

## Math + Literacy = Rich Learning

Integrating Reading, Writing, Speaking & Listening into Math Class

Thursday, April 4, 2019

4:30 - 5:30 PM

San Diego Convention Center Room 29D

Meg Knapik

megknapik@gmail.com





# Hello!

## I am Meg Knapik.

**Currently:** PreK - 8 Math Curriculum Coordinator & Specialist, GEMS World Academy Chicago

**Past:** K - 8 Director of Math, Middle School Assistant Principal, Adjunct Professor, 6 - 8th grade math teacher, author, speaker, life-long learner





## week 21



Your baby is 10.5" this week. That's about the size of a TI-89 calculator.







## Who is in the room?

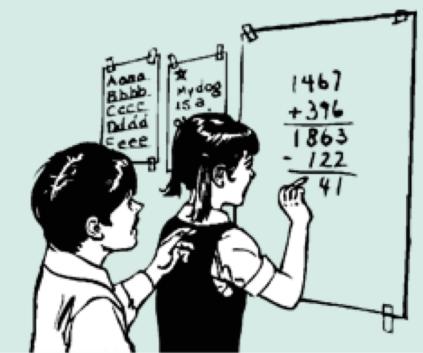
Let's get to know our classroom community.

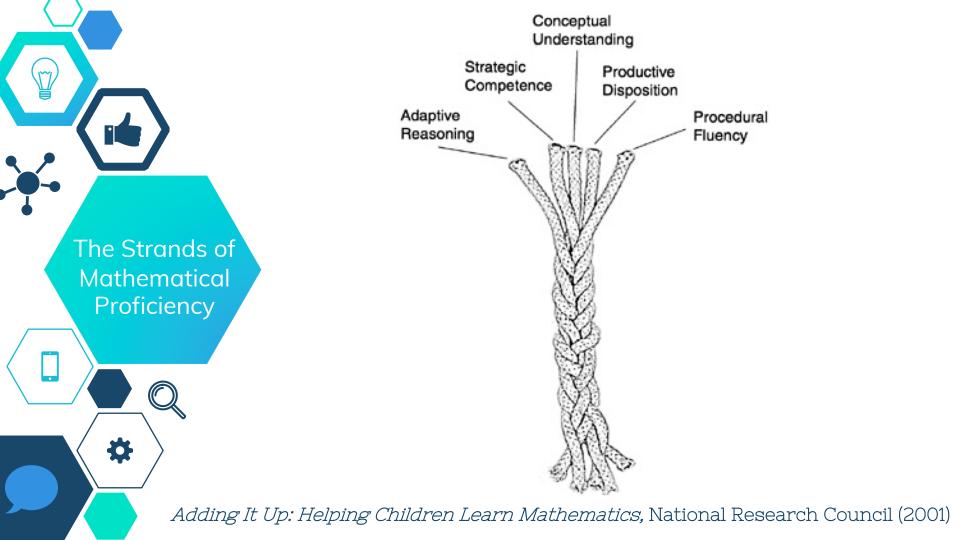


"Are you taking a foreign language classes this year?"

"Yes, math."









## 4 Tenets of Literacy



"When students use technology, they are not only more motivated and engaged in learning, but they are also gaining the skills necessary for life beyond the confines of school."

-Jamie Diamond & Meg Gaier Knapik,Literacy Lessons for a Digital World (2014)



Learning Targets

- Understand how literacy can activate & enrich student thinking in math
- Share purposeful ways to integrate the four tenets of literacy into a math class, both with & without technology





"What students already know about the content is one of the strongest indicators of how well they will learn new information relative to the content."

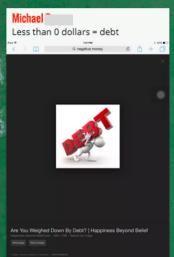
-Robert Marzano, *Building Background Knowledge for Academic Achievement* (2004)

"All learning involves transfer from previous experiences. Even initial learning involves transfer that is based on previous experiences and prior knowledge."

-National Research Council, *How People Learn: Brain, Mind, Experience, and School* (2000)

#### **Negative Numbers**

Where do you find negative numbers in real life? Post ideas, hyperlinks, and pictures here.



#### Carina

there can be negative numbers When you are looking at a bill if you are behind on your payment

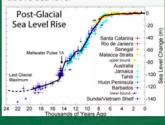


#### Ryan

I find negative numbers when I look at a thermometer during winter when it's a cold day.

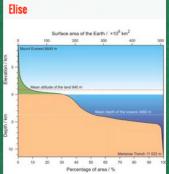


You find negitive numbers when you talk about under se level and above sea level



#### Vaibho





#### Devanshi

Below sea level

#### lohn

Negative is Greek, meaning other direction.

I find negative numbers

#### Michael

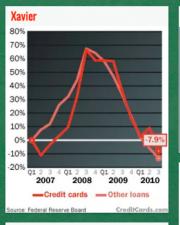
I fond it at the train station when it said t- 2 minutes

#### April

If you are in debt, you owe someone money

#### Eileen

can find negative numbers when



#### Nivanth



#### Isabel

You can find negative numbers in real life on a thermometer

#### Daisy

You find negative numbers when





Negative number

#### Jack

You find negative numbers at work

#### Niyanth

There are negative money in my bank account cause i don't have one

#### Josh F

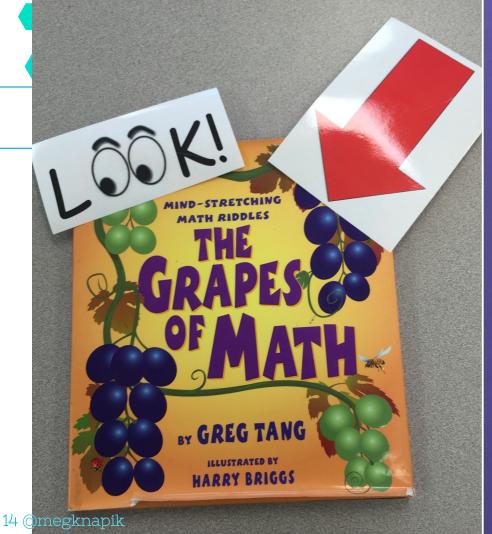
I see negative numbers used in real life when stock market brokers handling their stocks.











Highlight special books

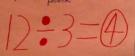


Wall Word

Let the students take charge!

Quotient

he quotient is the answer to a division problem.



DECIMAL:

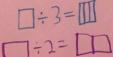
Seperating Whole numbers from Fractional parts.

ition. The mathmatics of working with variables

15 @megknapik

multiple

The act of security something into parts, or the process of being sequented



An Exponent is a number or variable in an expression that refresents how many times another nothbor or variable in the expression is used as a good in reported multiplication. =2 × 2 × 2 × 2 × 2 = 32

Fractions are a numerical quantity that is not a

Whole number. There are parts of a whole. Each piece is the same size the bottom is a tenuminator

Parallel lines are lines that lie In the same plane and never Potersecto



The DENOMINATOR of a fraction is the quantity below the bar in a fruction. It tells the number of equal parts into which the unde is divided.









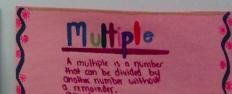
ADDITION

The process of pating two numbers together to

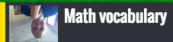
97





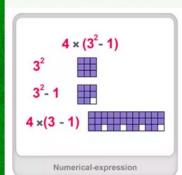






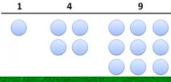
#### numeric express

A numeric expression is a expression that consists only of numbers with operation symbols.



#### Square of a number

A the product of a number times its self



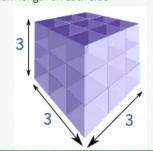
1/10 (Tenths)

Decimal a decimal is a part of a number by

Decimal Delet

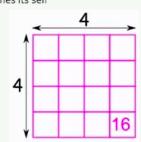
#### Perfect cube

A perfect cube is a cube that as the Sam length on each side



#### A perfect square

the product of a whole number times its self



#### Prime

when a number is prime it means it can only be divided by one and itself.

2 3 4 5 6 7 8 9 10

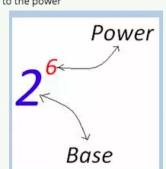
#### **Cube root**

The cube root is the opposite of when you cube a number you have a number and see what goes in to it three times a that is the cube root of the number



#### Base

The number that is going to be used to the power



#### Composite

A number that can be divided by



#### Cube of a number

When you cube little tree in the that you multip itself three time

visual glossaries on Padlet!

Individual



An exponent tells you how many

exponent =

(or index,

Prime factorization

factors.

or power)

base

Breaking up a number into its prim

48

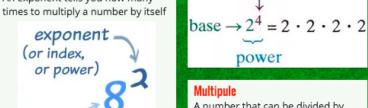
**Exponent** 

The powers is sort of like both base and powere together exponent

er that if

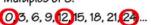
u get the

Root



A number that can be divided by another number with out a remainder usually divided by a number you are looking forv

Multiples of 3:



Multiples of 4:





"Each content teacher is responsible for showing students how to use discipline-specific literacy skills as a tool for accessing content and, with a sigh of relief, incorporating reading strategies only when they make sense within the discipline."

-ReLeah Cossett Lent,This is Disciplinary Literacy (2016)





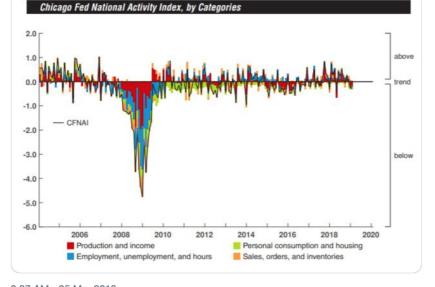




Chicago Fed National Activity Index slipped to -0.29 in Feb, down from -0.27 In Jan, suggesting little change in #economic growth. While production improved to -0.16 in Feb from -0.29 in Jan, #employment dropped from +0.07 in Jan to -0.07 in Feb.

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#CFNAI bit.ly/2HAiSDx



8:37 AM - 25 Mar 2019



9:40 PM Table 74/1 60043 Guests: 7 Reprint #: 1 Area: MAIN DINING Miso Hungry (2 @4.00) 8.00 9.00 Beet Salad 16.00 Crudo 13.00 Squash Blossom 22.00 Chickpea (2 @11.00) 18.00 Halibut 16.00 Goat Empanadas 15.00 Dumplings 15.00 Octopus 34 00 Scallops (2 @17.00) 11.00 Cauliflower 16.00 Pig Face 8.00 Choc 201.00 Subtotal 21.11

Tax 222.11 Total Balance Due 222.11

Thanks for Dining at the Goat!



Make at least three mathematical observations.

Write & answer a statistical question based on this data.

What do you notice? What do you wonder?



## Go-To Resources

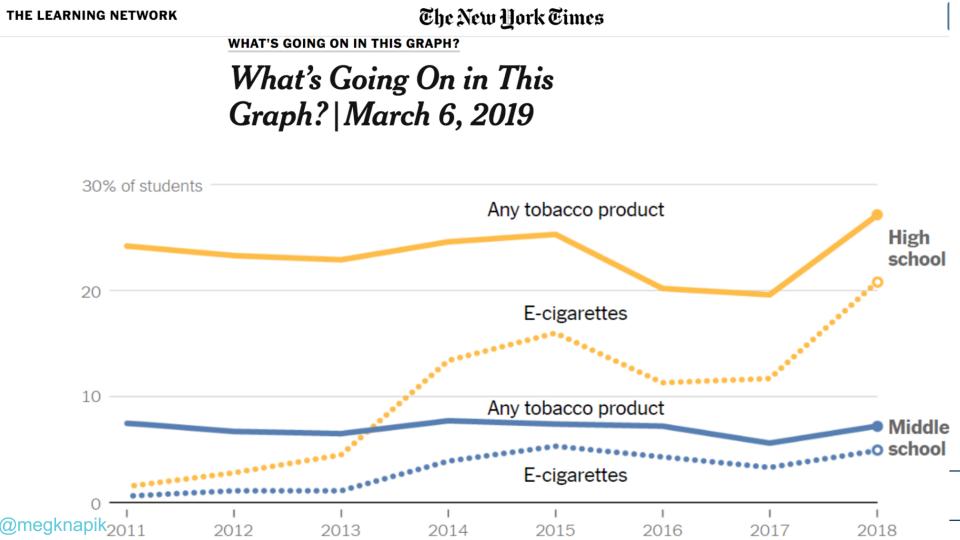
NY Times What's Going on in This Graph

Visual Capitalist

Wall Street Journal

<u>Gapminder</u>









#### This World Map was Drawn Based on Country Populations

To view this map at a higher resolution to see countries and data with detail, click here

It's likely you're very familiar with the standard world map.

It's shown practically everywhere – you'll see it online, on the news, in books, and even as a part of company logos. In fact, the world map is so ubiquitous that we don't even really think about it much at all, really.



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## THE WALL STREET JOURNAL.

U.S. Edition ▼ March 28, 2019 Print Edition Video

Estimated number of robocalls in the U.S.

10.0 billion

Life & Arts World Politics Economy **Business** Markets Opinion Real Estate WSJ. Magazine

#### What's News

### **Facebook Charged** With Violating Fair **Housing Laws**

The Department of Housing and Urban Development said it was charging Facebook with violating fair housing laws by enabling real-estate companies to improperly limit who

can view ads on its platform. • 70

#### **China Floats Cloud Concession to** Foreign Tech Firms in U.S. Trade Talks

China is offering foreign tech firms better access to its cloud-computing

market, as Beijing fashions

a compromise in a sector

megknapik

#### 7.5 5.0 30 40 10 20 30 2017 Note: Data for 1Q2019 through 3/25 Source: Hiya

The FCC Has Fined Robocallers \$208 Million. It's Collected \$6,790.

America's telecommunications regulators have levied hefty financial penalties against illegal robocallers and demanded that bad actors repay millions to their victims. But years 



The Yankees' Lost Decade



Floods Deal a New Blow to the

#### Markets

EUROPE



Q

FUTURES

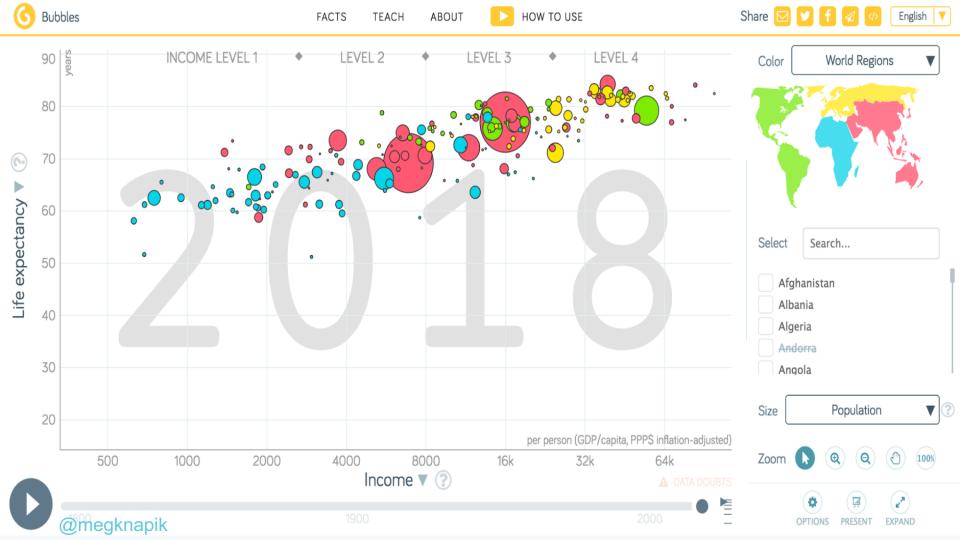
**MARKETS** 

#### **Opinion**

Mar 28 '19, 9:52 AM EDT

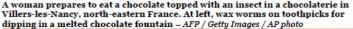
The Terminator Democrats By Daniel Henninger | Wonder Land

Tax Reform Is No 'Sugar High'











### Would you eat chocolatecovered bugs?

Lemann said the FDA allows 60 or more microscopic insect fragments for each 100 grams of chocolate. So it's not a huge leap to just go ahead and include a whole bug.



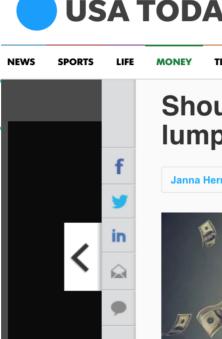
By Stacey Plaisance | Associated Press

The menu includes crickets and wax worms on toothpick skewers for dipping in a fountain of melted chocolate. It also includes "tarsal toffee" made with bug legs and mealworms, and fudge infused with crickets and marshmallows.



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### Should you take your \$750 million Powerball jackpot as a lump sum or annual payments?

INVESTIGATIONS

**NEWSLETTERS** 

**CROSSWORDS** 

Janna Herron, USA TODAY Published 3:10 p.m. ET March 27, 2019 | Updated 6:53 p.m. ET March 27, 2019



If you win the lotto, you may give some of your enormous loot to close family and friends but you'll also have to fork some over to the IRS. Buzz60's Mercer Morrison has the story Buzz60

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#### **POPULAR STORIES**



Report: Walgreens to sell CBD in 1,500 stores



"Students and adults are much more engaged when they are given open math problems and allowed to come up with methods and pathways than if they are working on problems that require a calculation and answer."

-Jo Boaler,

Mathematical Mindsets (2016)



## Types of Math Journaling

#### **Descriptive**

"Show and describe to me the best method, in your opinion."

#### **Evaluative**

"Out of these two methods, which method is better and why."

#### Creative

"What is a story to go with 300 - 125?"

#### Investigative

"Which works because the number is 125?

Which method works for any value?"



## Think, Write, Pair, Share

After independent work time, students write to explain their strategy so far, both successful and unsuccessful attempts. Students then have time to pair up with someone to share, compare, and continue working together before coming back together as a class to discuss.





## Self-Assessment & Reflection

- What did you try already?
- Was it successful? Why or why not?
- What will you do differently next time?



#### **Discussion Boards**

Students reflect in an online classroom discussion on the day's learning and key takeaways. After they post, they can read and comment on the responses of others.







Dec 12, 2018

I think the best coupon for the chair is the 20% off one. I think this because if the price is over \$100 then the numbers that the percentages will be bigger. For example in this problem the \$20 off coupon would've mad the price \$109.99, but the 20% off coupon would've made the price \$102.99. However in the Converse example, I would use the \$20 dollars off because with that it would be \$19.99 but the 20% off would give you \$32.99

https://docs.google.com/document/d/1PnK-



Julieta

Yesterday

For commutative I looked for whether or not the numbers had been switched in order.

For property of 0 I looked for a number multiplied by 0 and an answer of 0.

For associative property I looked for the way the numbers were grouped/represented.

For distributive property I looked for a simplified version of an expression.

For identity property I looked for an answer that was the same as one of the numbers that were being added.



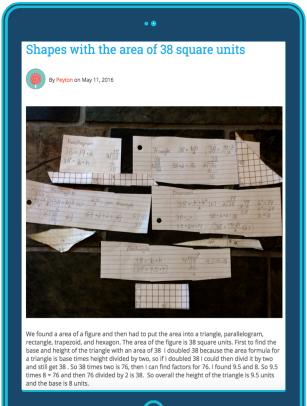
## Taking It to the Next Level: Student Blogging







Check your I MS!





2. and so 2 squared is 4. Since both squares in the sides are identical, or the same, I will add 4

and 4 together to get the total area of the two squares, since they are identical. 4 plus 4 is 8, and so that is the area of the two squares. Now I need to find the total area of the composite

figure. 20 plus 10, (for the two rectangles,) is 30. And 30 plus 8, (for the two squares) is 38. So

that is the area of this composite figure.



"The powerful thinkers in today's world are not those who can calculate fast, as used to be true; fast calculations are now fully automated, routine, and uninspiring. The powerful thinkers are those who make connections, think logically, and use space, data, and numbers creatively."

-Jo Boaler,

Mathematical Mindsets (2016)





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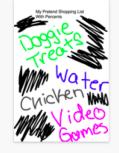
Q Search

Sort By ~



















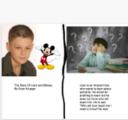












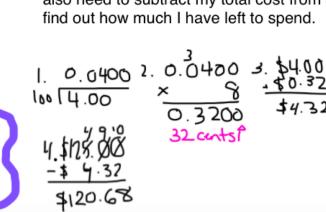


I've finally saved up \$125! Time to go shopping! But first, my mom, being the practical woman that she is, told me I could not use more than my \$125. Bummer! Guess I'm going to have to stay within my budget. When I arrived at the mall, I immediately ran into my favorite clothing store...Old Navy! There was this ADORABLE pair of flip flops! Perfect for this warm weather! The shoes cost \$5.00. But that was when I noticed that there was a 20% discount. I wonder how much they cost now?

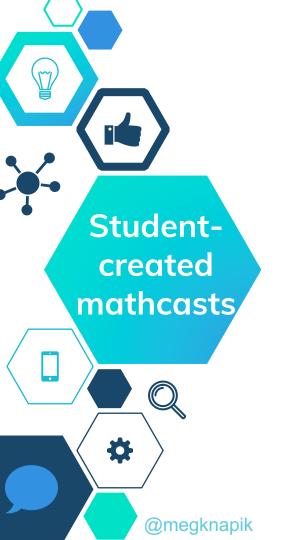
**OLD NAVY** 

First, to find my discount, I need to divide \$5.00 by 10 to find 10%. Then, I multiply the result by 2. My product is what I subtract from the original price, or my discount.

"Remember the sales tax!" My mom reminded me. "It is 8% of your total cost." I forgot! Now I need to calculate how much I will have to pay INCLUDING sales tax. So now I need to divide my \$4.00 by 100 to find 1%. Then I multiply that by 8 to find 8% of my total cost. Finally, I need to add that to my total cost. Oh wait! I also need to subtract my total cost from \$125 to find out how much I have left to spend.





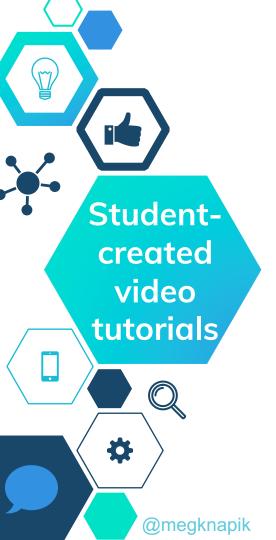












My real world How will I visually situation: model this? How will I explain How will I compute the problem? What to show the correct important math answer with vocabulary words appropriate units? will I include in my explanation?





#### Wakelet Example Idea



(Google Chrome)





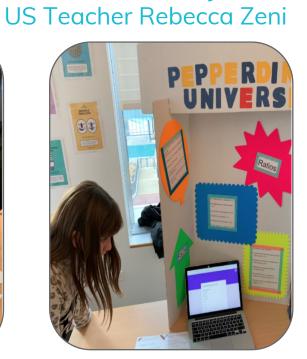








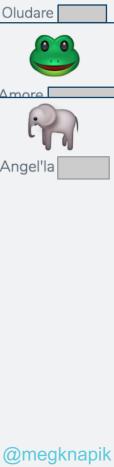












1. What were your questions for Dr. Croff Bell? How deep is the ocean? Why do you explore? 1. What were your questions for Dr. Croff Bell? Why was your favorite part of the journey? & How long was your journey? Angel'la 2. What did you learn about Dr. Croff Bell as an explorer? I learned Dr. Croff Bell used graphs & math like division & addition. 3. What type of data can Oceanographers collect? New & different specie data, sample data & math data. 4. How do ocean explorers use math to support their explorations? How ocean explorers use math to support their explorations is by making calculations about how low they are & how much boiancy they have. 5. Can you make a connection between Dr. Croff Bell and any other explorers we have been learning about? I think Sylvia Earle has a good connection with Dr. Croff

What tools do you use for math? What risks have you took as an explorer?

1. What were your questions for Dr. Croff Bell?

Bell because they are both deep sea divers.



Research, model, extrapolate, and write to analyze data!

US Example
Teacher
Richard Getzel
46 @megknapik

 $\begin{array}{c|c} x_1 \\ \hline 0 \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 10 \\ \end{array}$ 

Figure 1. N

Figure 2. F Correlation M value: -9 B value: 34

The data I chose to base my graph off of was the in the USA. This was a point of interest to me because it's curious to see the results. So, I generated a linear regress took from the site Gapminder. This would help predict what concerning child death rates. Along with the line generate are created. One of them, the correlation coefficient, is a accurately fit the regression line. The closer that number accurate it is (you can think of it like percentages, 1 being coefficient that I have for the line is .9871, meaning the da course, it is not as good as 1, although 1 is hard to achiev there are lots of variables that can affect it. The next value line. Thankfully, the slope is negative, approximately -9.6 number of children dying each year will decrease steeply value I want to discuss is the y-intercept or the b value. T child deaths in 2005; however, because it's generated bas the generated number is a prediction. This prediction was The indicator I chose measures how many young

In a indicator I chose measures now many young selected out of this topic, I figured out that there is a defin year (independent variable) and the number of child death coefficient was pretty close to 1, and there were no extren could tell the points were going down. This conclusion ma older, humanity makes new advancements. For example, lot and now people have created vaccines for deadly dise been developed, increasing the overall public health too. In the USA.

From my graph, I can tell the number of child deat decreasing dramatically. The amount is still quite big, but why the numbers are still so big is because young childre This is due to the fact that they aren't fully developed and world. They are also more prone to diseases than adults, ready to combat viruses. My graph is basically saying that technology gets better, making life-threatening accidents I might attribute to that are advances in locating tumors, groncerning surgery. Surgery improvements are especially in a life or death situation.

To get more information, I have done some resear 2000s and beyond. I came across an interesting article th and vaccines helped prevent death by measles and prolo of death by measles decreased by 74 percent globally be my statement that an advance in medical science can gre (especially child deaths). However, there is also some artivaccines might cause people not to take them, leading to

it is not increased by much and is due to the fact that people don't understand how they work. It still remains that new vaccines and surgical procedures help save a lot of lives.

The results of my research did support my hypothesis. Most articled did indeed say that because of new medicines created, death rates did decrease since the old days. However, some did shed some light onto points that I originally didn't think of. These points included that some people were actually opposed against new medicine since it could be "dangerous", making them not take it, and that overuse of a vaccine causes it to be less effective. These two issues could be why the number of child deaths still remain a large number, not decreasing as fast as it should. Plus, child death could also be caused by other factors not curable by science as it is now.

I predict that by 2028, about 12400 children will the day before age 5 in that year. This is based on the line generated from the data points I selected. I do believe that this is a possible value since it isn't 0, however, I'm sure it will not be exactly the amount I predicted. My research does support this because it states there are already so many new advances that are changing medical science today, and even more to look for in the future. The regression line generated will also continue to go down, however, I think it will flatten out or become less steep once it reaches 800 child deaths. This is because there are certain things that science cannot prevent, despite how advanced society is. Although, the future is uncertain and I might be wrong. Maybe humans will be that advanced someday.

Work Cited:

"Vaccine." The Gale Encyclopedia of Science, edited by K. Lee Lerner and Brenda Wilmoth Lerner, 4th ed., Gale, 2008. Research in Context,

https://link.galegroup.com/apps/doc/EJ2644032331/MSIC?u=chi180&sid=MSIC&xid=5d380446. Accessed 13 Jan. 2019.

"Medical Technology." Opposing Viewpoints Online Collection, Gale, 2015. Opposing Viewpoints in Context, https://link.galegroup.com/apps/doc/PC3010999205/OVIC?u=chi180&sid=OVIC&xid=2d7e704e. Accessed 13 Jan. 2019.

"Rehan Verjee to Lead EMD Serono as Company Advances its Innovative Medicines Strategy in North America." EMP Newswire, 3 Sept. 2018. Science In Context, https://link.galegroup.com/apps/doc/A552746897/SCIC?u=chi180&sid=SCIC&xid=4e18b344. Accessed 13 Jan. 2019|





### Mrs. Knapik's Clas

@MrsKnapikMath Follows you

We are a 6th grade math clas in math in the real world, critic and problem solving!

Barrington, IL

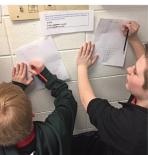
**Ⅲ** Joined February 2015



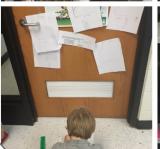


We wrote real life linear equations & saw how the intervals we use changes how data looks on our graphs #knapikmath





Following







## **Twitter Time!**

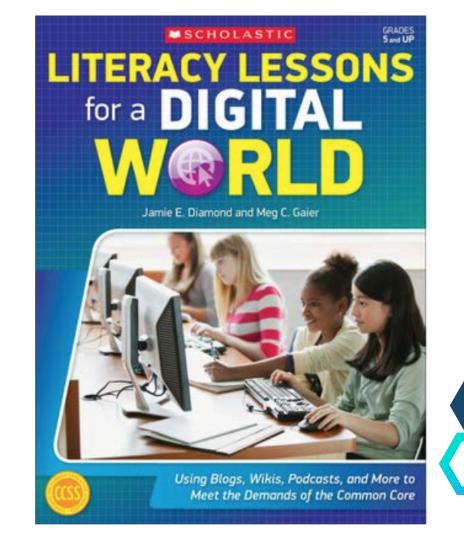
In 140 characters or less, send out a Tweet with some new learning or a takeaway from this session that you can implement in your classroom.





## FREE Book Giveaway!

Who has a birthday in April?





# Thanks!

## Any questions?

You can find me at:

- ♦ @megknapik
- megknapik@gmail.com
- megknapik.blogspot.com





Special thanks to all the people who made and released these awesome resources for free:

- Presentation template by <u>SlidesCarnival</u>
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