

# This Week at Central Academy

## January 25, 2010

Math is a language. It's strange, because I never realized this, or even heard it spoken, in my own K-12 education. But, in its purest form, math is a way of viewing the world around us, and then communicating that with others. Somehow, in my elementary and high school education, I always thought of math as a subject that stood alone and rarely connected with any of my other subjects, let alone with the world around me. What we used to call "story problems" (if a train leaves New York at... and another leaves San Francisco at...) were the bane of my existence in school. Something evil dreamed up by people with way too much time on their hands.

But in today's global world, one in which children are asked to understand and communicate information at far younger ages than we were, it is becoming increasingly important for those of us in education to do a far better job of teaching math, and helping students to draw connections between it and the real world.

This week's edition of *TWAC* is the second in our focus on math at Central. With the district's adoption of two math programs, one, *Investigations*, in the form of a text book, and the other, *Cognitively Guided Inquiry*, which is a process we use, we have gained two dynamic ways to help students understand and communicate about math. Central's opportunities for real-world experiences and discussions add to these new math structures, helping to enhance and deepen their impact on students.

I hope you will take a minute to glance at several of the articles. This will give you the opportunity to see how math is present throughout the day in the lives of our students. I am truly excited about the conversations I hear throughout the building at all levels around mathematical questions. An overwhelming majority of our students at Central have always loved math, but the richness of the conversations and debates I now hear around math has really helped to extend their thinking. From kindergarten through eighth grade, our students are daily growing in their realization that math is a way of looking at our world and communicating what we see. Imagine where that will take them in their future!

*Dianna*

### Central Academy's Website

Find out what's going on at Central by frequently visiting our website. The website includes:

Important Dates    Newsletters    Classroom Web pages

Pictures of Students (**You can search by student's first name, teacher name, or by level!**)

[www.middletowncityschools.com](http://www.middletowncityschools.com)

(click on Central Academy)

### IMPORTANT DATES

Jan. 27	Early Release – 2:00
Feb. 9	TEAM Bd. Mtg. – 6:30
Feb. 10	Early Release – 2:00

# EARLY PRIMARY CLASSROOMS

The new Investigations curriculum in math has provided many opportunities for the students in **Mrs. Brooks' Early Primary** class to extend their thinking. Over the last few weeks we have been working on collecting and representing data. This past week we have been collecting data of student's ages in our class and making representations of them. After seeing the results of our class' ages the students began to wonder how Mrs. J's students' ages would compare to ours.

We collected data from Mrs. J, and students made representations of Mrs. J's class ages. After comparing the two classes and having a lot of discussion about the ages of students, my students noticed some things that were the same and different about our class and Mrs. J's class. *Jerrel* and *Mason* noticed that all of the students in both classes were either 5, 6, or 7 years old. *Lorenai* and *Au'Laila* discovered that Mrs. J's class has 5 more students than Mrs. Brooks' class. *Taylor* and *Emilee* noticed that there are more 6 year olds than other ages in both Mrs. J's and Mrs. Brooks' class, with Mrs. J having twelve 6 year olds in her class and Mrs. Brooks having six 6 year olds in her class.

Using other students in the school who are of the same age range for our class' data, representations, and discussions provided a meaningful connection and interest to the student's learning. Being engaged and excited about their data really helped the students to stretch their thinking!

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Recently, students in **Mrs. Jantausch's Early Primary** class had the opportunity to deepen their thinking and use math in a real world setting. For our Day of Giving activity we went to the First United Methodist Church here in Middletown. Once there, we were able to apply some of our math skills while we were helping the community.

At the church, my half of the students spent the hour organizing and cleaning up the clothing depot/closet. There were piles of shoes, pants, blouses, coats, and other various items – all strewn around the floor in a big jumble. It was amazing to see how we used math to sort the items of clothing. *Gage* and *Keiara* were excited when they found matching shoes and were able to set them on the shelf as completed pairs. *Nicholas* eagerly darted in and out of the clothes racks, handing our Intermediate helpers shirts or pants to hang on the correct rack of clothes. Finding pairs of matching shoes and sorting the clothing by women's, men's, and children's may not seem like math, but it is a very real application of the skills we are learning here in Early Primary. When *Ashlynn* handed someone taller a woman's shirt to hang up on the appropriate rack, she had sorted by two attributes – the type of clothing (shirt) and gender (woman's).

These skills are important, but it is not always easy to see these connections when we do our work in the 60-minute math class. By applying these skills in real life, students are forced to think more deeply and to examine the role math plays in our everyday lives. Luckily, this time we got to help others in the process! Who knew math could be this rewarding and fun?

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This week **Ms. Roe's Early Primary** class began their measurement unit in our Math Investigations curriculum. The unit begins with nonstandard units of measurement (cubes, paper clips and tiles), then moves into standard units of measurement (inches, feet, etc.). The students were extremely excited to work cooperatively to measure their collection of objects with their tablemates.

*Khaleim*, who has only been a part of our class for a week, was so proud when he used his cubes to measure the length of a pencil. During our math discussion at the end of our math time, *Emma S.* shared that she had one less cube than *Khaleim* when she measured the pencil. I asked the students why they thought that was. *Heath* recognized that one of the pencils had lost the eraser during our math time. He

wondered if that was the reason why the answer was different. However, some of the students had one more cube than *Khaleim*. How could that be? *Katie* had another theory. She felt like the pencil was a little larger than the tower of cubes used to measure the pencil. She wondered if the answer was different because someone had added one more cube because it was a little larger than *Khaleim's* answer. Wow! It is so amazing to see these Early Primary students discovering the answers to their questions through these rich discussions with one another! Way to go Early Primary!

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Early Primary is our name and collecting data is our game! **Mrs. Uhl & Ms. Stillwell's Early Primary Class** has the graphing fever! We are learning so much about one another as well as learning how to collect and represent data! We have discovered that you can represent data in many ways such as using stickers, tally marks, smiley faces, post-it notes, student names, unifix cubes, and pictures.

One of the two questions we graphed this week was "How Old Are We?" First, the students got out enough cubes to represent their age. Then, as a class, they lined up all of their unifix cube sticks. We discussed how many students in our class were five years old, how many were six years old and how many students were seven years old. Then, the students were asked to make a graph to represent the number of ages in our classroom.

The students came up with some fantastic graphs. *Nathan* used two strategies. He used stickers to represent that 5 students in our class were 5 years old, 11 students in our class were in 6 years old and 6 students in our class were 7 years old. Then, he double-checked his work by writing each student's first and last initial on the sticker to make sure he had included every student. What a great strategy! *Charlie* also used stickers to represent his work but he made his stickers match the unifix cube sticks. So, he made 5 rows with 5 stickers each, then 11 rows with 6 stickers each and 6 rows with 7 stickers each. Great job! *Ashley* used stickers too but she took it a step further by writing down what she noticed about her data. She wrote that most students in our class were 6 years old. *Lexey* added a few more details to her graph. She wrote that while most of the students in our class were 6 years old, the fewest amount of students were 5 years old. In addition, she included the number sentence  $5 + 6 + 11 = 22$  students! Wow! Such wonderful thinking is going on in Early Primary!

Another part of our math day is solving word problems using the student's names and writing about a scenario the students can relate to! Recently, we have been working on solving multiplication word problems! One of the multiplication word problems this week was about when a student and I both brought in cookies for the class. Some students chose to solve the problem that stated that if each student gets 2 cookies and there are 8 students are at your table, how many cookies would that table have in all? *Trinity's* strategy was to draw 8 circles and put 2 tally marks inside each circle. Then, she counted all the tally marks to get a total of 16 cookies. *Noah* decided to use unifix cubes. First, he made 8 stacks with 2 unifix each. Then, he counted the unifix cubes and determined there were 16 cubes in all. Amazing work! Our class has been diligently working in math, and we all have continued to grow as mathematicians!

## **LATE PRIMARY CLASSROOMS**

In **Mrs. Andrade and Miss Zumbahlen's Room**, we are exploring different measurement units, tools, and techniques. Mrs. Brubaker, Central's superb Math Coach, continues to help strengthen our mathematical thinking during this second trimester.

In Investigations (our math program), the students are faced with many options to accomplish their mathematical tasks. We are currently using the U.S. Customary System of inches, feet, and yards. After lots of measurement practice, we agreed upon the most important measurement guidelines: no miscounting, no sliding, and no overlapping. However, we soon found out that creating a list and actually demonstrating those methods were two different things.

The most challenging assignment by far has been measuring the width and length of the classroom. Some of the measurements for the width of the room were 5 yards and 20 inches, and 9 yards and 2 inches. We had lots of rich discussion as to why there was a discrepancy. Quickly, the students figured out that some groups didn't measure the right dimension or distance. Another mistake was carelessness (not following the measurement guidelines). One group did a fantastic job. *Amalia* and *Austin* determined that the width of the room was 25 feet and 7 inches. When they demonstrated their technique, *Austin* had the task of writing down the measurements while *Amalia* moved one yardstick from one end of the room to the other. *Amalia* carefully placed her finger where the yard ended to place the yardstick down again to measure another yard. They had a great system that involved teamwork, and a good process. Way to measure!

We recently sent an assignment home involving body benchmarks, which is simply using a part of your body as a referent (inch, foot) to measure objects when you do not have a measuring tool. Because every home assignment is a continuation of a school objective, we had already figured out some body benchmarks in class. It was determined that there was one foot between *Chelsea F.*'s shoulders. *Daniel* figured out that from his knuckle to the end of his thumb was about an inch. *Aly P.* figured out that the width of her eye was about an inch. This led to lots of good discussion about not using just any body part. *Gabe H.* figured out that you should only use a body part that can actually be placed next to the object being measured (like parts of your hands). Good thinking!

As we move onto the metric system, we have come to the conclusion that giving our students the opportunity to measure using different tools and techniques is only one part of an enriching math program. It is truly the wonderful discussions that arise from all of the measurement blunders that get our students thinking about how these situations can arise in real life and problem-solve ways to prevent them. Mrs. B and I have learned that if you give our students an inch, they will take a foot. And when you hand over the foot, they will want a yard. One thing's for sure—we measure success in our classroom by how much we learn from our mistakes.

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Here we go again, it's another lesson on math in VanBurgey's and Zahora's room. It's a great lesson about why we need to have the same standard unit of measurement.

First, we started out reading a darling story titled, *How Big is a Foot?* It is a story about a king who wanted to have a new bed made for his queen. The king made the queen lie on the floor. He measured her with his foot. His measurement was three feet wide and six feet long. Then he had his apprentice make the bed. When the bed came back it was too small. The king became so mad, that he had the apprentice thrown in jail.

After reading this story to the students, they had to go back and write a letter to the apprentice telling him why the queen's bed was too small and how to fix it. *Emma* said to the apprentice, "The bed was too small because your feet are smaller than the king's and the smaller the feet the smaller the bed." *Josh* said, "Your feet are too small!" *J. J.* said, "The king's foot is bigger than yours, use the king's foot!" *Kaitlyn* said, "I think why the bed was too small is because your feet might be smaller than the King's feet. You could measure the King's feet to make it bigger for the Queen."

We know you are anxiously awaiting the end of the story to find out whether the apprentice got out of jail. You need to ask your child if you want to know how the story ends. You might also ask them what the point of the entire lesson was and why it is necessary to have a standard system of measurement. Until next time, keep measuring, Go Central!

## INTERMEDIATE CLASSROOMS

The students in **Mrs. Larison's Intermediate** class have been learning about how to determine the factors of any given number (the numbers that can be multiplied together to equal any given number). Students use different methods to find the factors. *Taliyah* likes to use a number chart to help her. *Alhmad* prefers using tiles to make arrays. Then, he finds the dimensions of the arrays and names the factors. *Kyra* often relies on a paper and pencil method, of her own design, to help her find the factors. What is important is that the students are not prescribed a particular method to use. Therefore, they must think of a way that works best for them.

Exploring the factors of numbers extends the way in which students think about numbers. For instance, *Austin* was recently trying to solve a difficult multiplication problem. He was struggling a bit until he remembered that numbers can be broken down into their factors, thus making the multiplication problem more manageable to solve. The connection he made joyfully registered in his eyes and on his face. He had found a way to help solve more complex multiplication problems, without having to remember the steps involved in finding the answer using a traditional algorithm. By applying prior knowledge and thinking beyond a typical procedure, he found mathematical success.

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As we discussed in our last article, math in **Muenchenburgey Land** has changed somewhat this year with the addition of the *Investigations* series. In addition to our work with *Investigations* and CGI, we have also continued using math contracts to enhance students' learning. Students really look forward to math contract time, as they enjoy the engaging activities that act as vehicles to deliver the curriculum.

One of the favorite activities on our current contract is a measurement project called *Design/Decorate Your Room*. The students plan out a blueprint for their ideal bedroom and then actually create their room in a cardboard box. The students are responsible for finding the area and perimeter of each of their walls and floor, as well as for all the items they place in their rooms. *Alexis Y.* has developed and demonstrated a conceptual understanding of what area and perimeter are and how to measure each through measuring her walls and floor, as well as the other components of her room. She has also discovered the connection between the math she is learning in school and how she may need to use those skills in the real world. *Claire* ambitiously undertook the process of designing, measuring, and creating each of the components of her own room. Through this activity, she demonstrated a stronger understanding of why area is measured in square inches and perimeter is measured in linear inches. *Marcus* even discovered that the perimeter of a circle has a special name called circumference, when he had to find the perimeter of his circular bed in his room! From our work in *Investigations*, the students were able to make the connection between using arrays to find multiplication combinations and using multiplication combinations to find area!

Another contract activity that the students are enjoying is *Winter Toothpick Geometry*. In this activity, the students play a game with toothpicks where they create parallel, perpendicular, and intersecting lines. They then reflect on the game by writing a description of each of the lines and identifying where in our environment (in the classroom, in their house, outside, etc.) they can be found. This again helps them connect math to the real world. On *Mary's* reflection, she identified parallel lines on her notebook paper,

perpendicular lines on our ceiling at school, and intersecting lines on railroad tracks when they cross over each other.

The different ways of exploring math concepts in our classroom truly helps reach and meet all the needs of the wide variety of learners in our community!

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**Ms. Thinner's Intermediate Class** works collaboratively on many different math problems each day. Many students learn math in many different ways. Each math lesson ends with a CGI Problem. The CGI Problem reinforces the multiplication lessons we are currently working on in *Investigations* (the district math program), and the division problems that we are beginning next week. Students work in collaborative groups to solve the problem with the materials that are in their CGI Bins. Students may also use any materials that are in the classroom to assist them. *Yulia* shared her CGI response with the class on the Elmo (overhead projector connected to the computer). Students could then look at her exact solution and ask her questions about her explanation as well. Students work together in groups of three or four to solve these problems.

Our class works cooperatively in other ways too. Students have been partnering to play a Math Game called "Multiplication Compare." Students deal out digit cards and make sure that each player has twenty cards face down. Then, students flip two cards at the same time face up for their partner to see. A discussion commences between the partners about who has the greater product. The player who has the greater product takes all four cards and places them face down. Next, another two cards are flipped by each partner, until all cards have been flipped in that pile. The player who has the most cards wins. *Austin* enjoyed playing three rounds of this cooperative game with his partner. Students not only learn cooperative skills, but also how to discover the "greater product" in math. There are many similar games like this one in the *Investigations* program. So there are many daily opportunities for cooperative problem-solving and individual student success.

## **MIDDLE SCHOOL CLASSROOMS**

**Kristi Joseph's** math class has been playing some concept games that focus on the current math topics. *Lexi*, while playing an integer game with her table led by **Joy Carroll**, commented that the game would help her with her math assignments – and it has! *Corey* tackled a difficult concept in another game at his table with **Kristi**. During yet another game *Angel F., Althea, Austin H., Jonathon* and *Stevie* demonstrated higher level thinking skills. Another great benefit of these games has been the students' sharing of mathematical strategies as they "thought aloud" during the games. This sharing of knowledge has led to quite a few "a-ha moments," as other students' understanding was enhanced through their peers' sharing of strategies.

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This trimester in **Mrs. Smith's Algebra/Geometry class**, we have been focusing along with the district Algebra and Geometry calendars on many facets of slope. The Algebra students have been working on taking slope and writing equations in various forms. I have been really impressed with the leadership of *Regan, Jordan, Travis* and *Ashley*. They are always ready to lend a helping hand. In addition, the most improved this week would go to *Alana* and *Sam*. They are really putting things together. Keep up the great work.

The Geometry students have been studying the properties of polygons and their respective angles. They are developing a set of conjectures that will be used to formulate theorems. *Mark* and *Mikala* have been stellar examples this week. They took their district semester exam yesterday and all did an excellent job.

They will be moving on to circles and a multitude of applications within the constraints of the definition of circles. I am really expecting great things from all these students.

## Other Places and Voices Around Central

In Mrs. Joseph's math class, **Mrs. Carroll** was working with small groups using a card game to help students add and subtract with integers. The students really enjoyed learning math using a game instead of the traditional worksheets. After about five minutes of playing, *Lexi* said, "This will help me with my Algebra!" The entire group wanted the game to continue so much that so if one student ran out of cards, someone else shared their cards to keep the game going. *Stevie* and *Raven* shared cards, *Jonathan* and *Alex* shared cards and *Lexi* shared with everyone. We never had a winner or loser for the game, but everyone won in learning more math.

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**Mr. Perdue** was helping in Mrs. VanOstrand's and Mrs. C. Amburgey's classroom with measurement this past week. Two of the students he helped were *Drew* and *Josh*. They were measuring everyday items in the classroom using inches and feet. They are also beginning to measure time by learning to read the clock in the classroom and at home.

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As I, **Mrs. Brubaker, Math Coach**, work with teachers and their students in extending all of our thinking around math instruction, I am proud to report that student's thinking is extended and challenged daily in math at Central. This ranges from students being asked to explain their answers even when they are correct, to being asked if there is another way to solve a problem after they have solved it one way. Additionally, students are discussing their math and being encouraged to ask each other questions about how they solved a problem or why they chose to do it in that way. Many of the problems the students are doing are multi-step problems that allow the students to make connections to different areas in math, thus helping them extend their thinking about how math is used to solve problems.

One recent example of extending learning through student discussion and teacher questioning was in Mrs. Andrade's class, when the class was reporting out their measurements for the length and width of the room. Instead of just reporting their measurements the students were asked what they noticed about the measurements, which led to the question of why were their measurements were different for the same length or width. This started a rich discussion about the possible reasons for the difference in the measurements. Greater understanding of the terms length and width were gained during this discussion, as well as how important it is to accurately keep track of the strategies we use to gett correct measurements. This is just one example of how discussion and questioning in math can lead to deeper understanding. As I move from room to room, I hear students of all levels explaining their thinking and discussing their math. What a rich learning environment for math!

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Music is very mathematical because of its rhythmic content. In **Mrs. Hick's music room**, the relationship between note/rhythmic values is taught in various ways. For the intermediate students, fractional relationships are used to extend their thinking in a musical format.

Students can use the concept of a musical pizza to remember note values! This has been done visually in class on various occasions. For instance, given that:

A WHOLE pizza = 4 beats (the value of a WHOLE NOTE), cutting the pizza in half to share it with a friend makes each HALF worth 2 beats (the value of a HALF NOTE). If each of those two people cuts his half in half again to share with another friend, each person now has a QUARTER of the pizza (1 beat, the value of a QUARTER NOTE). If each of those pieces is cut in half again ( $\frac{1}{2}$  of a beat, an eighth of the pizza) the value of a single note is an EIGHTH NOTE.

Showing relationships using examples students can relate to is always helpful! This is just one example.