Supporting ELs in Math During Task Based Instruction

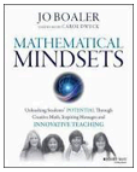
Kristina Danko
ESL Instructional Facilitator
Rutherford County Schools
dankok@rcshools.net

@KristinaDanko

2019 ELL COLLABORATIVE SUMMER ACADEMY:
TNTESOL MINI CONFERENCE

TNTESOL SINCE 1978
TENNESSEE TEACHERS OF ENGLISH TO SPEAKERS OF OTHER LANGUAGES

Research and References

	Leinwald, S., Brauer, D.J., Huinker, D., Berry III, R.Q., Dillon, F.L., Larson, M.R., ...Smith, M.S. (2014). *Principles to Actions Ensuring Mathematical Success for All.* Reston, VA: NCTM.
WIDA	Can-Do Descriptors Levels of Language Development Standards
	Boaler, J. (2016). *Mathematical Mindsets.* San Francisco, CA: Jossey-Bass. youcubed Youcubed.org (Videos)
Understanding Language/SCALE Stanford Graduate School of Education	Zwiers, J., Dieckman, J., Rutherford-Quach, S., Daro, V., Skarin, R., Weiss, St., Malamut, J. (2017). *Princiiples for the design of mathematicas curriculum: Promoting language and content development. Understanding Language,* 2.

Reflection and Exit Ticket

2019 ELL COLLABORATIVE SUMMER ACADEMY: TNTESOL/NCTE CONFERENCE

MT TNTESOL

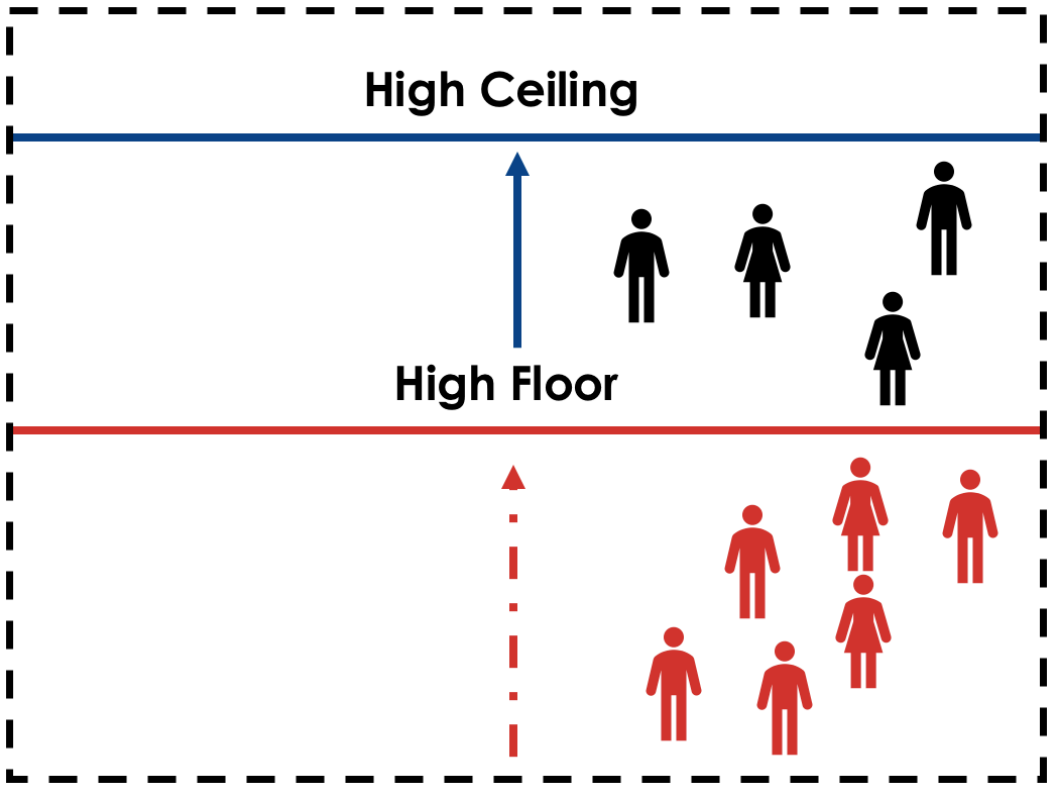
Objectives for Learning Session:

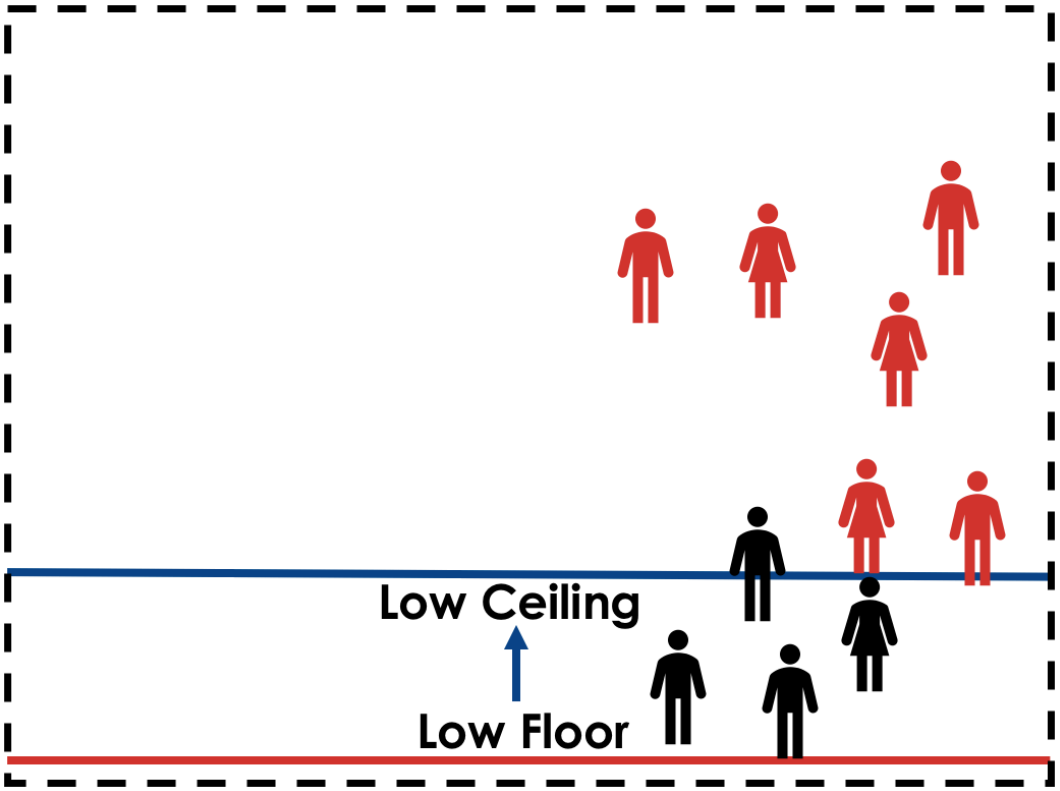
- Develop an understanding of approach to math instruction that promotes language.
- Explore language routines that promote language.

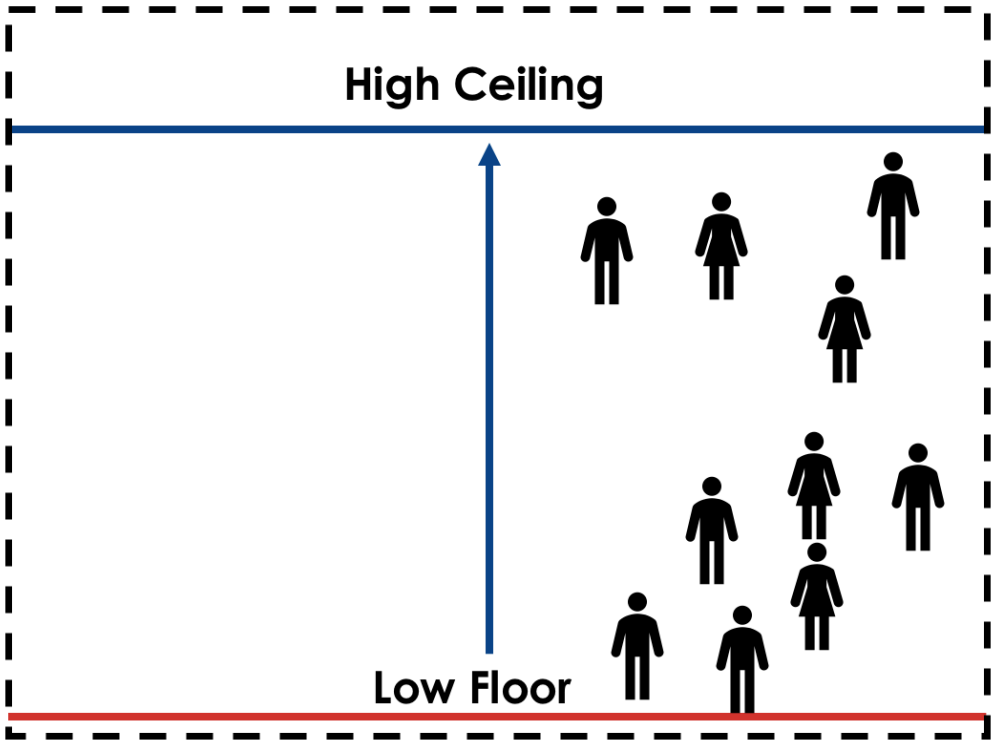
- Experience a language math routines through "doing math."

Contact: dankok@rcschools.net
Twitter: @kristinadanko

LINK TO SURVEY:
https://tinyurl.com/ELsmathTB


High Ceiling
High Floor


Low Ceiling
Low Floor



How to pick math tasks for <u>all learners?</u>

- ❑ Task that promote “doing” mathematics
- ❑ Has multiple entry points and various solution pathways

  -”Low Floor, High Ceiling”

- ❑ Require exploration of mathematical relationship
- ❑ Students explore the task first and then formalize and connect solution methods

Examples of Information Gaps in Math

Student A	Student B
1 	1
2	2 
3 	3
4	4 

Information Gap
Promoting Language in Math Principles

Principle 1: Support Sense Making	Scaffold tasks → Making Own Meaning Students do not need to understand language before you can negotiate meaning. Focus on amplifying not simplifying the language.
Principle 2: Optimize Output	Output → language to communicate their ideas to others Support and allow students to describe their thinking clearly adding precise math related language.
Principle 3: Cultivate Conversations	Explaining → Understanding Strengthen students' opportunity to make meaning and clarify meaning.
Principle 4: Maximize linguistic and cognitive meta-awareness	Connections → Conceptual Understanding Students should discuss their connections between ideas. Math is conceptual not procedural, conceptual understanding leads to compression of concepts.

Information Gap
Promoting Language in Math Principles

	Scaffold tasks → Making Own Meaning Students do not need to understand language before you can negotiate meaning. Focus on amplifying not simplifying the language.
Principle 2: Optimize Output	
Principle 3: Cultivate Conversations	
	Connections → Conceptual Understanding Students should discuss their connections between ideas. Math is conceptual not procedural, conceptual understanding leads to compression of concepts.

Information Gap
Promoting Language in Math Principles

Principle 1: Support Sense Making	
	Output → language to communicate their ideas to others Support and allow students to describe their thinking clearly adding precise math related language.
	Explaining → Understanding Strengthen students' opportunity to make meaning and clarify meaning.
Principle 4: Maximize linguistic and cognitive meta-awareness	

Promoting Language in Math Principles
Math Language Practices

1. Stronger and Clearer Each Time	Purpose: To provide a structured and interactive opportunity for students to revise and refine both their ideas and their verbal and written output (Zwiers, 2014).
2. Collect and Display Data	Purpose: To capture students' oral words and phrases into a stable collective reference.
3. Critique, Correct, and Clarify	Purpose: To give students a piece of mathematical writing that is not their own to analyze, reflect on, and develop.
4. Information Gap	Purpose: To create a need for student to communicate (Gibbons, 2002).
5. Co-Craft Questions and Problems	Purpose: To allow students to get inside of a context before feeling pressure to produce answers, to create space for students to produce the language of mathematical questions themselves, and to provide opportunities for students to analyze how different mathematical forms can represent different situation.
6. Three Reads	Purpose: To ensure that students know what they are being asked to do, create opportunities for students to reflect on the ways mathematical questions are presented, and equip students with tools used to negotiate meaning (Kelemanik, Lucenta & Creighton, 2016).
7. Compare and Connect	Purpose: To foster students' meta-awareness as they identify, compare, and contrast different mathematical approaches, representations, concepts, examples, and language.
8. Discussion Supports	Purpose: To support rich and inclusive discussions about mathematical ideas, representations, contexts, and strategies (Chapin, O'Connor, & Anderson, 2009).

Differentiation

Practice-*Delivery*	Process-*Lesson Design*	Products-*Activity or Work*	Content-*Reading or Materials*	Assessment-*How Understanding will be Measured*

Language Routines

MLR1: Stronger and Clearer Each Time
MLR2: Collect and Display
MLR3: Critique, Correct, and Clarify
MLR4: Information Gap
MLR5: Co-Craft Questions and Problems
MLR6: Three Reads
MLR7: Compare and Connect
MLR8: Discussion Supports