Differentiating Math Tasks for ELs

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When you think of math what is the first thing that comes to your mind?
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.”

Review the WDIA Framework.
Agenda-Learning Journey

Framing Learning → Glimpse of Research and Resources → WIDA

Language Demands and Differentiation → Math Tasks → Information Gap: Promoting Language in Math Principles

"Doing Math": Explore Routines → Reflection & Feedback Ticket/Evaluation
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| **Can-Do Descriptors** Can-Do Descriptors  
Levels of Language Development  
Standards |
Youcubed.org (Videos) |
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<th>Language Stages</th>
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Backwards Bicycle
How to pick math tasks for all learners?
frustrated, intimidated, unable to start
Underserved, bored, unreached potential
How to pick math tasks for all learners?

- 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
Doing Math

**Wafers and Crème Task - Notice & Wonder**

Mrs. Danko was looking at the back of the packages of two different Oreos packages.

The regular Oreos stated 3 Oreos had 160 calories. The double stuffed packages said 2 Oreos had 140 calories.

- Task that promote “doing” mathematics
- Has multiple entry points and various solution pathways -”Low Floor, High Ceiling”
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How many calories in one single layer of crème?
**Differentiation?**

What is it and what does it mean to you?

*Differentiation* refers to a wide variety of teaching techniques and lesson adaptations that educators use to instruct a diverse group of students, with diverse learning needs, in the same course, classroom, or *learning environment*.

Also called “differentiated instruction,” differentiation typically entails modifications to *practice* (how teachers deliver instruction to students), *process* (how the lesson is designed for students), *products* (the kinds of work products students will be asked to complete), *content* (the specific readings, research, or materials students will study), *assessment* (how teachers measure what students have learned), and *grouping* (how students are arranged in the classroom or paired up with other students).

https://www.edglossary.org/differentiation/
Promoting Language in Math Principles

* Information Gap

Principle 1: Support sense-making
Principle 2: Optimize output
Principle 3: Cultivate conversation
Principle 4: Maximize linguistic and cognitive meta-awareness
Promoting Language in Math Principles

Principle 1: Support sense-making
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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
Math Language Routines

MLR1: 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).
MLR2: Collect and Display

Purpose: To capture students’ oral words and phrases into a stable collective reference.
MLR3: Critique, Correct, and Clarify

Purpose: To give students a piece of mathematical writing that is not their own to analyze, reflect on, and develop.
MLR4: Information Gap

Purpose: To create a need for student to communicate (Gibbons, 2002).
MLR5: 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.
Math Language Routines

MLR6: 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).
MLR7: Compare and Connect

Purpose: To foster students’ meta-awareness as they identify, compare, and contrast different mathematical approaches, representations, concepts, examples, and language.
Math Language Routines

MLR8: 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

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3-Read Protocol

• First Read: Teacher reads the problem stem orally.
  
  *Key Question: What is the situation about?*

• Second Read: Class does choral read or partner read of the problem stem.
  
  *Key Question: What are the quantities in the situation?*

• Third Read: Partner or choral read the problem stem orally one more time.
  
  *Key Question: What mathematical questions can you ask?*
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Wafers and Crème Task - Notice & Wonder

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What questions could we ask?
Wafers and Crème Task - Notice & Wonder

How many calories in one single layer of crème?

Double Stuff Crème = 2 x Single Crème
Promoting Language in Math
Principles

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Standard Addressed

- 8.EE.C.8.b- Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, \(3x + 2y = 5\) and \(3x + 2y = 6\) have no solution because \(3x + 2y\) cannot simultaneously be 5 and 6.
Promoting Language in Math Principles

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Reflection and Exit Ticket

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Twitter: @kristinadanko

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