How we Changed a Mathematical Mindset

3-4-18
4:00-5:15

Caffeine

What is your beverage of choice in the morning?

Estimate the caffeine in each one of these drinks.

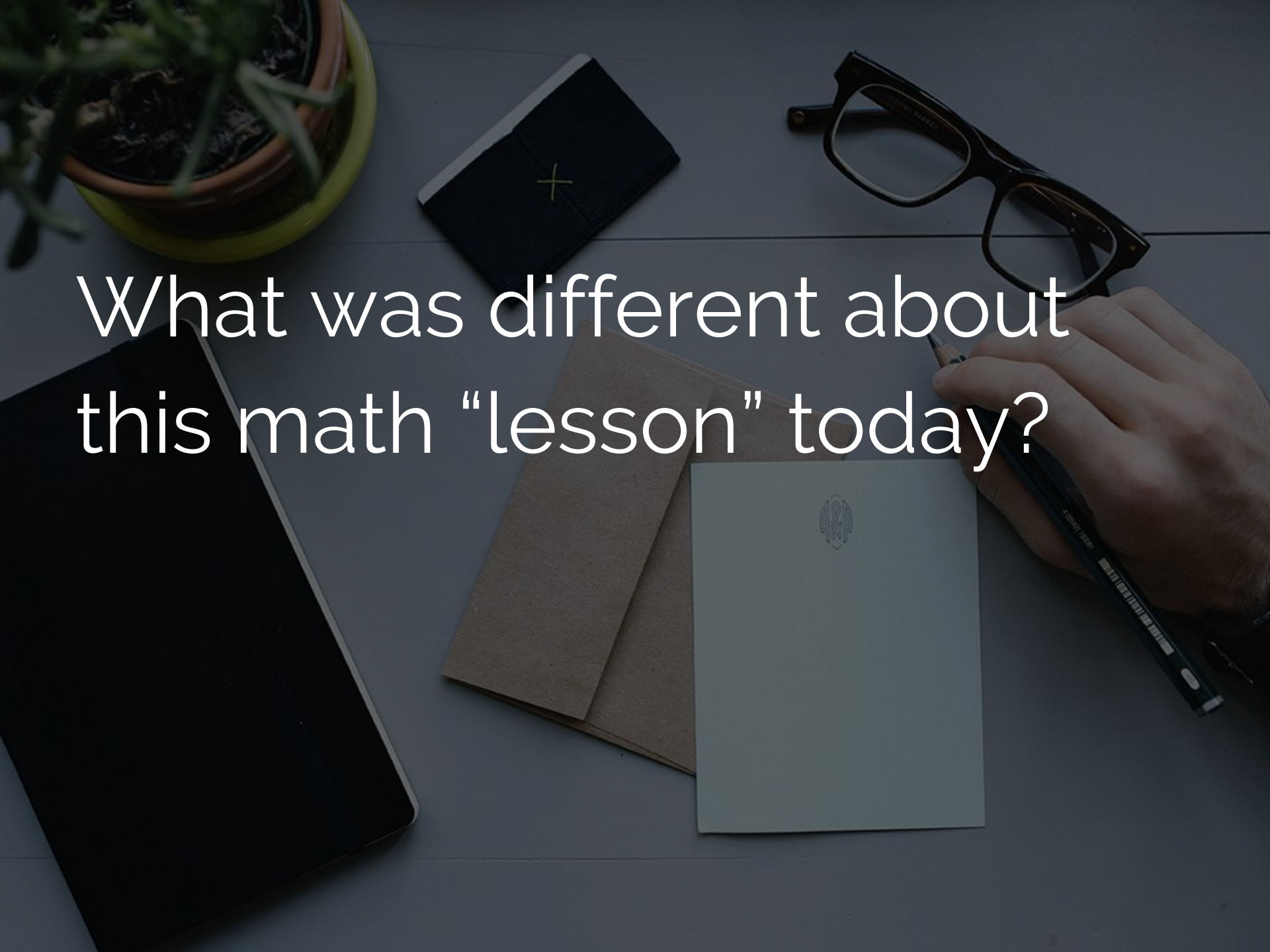
Drink	Size of drink	Estimate of Caffeine (mg)	Actual amount of Caffeine	Amount per fluid oz	How much do you need to drink
Coke Classic	12 fl oz				
McCafe	16 fl oz				
Monster	16 fl oz				
Mountain Dew	12 fl oz				
Red Bull	8.46 fl oz				
Starbucks Pike Place Brew	8 fl oz				

Actual Amounts

Drink	Size of Drink	Actual Amount of Caffeine
Coke Classic	12 fl oz	34 mg
McCafe	16 fl oz	145 mg
Monster	16 fl oz	160 mg
Mountain Dew	12 fl oz	54 mg
Red Bull	8.46 fl oz	80 mg
Starbucks Pike Place Brew	8 fl oz	180 mg

- How many of each of these drinks would your need to consume to equal the amount of caffeine in this dessert?

- one more estimate
- 24 oz
- 234 mg


What was different about this math “lesson” today?

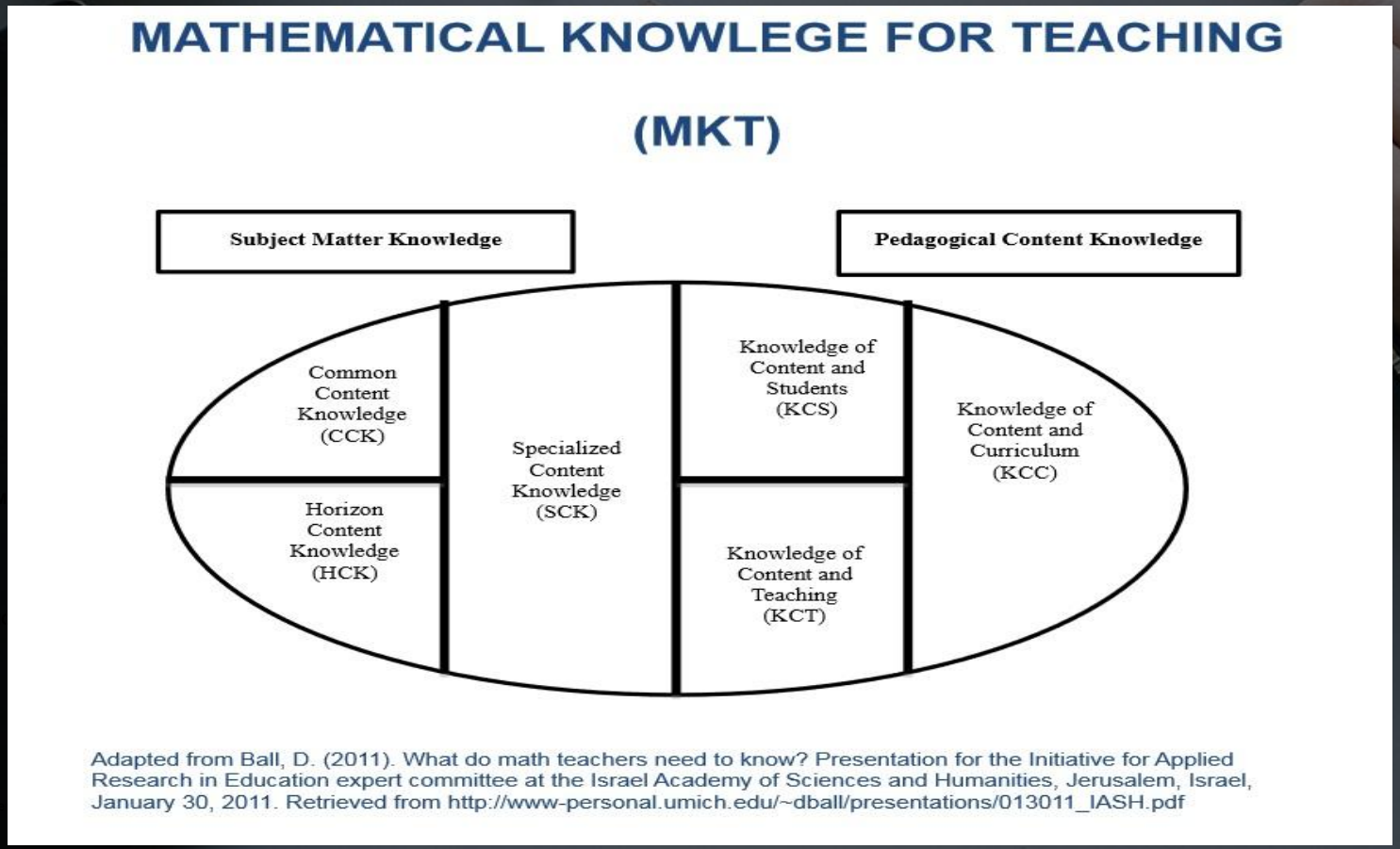
Rich Tasks

- What are they?
- Where do I find them?
- How do I plan for them?
- How do they fit into our curriculum?
- How do I prepare my students for them?
- Other questions….

Research

Domains of Mathemtical Knowledge for Teaching

Deborah Ball, Mark Thames, Geoffrey Phelps



History and
Process

History of the District

1.) For several years all the focus had been on literacy.

2.) Teachers were spending all their time and energy learning and developing in teaching reading and writing so the district purchased a resource using it as a math curriculum.

3.) The perfect storm had taken place with Common Core and Missouri Learning Standards. Teachers had no idea what the new standards in math were and definitely no knowledge of the mathematical practices.

4.) Math performance/achievement scores district-wide were low - MAP, EOC, ACT.

5.) Embarrassing math achievement combined with new standards, new leadership, and a very expensive resource left both teachers and administrators wanting some much needed attention on the teaching and learning of math.

Roles of Key Players

Role of Expert

- Bring a connection between Specialized Content Knowledge and Horizon Content Knowledge
- Facilitate teachers doing the math first
- Concrete to abstract
- Facilitate learning and understanding of the standards

Role of Curriculum Director

- Facilitate learning and understanding of the standards
- Protected time
- District-wide PD
- PD of administrators and school board
- Development of the actual curriculum document

Role of Task Force

- Active participant - be willing to do the math!
- Feel the energy and excitement of teaching and learning math differently
- Open-minded
- Pioneers in the district - take learning back to classrooms and experiment
- Complete the district curriculum document
- lead/facilitate district-wide PD

Logistics

1.) How did the district pull this team together?
   a.) K-5, 2 teachers from each grade level across buildings
   b.) 4 elementary instructional coaches
2.) What types of PD have been implemented along our journey?
   a.) Full days/Pull-Out Days (Task Force)
   b.) Modeling
   c.) Site Visits
   d.) Coaching
   e.) District Roll-Out
   f.) Curriculum Camp
   g.) Administrator Meetings
   h.) School Board Workshop

Process

Essentials

Rich Tasks
Manipulatives
Number Talks

Rich Tasks

Essential

- Task fits into the core of the curriculum
- Represents a “big” idea
- Has the potential to broaden students' skills and/or deepen and broaden mathematical content knowledge,

Authentic

- Students value the outcome of the task
- Might be set in contexts which draw the learner into the mathematics either because the starting point is intriguing or the mathematics that emerges is intriguing

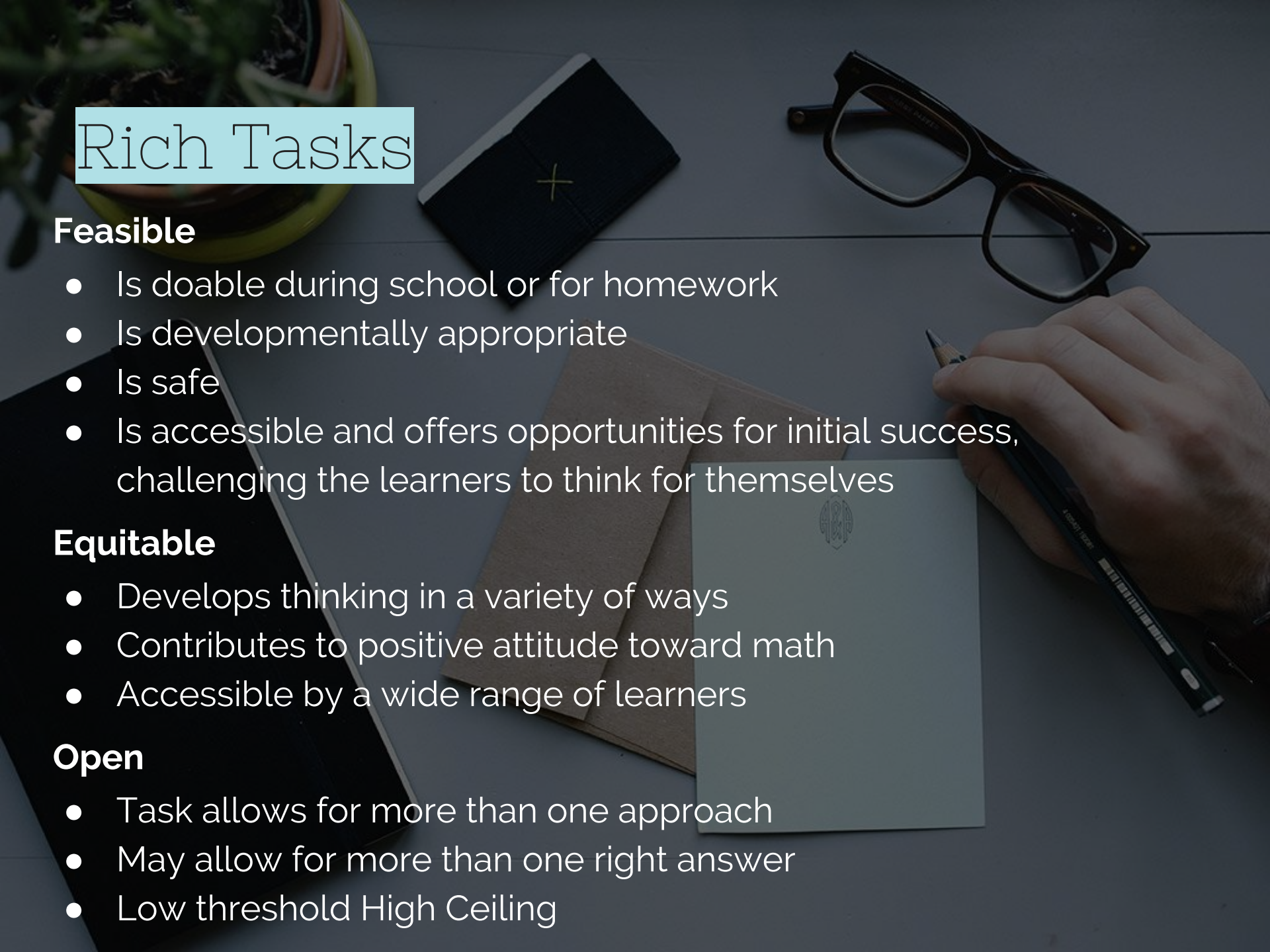
Rich Tasks

Rich

- Leads to other problems/ Raises other questions
- Has many possibilities
- Encourages creativity and imaginative application of knowledge
- Has the potential for revealing patterns or lead to generalizations or unexpected results

Active

- The student is the worker and decision-maker
- Promotes interaction with other students
- Students are constructing meaning and deepening understanding



Rich Tasks

Feasible

- Is doable during school or for homework
- Is developmentally appropriate
- Is safe
- Is accessible and offers opportunities for initial success, challenging the learners to think for themselves

Equitable

- Develops thinking in a variety of ways
- Contributes to positive attitude toward math
- Accessible by a wide range of learners

Open

- Task allows for more than one approach
- May allow for more than one right answer
- Low threshold High Ceiling

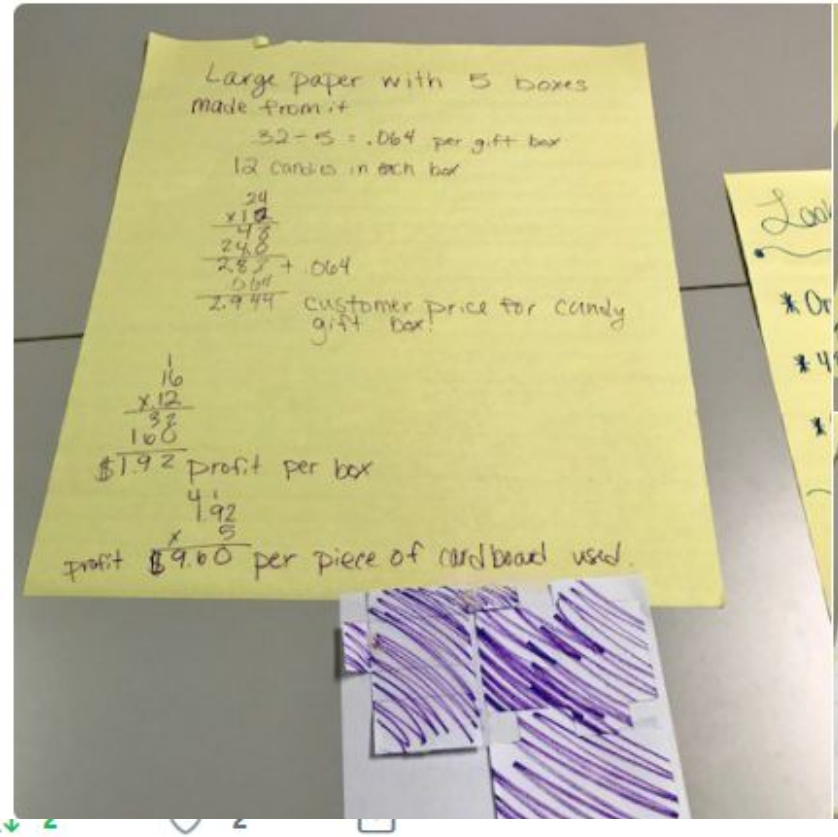
Rich Tasks

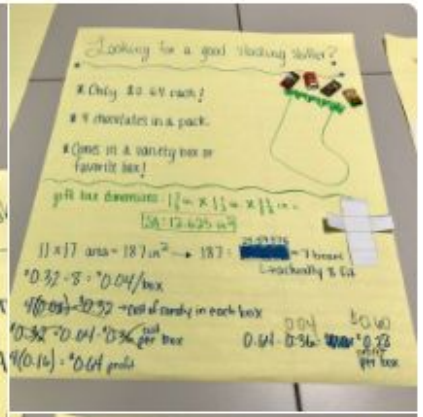
Teachers experienced many different tasks

- Penny investigation
- Cogs
- Pentominoes
- Caffeine Drinks
- Candy boxes

In all of these the teachers fully participated as a student before discussion or planning of curriculum.

Rich Tasks





Glenna Bult @gjbult · 28 Mar 2017

Quote from ECTF - "I know where I need to go, but it's getting there that is so hard." Thank you again, Dr. Jeanine Haistings! #GVEaglePD

3

Glenna Bult @gjbult · 28 Mar 2017

Quote from ECTF - "I can feel my brain thinking differently, and it's uncomfortable." Thank you again, Dr. Jeanine Haistings! #GVEaglePD

2 9

Manipulatives

- What defines a manipulative?
- What is its purpose?
- How does it build conceptual understanding?
- Research and position statements from NCTM to help build rationale.
- Logistics to using manipulatives in the classroom.

Manipulatives

Teachers took part in learning experiences where they needed a hands-on manipulative to help them.

Why Number Talks

- Low achievers are often so because they don't use numbers flexibly. Instead, they try to memorize methods which results in a lifetime of mathematics struggles.
- Students who memorize more easily are not higher achieving, nor do they have more "math ability" or higher IQ scores.
- We need a deeper understanding of mathematics for today's information age.
- To be mathematically proficient is to compute accurately, efficiently, and flexibly

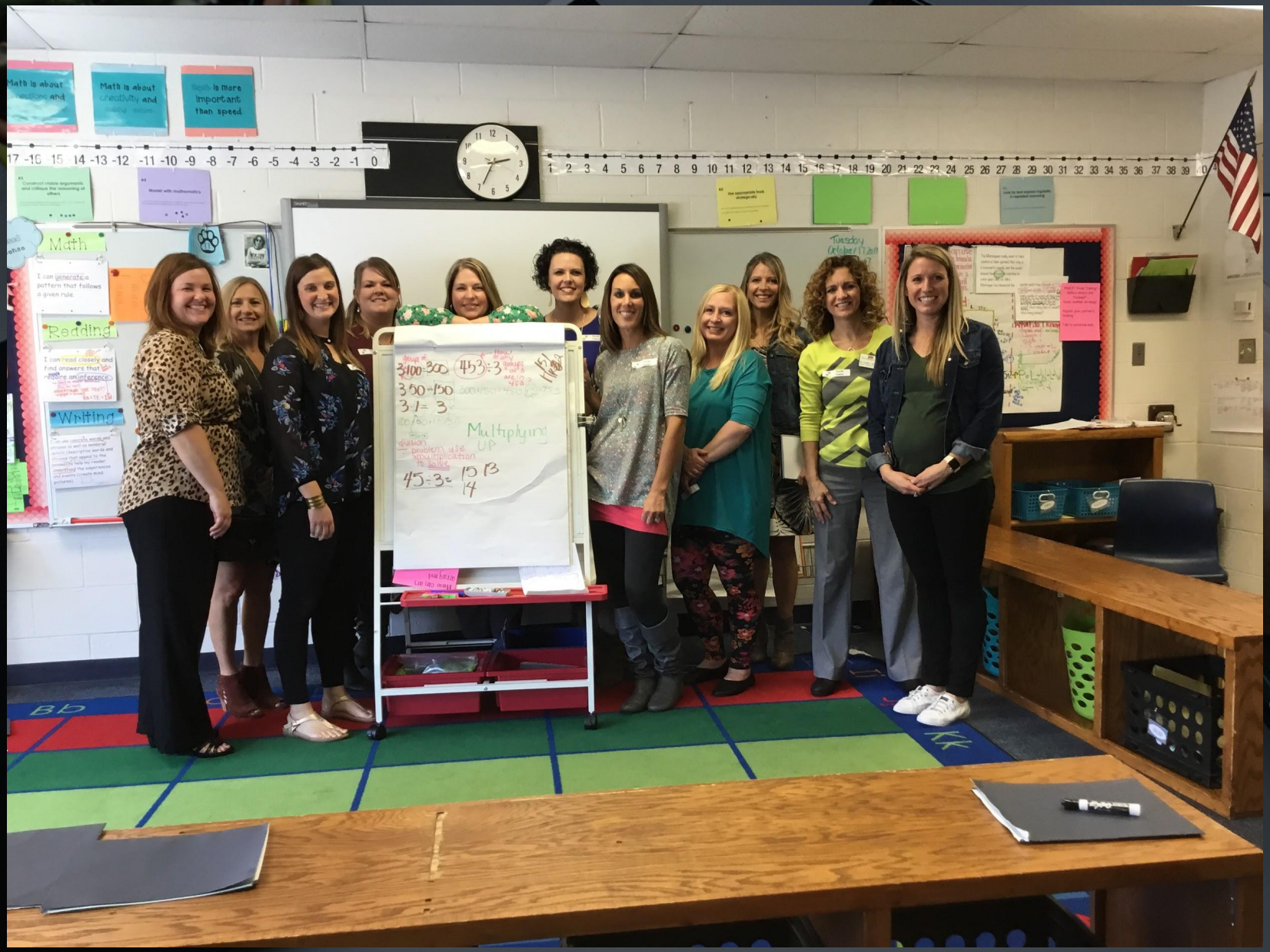
Purpose of Number Talks

- Students are working in an environment that focuses on number relationships.
- Students can use these relationships to develop flexible strategies.
- Mental computation is a key component.
- Students are allowed to build on number relationships to solve problems instead of relying on memorized procedures.
- Students are encouraged to rely on what they know about numbers and how they are related
- Students need to be comfortable with explaining ideas in public.
- Students need to be “ok” with making mistakes.
- Students need to see mistakes as opportunities to grow and learn.
- Students need to know reaching a right answer fast is not a sign of being good at mathematics

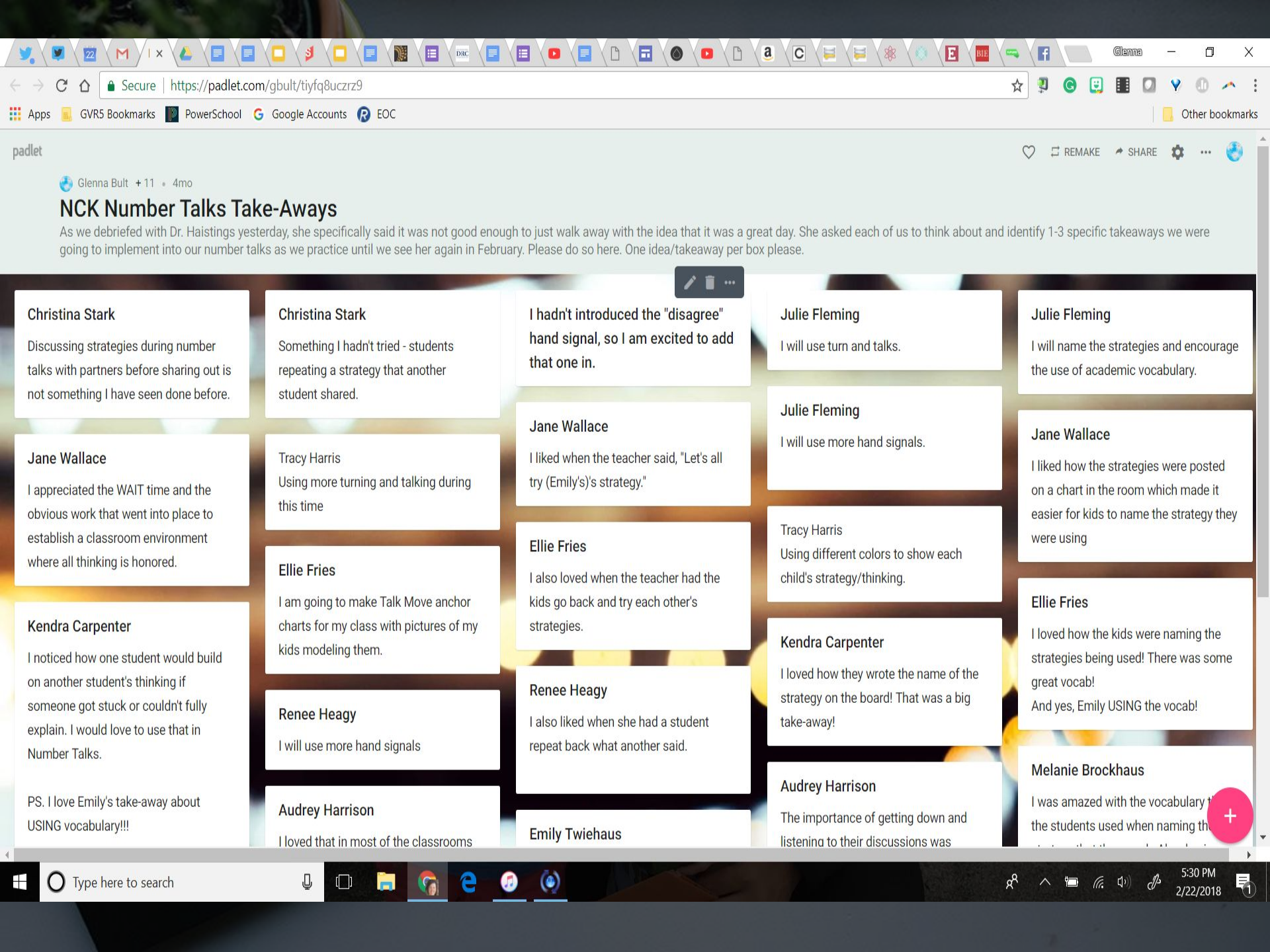
6+7=
13

Key Aspects of Number Talks

- Display equation in horizontal manner
- Provide students time to individually, mentally solve the problem
- Students use hand signals to demonstrate how many different ways they can solve it
- Ask students to verbally share their answers and record all student responses
- Ask who would like to defend their response(s)
- Precisely scribe student thinking, ask if represented accurately, name strategy
- Ask students if they agree or disagree with the students who defended the response
- Ask another student to defend their answer using a different strategy
- Attempt to build to most efficient (listen in on turn-and-talk, intentionally call on students)


Math is about creativity and
Math is more important than speed
Math
I can generate a pattern that follows a given rule.
Reading
I can read closely and find answers that require an inference.
Writing
Multiplying
45÷3=
Tuesday
October 17, 2017

BE
READ
Turn Talk
Helen Keller


Secure https://padlet.com/gbult/tiyfq8uczrz9
Apps GVR5 Bookmarks PowerSchool Google Accounts EOC Other bookmarks
padlet
REMAKE SHARE
Glenna Bult +11 • 4mo
NCK Number Talks Take-Aways
As we debriefed with Dr. Haistings yesterday, she specifically said it was not good enough to just walk away with the idea that it was a great day. She asked each of us to think about and identify 1-3 specific takeaways we were going to implement into our number talks as we practice until we see her again in February. Please do so here. One idea/takeaway per box please.
Christina Stark
Discussing strategies during number talks with partners before sharing out is not something I have seen done before.
Jane Wallace
I appreciated the WAIT time and the obvious work that went into place to establish a classroom environment where all thinking is honored.
Kendra Carpenter
I noticed how one student would build on another student's thinking if someone got stuck or couldn't fully explain. I would love to use that in Number Talks.
PS. I love Emily's take-away about USING vocabulary!!!
Christina Stark
Something I hadn't tried - students repeating a strategy that another student shared.
Tracy Harris
Using more turning and talking during this time
Ellie Fries
I am going to make Talk Move anchor charts for my class with pictures of my kids modeling them.
Renee Heagy
I will use more hand signals
Audrey Harrison
I loved that in most of the classrooms
I hadn't introduced the "disagree" hand signal, so I am excited to add that one in.
Jane Wallace
I liked when the teacher said, "Let's all try (Emily's)'s strategy."
Ellie Fries
I also loved when the teacher had the kids go back and try each other's strategies.
Renee Heagy
I also liked when she had a student repeat back what another said.
Emily Twiehaus
Julie Fleming
I will use turn and talks.
Julie Fleming
I will use more hand signals.
Tracy Harris
Using different colors to show each child's strategy/thinking.
Kendra Carpenter
I loved how they wrote the name of the strategy on the board! That was a big take-away!
Audrey Harrison
The importance of getting down and listening to their discussions was
Julie Fleming
I will name the strategies and encourage the use of academic vocabulary.
Jane Wallace
I liked how the strategies were posted on a chart in the room which made it easier for kids to name the strategy they were using
Ellie Fries
I loved how the kids were naming the strategies being used! There was some great vocab!
And yes, Emily USING the vocab!
Melanie Brockhaus
I was amazed with the vocabulary
the students used when naming th
Type here to search
5:30 PM
2/22/2018

Roll Out to Schools

1. February 23, 2017
2. November 7, 2017

Roll Out to Schools

Candy Gift Box Dilemma

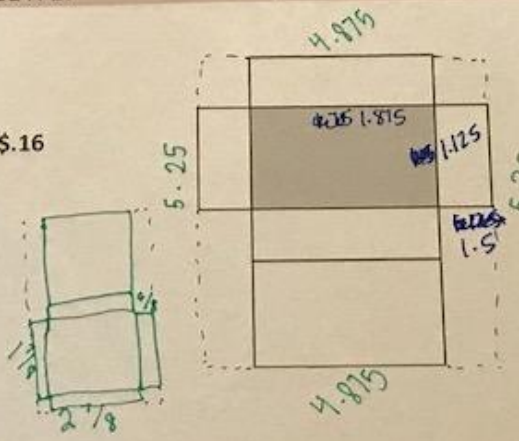
ITEM #	Size(inches)	Price per sheet
CSS-811	8.5 X 11	0.15
CSS-814	8.5 X 14	0.24
CSS-1114	11 X 17	0.32

3 boxes

Cost per candy bar $.08

Profit from each candy Bar $.16

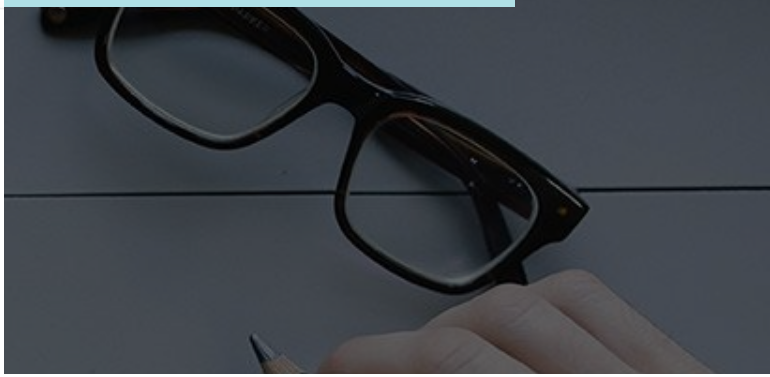
Candy cost per box $0.92



25.59375

$10.78
5.625
216.405

February 2017 Late Start



Glenna Bult @gjbult · 23 Feb 2017

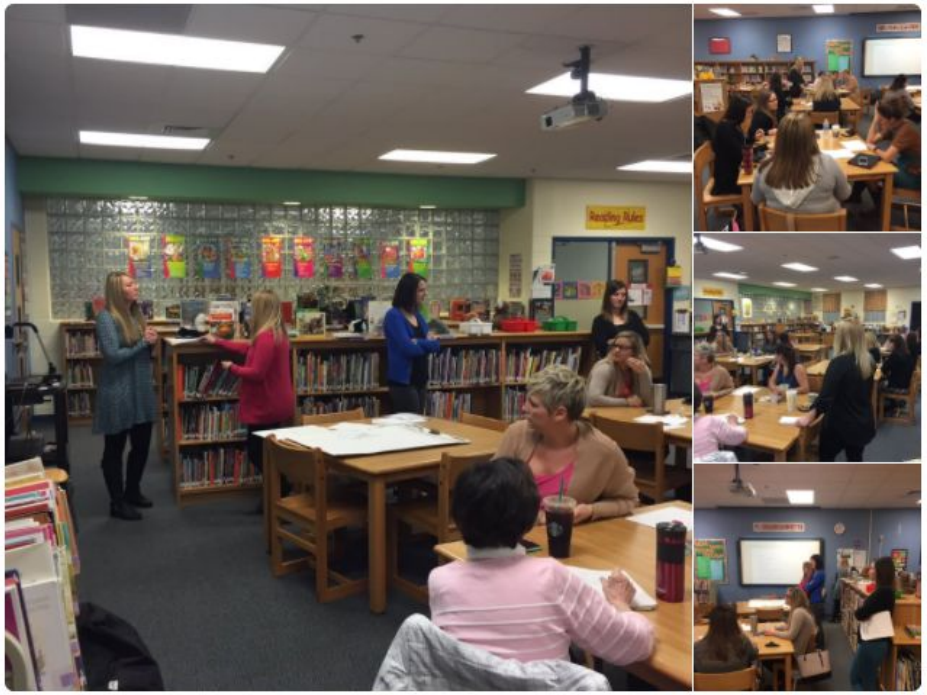
Love to see administrators engaged in PD w/ Ts and learning together! ECTF facilitating a hands-on, rich mathematical task. #GVEaglePD

9

You Retweeted

Heather Gross @heatherjgross · 23 Feb 2017

5th/6th grade teachers engaged in Math task #gveaglepd during Late Start @prairiebranch

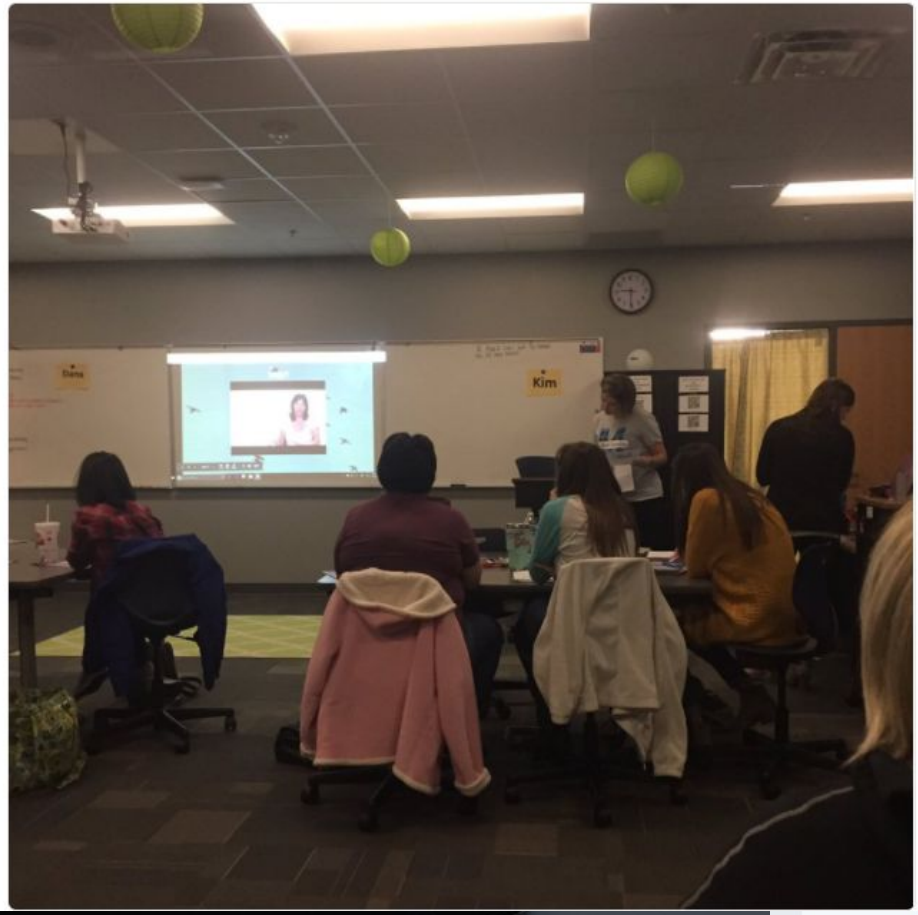


4 9

November 2017 PD Day

Casey DeLoach @CDeloach6 · 7 Nov 2017

Learning about Number Talks with 2nd grade. Powerful conversations about developing mathematical thinkers. #GVEaglePD



You Retweeted

Jessica Reynolds @runjesirun · 7 Nov 2017

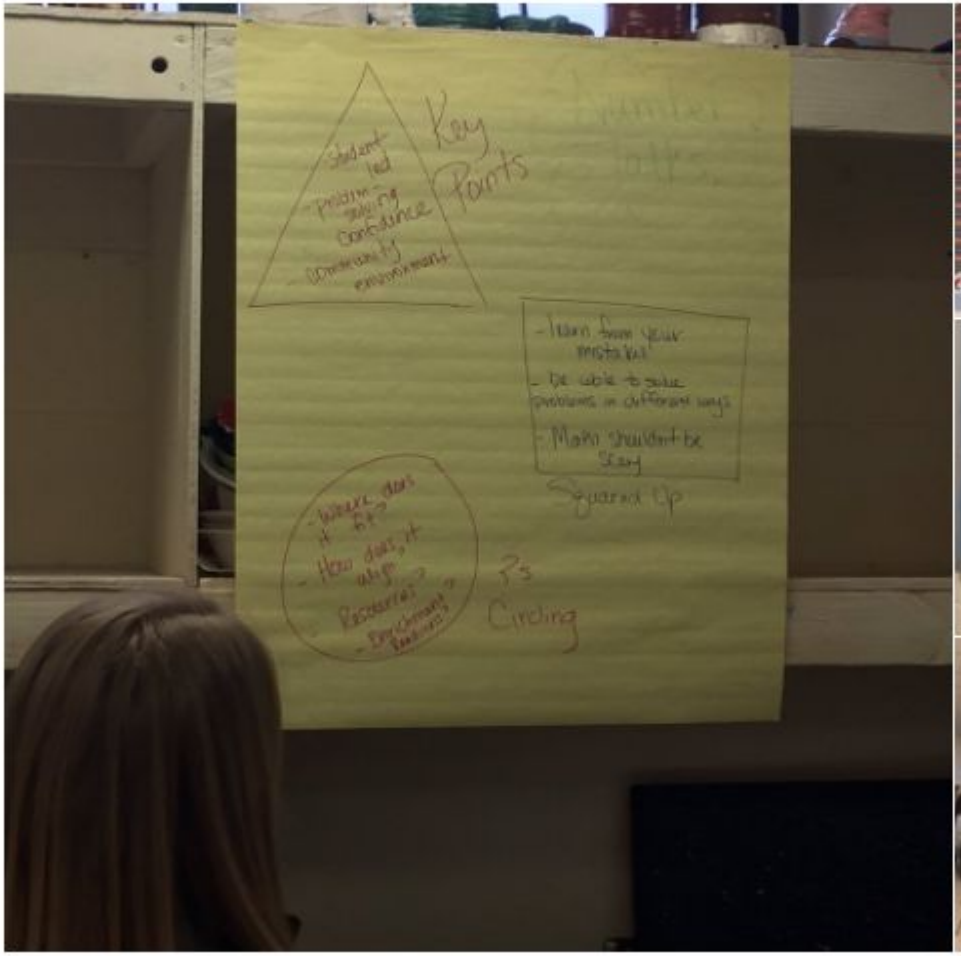
"There are far too many students who feel like they are no good at math because they aren't quick to get the right answer." This changes now with number talks! #GVEaglePD

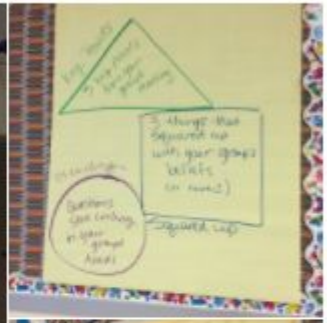
2 14

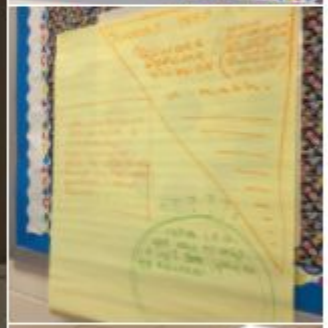
November 2017 PD Day

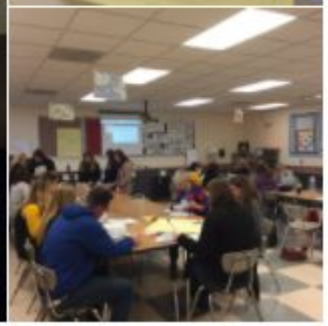
Prairie Branch Elem. @prairiebranch · 7 Nov 2017

5th grade teachers engaging in Number Talks! Great work facilitating, Julie Fleming and Christina Stark! #GVEaglePD





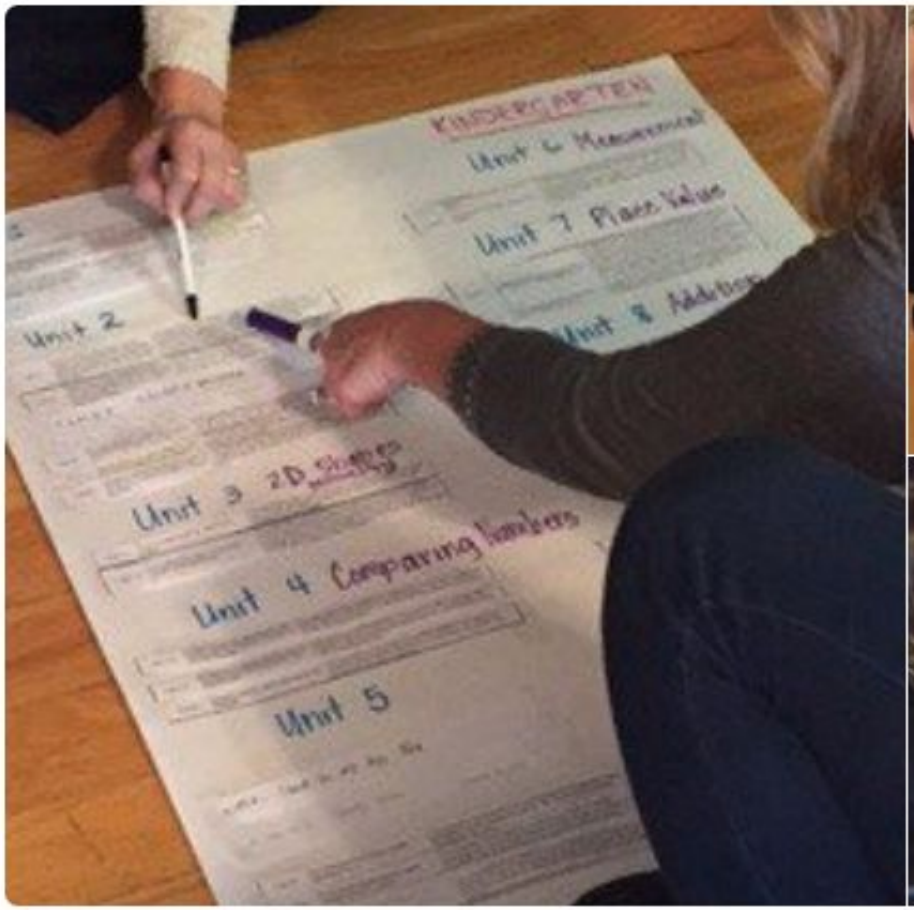




Last step...Creating Curriculm

Glenna Bult @gjbult · 16 Feb 2017

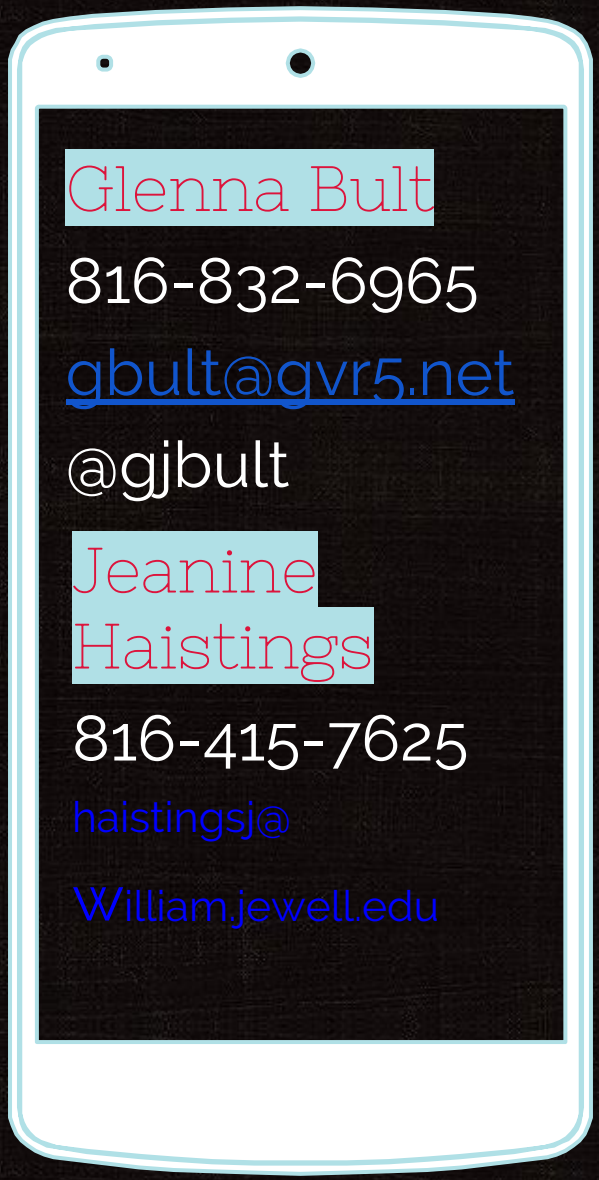
Our Elementary Curriculum Task Force trying to determine the best way to organize and group math standards. Round #1. #GVEaglePD



1 10

Reflections

Emily Twiehaus - 16-17 4th Grade Teacher, 17-18 Instructional Coach

Ellie Fries - Kindergarten Teacher (27 years)

Contact us anytime!