection from their taught vocabulary word to students' created pictures. The vocabulary chart is displayed in the classroom so that students can refer to it later. The goal of using this strategy is to give students the opportunity to make meaning of mathematical vocabulary through pictures, words, and oral communication. Many students in my class lack oral language skills or are categorized as English language learners (ELLs). I have found this vocabulary strategy to be beneficial for students' mathematical learning and also as a language intervention strategy for students who have oral language deficiencies.

Implementing vocabulary chart activity

In anticipation of introducing the concept of addition, I knew this would be the perfect opportunity to get students' learning off to a solid start with rich addition vocabulary lessons. CCSSM K.OA1 states that students will "represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps)," physically "acting out situations, verbal explanations, expressions, or equations" (p. 11). Key vocabulary terms include *in all* and *joining* . I created an introductory mathematics lesson focusing on the word joining , which used the vocabulary strategy as a lone activity focused on the word joining . To successfully create the vocabulary chart with student work, it is important for the teacher to give many concrete examples of the chosen vocabulary word so that students can visually see what the word means and also to be physically involved in defining the word through manipulative materials. For example, students were actively involved with the joining process by acting out scenes such as playing in the block lab. We talked about what it would mean for another student to join them in the block area. Students volunteered such answers as "We can go play with them, so now more students will be at the block lab" and "Now we will play together." Students started to catch on to keywords, such as together , as they described the situations and process presented to them.

Darius shared with his classmates the real-world connection he had made to the word *join*.

Another example used animal manipulatives. I created two groups of animals in two separate locations. While I physically moved the two groups into one large group, I asked my students to describe what was happening to the groups. I did this several times, using a variety of groups and then asking students to share with their partner what was happening to the groups. I did this several times, using a variety of groups and then asking students to share with their partner what was happening to the groups. My students were obviously making the connection of joining two groups together because conversations among partners included specific vocabulary such as *altogether* and *joining* . Van de Walle, Karp, and Bay-Williams (2013, p. 107) explain, "Making their strategies public and connecting the strategies to others is interesting and supports learning of all students, while building confidence for the ELL."

Sharing their work

After many modeling examples, students were ready to create the vocabulary chart by creating their own pictures to explain what the word *joining* meant. They were asked to take an index card back to their seat and draw a picture that would explain to the class what joining meant. I explained to them that they must be able to tell the class about their picture and why it represented *joining* . That students understood the vocabulary term was apparent because they applied the word to a real-world situation that they had created. After ten minutes of watching my little mathematicians draw furiously, we started our group sharing. One by one, hands flew into the air, eager to share their work. Students provided answers such as these:

- "I was playing outside, and my mom joined me; now we are both playing together."
- "Here is one marker, and two more are given to me to join; now I have [*counting aloud and pointing*] three."

Students were able to define the word join by creating a meaningful picture. At this point in the lesson, I could tell no observable difference between the varying academic levels of my students. One of my ELL students drew a picture of herself playing under a rainbow with a friend. As she showed her picture to the class, she said, "Here I am playing under a rainbow, and my friend came to join me. Now, there are two children under the rainbow."

Another student raised her hand and added, "There are more kids under the rainbow when you join."

In my classroom, students were making sense of the term *joining* in their own way, making their understanding meaningful and observable through their pictures and dialogue. Students felt more confident in class after this activity. The vocabulary chart displays a piece of each student's thoughts and now hangs in our classroom. The chart enhanced student learning because it helped them apply new knowledge in their own way to make a real-world connection that they could understand. It also served as a constant visual in the classroom to refer to as we tackled new words, such as plus and the addition symbol. For example, after a few lessons learning joining stories and addition problems, students asked me if we could add the addition symbol (+) to the chart, as they now understood it also means joining .

Helping students learn

As I compared my teaching of addition from this year to previous years, I felt that this chart helped my students' learning of mathematics and oral language. I had embraced the foundational needs of each student and created a firm basis that met students at their individual level. As my class progressed through the concept of addition, I observed students attending to precision, which I once saw as unattainable for my students. Their understanding of addition deepened meaningfully as they used real-life stories they created to understand the process of joining groups together. For example, days after the vocabulary chart lesson, I was lining up students for dismissal. As I called each mode of transportation to line up, one of my language students raised his hand and said, "The bus riders are joining the car rider line, just like in our chart we made! The line has more kids now!" I could hear the satisfaction in his voice. It was evident that the meaning of the word *joining* made sense to this student. He demonstrated that he understood the very basics needed to comprehend addition. The evidence is in not only their assessments but also their ability to communicate with their peers.

A diverse, adaptable, useful tool

Oral language development is an ongoing skill addressed in elementary school classrooms. This vocabulary strategy can be adapted to other disciplines and grade levels. For example, it could be used as a quick formative assessment, after vocabulary terms have been taught, to help teachers monitor progress. The strategy could also be easily adapted to include student-produced illustrations, photos, or newspaper clippings that support students' understanding and oral language development of mathematics operation concepts like take-away subtraction, comparison subtraction, multiplication as repeated addition, multiplication as rectangular array, partitive (sharing) division, or measurement (subtractive) division. In conclusion, this oral language strategy is a diverse, adaptable, and useful learning tool available to help students deepen and expand their conceptual understanding of mathematical concepts with real-world connections. clippings that support students' understanding and oral language development of mathematics operation concepts like take-away subtraction, comparison subtraction, multiplication as repeated addition, multiplication as rectangular array, partitive (sharing) division, or measurement (subtractive) division. In conclusion, this oral language strategy is a diverse, adaptable, and useful learning tool available to help students deepen and expand their conceptual understanding of mathematical concepts with real-world connections.

The vocabulary chart hung in the classroom, a visual reminder of each student's work, enhancing their learning as well as helping them apply new knowledge and make real-world connections.

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An Exploration of Hundredths, in Part

 Author: Nicholas J. Gilbertson

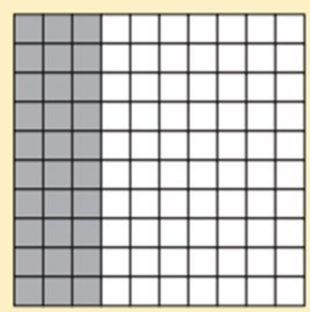
Teachers have found many different ways to support students who are learning about rational numbers. Some of the most productive ways often involve the use of representations that anchor students' experiences in the quantities being learned. Although almost all representations have their limitations, they also provide opportunities to support students in pressing their understanding of rational numbers. In this article, I share an activity motivated by a discussion that occurred during one of my seventh-grade classes. We used a hundredths diagram, in which the area of the large square represented 1 unit (for other interesting uses of this diagram, see Scaptura, Suh, and Mahaffey 2007 and Cramer et al. 2009).

The students had vast experience with this diagram, especially when operating on rational numbers and converting among percentages, fractions, and decimals. Students were given an assignment to shade the appropriate number of squares to represent 1/2 percent. I anticipated that this problem would be unproblematic, and I was surprised to see how difficult it was for many students to solve. Many students felt that one-half of the large unit square should be shaded (focusing on the "1/2" part), whereas many others felt that one-half of a small 0.01 square should be shaded. (Olson et al. 2010 referred to this issue as the "percent predicament." They noted how students confused 5/7 and 5/7 percent.) The ensuing discussion was quite rich, but it failed to create a consensus within the class. Realizing that there was something missing in students' understanding, I gave students the Percentage Art activity sheet.

LEARNING TARGETS

The main purpose of this activity is for students to be able to represent noninteger percentages. Many students view percentages, decimals, and fractions as unique representations. These different representations cause confusion when students are asked to reason using a value such as 0.5 percent. Yet we see these types of percentages all the time in the real world, from population growth rates to auto loan interest rates. This activity supports the Common Core's Standard for Mathematical Practice "Attend to precision" (CCSSI 2010, p. 7) because students have to accurately represent the values in the hundredths diagram (see fig. 1). It also furthers their development of "a unified understanding of number, recognizing fractions, decimals . . . , and percents as different representations of rational numbers" (p. 46).

Fig. 1 A hundredths grid is shaded, in part, to show various quantities.

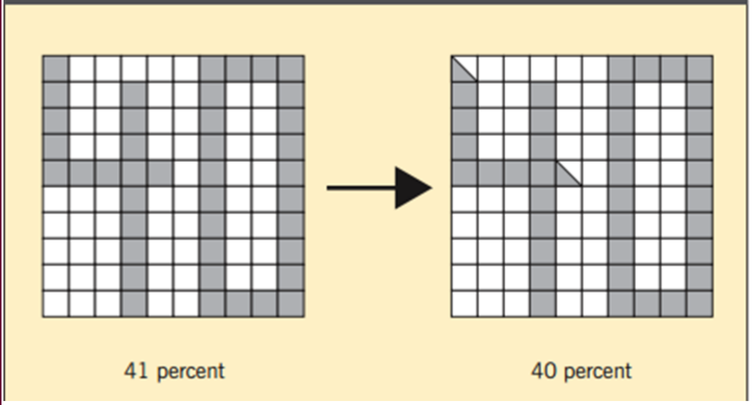


The shaded region represents 30 percent = 30/100 = 0.30.

STUDENTS' EXPLORATION OF THE TASK

In question 1 of the activity, students may need several tries before creating a correct image. Numbers close to 1 (those greater than about 0.80 or 80 percent) and numbers close to 0 (those less than 0.15 or 15 percent) are quite challenging because either of these extremes produce large numbers of shaded or unshaded squares. Numbers between 0.20 and 0.50 seem much easier to create, with students being most successful with quantities between 0.30 and 0.40. Choosing a number that works is an important first step for students to consider.

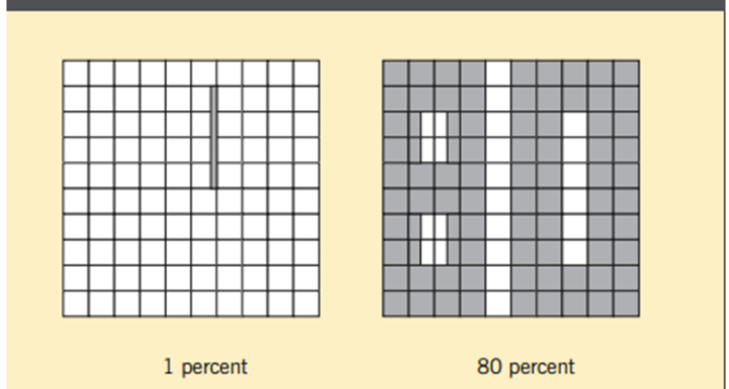
Fig. 2 Half squares are in play to adjust the image's percentage.



Many students will likely be unsuccessful in their first few attempts. This activity works well in small groups of two to four students, specifically because failed attempts can elicit discussion about how to tweak the image so that it meets the criteria of the problem. For example, in figure 2, the student used 41 squares to create the number 40, but with two slight modifications the image only used 40 squares, which was the intended value.

A good way to break up the activity in class is to have a brief discussion after question 1. This gives students an opportunity to see how other students are solving the task and may highlight some interesting points for the class to discuss. For example, in figure 2, one could ask students what value they would give the small triangular piece in the figure (1/2 percent, 0.005, or 1/200), which can help students think about how to accurately represent noninteger percentages.

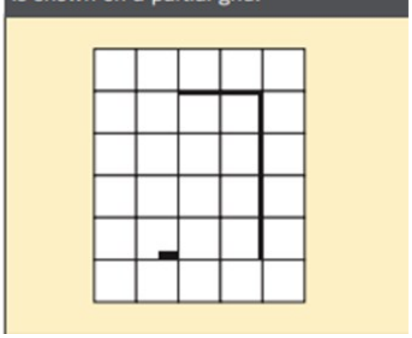
Fig. 3 Representing both small and large percentages often causes difficulties for students.



With questions 2 and 3 on the activity sheet, students explore further how to structure the space in the hundredths grid to make small and large numbers. Students will likely find that working with large amounts of white or shaded space is challenging as well as engaging. Figure 3 shows two examples of these extreme values, 1 percent and 80 percent.

In question 3, students consider the possibility of drawing a number that is less than 1 percent. Students may think that this is impossible because they are used to filling in full squares; they will also think that representing a quantity less than 1 percent will use less than a full hundredth square. If the small triangle (from fig. 2) appeared previously, this would be a good opportunity to remind students that it is possible to shade in values for less than 1 percent. Figure 4 is an example of how a student might represent 7/10 percent. Each segment (and the decimal point) represents 1/10 percent.

Fig. 4 One way to represent 0.7 percent is shown on a partial grid.



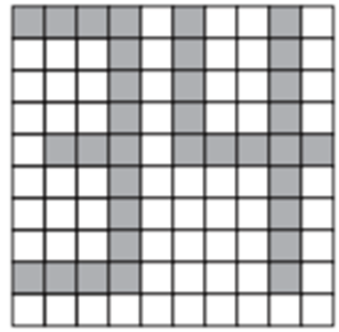
LESSON TAKEAWAYS

After students have had the opportunity to explore and share their solutions, they should have a better sense of how to represent noninteger percentages using the hundredths diagram. In my own class, this activity seemed to be eye-opening for many students in that they had not considered these important rational numbers and how they could use their existing representations in new ways. The hundredths diagram has shown its usefulness in supporting student understanding of representing rational numbers and has many creative uses as students explore this often challenging content of middle-grades mathematics.

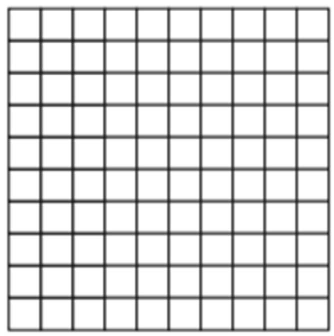
Percentage Art Activity Sheet

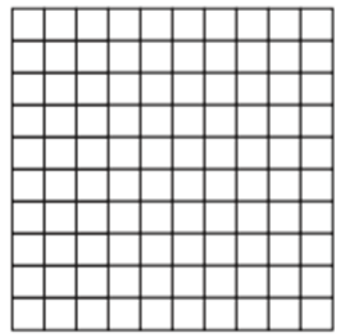
Name____

In the figure at right, what percentage of the unit square is shaded?



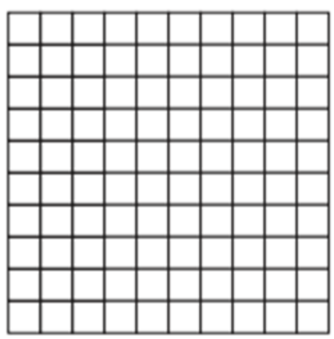
1. Using the hundredths grids at right, represent a number that corresponds to the percentage of the unit square that is shaded, as shown in the example above.



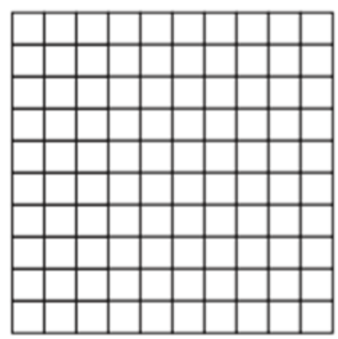


2. 2. What are the smallest and largest numbers you can represent on the hundredths grid? Represent these two numbers at right.

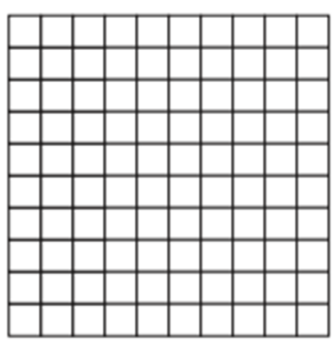
Smallest

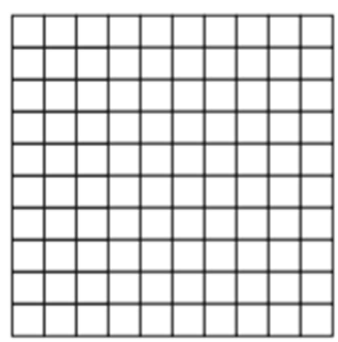


Largest



3. A student from another class claims he or she can represent a number that is smaller than 1 percent (but greater than 0 percent). Is this possible?





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Cramer, Kathleen A., Debra S. Monson, Terry Wyberg, Seth Leavitt, and Stephanie B. Whitney. 2009. "Models for Initial Decimal Ideas." Teaching Children Mathematics 16 (September): 106–17.

Olson, Melfried, Fay Zenigami, Hannah Slovin, Janet H. Frost, and Lynda R. Fig. 4 One way to represent 0.7 percent is shown on a partial grid. Weist. 2010. "Take Time for Action: The Percent Predicament." Mathematics Teaching in the Middle School 15 (March): 374–76.

Scaptura, Christopher, Jennifer Suh, and Greg Mahaffey. 2007. "Masterpieces to Mathematics: Using Art to Teach Fraction, Decimal, and Percent Equivalents." Mathematics Teaching in the Middle School 13 (August): 24–28.

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Smarter Cookies

By Jeremy F. Strayer and Michael Todd Edwards

A news story claiming that the cream filling of a popular "double" cream sandwich cookie is not really double" went viral in fall 2013. A high school mathematics teacher posted a blog entry describing how he and his students measured 20 cookies, analyzed the data, and concluded that the double cream cookies had only 1.86 times the filling of the regular variety (Anderson 2013). A media frenzy ensued. Countless blog sites and large media outlets—including CNN, The Huffington Post, ABC, Time, and The Atlantic—picked up the story, leading many to conclude that the double cream cookies "aren't all they're stuffed up to be" (Perreira and Payne 2013).

The news story broke while we were teaching statistics topics in entry-level undergraduate courses—an introductory statistics course and a methods course for secondary school mathematics teachers. As mathematics educators, we found the report both encouraging and troubling. We are genuinely excited whenever we see real-world applications play a prominent role in school classrooms. Nevertheless, investigative reports highlighting the use of very small, non-representative samples and dubious data collection strategies are disturbing; they reinforce statistical misconceptions and misunderstandings.

In this sense, the story was immediately compelling and timely; it provided us with a vehicle for engaging students in a meaningful investigation of statistical claims in the popular media. Within a few weeks—and after many hours of collaborative planning—we developed a project that encouraged students to implement statistical experiments of their own design while confronting misunderstandings perpetuated by the news story. Here we describe that project—the Cookie Conundrum—through displays and discussions of our students' work. Although we conceived the Cookie Conundrum as one for use with undergraduates or preservice teachers, the project could certainly be examine unfounded claims involving double-cream cookies.

The Cookie Conundrum project consists of three phases. We conceived phase 1 and phase 2 to be completed in approximately one class meeting each, with phase 3 requiring several class meetings. However, we recognize that timing will vary according to the students' prior experiences and content knowledge.

- *Phase 1* (*Replication*): First, students are introduced to the original study. After watching a CNN video high lighting the basics of the news story, small groups replicate the data collection (GAISE component 2) and preliminary data analysis (GAISE component 3), gaining a more detailed understanding of the methods used as they produce comparison data.

- *Phase 2* (*Critique*): Students consider the original cookie investigation and ensuing media coverage more critically. First, they formulate their own research questions (GAISE component 1). Next, they critique the original data collection methods (GAISE component 2) and brainstorm alternatives.

- *Phase 3* (*Reformulation*)*:* Last, students analyze and interpret a revised data set (GAISE components 3 and 4) to answer their own cookie questions.

Next we describe challenges and opportunities that we observed with our students as they engaged in each of the three phases of the project.

PHASE 1: REPLICATING THE ORIGINAL STUDY

We launch the project by showing students a CNN video (http://bit.ly/cnn_cookies) that describes the background of the cookie experiment and the ensuing controversy it prompted. Following the method reported in the video and the teacher's original blog post (Anderson 2013), our students weighed ten regular and ten double-cream cookies, with and without cream, as illustrated in **figure 1**.

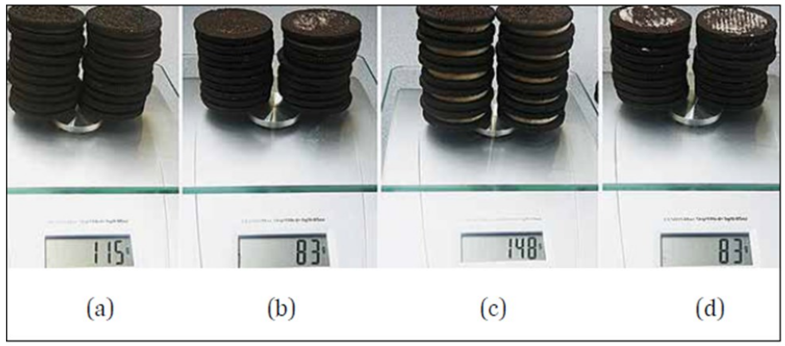

Fig. 1 Students weighed 10 regular cookies (115 g) (**a**), biscuits from the same 10 regular cookies (**b**), 10 double-cream cookies (148 g) (**c**), and biscuits from the same 10 double-cream cookies (**d**).

For each type of cookie, small teams of three to four students separated cream from biscuits, simultaneously twisting the top and bottom in opposite directions. This approach left all the cream on one biscuit. As **figure 2** suggests, teams scraped as much of the remaining cream off the bottom biscuit as possible using readily available materials.

Figure 2

Next, teams subtracted the mass of 10 cookies without cream (i.e., the biscuits) from the mass of the same cookies with cream. This calculation provided an estimate of the mass of the cream, which students used to calculate the cream ratio for 10-cookie samples. Student work is shown in **figure 3**.

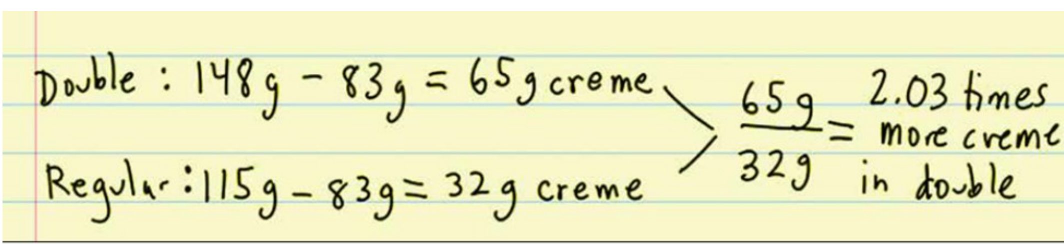

Fig. 3 A student calculated a cream ratio for regular and double-cream sandwich cookies.

Similar calculations by five other teams are provided in **table 1**. As the table indicates, the teams generated conflicting results. Some cream ratios were larger than 2, whereas others were less. This variation, coupled with remarks from the cookie manufacturer stating that "our recipe . . .has double the stuff, or cream filling, when compared with our . . . original" (Perreira and Payne 2013), brought into question both the design of the reported investigation as a statistical study as well as the subsequent media coverage. Confronted with additional data, many students questioned whether newsroom editors and correspondents had taken the time to perform the cookie experiment before reporting their findings.

Table 1 Measures for 10 Regular and 10 Double-Cream Cookies

Group	Regular Cookies with Filling	Regular Cookies without Filling	Double-Cream Cookies with Filling	Double-Cream Cookies without Filling	Cream Ratio
Group 1	115	82	146	82	1.94
Group 2	116	83	146	82	1.94
Group 3	116	82	147	82	1.91
Group 4	114	85	146	81	2.24
Group 5	114	84	147	83	2.13

A prospective high school teacher in our methods course shared the following observations: "It is absolutely amazing to me that the cookie story went viral based on data obtained from 20 cookies in two bags. In 15 minutes, we obtained results that contradicted details presented in the online article. Personally, it's difficult for me to believe that others would report that double cookies have less than twice the icing using data collected this way" (Student A, personal communication, Nov. 21, 2013)

The simple act of repeating the data collection (GAISE component 2) and mathematical analysis (GAISE component 3) allowed our students to experience natural variation that exists in repeated processes, providing an important point of reference as they developed statistical data analysis methods in subsequent phases of the project.

PHASE 2: CRITIQUING THE ORIGINAL STUDY

In the next phase, we asked students to reflect on weaknesses of the original cookie investigation as they critiqued the data collection procedures from phase 1 and formulated their own research questions (GAISE component 1). To help focus classroom conversations and generate discussion, we divided students into a number of small "question" and "data" groups, each consisting of three to four students. Individual question groups were asked to state the aim of the original study as a one-sentence research question. Data groups brainstormed concerns related to data collection procedures. After some time, the small groups came together, forming large question and data groups. The larger groups shared initial ideas, consolidating their findings as they prepared a short presentation for the whole class. Below we provide observations that students shared in their whole-group presentations.

Question Formulation

The following research questions were generated by question groups in our classes.

1. Does a double-cream cookie have double the cream of a regular cookie?

2. Do double-cream cookies have double the cream when compared with regular cookies?

3. Is the average amount of cream in double-cream cookies equal to 2 times the average amount of cream in the regular cookies?

These three questions are related, but the scope of each query is markedly different. Question 1 is not a statistics question as defined by GAISE because it is not answered using data that vary; it is answered by comparing only two individual cookies. On the other hand, questions 2 and 3 are answered using multiple cookies of the same type, and the amount of cream in each will differ, even if only slightly. Moreover, questions 2 and 3 suggest generalization to the broader group of all regular and double-cream cookies. In addition, question 3 suggests comparing the mean (i.e., average) amount of cream, a population parameter, in the two cookie types. In whole-group conversations, students noted that questions 2 and 3 "ask the same sort of question" but that question 3 suggests "what to do" more clearly than question 2.

The comparison of student-authored research questions helped students—both those in methods courses and those in introductory statistics courses—recognize the importance of posing questions succinctly, in ways that are clearly measurable and testable. Further, the task emphasized that statistical studies require asking statistical questions— those that can be answered using data that vary.

Data Collection

The concerns of our data-group students focused on limitations associated with sample size. In addition, students identified problems concerning data variation, instrument precision, and random sampling. These concerns are summarized below.

Sample size and variation.

The data-group students agreed that sample size in the original investigation was "too small," although they struggled to articulate what "too small" meant. Several groups recommended repeating the original investigation with 50 of each cookie rather than 10. This recommendation led to a series of interesting questions. For instance, why not 100? Why not 500? How many cookies are needed? Questions such as these sparked animated debates in each of our classes. Although some students agreed that 50 cookies would provide a more accurate overall measure of regular and double-cream varieties than 10, others understood that statistical questions need to be answered using data that vary (Franklin et al. 2007). By challenging students with the question "How many measurements were actually taken?" students came to the conclusion that finding the average weight of 10 or 50 (or even 5 million) cookies provides a single measure of weight and, as such, fails to reveal how weight in a sample tends to vary from one cookie to another. When we asked students, "Is taking one measurement enough?" they responded that the original investigation failed to provide information regarding variation of cream weight "from cookie to cookie" for each cookie type.

Instrument precision.

A number of students in both classrooms expressed concerns regarding the precision of the scales used to measure cookies. Note that the scales in **figure 2** measure mass to the nearest gram. Hence, conflicting results may be due in part to instrument precision. For instance, one methods student asked her classmates to consider the measurements in the first row of **table 1**. She pointed out that measures of 146.4, 81.5, 114.5, and 82.4, when rounded to the nearest gram, yield a cream ratio identical to that provided in the table: 1.94. Yet the unrounded measures yield a ratio larger than 2 (i.e., 2.02). Students' observations such as these suggested the need for scales that measure to the nearest tenth or hundredth of a gram.

Random sampling.

Last, our students noted that the cookies in the original investigation came from the same package. As such, the cookies were manufactured on the same day, at the same time, on the same machinery, at the same processing plant. As one preservice teacher commented, "What if the icing station at the double-cream factory was dispensing less cream than usual on that day? What if regional differences existed at different factories?" (Student B, personal communication, Nov. 21, 2013). By failing to randomly sample cookies, the original investigation failed to account for possible variation associated with the cookie manufacturing process.

PHASE 3: REFORMULATING THE STUDY

In the final phase, we asked students to reformulate the original study. In small teams, they developed their own research questions (GAISE component 1) and described their own procedures for collecting (GAISE component 2), analyzing (GAISE component 3), and interpreting (GAISE component 4) cookie data (see the sidebar). Phase 3 culminates with students sharing their analyses and findings in short presentations to classmates.

Here we highlight issues critical to the success of this phase. Specifically, we describe how students addressed their concerns associated with data collection, sampling, precision, and variation. Last, we highlight a statistical investigation that was popular among introductory statistics students that aimed to compare regular and double-cream cookies more rigorously than the original cookie investigation.

Sampling Concerns

Students commonly believe that factors such as sample size are more important than representativeness, so at the beginning of phase 3 we emphasized the importance of collecting data from a sample that adequately represents the population. Through online research, students learned that this particular brand of regular and double-cream cookies is manufactured at two different factories in the United States. They also learned that strict controls are implemented to ensure uniformity at each factory through a Total Quality Management (TQM) process (Manley 2011; Lusas and Rooney 2001). On the basis of these findings, students concluded that it was reasonable to assume that cookies purchased from a few different stores at different times could adequately represent the population of all regular and double-cream cookies.

Precision and Variation Concerns

Students determined that a precision scale capable of measuring mass to the nearest hundredth of a gram should be used to collect mass data from individual cookies. Unlike the original investigation, which provided students with a single measure of mass, the revised approach should provide students with access to data that vary.

Data Collection Concerns

Because purchasing packages of cookies and precision scales for multiple groups is cost prohibitive and because significant time is required to collect individual cookie data, we elected to collect cookie data that our students could subsequently use in their follow-up work. We measured the mass of cream and biscuits for 180 regular and 180 double-cream cookies purchased from different stores in two different states. Our data collection was informed by concerns that students expressed in phase 2. We provided access to the data from an online spreadsheet available at http://bit.ly/cookie-data.

Student Investigation

After concerns regarding data collection, sampling, and precision were addressed, small groups of students formulated their own research questions in phase 3. One group's research question is provided in question 4:

4. Is the mean mass of cream in all double-cream cookies equal to twice the mean mass of cream in all reg ular cookies?

To address this question, the student group performed a hypothesis test with the provided data after deciding to identify and remove outliers. Using a two-sided (i.e., two-tailed) *t*-test, the group determined whether there was evidence that the mean of twice the mass of the regular cream is different from the mean double–cream mass. Using R, a freely available statistics analysis software (go to http://www.r-project.org), students analyzed data from http://bit.ly/cookie-data to generate the results provided in figure 4.

Variable Name	estimated mean	degrees of freedom	t	p	confidence interval percent	confidence interval of difference
original2x.no.outliers double.no.outliers	6.334379 6.514118	224.6721	-4.734654	3.885102e-06	95	-0.2545469 -0.104931

Fig. 4 Student results of a *t*-test comparing the mean of twice the mass of regular and double-cream data sets showed evidence that double-cream cookies have more than twice the cream of regular cookies.

In their written work, students summarized their interpretations of these results, connecting the t-statistic back to regular and double-cream cookies. After a class discussion of these results, one team member wrote the following summary: "The t-test gives a p-value of 0.000004. This means that if we randomly collected 360 cookies many, many times, where the double-cream cookies are truly twice the regular cookies, only 0.0004% of those samples would produce the difference we observed in our data. Because this probability is so small and because the mean cream weight of the double-cream cookies in our sample was larger than twice the mean cream weight of our regular cookies, we can conclude that, on average, the cream in double-cream cookies for this brand is actually more than twice the cream in the regular cookies" (Student C, personal communication, Nov. 21, 2013).

These findings were consistent with those of other student groups in both our classes. Without exception, students found reasonable evidence to conclude that double-cream cookies, in fact, had at least twice the cream of regular cookies. Arguably more important, students in both classrooms recognized that the media failed to tell the whole story.

NEXT STEPS AND IDEAS FOR FURTHER STUDY

Engaging Students at Various Levels

Connecting content from the mathematics classroom with news stories in the popular media provides students at any level with opportunities to use tools that are accessible to them to strengthen their understanding of statistics. Students in earlier grades can analyze cookie data using comparative displays (box plots and stem-and-leaf plots); measures of center (mean, median, and mode); measures of spread (variance, standard deviation, and interquartile range); and position (quartiles and percentiles). More advanced students can use resampling and bootstrapping methods or more traditional hypothesis testing such as that presented in the previous section.

Exploring Other Topics

The Cookie Conundrum project demonstrates ways in which new teaching and learning ideas can be generated in the space created by the overlap of popular media, teacher blogs, and instructional objectives. Certainly, such investigations are not limited to the study of cream-filled cookies. The three-phase model explored here may be used to investigate a myriad of other media claims in the mathematics classroom. Indeed, accounts in the popular media are rife with categories of examples worthy of exploration in school classrooms. Consider the following news stories and advertisements:

THE COOKIE CONUNDRUM: PHASE 3

Formulating a Question

1. What question does your group wish to answer with the revised cookie data? State the aim of your follow-up investigation as a one-sentence research question.

Collecting Data

2. What issues should you address when collecting data that will help you answer the question that you formulated?

Analyzing Data

3. Analyze the cookie data available at http://bit.ly/cookie-data, specifically addressing the research question 1. Describe the steps of your analysis in several complete sentences. For each step, provide a brief justification for its inclusion in your study.

Interpreting Results

4. What do the results of your analysis appear to indicate? Justify your conclusions using evidence from your data analysis. Include data displays (e.g., graphs, output from statistical software, etc.). In several complete paragraphs, give thoughtful interpretations of these displays and the other data analysis that you performed.

- A teen recently claimed that the U.S. government would save $400 million by changing fonts on government documents from Times New Roman to Garamond (Miller 2014). Is this true? What mathematical and statistical claims are made in the media story?
- A news report claims that students are not attending school dances because of their social media use (Pawlowski 2014). Is this claim warranted? What role did data, mathematics, and statistics play in this story?
- A popular sandwich chain was recently sued for selling foot-long subs that were shorter than expected (Arumugam 2013). Was such a lawsuit warranted? What role might statistics play in the controversy?
- A popular brand of gum is marketed as producing "double" bubbles. Does the size of bubbles generated while chewing this brand of gum result in bubbles that are any larger than competing brands of bubble gum?

The Cookie Conundrum project provides powerful learning opportunities for students and their teachers. First and foremost, the project empowers students to question news reports that make use of mathematics and statistics. Because today's students live in an age of unparalleled access to data and technology, they need opportunities to grow as critical consumers of information. Classroom activities that encourage students to analyze data and statistics in media literacy contexts—news articles, blog posts, video analyses, statistical reports—address calls for instruction that is both "robust and relevant to the real world" (CCSSI 2010). As students complete the Cookie Conundrum project, they are surprised to uncover reporting that misrepresents facts. Moreover, they understand that journalists and readers need solid statistical understanding to report and respond to quantitative studies in an educated manner. Indeed, the project illustrates the need for quantitative literacy among all our citizenry.

Teachers who provide opportunities for students to make meaning of the complexities found in the four components of statistical studies (as outlined by the GAISE report) will help those students decipher warranted and unwarranted statistical claims—whether the claims are found in the news media, government reports, or the workplace. When we neglect to help students make meaning of these components, we unwittingly provide them with an artificial sense of the statistical design and investigation process. Through projects like the Cookie Conundrum, students are challenged to reason with and about data to reach well-reasoned conclusions in easily accessible and highly motivational contexts.

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NCTM Update

My name is Stacey Bell and I am pleased to be the NCTM Rep for KATM. NCTM has a new website design and has been focusing on developing its Affiliate Site for its members. As an affiliate of NCTM, KATM is able to now post our upcoming events on this new site for neighboring states to see. And likewise, we are able to see what other affiliates are doing around us. You should check it out at http://www.nctm.org/affiliates/

In other news, the NCTM election is coming up. Voting starts Sept. 30 for NCTM members. There are four positions to vote for to fill their executive board of directors.

Candidates for Director, Elementary Level (one will be elected)

Gina Kilday, Metcalf Elementary School, Exeter, RI

Steven T. Klass, Park Dale Lane Elementary, Encinitas, CA

Candidates for Director, Middle School Level (one will be elected)

Gloria Brown Brooks, Santa Ana Opportunity School, Hollister, CA

Kevin J. Dykema, Mattawan Middle School, Mattawan, MI

Candidates for Director, Canadian Region (one will be elected)

Olive Chapman, University of Calgary, AB

Maureen MacInnis, Charles P. Allen High School, Bedford, NS

Candidates for Director, At-Large (one will be elected)

Eric Milou, Rowan University, Glassboro, NJ

Kay A. Wohlhuter, University of Minnesota Duluth, Duluth, MN

To find out more about these candidates and make informed decisions go to: http://www.nctm.org/election/ to find bios for each candidate. You will also want to make sure your email address is current.

Being members of both organizations allows you to have a wealth of resources for you and your classroom.

KATM Cecile Beougher Scholarship
ONLY FOR ELEMENTARY TEACHERS!!

A scholarship in memory of Cecile Beougher will to be awarded to a practicing Kansas elementary (K-6) teacher for professional development in mathematics, mathematics education, and/or mathematics materials needed in the classroom. This could include attendance at a local, regional, national, state, or online conference/workshop; enrollment fees for course work, and/or math related classroom materials/supplies.

The value of the scholarship upon selection is up to $1000:

- To defray the costs of registration fees, substitute costs, tuition, books etc.,
- For reimbursement of purchase of mathematics materials/supplies for the classroom

An itemized request for funds is required. (for clarity)

REQUIREMENTS:

The successful candidate will meet the following criteria:

- Have a continuing contract for the next school year as a practicing Kansas elementary (K-6) teacher.
- Current member of KATM (if you are not a member, you may join by going to www.katm.org. The cost of a one-year membership is $15)

APPLICATION:

To be considered for this scholarship, the applicant needs to submit the following no later than June 1 of the current year:

1. A letter from the applicant addressing the following: a reflection on how the conference, workshop, or course will help your teaching, being specific about the when and what of the session, and how you plan to promote mathematics in the future.
2. Two letters of recommendation/support (one from an administrator and one from a colleague).
3. A budget outline of how the scholarship money will be spent.

Notification of status of the scholarship will be made by July 15 of the current year. Please plan to attend the KATM annual conference to receive your scholarship. Also, please plan to participate in the conference.

SUBMIT MATERIALS TO:

Betsy Wiens
2201 SE 53rd Street
Topeka, Kansas 66609

Go to www.katm.org for more guidance on this scholarship

Capitol Federal Mathematics Teaching Enhancement Scholarship

Capitol Federal Savings and the Kansas Association of Teachers of Mathematics (KATM) have established a scholarship to be awarded to a practicing Kansas (K-12) teacher for the best mathematics teaching enhancement proposal. The scholarship is $1000 to be awarded at the annual KATM conference. The scholarship is competitive with the winning proposal determined by the Executive Council of KATM.

PROPOSAL GUIDELINES:

The winning proposal will be the best plan submitted involving the enhancement of mathematics teaching. Proposals may include, but are not limited to, continuing mathematics education, conference or workshop attendance, or any other improvement of mathematics teaching opportunity. The 1-2 page typed proposal should include

- A complete description of the mathematics teaching opportunity you plan to embark upon.
- An outline of how the funds will be used.

An explanation of how this opportunity will enhance your teaching of mathematics.

REQUIREMENTS:

The successful applicant will meet the following criteria:

- Have a continuing contract for the next school year in a Kansas school.
- Teach mathematics during the current year.

Be present to accept the award at the annual KATM Conference.

APPLICATION:

To be considered for this scholarship, the applicant needs to submit the following no later than **June 1 of the current year.**

- A 1-2 page proposal as described above.

Two letters of recommendation, one from an administrator and one from a teaching colleague.

PLEASE SUBMIT MATERIALS TO:

Betsy Wiens, Phone: (785) 862-9433, 2201 SE 53rd Street, Topeka, Kansas, 66609

KSDE Update, June 2015

Assessment

Assessment had less technical difficulties than last year.

Standard setting took place in late July. A team of math teachers from across the state at different levels was assembled to participate in this.

Item reviews are taking place in June, August and October for new items.

HS will have performance task this next year. It will be a pilot year. It should be similar in length as other grades, taking roughly 30 minutes to complete.

KSDE and CETE met over the summer months to discuss positives and negatives about the assessment process and use feedback from the field to make possible changes.

Acceleration Group

KSDE received approval on a contract to create a group to focus on the issue of acceleration in middle and high school mathematics. This group will met July 13-15 in Lawrence and was comprised of K-16 math educators across the state. This group was tasked with creating the following items:

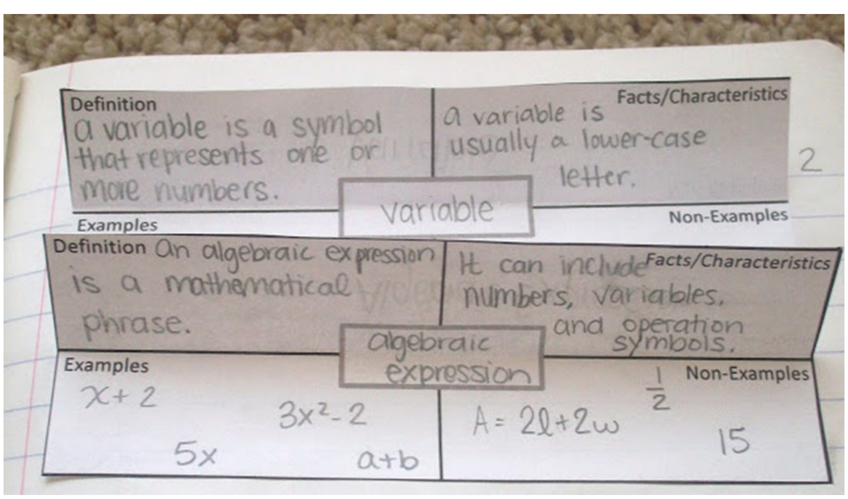
*a paper on acceleration and maybe sequencing

*pipeline for grades 6-12, both from a traditional standpoint as well as integrated,

*parent Guide on acceleration and sequencing, a concise document with the facts about what acceleration meant in the past and what it means now and what the research is showing is best for students to achieve success in college and the workforce

*video for the public explaining the costs/benefits to acceleration and what the research says is best for students

KSDE has a Twitter account for Math now @ksdemath so please follow if you participate in this form of social media and share with others! Tweets are posted on the KSDE math website http://community.ksde.org/Default.aspx?tabid=5255 it is easier to view using chrome rather than Internet Explorer.



Here's a great way to have students focus on attending to precision with vocabulary in their math notebooks. Photo from http://mathequalslove.blogspot.com/2012/08/a-peek-at-my-algebra-1-interactive.html?showCom-

KSDE Update, September 2015

2014 - 2015 ELA and Mathematics Cut Scores

Cut scores for all performance categories for the 2014 - 2015 KCCRA ELA and Mathematics assessments and the DLM ELA and Mathematics assessments are now posted on the KSDE Assessments webpage.

http://community.ksde.org/Default.aspx?tabid=5418

ELA and Math Kansas College and Career Ready Assessments

Preliminary state-level aggregate data was shared with the State Board of Education and released to the public.

Emphasis during the Board presentation was placed on consulting the Performance Level Descriptors (PLDs) when reviewing and analyzing results for each performance category. The Performance Level Descriptors can be found at http://www.ksassessments.org.

Included in the September 8 press release on the assessments was information about the four new performance categories.

Because of the dramatic shift in assessment format as well as the increased rigor of the standards, assessment results cannot be compared to any previous assessment. The 2015 results will serve as a benchmark by which to measure future progress.

Press release is available at http://www.ksde.org/Portals/0/Communications/Admin/Kansas%20Schools%20Raising%20the%20Bar%20on%20Student%20Success_FINAL.pdf

October 1:

Parent letters and district/building reports will be available in KITE at CETE. The CETE reports will provide individual, building, and district sub-score and claim data. These reports are intended to be used for instructional purposes.

October 12:

Beginning October 12, districts and buildings will be able to view assessment results in the KSDE Check Your Data authenticated application. To request access to the Check Your Data application, district and building personnel will need to login to Common Authentication and select the "manage my account" button and select "check your data" from the list of options. Once requested, the superintendent will need to authorize access. The Common Authentication link is https://onlineksde.org/authentication/login.aspx

A quick guide to checking data will be provided within the application to assist schools in reviewing, correcting, and verifying information.

October 31:

October 12 through October 31 is the correction window for buildings and districts to review their 2015 assessment results and make any necessary corrections. The 2015 assessment results will serve as baseline data for future accountability measures.

KSDE Update, September 2015

November 30:

Districts and buildings will be able to preview the 2014/15 state Building Report Card on the KSDE authenticated website.

December 8:

KSDE will release the 2014/15 Building Report Card on the KSDE website after the presentation to State Board of Education.

KSDE K-5 Parent Guides

The Kansas State Department of Education is excited to announce the release of our Parent Guides created for Kansas parents by Kansas educators!

These documents help provide a clearer understanding of what students will learn at a specific grade level in parent friendly language. Furthermore, these documents provide a few activities parents can do at home with their child to further support their learning of mathematics. The Guides are simple yet precise one page documents that are perfect for distribution during parent teacher conferences or any other school related event.

Check out these and other great parent resources at http://community.ksde.org/Default.aspx?tabid=5651.

Join the Conversation!

Committees will soon be formed to review The Kansas College and Career Ready Standards in English Language Arts (ELA) and Mathematics. Once committees are defined, the first order of business will be to review the current standards and the feedback received from our constituents about the standards. Toward that end, the KSDE is inviting you to provide input on the standards and have a voice in the conversation. Please join us in the conversation by accessing the standards web application at: http://standards.ksde.org/.

Your feedback is important to us. Share this site and this message with your stakeholders. Provide us with information on what you think about our Kansas College and Career Ready standards in ELA and Mathematics. **All interested parties wishing to provide feedback have until October 30, 2015 to submit feedback via this interactive website.**

State Tour Revisits Schedule

Earlier this year, Kansas Commissioner of Education Randy Watson and Deputy Commissioner Brad Neuenswander held community conversations across the state to find out from the citizens of Kansas what they want from their education system. More than 1,800 Kansas residents, teachers, parents, students, higher education representatives and members of the business community participated in these events and their responses have been gathered and analyzed. Now, it's time to report back on what Kansas told us.

Join us at one of the following events as we share the results of these important community conversations that will help shape the future of Kansas education. Dates listed on following page.

KSDE Update, September 2015

Date	Time	City	Location
September 16 (Wednesday)	**11 a.m.**	**Topeka**	Kansas Association of School Boards (KASB) 1420 SW Arrowhead Road, Topeka
September 25 (Friday)	**10 a.m.**	**Hutchins on**	Education Services and Staff Development Association of Central Kansas (ESSDACK) 1500 E 11th, Hutchinson
September 25 (Friday)	**1:30 p.m.**	**Wichita**	School Service Center Bldg. 3850 N. Hydraulic, Wichita
September 28 (Monday)	**12:30 p.m.**	**Ellis**	Ellis High School (auditorium) 1706 S Monroe, Ellis
September 29 (Tuesday)	**11:30 a.m.**	**Sublette**	Southwest Educational Service Center (SWKESC) 810 Lark Avenue, Sublette
September 30 (Wednesday)	**11:30 a.m.**	**Oakley**	Northwest Kansas Service Center (NWKESC) 703 W. Second, Oakley
October 1 (Thursday)	**11:30 a.m.**	**Salina**	Webster Conference Center 2601 North Ohio, Salina
October 6 (Tuesday)	**11:30 a.m.**	**Olathe**	Educational Center 14160 Black Bob Road, Olathe
October 7 (Wednesday)	**11:30 a.m.**	**Greenbush**	SE Kansas Education Service Center (Greenbush) 947 W. Highway 47, Girard
October 8 (Thursday)	**11:30 a.m.**	**Clearwater**	South Central Kansas Education Service Center (SCKESC) 13939 Diagonal Road, Clearwater

Contact: Penny Rice, price@ksde.org.

Do you like what you find in this Bulletin? Would you like to receive more Bulletins, as well as other benefits?

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Are you a member of NCTM? Yes___ No___

Position: (Cirlce only one)

Parent
Teacher:: Level(s)________
Dept. Chair
Supervisor
Other

Referred by: ________________________________

KANSAS ASSOCIATION MEMBERSHIPS

Individual Membership: $15/yr. ___

Three Years: $40 ___

Student Membership: $ 5/yr. ___

Institutional Membership: $25/yr. ___

Retired Teacher Membership: $ 5/yr. ___

First Year Teacher Membership:$5/yr. ___

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(open to spouses of current members who hold a regular Individual Membership in KATM)

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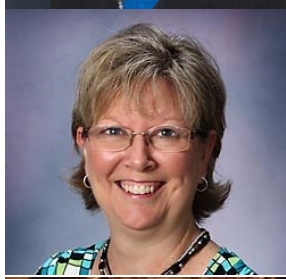

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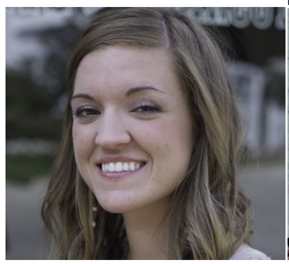

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