Conversational Math Activities!

Promoting Academic Language for ELLs

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The Role of Language in Math

Education Connections
Teachers working together for English learner success

Although math knowledge relies in part on students' ability to use logic, numbers, and symbolic systems, recent research has stressed that **success in the math classroom draws on more than just learning math vocabulary** (Moschkovich, 2002). To promote success in math, **students must be continually challenged to develop daily language skills** (Barwell, Leung, Morgan, & Street, 2005; Moschkovich, 2010); **to engage with texts and activities that highlight how language is used; and to master new writing techniques, strategies, and structures within the field of mathematics** (Moschkovich 2010; Lee, 2006; Van Eerde & Hajer, 2009).--Eric Halvorson

Attention getter...

Class!

YES!

Language Teachers . . .

Math methodology is hands-on inquiry based instruction which works well for English Learners (ELs). So, effective math teachers are therefore also language teachers!

Language teachers need to:

- Encourage constructive errors
- Create opportunities to practice academic language
- Construct activities that promote students to convey meaning
- Practice phrases that empower students such as “I have a question” or “What does … mean?”

www.speedofcreativity.org

The Challenges

http://www.serflo1.com/MATH.html

- Academic Language
- Words with Multiple Meaning
- Idiosyncratic English Expressions
- Sentence Structures
- Content Grammar
- Word Order
- Syntax
- Polysemous Words
- Cultural Differences
- Background Knowledge

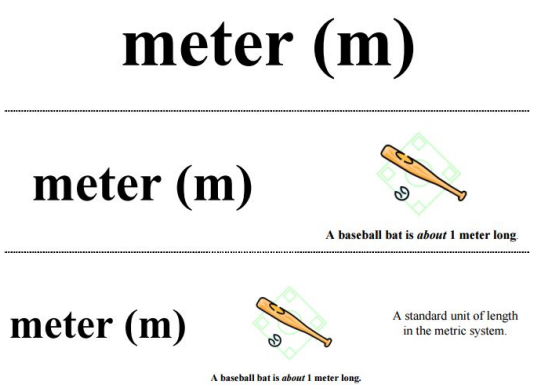
And before we get to the activities...

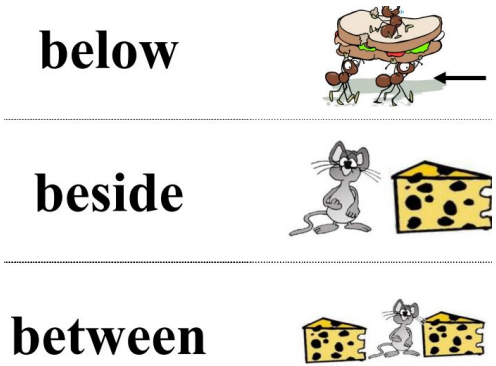
Apart from grammar, vocabulary, and pronunciation ...

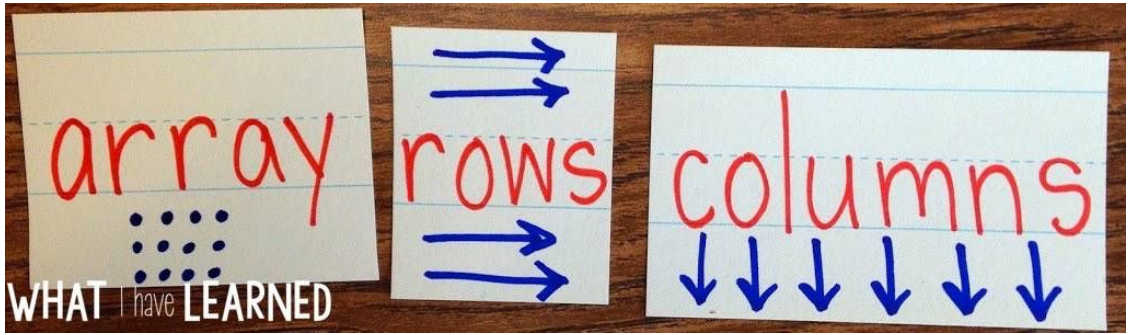
SPEAKING means:

- Paralinguistic features (i.e. culturally appropriate gestures, facial expressions)
- Kinesthetic features (i.e. culturally appropriate body language)
- Social and academic conventions (formal/informal language usage)

Actively use word walls







http://www.graniteschools.org/mathvocabulary/vocabulary-cards/

Word Wall ideas

Get them talking...

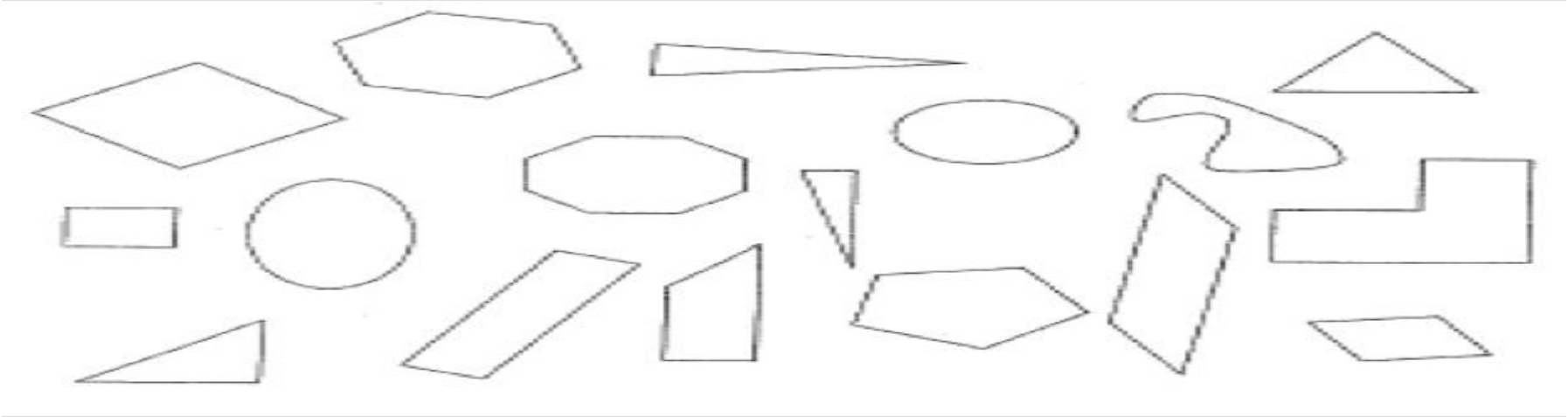

Teach! Okay!

Meaning imbedded

http://www.broward.k12.fl.us/studentsupport/ese/PDF/MathWordWall.pdf

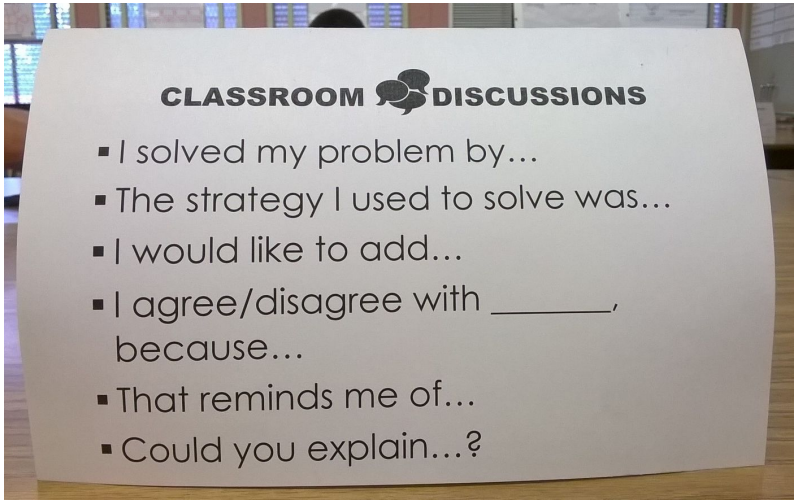
http://www.doe.virginia.gov/instruction/mathematics/resources/vocab_cards/

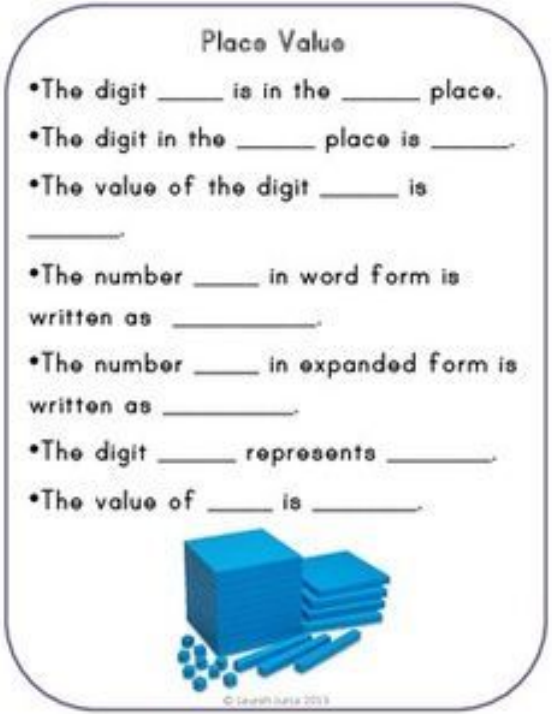
Geometric Attributes: Sorting Shapes



Caroll, M., Coates, G., Coggins, D., & Kravin, K. (2007). *English Language Learners in the Mathematics Classroom*. Corwin Publishing

Sentence frames

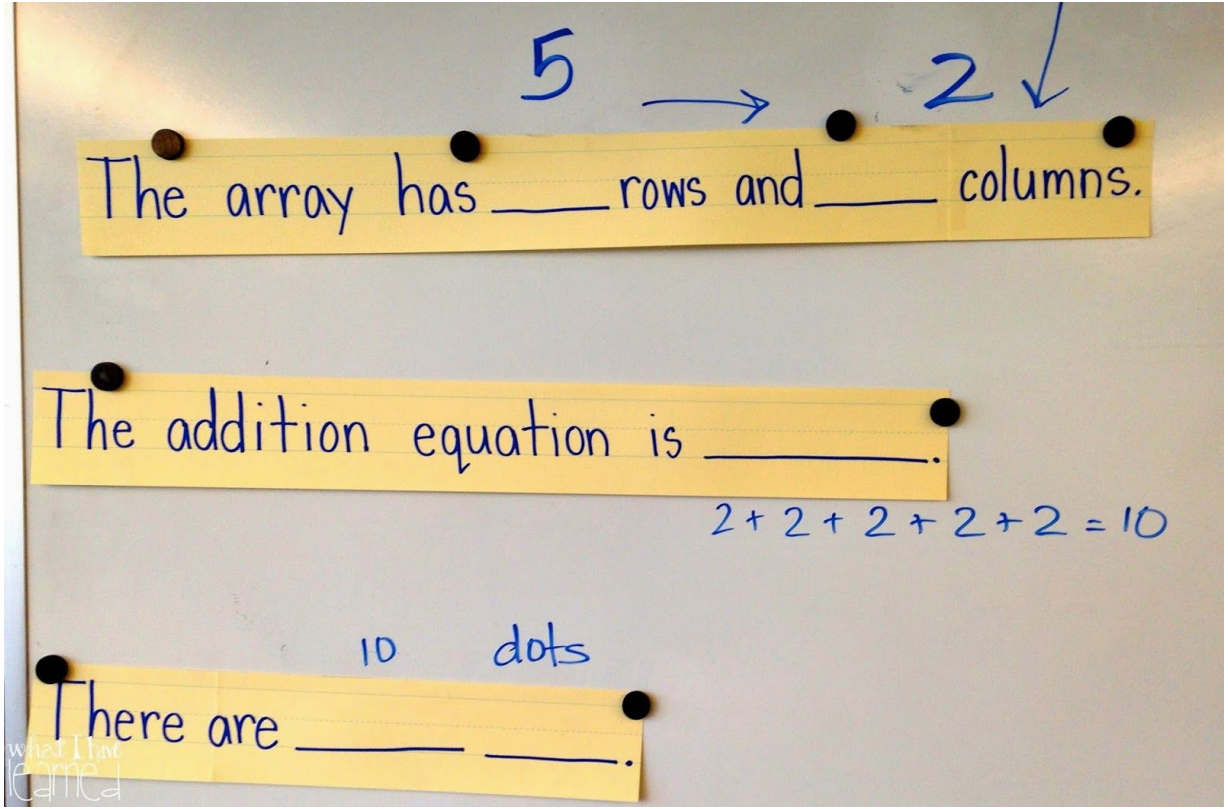




[Download example chart here.]

Math [Conversation protocol] a la Jeff Zwiers

https://www.smore.com/d91s-sentence-frames?embed=1



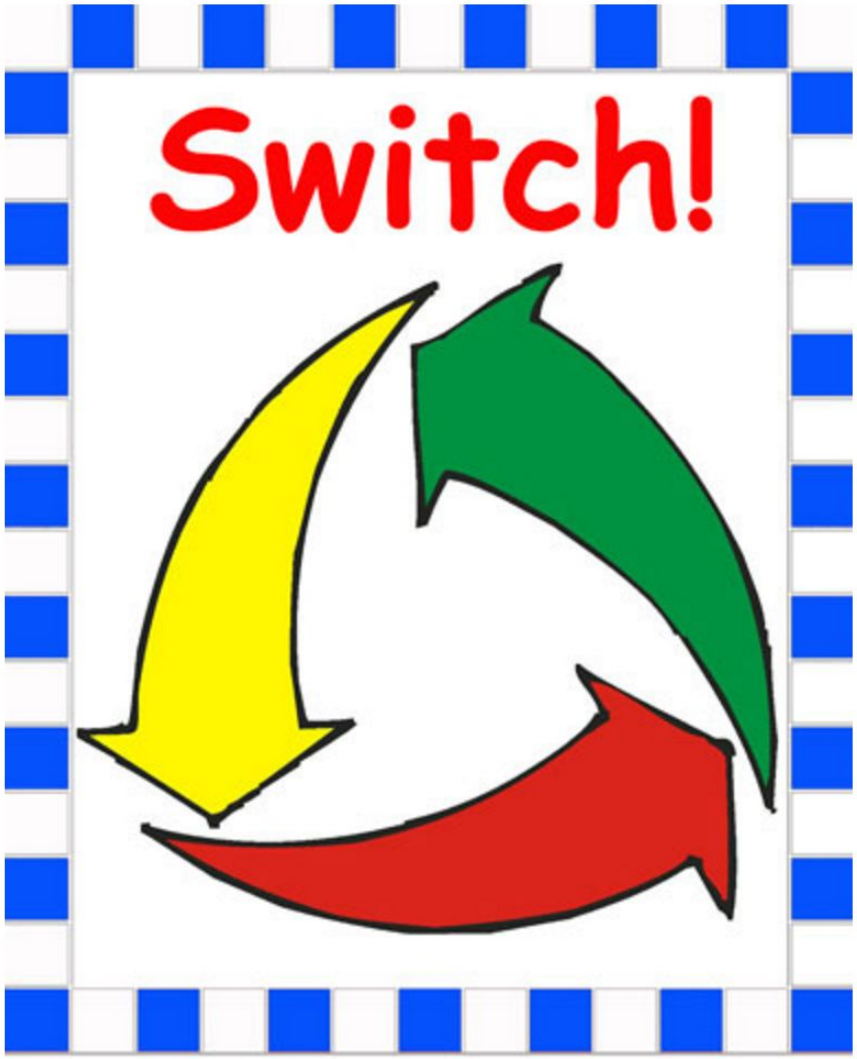
Imagine this with sticky notes...

Beyond the vocabulary

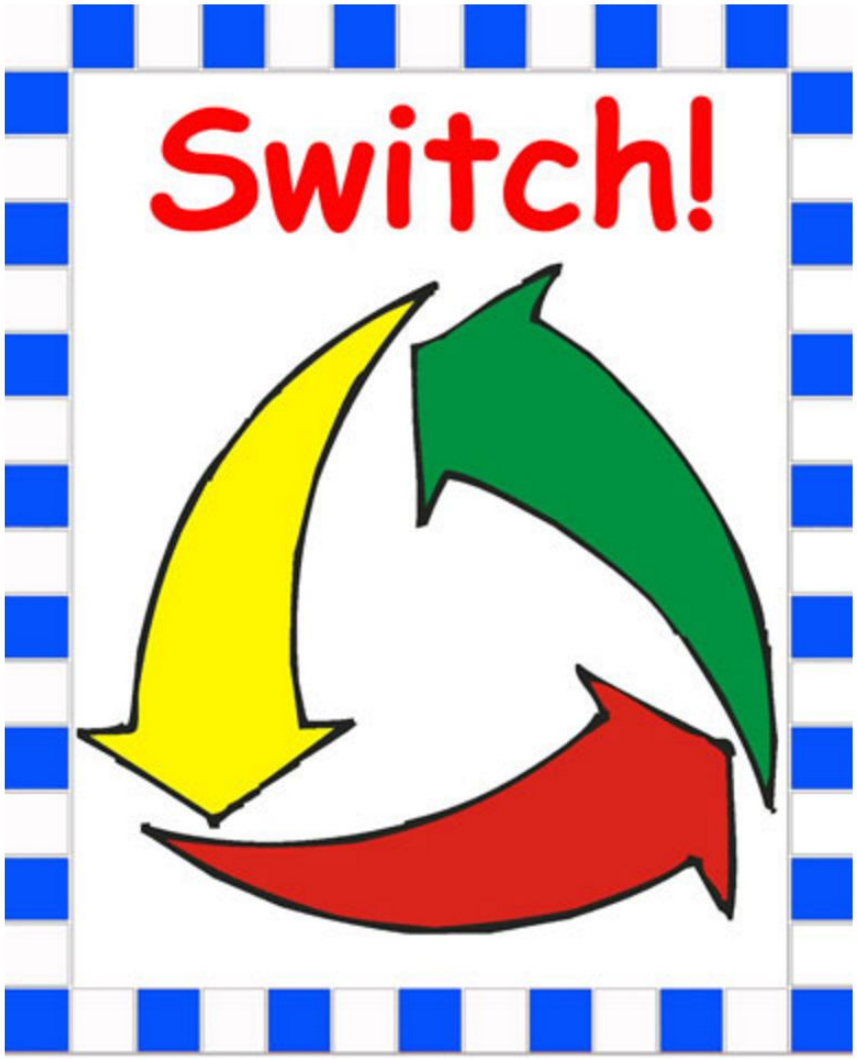
Language support for number talks.

This video empowers students with phrases they need to be able to agree with (politely), disagree with (politely) or build on answers using ACADEMIC VOCABULARY!

Expanding the talking...

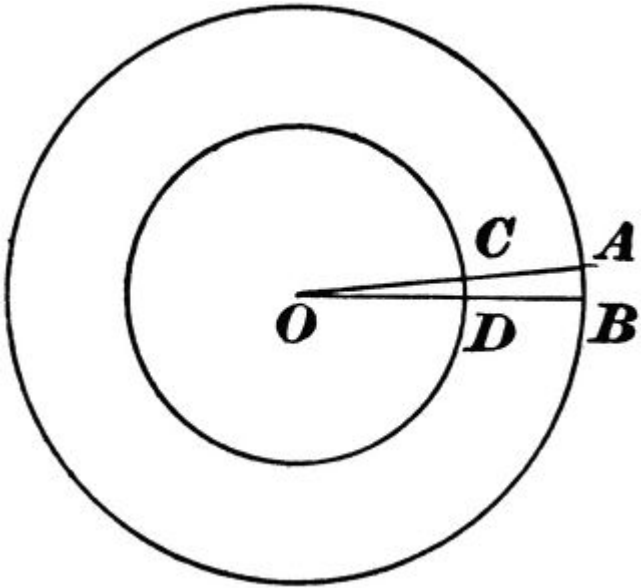

Switch!


Teach! Okay!


Switch!

Concentric Circles

The class is divided into two equal groups. One groups of students forms an inner circle and the other an outer circle. The students face each other to converse about an identified topic. After a few moments, outer circle takes one step to the right (or both move counter clockwise) to converse with a new partner.



http://etc.usf.edu/clipart/42300/42356/trigcirc_42356_lg.gif

Conversations with a partner, small group, whole group

Guided Conversation Example

I have a small/medium/large family.
There are xxx people in my family.
What about you? Do you have a small/medium/large family?

Take 1
Switch partners - Take 2
Switch partners: no narrative - Take 3

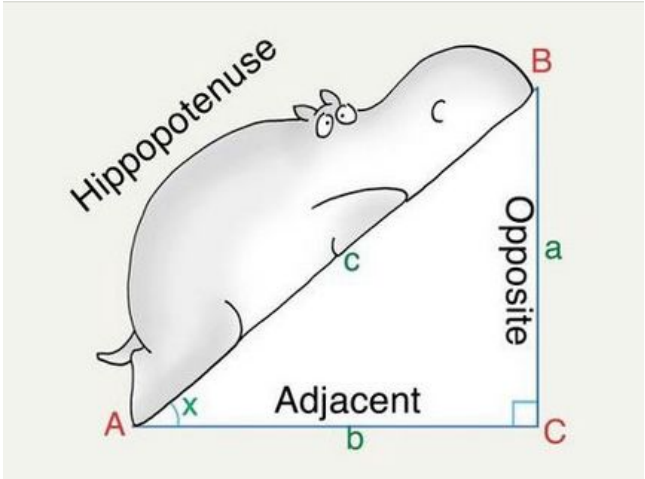
When Building a Conversation

- Provide sentence starters/frames, building blocks, phrases, and vocabulary banks
- Have students prepare for both roles: questions and answers
- Make the conversation real

http://oisl.emory.edu/images/Conversation%20Partner%20Program/hello-conversation-bubbles-medium1.jpg

Use Unusual Images to Start Conversations

https://solvemymaths.files.wordpress.com/2014/11/bvaqu22cqaa205w.jpg



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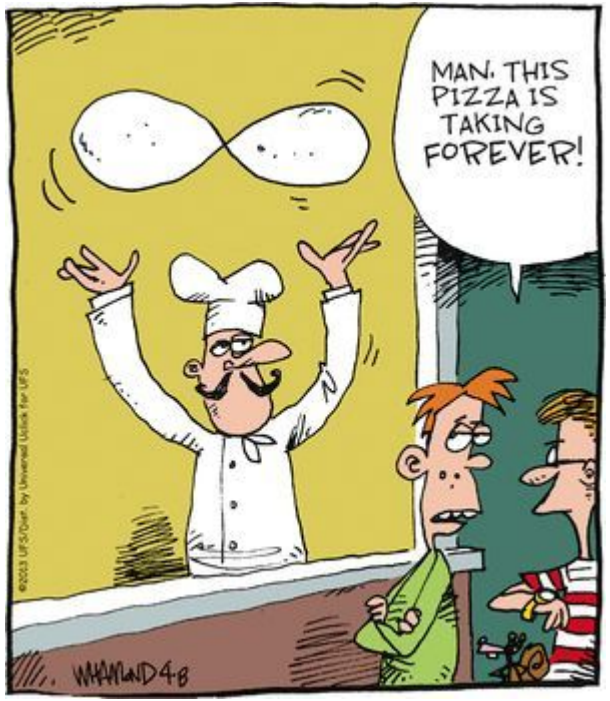
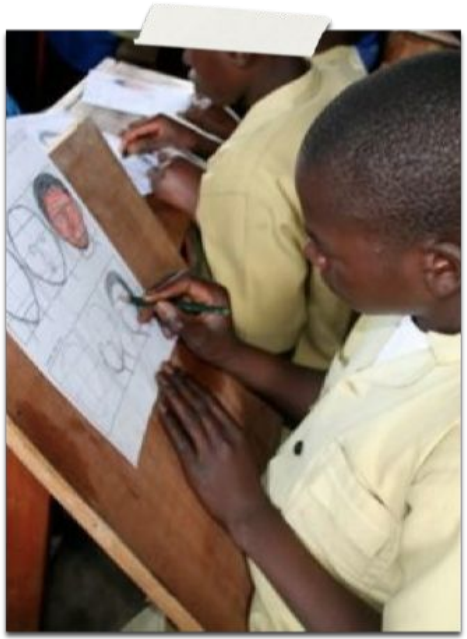


https://s-media-cache-ak0.pinimg.com/736x/7a/3a/80/7a3a80dc6b3a439700db01274eb08f4c.jpg

Information Gap Conversation Based on Images

Student 1: Comes to the front of the class and views the image. Returns to their partner and describes the image.

Student 2: Listens to student 1 and draws the image described.



http://artforgorillas.wildlifedirect.org/tag/gorillas/

Recreating the Narration

Student 1:

Student 2:

Make them famous!

Publicize student success by making an anchor poster with their strategy. Maybe they have a different way to add/multiply/subtract divide. Celebrate by posting **BHIM'S STRATEGY!**

Make them famous (part 2)!

Get buy-in by changing the names in the questions… and make the situations relevant. Do your students know/care about tulip bulbs? What project could you do to make the lessons more relevant? Who is the student who doesn't pay attention? Can you use his name and the names of others?

The teacher brought 20 cup-cakes to school, but there were only 17 students in the class. If each student had one cupcake, how many cupcakes were left?	Mary had 18 fish in her fish tank. She transferred 12 of the fish to her brother's fish tank. How many fish were left in Mary's tank?
Ashish had a box of 17 books. His friend Michael had a box of 13 books. What is the difference between the number of books in each box?	Mr. Walters planted 28 tulip bulbs in his yard. His dog dug up 11 of the bulbs. How many bulbs were left in the ground?
Sam got 21 pieces of candy while trick-or-treating. His mom took 19 of them away to save for later. How many pieces of candy did Sam have left?	Kim had 27 stickers, but then she gave away 9 of them. How many stickers did she have left?

Group Exercises

Group Exercises bring students together to work on a collective solution. Each student receives a different clue to a word problem (or another task that can be separated).

Jane went to the zoo with her family. She bought 3 children tickets and 2 adult tickets. How much money did Jane spend?

John Ball Park Zoo tickets	
Type of ticket	Cost of ticket
Children	$3
Youth	$5
Adult	$8

Role Play

Whether small or large group role play create situations that need resolution

Small Group Role Play Example

Student 1: You are at the grocery store. You are very hungry and feel that you might not have enough money. You really want to buy as much as you can with the money you have.

Student 2: You are the cashier at the grocery store with a long line of customers. Student 1 keeps asking you to check prices of items.

Group Role Play should have:

- Controversial Topics (i.e. polluting factory coming into ecologically sensitive area, casino, etc.);
- 10-12 roles (i.e. mayor, PR person, local companies, journalists, activists);
- Introduces so students have information about others (i.e. corruption of mayor) and are able to ask and answer questions.
- Student opinions that are summarized and justify their vote.

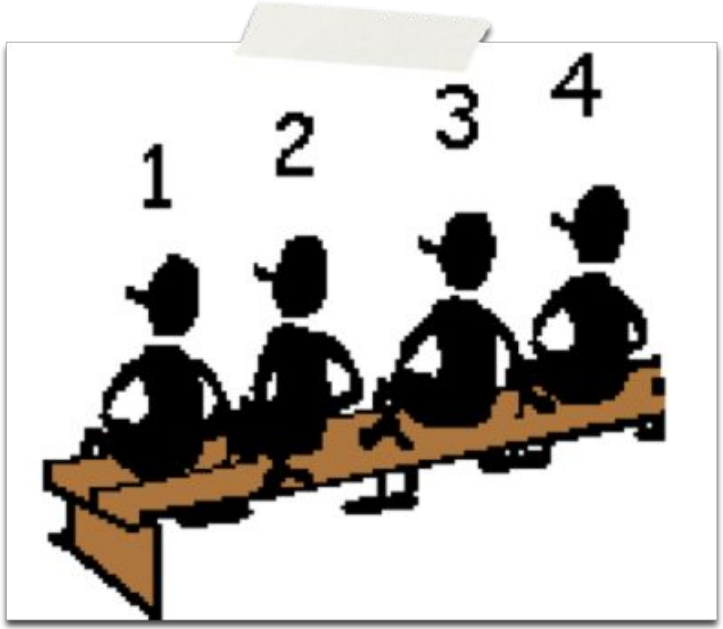
Hearing

A group of “expert” students discuss a topical question and may be interviewed by fellow students who have to make the final decision.

https://upload.wikimedia.org/wikipedia/commons/f/fe/Student_Panel_Discussion.jpg

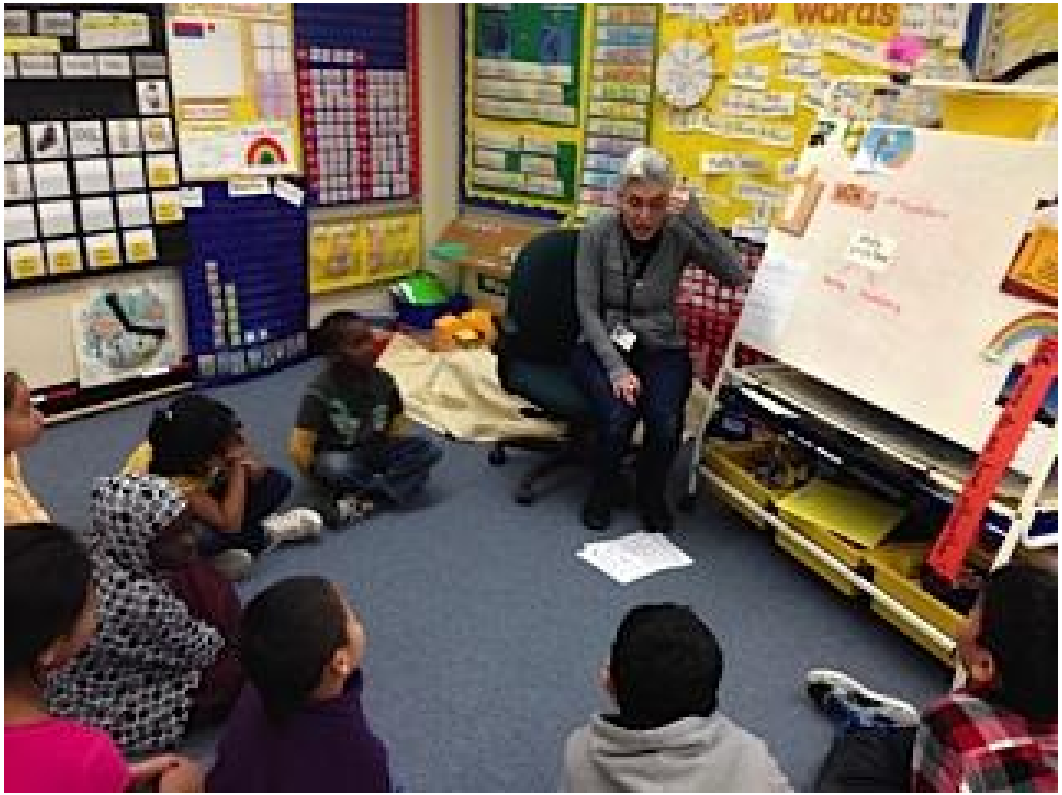
Forced Opinion / Numbered Heads

To ensure that all members of the class or group give their opinion or contribute, numbers are distributed which determine order of speaking.

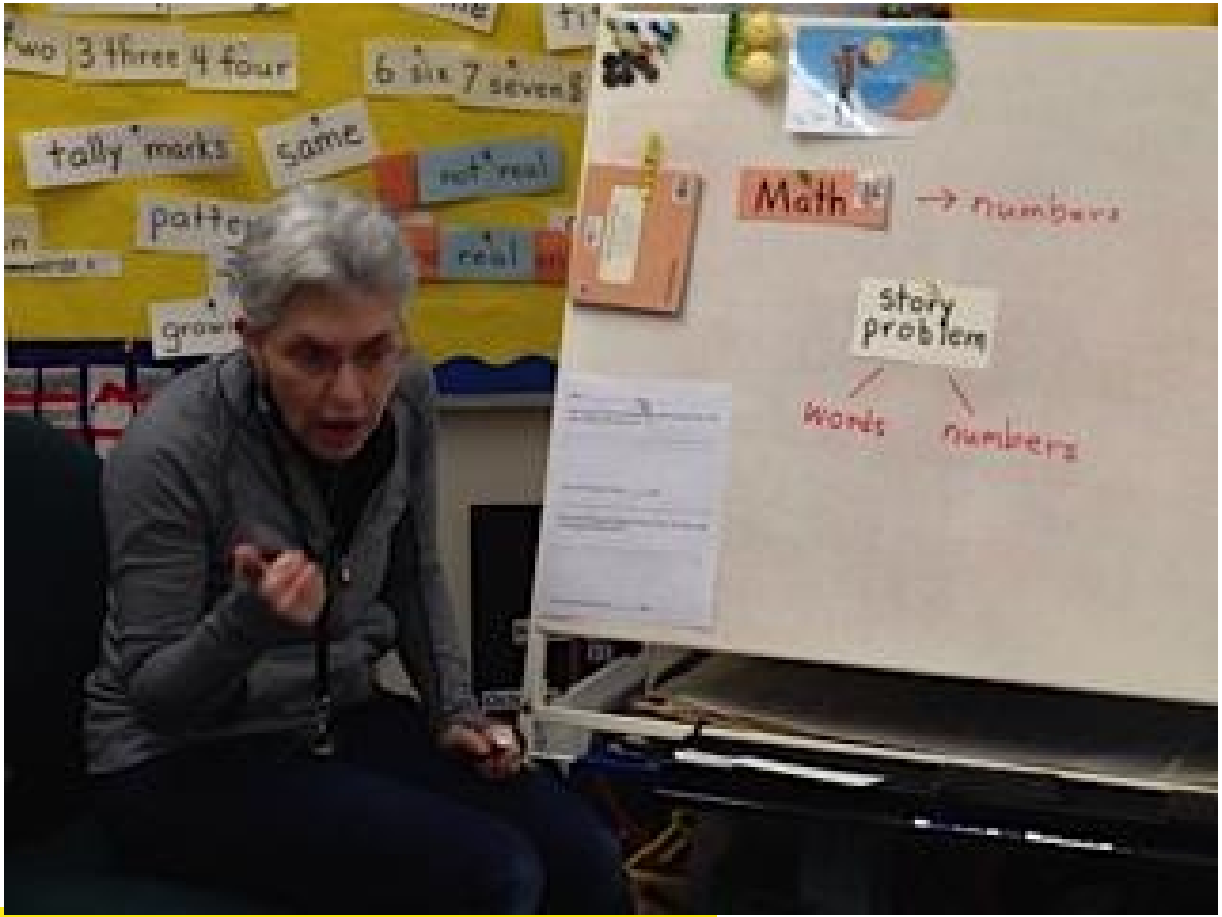


http://2.bp.blogspot.com/-4OJQsGIDAkU/Vli__Au1GEI/AAAAAAAADgI/2jbNW-g5Jp8/s1600/numbered%2Bheads.png

What this looks like in action...



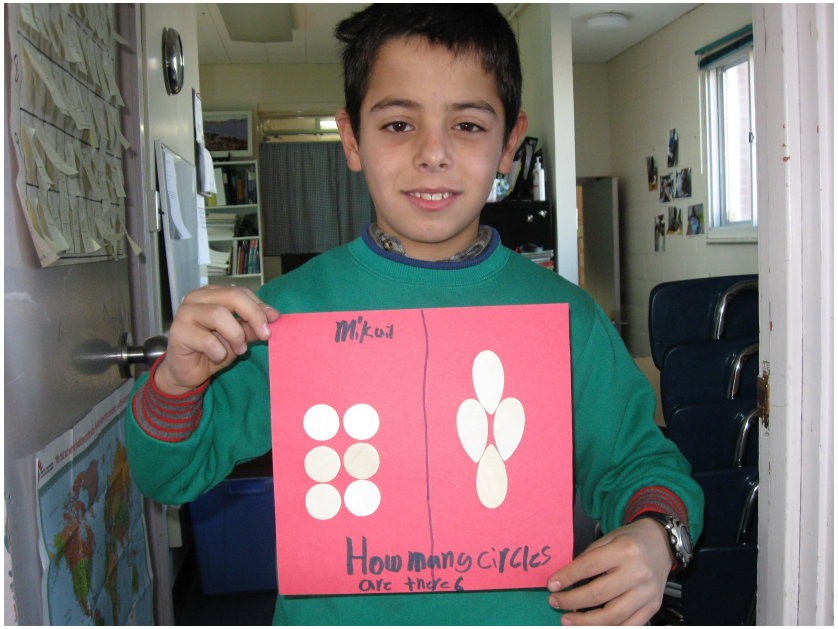
Drama and math @ Integrated Arts Academy

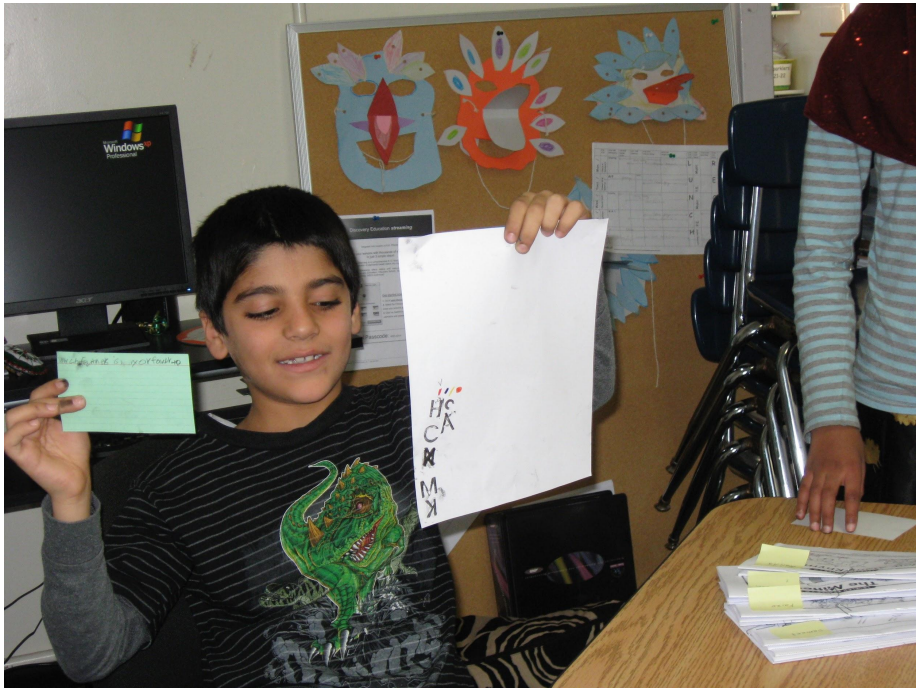


Making clear the difference: Math vs. Reading

Props for a beach problem

Setting the stage with trash, sea stars and shells





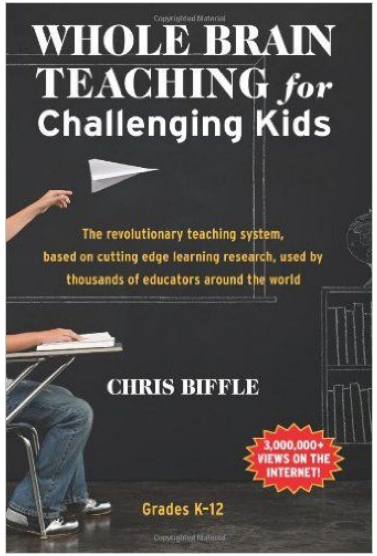
It doesn't always have to be such a production...

Promoting Conversation in the Math Classroom

- Tailor your class with personalized vocabulary
- Identify key phrases or new vocabulary to pre-teach
- Find relevant, provocative and playful contexts for language learning
- Use exclamation, segues and connectors
- Incorporate reactions: surprise, disbelief, horror, encouragement and interest
- Teach ways to disagree and agree
- Get to know your students and their cognitive understanding, and linguistic and emotional resources they offer
- Provide visual cues, graphic representations, gestures, realia, and pictures

Thank you!

Resources



- https://bsdellmath.wikispaces.com/home
- https://sites.google.com/a/bsdvt.org/mathforells/
- http://bridges1.mathlearningcenter.org/resources/materials (home connections)
- https://www.teachingchannel.org/videos/subtraction-math-lesson-ousd#
- https://www.teachingchannel.org/videos/sentence-frames-ousd
- https://www.teachingchannel.org/videos/open-ended-questions-ousd
- http://wholebrainteaching.com/index.php?option=com_k2&view=item&layout=item&id=159&Itemid=125
- Freeman, D. and Anderson, M. (2011) *Techniques & Principles in Language Teaching, 3rd ed.* Oxford: Oxford University Press.
- Chris Biffle Whole Brain Teaching: https://www.youtube.com/watch?v=eBeWEgvGm2Y (Class/Yes)