

MATH DISCOURSE

LET'S TALK ABOUT MATH!

ANNIE
FOREST

@MRSFOREST



Annie Forest

- 12 years of experience teaching middle school math
- National Board Certified Teacher
- Blogger:
www.showyourthinkingmath.blogspot.com
- 2014 ICTM Middle School Teaching Award, 2015 State Finalist for PAEMST
- Follow me on Twitter @mrsforest

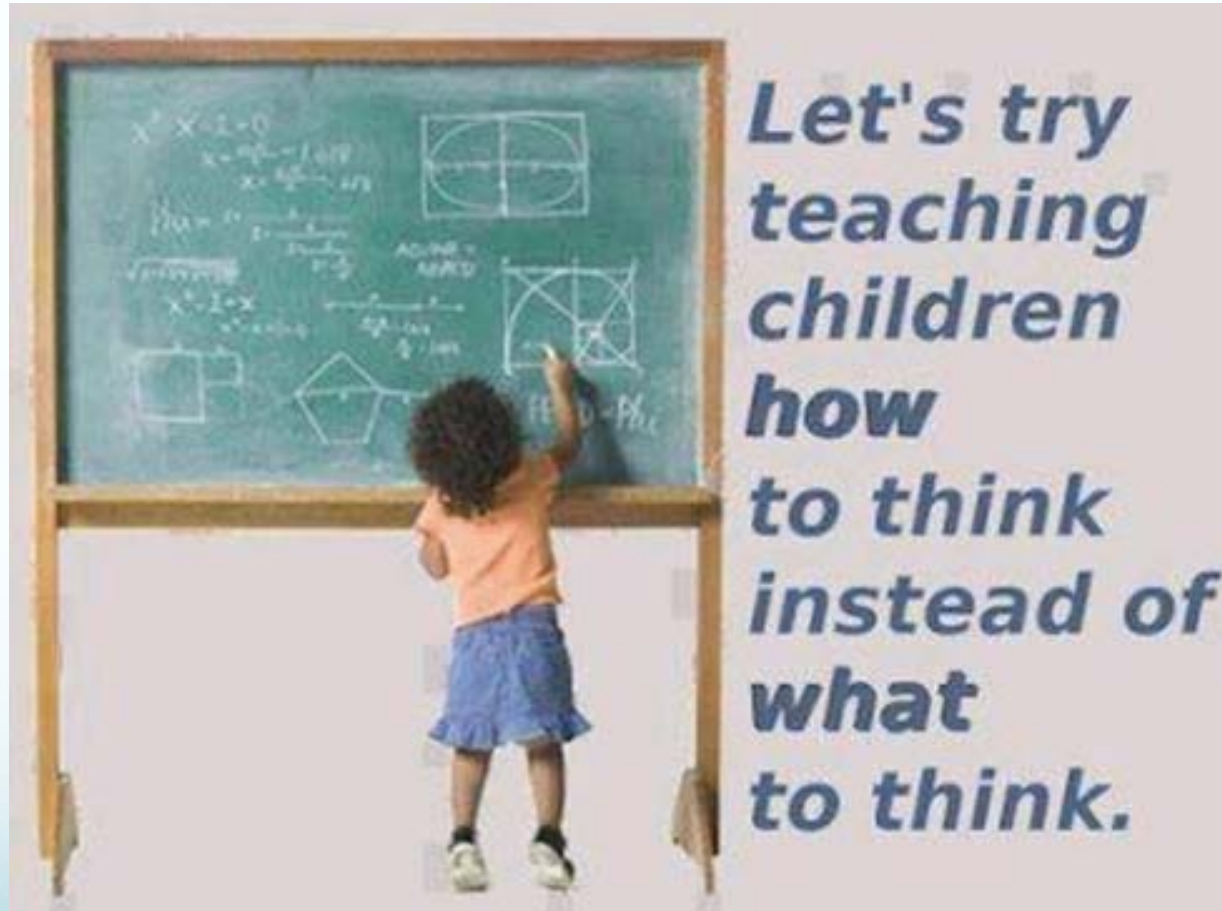
Shared Agreements

- Be respectful of everyone's opinions
- Be willing to rethink our own ways of teaching
- Think critically about what is best for student understanding
- When we know better, we do better

Why do we need to rethink *how we teach math?*

I want to help students understand and make sense of the the math, to be their guide.

I don't want my students to understand the math in spite of my teaching!

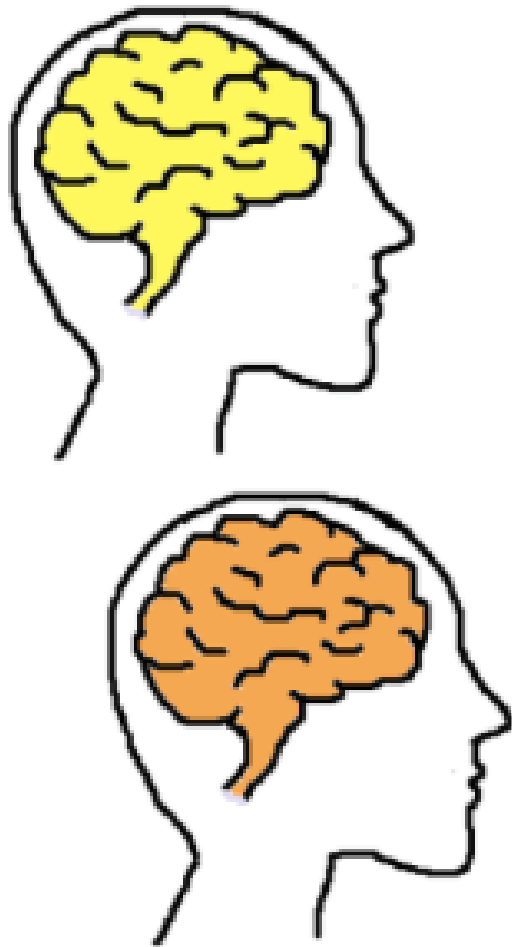


Quick Write

- To learn from discussions or group work **students need...**
- To manage successful discourse **teachers need...**
- Sometimes math discussions are **unproductive because...**

How Get Kids Talking

- Safe Classroom Environment
- Structures
- Questioning Techniques
- Expectations/Norms/Procedures
- Interesting Math



“Math communication – or any communication – is a problem of **empathy**.

You have to imagine yourself **in the mind of somebody** who doesn't know something that you do.

Jordan Ellenberg

author of *How Not to Be Wrong: The Power of Mathematical Thinking*

Math Practices

Make sense of problems and persevere in solving them.

Reason abstractly and quantitatively.

Construct viable arguments and critique the reasoning of others.

Model with mathematics.

Use appropriate tools strategically.

Attend to precision.

Look for and make use of structure.

Look for and express regularity in repeated reasoning.

Math Practices

Make sense of problems and persevere in solving them.

Reason abstractly and quantitatively.

Construct viable arguments and critique the reasoning of others.

Model with mathematics.

Use appropriate tools strategically.

Attend to precision.

Look for and make use of structure.

Look for and express regularity in repeated reasoning.

Beware: Imprecise Language

- Opposites vs. **Inverses**
- “Similar” vs. **“In Common”**
- Top/Bottom Number vs. **Numerator/Denominator**
- Reducing vs. **Simplifying**
- Borrowing vs. **Trading/Regrouping**
- Long Numbers are Large Numbers?
- Equal sign means “find the answer” vs. **Equality**

Math Talks



Annie Forest, 2016 @mrsforest
www.showyourthinkingmath.blogspot.com

Math Talk

- Regular classroom routine (daily or about twice per week)
- At the most it should last 10 minutes
- Gets students to make arguments and justify their thinking

Expectations

- Quiet think time
- Give a signal when an answer is reached
- Keep thinking of alternate ways to do the problem
- Share ideas
- Mistakes are gifts!



mistakes are
GIFTS
in classroom discussions!

Math Talk

$$342 + 99 = \underline{\hspace{2cm}} + 105$$

Planning

- Before

Choose a problem (related to content or not)

Go over expectations with class (each time)

- During

Be quiet (it's tough!)

Ask questions and don't assume

- After

Reflect

What do I do?
They aren't saying anything!



Turn-And-Talk

- Helpful for reluctant learners, students with IEPs, or ELLs
- Use “strategic eavesdropping”
- You can use sentence stems
- Ask one partner to share, other partner to summarize or add-on

Asking Questions

- Encourage students to “tell me more about...”
- No opt out
- Wait Time
- Resist “voice-overs”
- Focus students (instead of funneling)

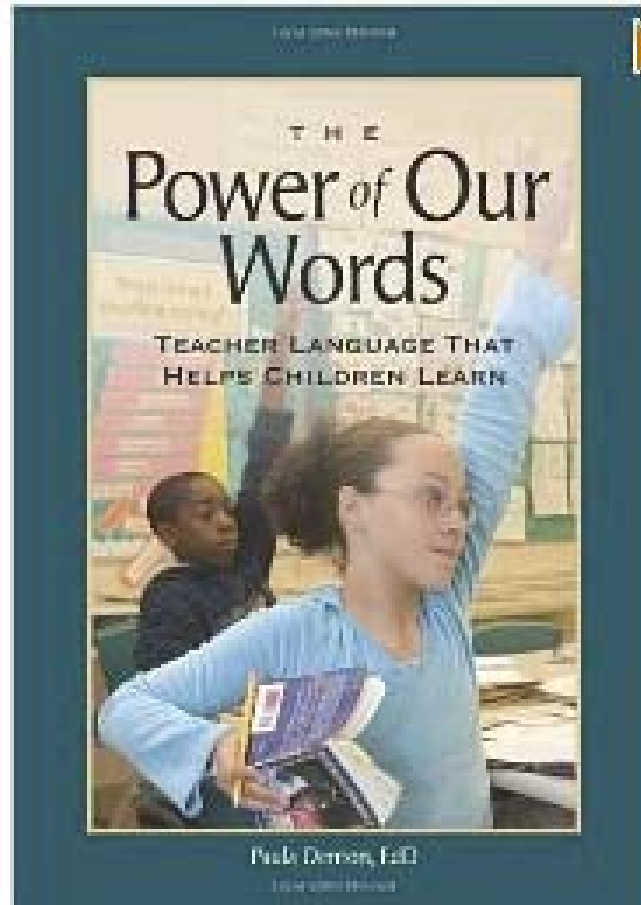
Funneling vs. Focusing

Funneling	Focusing
Teacher Engaged in Cognitive Activity	Student Engaged in Cognitive Activity
Questions lead student through a procedure	Questions guide students through their own thinking
Students gets the correct answer, but does not see the connection between the questions	Teacher can understand what the student is thinking

Giving Feedback

- De-emphasize competition
 - instead of “better,” try “different”
 - instead of “best,” try “efficient”
- Avoid personal approval

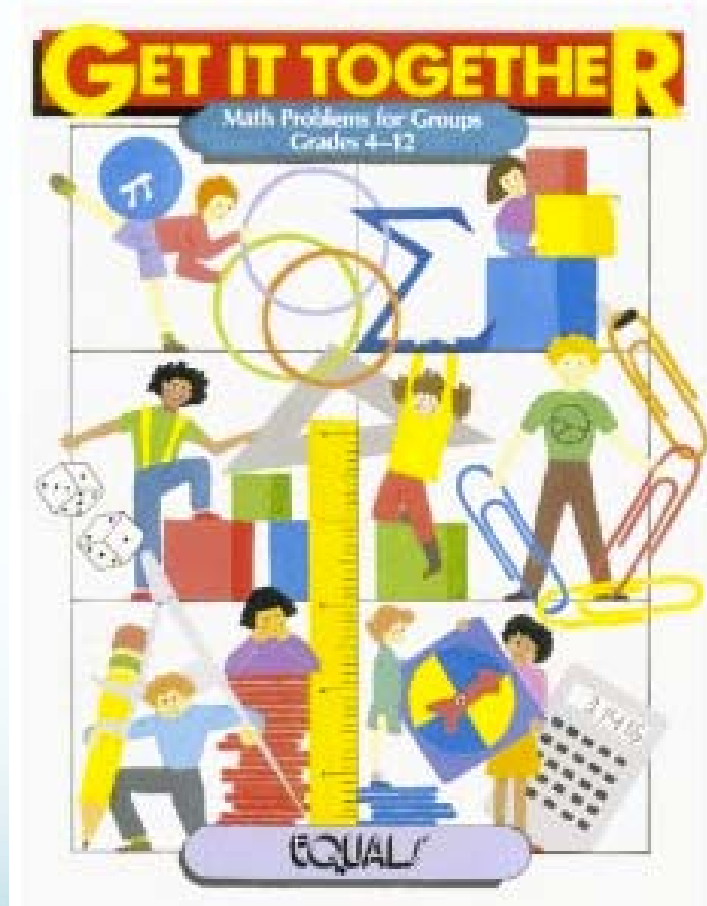
The Power of Our Words by Paula Denton



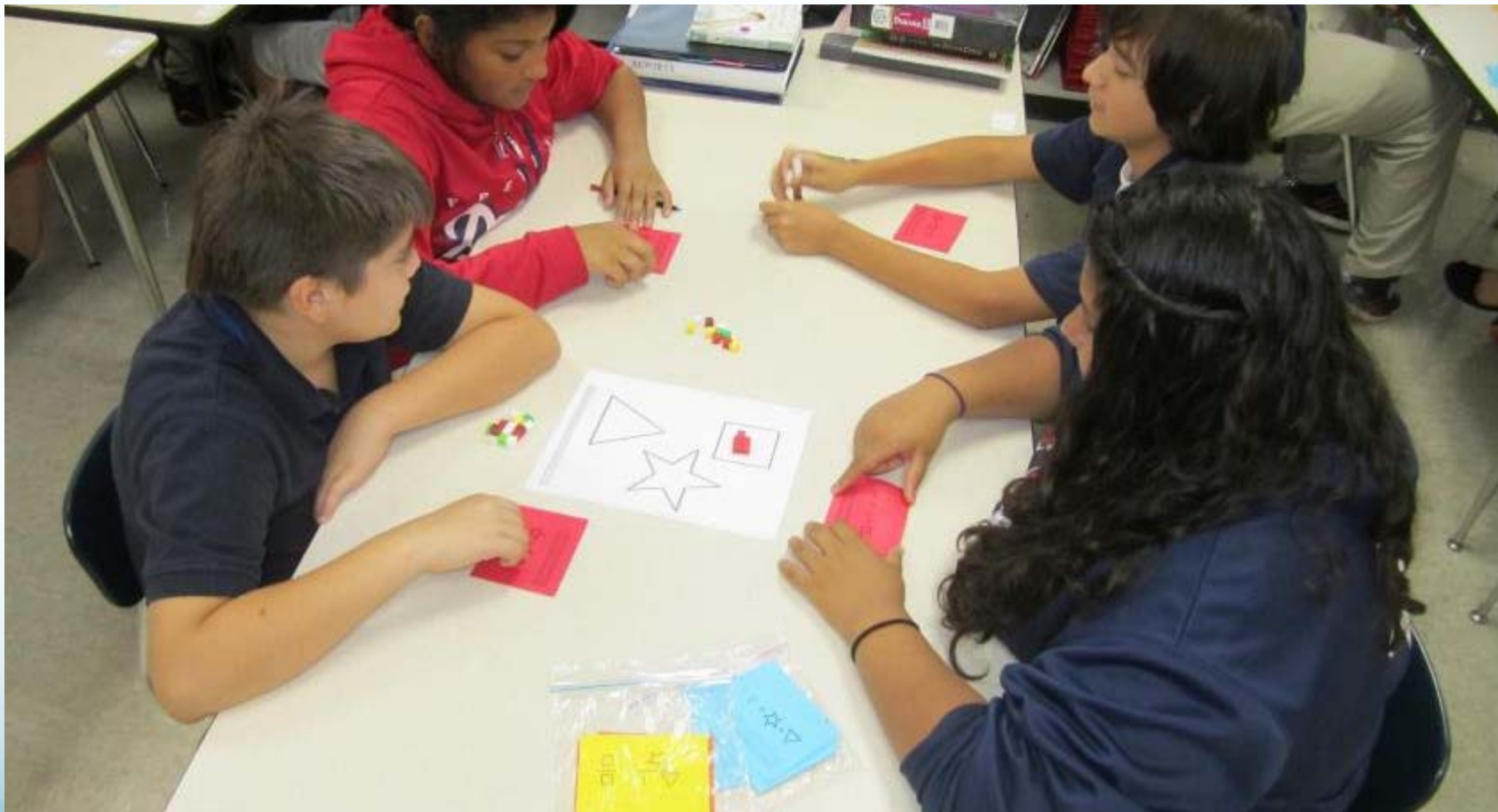
Annie Forest, 2016 @mrsforest
www.showyourthinkingmath.blogspot.com

Get It Together

By: Tim Erickson



Expectations



Annie Forest, 2016 @mrsforest
www.showyourthinkingmath.blogspot.com

How to handle problems in the group

Kind Reminder	Report to Teacher
Someone is bossy/not letting others participate	Someone is being physically hurt
Someone is not helping or working	Someone is being emotionally hurt or bullied
Someone is bothering or annoying you	

Are we right?



Annie Forest, 2016 @mrsforest
www.showyourthinkingmath.blogspot.com

Let's try one!

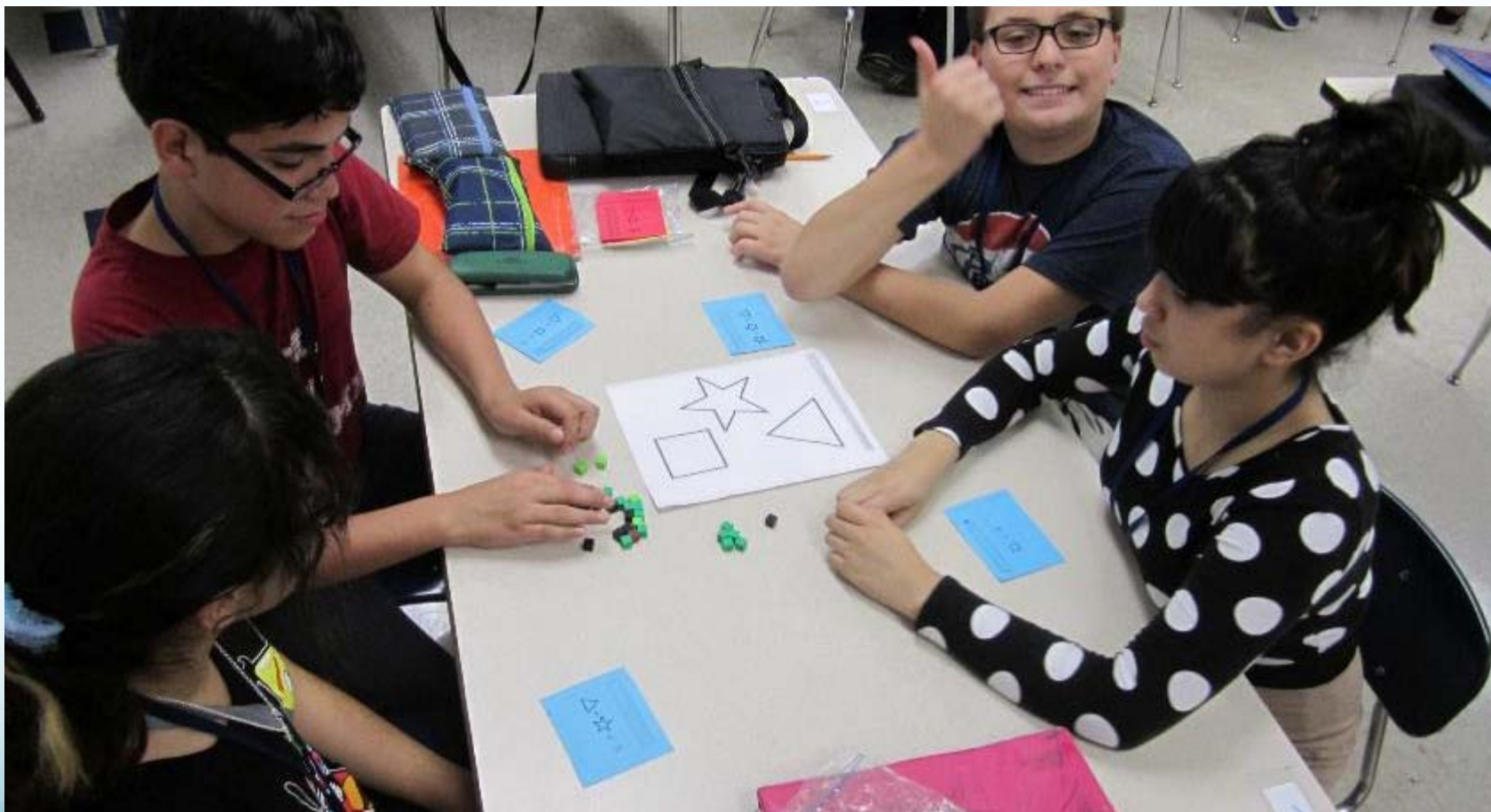


Annie Forest, 2016 @mrsforest
www.showyourthinkingmath.blogspot.com

Management Tips

- Colored paper is your friend
- Ziploc bags can keep you organized
- Flexible seating arrangements
- Leave enough time to put materials away

Classroom Example



Annie Forest, 2016 @mrsforest
www.showyourthinkingmath.blogspot.com

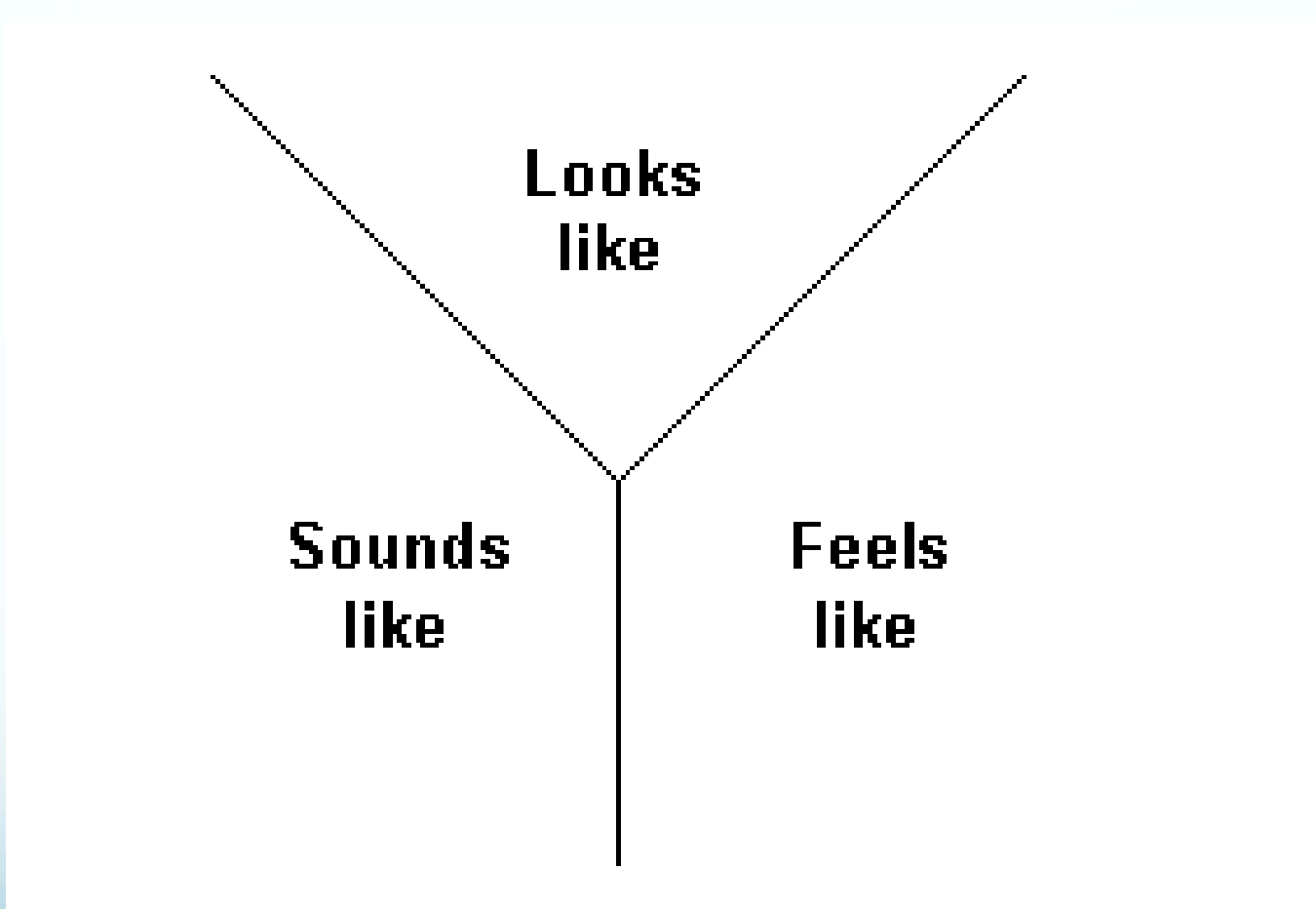
Quiz-Quiz-Trade

- Kagan Cooperative Learning Structure
- Can be used as an ice-breaker (fun) or for content

ice-

Y-Chart:

A productive math discussion...



Resources

- Get It Together by Tim Erickson
- The Power of Our Words by Paula Denton
- Learn Like a Pirate by Paul Solarz
- Intentional Talk by Elham Kazemi and Allison Hintz
- www.mathsolutions.com/mathtalk
- www.kaganonline.com
- www.cultofpedagogy.com

“Like” Illinois Council of Teachers of Mathematics on Facebook!



QUESTIONS?

