Spring 2017

eNewsletter

The Mathematically Connected Communities (MC²) spring edition is the second of two eNewsletters for the 2016-2017 school year. Please Note: These are interactive newsletters intended to be viewed online in order to be able to access the embedded links to the multiple resources provided. Upcoming editions will be emailed to subscribers. Anyone not currently on our listserv may subscribe by emailing Sheila (sshills@nmsu.edu).

This year's eNewsletters will serve as a follow-up for districts who attended the MC² summer 2016 professional learning sessions. Those who did not attend can also benefit from these.

In this issue:

- 2017 Summer Professional Learning Opportunities
- MC² Presentations/Publications
- PARCC Update
- Where are they now?

2017 Summer Professional Learning Opportunities

We are excited to offer New Mexico educators an opportunity to participate in MC² Summer **MathLab™** – a professional learning experience in mathematics designed for teachers and instructional coaches to enhance their content and pedagogical knowledge, deepen their understanding of the CCSS-Mathematics, and study effective research-based best practices.

2017 MathLab™ Locations & Dates:

Las Cruces: June 5-9 (Grades 6-12) **Alamogordo:** June 5-9 (Grades K-5)
Los Lunas: June 12-16 (Grades K-12) **Santa Fe:** June 19-23 (Grades K-8)

For more information contact a MC² Mathematics Education Specialist (http://mc2.nmsu.edu/community/mathed.htm).

MC^2 Presentations/Publications:

Upcoming Presentations:

- Society for Information Technology and Teacher Education (SITE) Conference: *Mathematically Connected Communities: Flexible and Budget-Friendly Online Professional Learning Design to Promote Best Practices* by Sara Morales and Terri Sainz on March 8, 2017, 1:45 pm-2:45 pm, Austin, Texas. (http://site.aace.org/conf/overview/)

- NCTM Annual Meeting & Exposition: *MathLab™: Building Conceptual Understanding of Exponential Functions in Algebra I* by Kathe Kanim and Regina Watson on April 8, 2017, 1:30 pm-2:45 pm, San Antonio, Texas. (Program at http://www.nctm.org/annualprogram/)

- STEM Symposium: June 1-2, 2017 in Albuquerque, NM. *Look for MC^2 presentations.* (http://ped.state.nm.us/ped/MathandScience_index.html)

Publications:

Two articles published by Learning Forward in their February 2017 issue of *The Learning Professional* (formally known as the *Journal of Staff Development*):

- ***Moving from 'students can't' to 'how students can': A learning design anchored in the Standards for Professional Learning puts the focus on equity***. By Janice Bradley, Andrea Rorrer, Ashley McKinney, and Cori Groth (Available to the public at https://learningforward.org/docs/default-source/the-learning-professional-february-2017/moving-from-students-cant-to-how-students-can.pdf)

- ***Problem solvers: MathLab's design brings professional learning into the classroom.*** By Sara Morales and Terri Sainz (Available with membership to Learning Forward at https://learningforward.org/publications/jsd/jsd-blog/jsd/2017/02/21/the-learning-professional-february-2017)

PARCC Update:

MC^2 is sponsoring teacher information sessions on how to help students fluently utilize the technology tools associated with the PARCC assessment. The purpose of these grade-band online tutorials is to demonstrate with commentary how to navigate ion and use the tools available for the Computer-Based Assessments. The items appearing in the tutorials are samples used to allow students and educators to gain familiarity with the technology platform that will be used for taking the PARCC assessments. Check the MC^2 website often for the archived videos to be released in March. The following grade-bands will be represented since each has its unique navigation tools not highlighted in prior samples.

- Grades 3-5
- Grades 6-7
- Grade 8
- High School (including 8th grade Algebra I)

Where are they now?

This MC^2 eNewsletter highlights a Fall 2016 MC^2 Math Content Workshop participant:

Who: Richard Armentrout

What/Where Teaching: Grade 8-Algebra I, Cuba Middle School
Cuba Independent School District

After attending the Fall MC^2 Math Content Workshop in Bloomfield, I had my class work with Fermi problems and wanted to share my students' work. Enrico Fermi was an Italian physicist who lived from 1901 to 1954 and created the world's first nuclear reactor. In 1938, he was awarded the Nobel Prize in Physics. He is also credited with the "Fermi Problem" which involves calculations using educated estimates to solve a seemingly impossible problem. Fermi was fond of questions such as, *How many piano tuners are there in Chicago?* An example of a Fermi problem may be *How much popcorn would it take to fill the Grand Canyon?*

The class worked in groups of two and three to solve problems such as *How many ants are in New Mexico?* or *What are the ratio of cats to birds in New Mexico?* They had to research statistics, extrapolate from this information, and apply problem-solving strategies to arrive at defendable conclusions. Students also had to consider questions such as *How do migration patterns influence populations?* or I*s this population a function of area (birds) or a function of human population (cats)?* They completed the project by designing and presenting a poster which defended their results as classmates critiqued their work.

Mathematical Practices which are part of the New Mexico Common Core State Standards addressed in this project included:

- MP 1. Make sense of problems and persevering in solving them.
- MP 2. Reason abstractly and quantitatively.
- MP 3. Construct viable arguments and critique the reasoning of others.

One of the groups estimating the number of ants began by looking at how many ants there were in the United States (approximately 100 trillion). They then divided by the number of states (50) to get their high guess (around 2 trillion) and divided by the area of the United States (3,767 million) to come up with their low estimate (263,365 ants per square mile). To make their answer more precise, the group found the area of New Mexico

and multiplied that by the estimated number of ants per square mile. Their final answer was 32,050,829,602 ants in New Mexico (see Figure 1).

The project encouraged students to go deeper into their investigations to consider, for example, the migration paths of birds in New Mexico and how bird populations vary in the course of a year. Some students wondered whether to include cats in shelters (see Figure 2). Many of them asked questions about populations being a function of land mass, such as birds, or a function of human populations, such as pets. This brought up discussions about census populations—comparing them to land areas for each of the states.
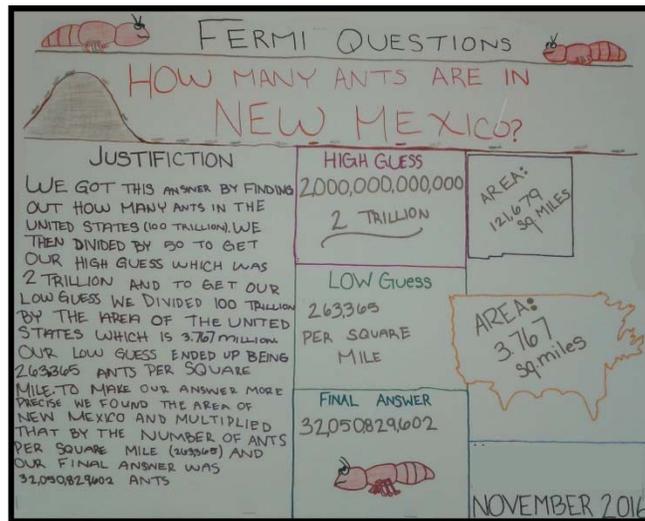

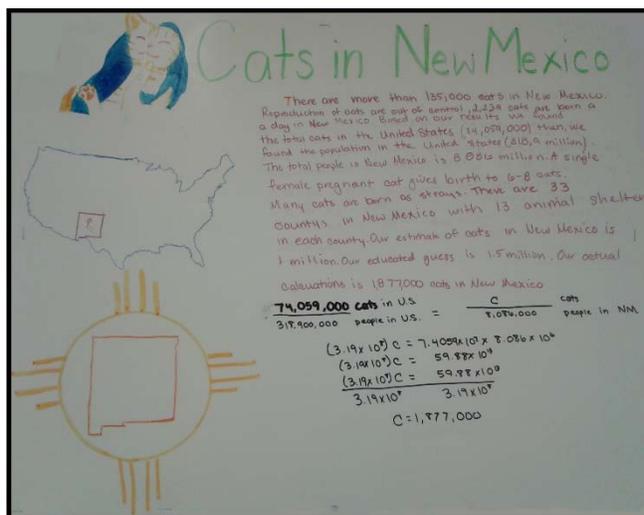Figure 1: How Many Ants Are in New Mexico?

Figure 2: Cats in New Mexico

Scientists often use the term order of magnitude to describe a ballpark estimate. The order of magnitude of a number is which power of ten it is closest to, or how many digits the number has before the decimal point. For example, if you were estimating the number of people in New Mexico, then one million would be the right order of magnitude, but one billion or one thousand would not. To clarify, the purpose is not to find out the exact number, but to practice reasoning with quantities, assumptions, and estimates.

One of the most valuable lessons they learned from this activity is that they can always go deeper. The more they learn, the more questions they start to ask and as they go deeper and deeper with their investigations, their accuracy will more than likely improve and this process strengthens the viability of their justifications.

For questions contact a MC² Math Education Specialist **or**
Email Sheila **or** Terri
MC² Home Page

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MC² is always striving to improve the learning experience.