Welcome to Unveiling the Magic

- Look through the cards on your table
- Notice and Wonder
- Discuss!

Unveiling the Magic

Tina Cardone

Who are you?

Introduce yourself to your table mates

- Name
- School, Grade Level, Role
- What are you hoping to get out of this workshop?
- One interesting fact about yourself

Norms

- Use I statements (My students)
- Trust everyone wants the best for students
- Use strength based language

Too Helpful?

Mr. Moore is giving out 15 cookies to 4 of the students in his class. He wants each student to get the same amount of cookie. How much cookie should each student get?

Hint: Cut the leftover cookie(s) into enough pieces for each student to get a piece.

Bonus Question: Which DURT strategy did you use?

If you get a remainder, think of DURT:

Drop or ignore the remainder

Use the remainder because it is the answer.

Round the answer up.

Turn the remainder into a fraction.

https://illustrativemathematics.blog/2018/03/20/instructional-materials-matter-interpreting-remainders-in-division/

Too Helpful?

“How does this hint provide students with opportunities to engage in Math Practice 1: Make sense of problems and persevere in solving them?”

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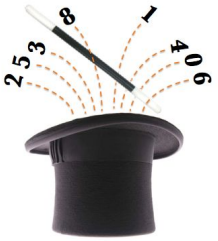
Too Helpful?

“How does this hint provide students with opportunities to engage in Math Practice 1: Make sense of problems and persevere in solving them?”

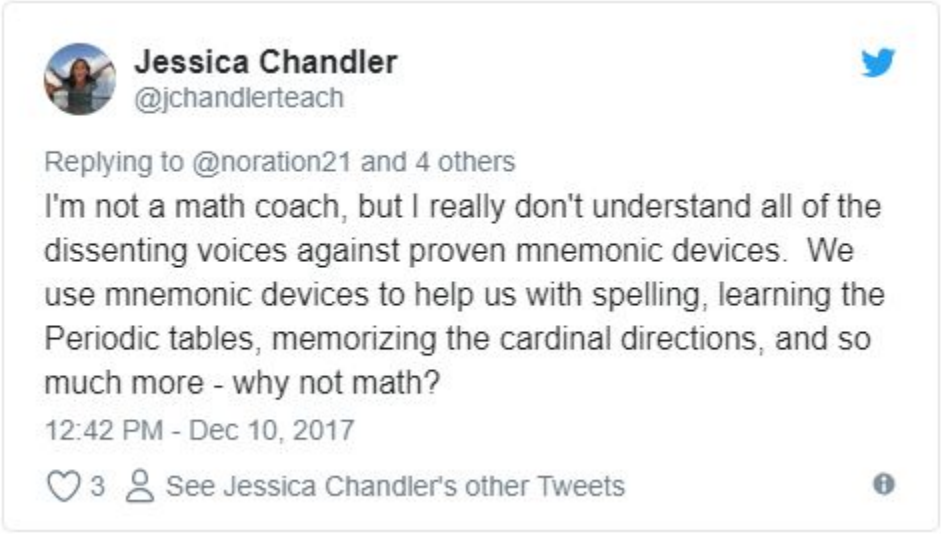
“As a teacher, how will I know students understand how and why to partition the cookies as opposed to reading the hint?”

https://illustrativemathematics.blog/2018/03/20/instructional-materials-matter-interpreting-remainders-in-division/



- Is it a trick?
  - Method
    - Kids can explain: **Shortcut**
    - “Because __ said so”: **Trick**
  - Definition
    - New term: **Mnemonic**
    - Based on previous terms: **Trick**

So Do We Use Mnemonics?



Jessica Chandler
@jchandlerteach

Replying to @noration21 and 4 others

I'm not a math coach, but I really don't understand all of the dissenting voices against proven mnemonic devices. We use mnemonic devices to help us with spelling, learning the Periodic tables, memorizing the cardinal directions, and so much more - why not math?

12:42 PM - Dec 10, 2017

3 See Jessica Chandler's other Tweets

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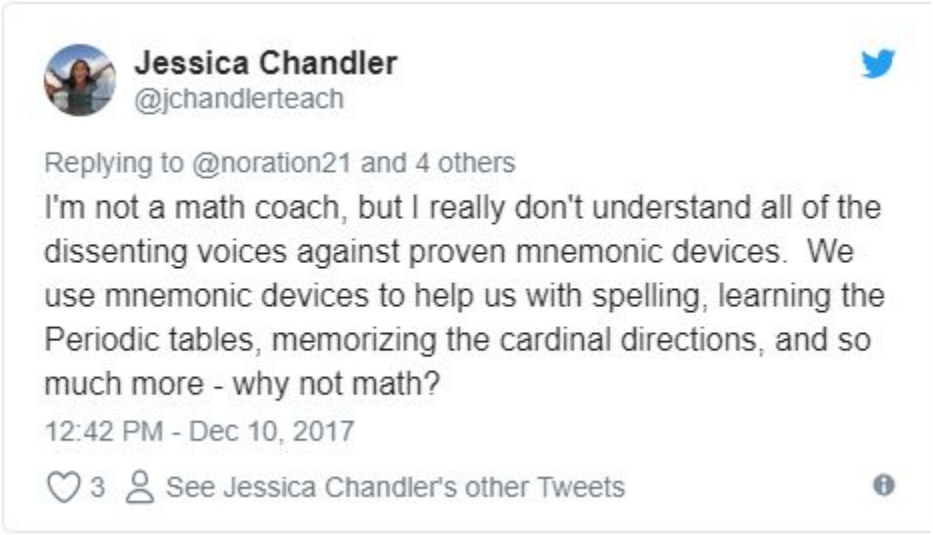

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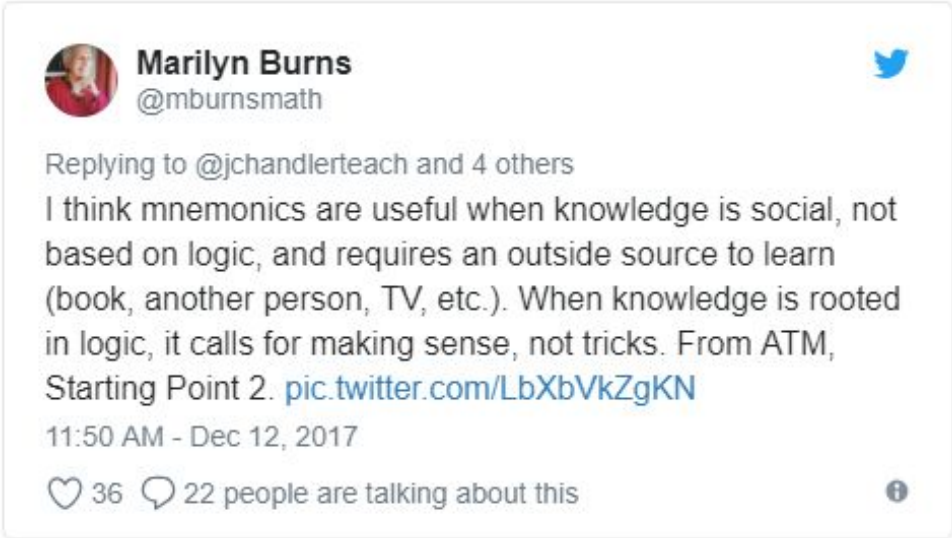


Marilyn Burns
@mburnsmath

Replying to @jchandlerteach and 4 others

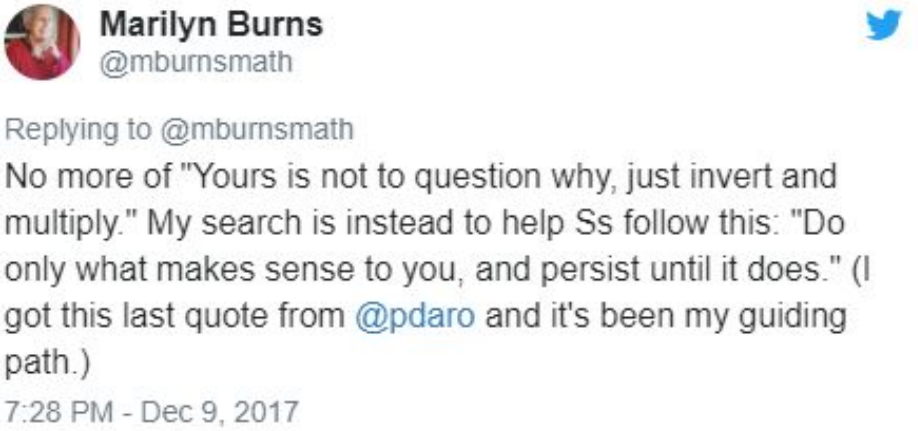
I think mnemonics are useful when knowledge is social, not based on logic, and requires an outside source to learn (book, another person, TV, etc.). When knowledge is rooted in logic, it calls for making sense, not tricks. From ATM, Starting Point 2. pic.twitter.com/LbXbVkZgKN

11:50 AM - Dec 12, 2017

36 22 people are talking about this

https://www.amazon.com/About-Teaching-Mathematics-K-8-Resource/dp/1935099329

Even Marilyn Burns Isn't Perfect



Global Math Department and #MTBoS: Math Twitter Blog-o-Sphere

We are passionate math educators who take pride in sharing our best math teaching ideas.

Explore MTBoS

GLOBAL MATH DEPARTMENT

To join in on the fun visit

ExploreMTBoS.wordpress.com

Types of Tricks

- Imprecise Language
- Methods Eliminating Options
- Tricks Students Misinterpret
- Math as Magic

Not the Goal

EVERY TIME YOU DO THIS:

$$(x^2+3)^2 = x^4+9$$

-or-

$$\sqrt{x^2+9} = x+3$$

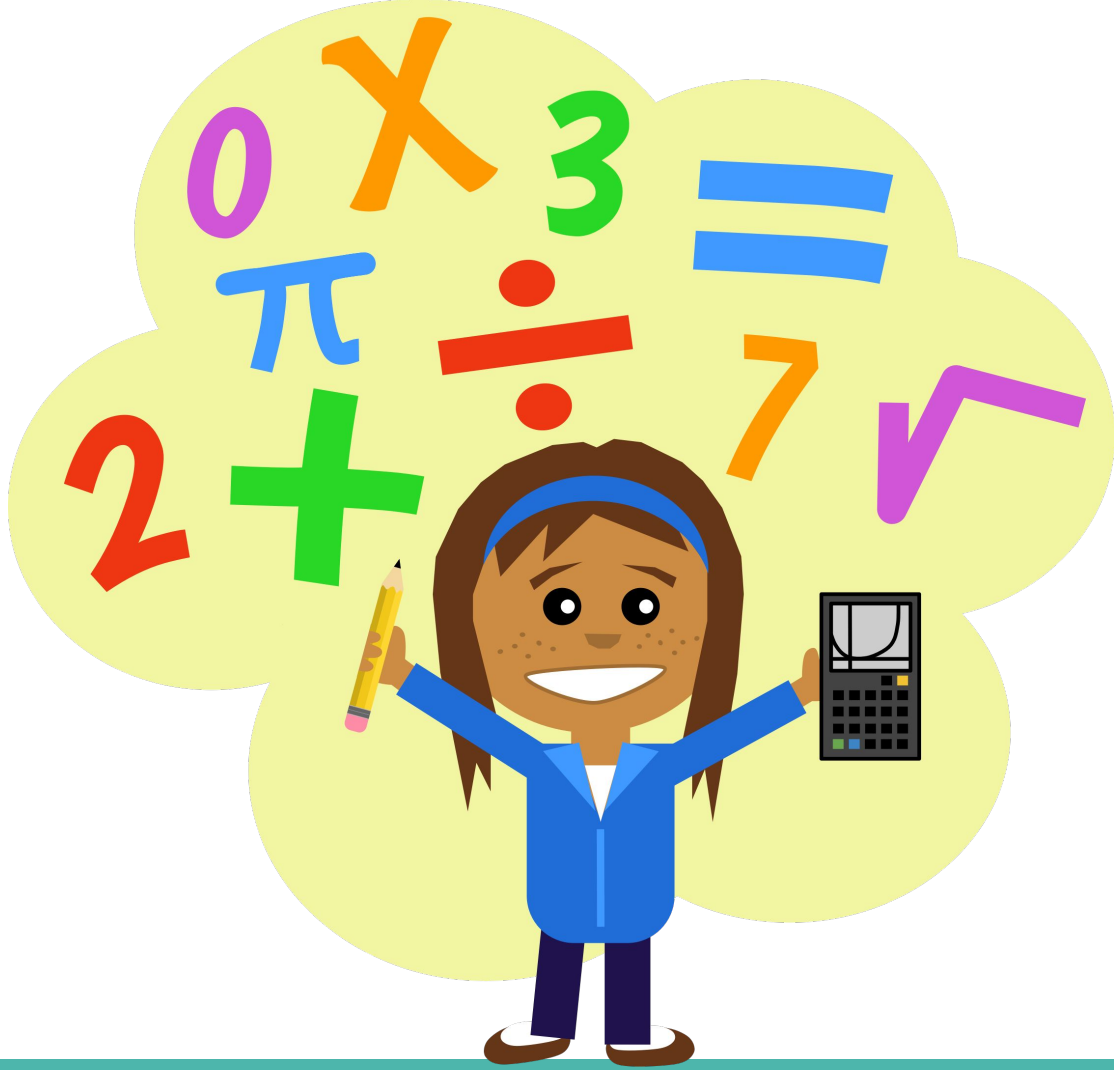
A PUPPY DIES.

Tricks Are For Kids?

Tricks appear.

Then what?

We investigate!



Judah's Theorem (aka the Horn family is Awesome)

The video.

Judah's Theorem

If Judah has piqued your interest, there's a card on the table with a link and you can check out the whole thread of corollaries and hypotheses later!

The Investigative Process

Step 1: That’s interesting, can I do it?

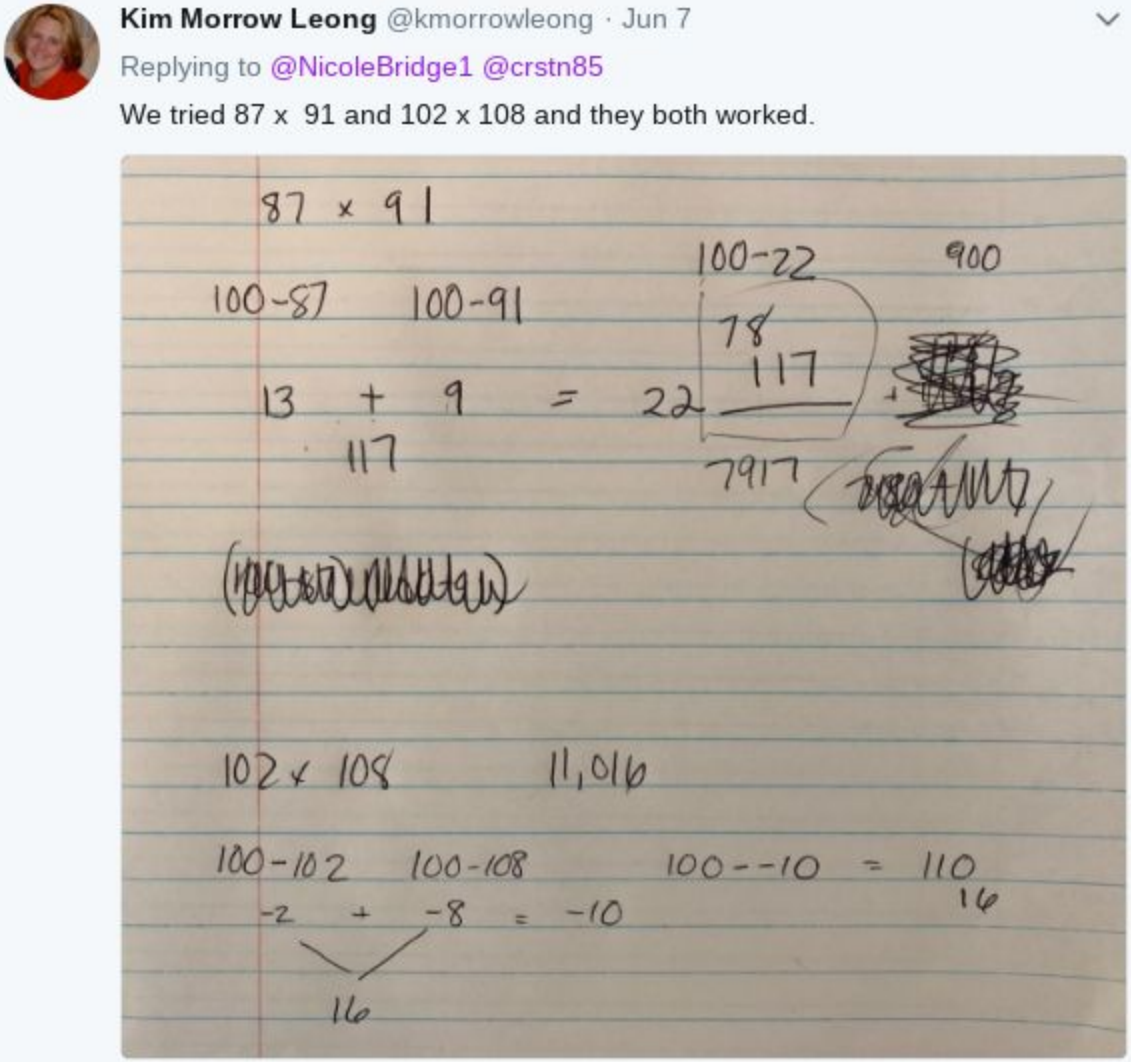
Step 2: Does it work for this other thing?

Step 3: Why does it work?

A Viral Video

https://www.youtube.com/watch?v=3oMuVVKU1eQ

1. Can I Do It?

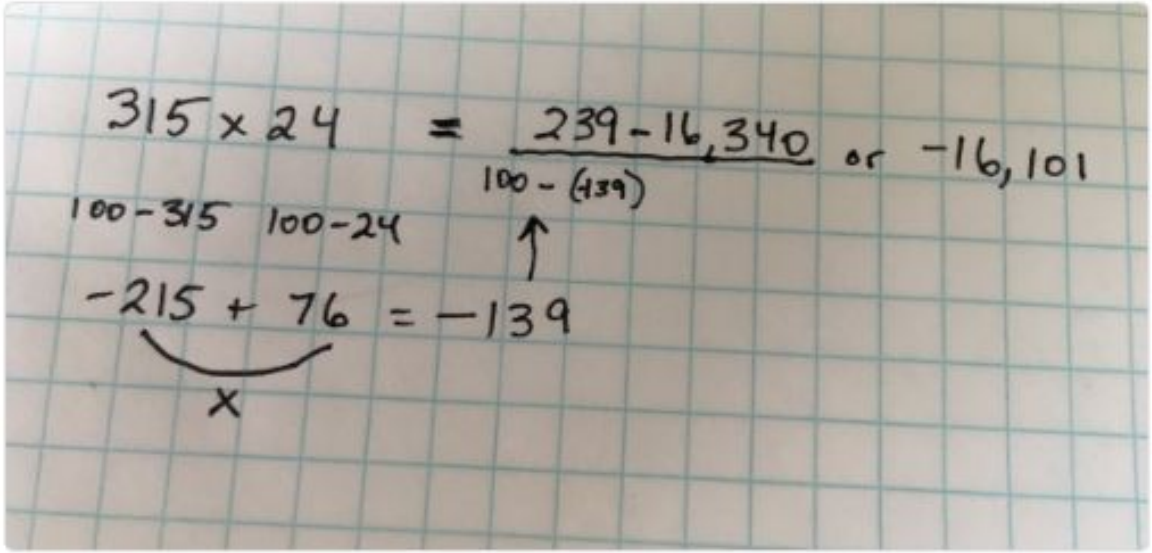

Kim Morrow Leong @kmorrowleong · Jun 7
Replying to @NicoleBridge1 @crstn85
We tried 87 x 91 and 102 x 108 and they both worked.
87 x 91
100-87 100-91
13 + 9 = 22
117
100-22
78
117
7917
900
102 x 108
11,016
100-102 100-108
-2 + -8 = -10
16
100--10 = 110
16

2. When Does It Work?

Mark Trushkowsky @mtrushkowsky · Jun 8

Replying to @crstn85

This is so great! I always wondered how 9 x 0 = -110, and now I know! But I'm confused. Is 315 x 24 equal to 239-16,340 or do you have to reduce it to -16,101?



1 1

Tina Cardone @crstn85 · Jun 8

Well done completing step 2 of trick investigating: try to find some cases where it works and where it doesn't!

3. Unveil the Magic, Find the Math

If you’re curious about this one, there’s a card for it on the table.

Finding the Joy

“My most vivid experiences in mathematics classrooms often point to joy, wonder and beauty of learning mathematics. … We need to… promote and value students’ participation in mathematical discussions — sharing their reasoning and creating, critiquing, and revising arguments. “

- Dr. Robert Q. Berry III
  President, NCTM

http://www.educationandcareernews.com/stem/meaningful-math-education-is-for-each-and-every-student

Your Turn!

Step 1: That's interesting... Can I do it?

Try the thing. Can you follow the steps and make it work?

Step 2: Does it work for this other thing?

Try it in some different cases. Can you break it?

Step 3: Why does it work?

Dig deep into the why!

What underlying mathematics can you connect it to?

Summarize Your Findings

1. Organize your thoughts.
2. Make something to share.
3. Check out the other groups!

Everyone Should Learn: Math Makes Sense

All students deserve to experience joy and aha moments in math class.

- Students with gaps in their math education
- Students who can already ace your quizzes
- Students right on target with your pacing guide
- Students with disabilities
- Students learning English
- Students in public, private, charter, rural, urban, suburban schools
- Students of color
- Students who identify as white
- Students at the top rated schools and the ones in receivership
- Students with wealthy parents
- Students living in poverty

Standards of Math Practice

MAKE SENSE OF PROBLEMS AND PERSEVERE IN SOLVING THEM

"I can figure out what a problem is asking."

"I can solve problems without giving up."

CONSTRUCT VIABLE ARGUMENTS AND CRITIQUE THE REASONING OF OTHERS

"I can justify my answer and examine someone else's."

Investigate Everything

It doesn’t have to be a trick to dig deep.

The algorithms and theorems in your content standards are also ripe for this approach.

Step 1: That’s interesting, can I do it?

Step 2: Does it work for this other thing?

Step 3: Why does it work?

Becoming the Math Teacher You Wish You'd Had

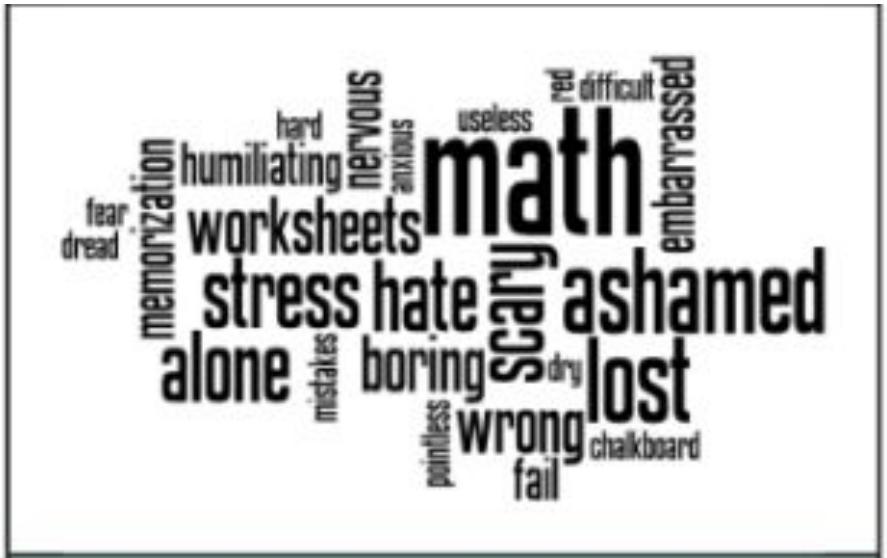


Figure 1.1 *Words many teachers use to describe their experience as math students*

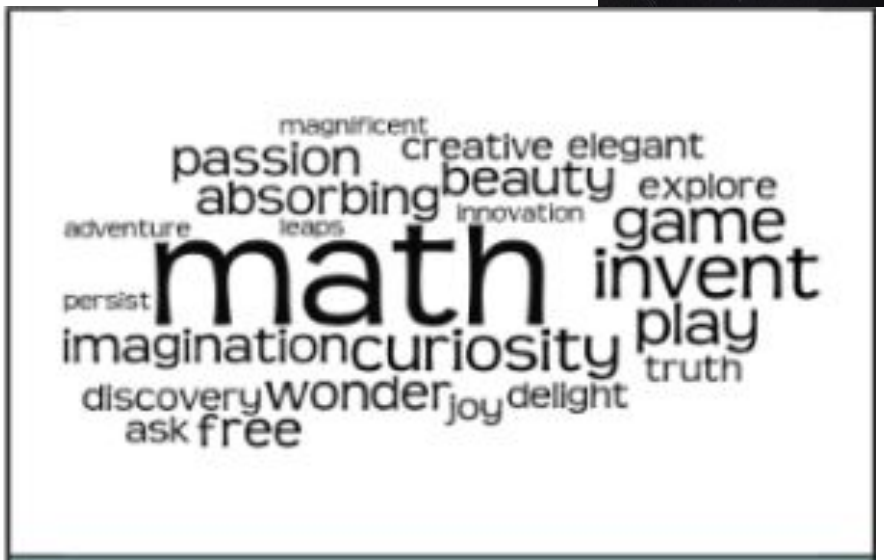


Figure 1.2 *Words mathematicians use to describe mathematics*

This is How We DO Math

In this era of high stakes and high stress, it is imperative to set the classroom culture carefully:

“One way to do this is to plan playful, beautiful, joyful mathematics lessons for students! … I wonder how we can set up mathematics classroom communities that provide intellectual and physical safety for ALL students to do mathematics?”

-Lybrya Kebreab

https://lybryaslogoflearning.wordpress.com/2018/08/22/this-is-how-we-do-math/

This is How We DO Math

(a) mistakes and diverse perspectives are valued,
(b) fun, beauty, play and teamwork are HOW we do math, and
(c) we're going to tackle some tough stuff in here, so get ready kiddos!

-Lybrya Kebreab

https://lybryaslogoflearning.wordpress.com/2018/08/22/this-is-how-we-do-math/

Now What?

How can you make this happen in your class?

READY TO MAKE A CHANGE: