Supporting ELs in Math During Task Based Instruction

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<table>
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<th>Research and References</th>
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<tr>
<td><strong>Can-Do Descriptors</strong></td>
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<td><strong>Levels of Language Development Standards</strong></td>
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<td><strong>Youcubed</strong> Youcubed.org (Videos)</td>
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**Reflection and Exit Ticket**

**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.”

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Twitter: @kristinadanko  
**LINK TO SURVEY:**  
https://tinyurl.com/ELsmathTB
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
Examples of Information Gaps in Math

<table>
<thead>
<tr>
<th>Student A</th>
<th>Student B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

- Student A: 1 (red triangle), 2 (orange circle), 3 (orange circle), 4 (blue diamond)
- Student B: 1 (green pentagon), 2 (green pentagon), 3 (green pentagon), 4 (blue diamond)
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.
### Principle 2: Optimize Output

**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 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.
**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.

**Principle 4: Maximize linguistic and cognitive meta-awareness**

Explaining Understanding
Strengthen students' opportunity to make meaning and clarify meaning.
<table>
<thead>
<tr>
<th>No.</th>
<th>Practice</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Stronger and Clearer Each Time</td>
<td>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).</td>
</tr>
<tr>
<td>2.</td>
<td>Collect and Display Data</td>
<td>Purpose: To capture students’ oral words and phrases into a stable collective reference.</td>
</tr>
<tr>
<td>3.</td>
<td>Critique, Correct, and Clarify</td>
<td>Purpose: To give students a piece of mathematical writing that is not their own to analyze, reflect on, and develop.</td>
</tr>
<tr>
<td>4.</td>
<td>Information Gap</td>
<td>Purpose: To create a need for student to communicate (Gibbons, 2002).</td>
</tr>
<tr>
<td>5.</td>
<td>Co-Craft Questions and Problems</td>
<td>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.</td>
</tr>
<tr>
<td>6.</td>
<td>Three Reads</td>
<td>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 &amp; Creighton, 2016).</td>
</tr>
<tr>
<td>7.</td>
<td>Compare and Connect</td>
<td>Purpose: To foster students’ meta-awareness as they identify, compare, and contrast different mathematical approaches, representations, concepts, examples, and language.</td>
</tr>
<tr>
<td>8.</td>
<td>Discussion Supports</td>
<td>Purpose: To support rich and inclusive discussions about mathematical ideas, representations, contexts, and strategies (Chapin, O’Connor, &amp; Anderson, 2009).</td>
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</tbody>
</table>
## Language Routines

<table>
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<tr>
<th>Practice-Delivery</th>
<th>Process-Lesson Design</th>
<th>Products-Activity or Work</th>
<th>Content-Reading or Materials</th>
<th>Assessment-How Understanding will be Measured</th>
</tr>
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### Differentiation

**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