

Do's & Don'ts



of EL Instruction

SUBJECT

MATH

AREA OF FOCUS

II

GUIDELINE

6

SPECIFICATION

6A

6B

6C

6D

GRADES K-5

Amplify and Facilitate Student Curiosity about Language

Over the course of our careers, there have been multiple instances where we have introduced or used a word or phrase during our mathematics instruction only to learn later in the lesson that students were thinking of entirely different meanings. For example, during one lesson, a student wrote “kind of pets,” to label a graph, referring to different types of pets. When asked about the meaning of kind, his multilingual partner said that “kind means ‘nice.’” This led us to think more about the ways we craft our instruction to facilitate multilingual learners’ development of language, including specialized mathematical language. In addition, as we wrote and enacted mathematics curricula, we noticed how [contexts](#), visuals, language, and instructions interfered with multilingual students’ learning of mathematics. As a result, it is critical for teachers to ensure language is not a barrier to students’ learning of mathematical concepts. As teachers facilitate students’ use of academic language, there are different challenges teachers need to take into account, such as:

- Some language has multiple meanings, but not mathematical meanings (e.g., leaves the room vs. leaves on a plant).
- Some language has multiple meanings, including meanings used in mathematics (e.g., change in your pocket vs. rate of change).
- Some language is specific to mathematics (e.g., Pythagorean Theorem, parallelogram).

For multilingual learners to develop the mathematical language to effectively explain their thinking, they must be provided with opportunities to use mathematical discourse (i.e., spoken or written communication).¹ Moreover, teachers must create a supportive environment that facilitates a curiosity about language. As teachers plan lessons, they must consider language that may be familiar and unfamiliar to students. They must also think about how everyday meanings of specific language can be used to build mathematical meanings. For example, Ms. Bristow introduced fractions by referencing the concept of “fair shares”. Chval, Smith, Trigos-Carrillo, & Pinnow² offer questions to guide decision-making such as:

- What are the most critical words/phrases to introduce or involve in discussions? (e.g., fractions, fair, equivalent, equal, whole)
- How much time should I invest in building meaning for this language? (e.g., discussing language that is critical to multiple lessons or an entire unit through the use of photos, stories, or videos is worth the investment)
- How can I best utilize the classroom’s board/writing space to build meaning? (e.g., Visual displays that will be referenced in multiple lessons should be captured on



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spaces that will not be erased, such as chart paper. They should be accessible to students to touch rather than posted above their reach so that students can interact with them. Consideration should be given to location, sequence, and duration.)

- Which examples of student mathematical work would help students build meaning? (e.g., select work that has different visual representations/labels and approaches to solving problems, and create examples of common misconceptions by “fictitious” students to discuss).

It is recommended that these practices be part of a comprehensive approach to EL instruction and not in isolation as laid out in our [Guidelines for Improving Math Materials for English Learners](#).

Based on the research and ELSF guidelines, we suggest the following:

<p> Value multilingualism. Respect and sustain multilingual learners' languages by encouraging students to communicate in between languages in their texts (“translanguaging”) when it will support them create and negotiate meaning.³ Ask multilingual learners to share their mathematical thinking in languages other than English in whole class discussions, which demonstrates to their peers that these students have valuable mathematical ideas.</p>	<p> Don't assume that because a student has familiarity or use of a first language, they have the ability to describe mathematical concepts in that first language if they did not have opportunities to learn those concepts in that language.⁴ When you do not have experience with your students' languages, you can position these students as the experts in your classroom who can highlight key ideas on class documents in their languages.</p>
<p> Create a supportive environment where students feel comfortable asking questions about the meaning of mathematical and other language. Students should have the opportunity to reflect on and build awareness around their own language use practices (i.e., meta-awareness). Provide multilingual learners time to share their ideas with you and their peers in small groups before sharing with the entire class.⁵ To strengthen these opportunities, use the Stronger and Clearer Each Time routine.</p>	<p> Don't limit your assessment of multilingual learners' understanding to final products or summative assessments. It is important to formatively assess students' math and language development during each task and activity so that you are well positioned to contingently shift instruction as needed. For example:</p> <ul style="list-style-type: none"> • watch multilingual learners solve problems in real time; • analyze multilingual learners' mathematical work; • examine written work to identify patterns, conceptions, and understandings; and • encourage multilingual learners to share their thinking and approaches. • Use the Collect and Display routine.
<p> Consider students' fluency with reading text and tenses when you write word problems.⁶ Use active voice (e.g., use “Juan shares 5 cookies with his friends” rather than “5 cookies are shared by Juan with his friends.”). Use straightforward questions (e.g., <i>What fraction of the pasta is left?</i> rather than <i>What amount of the cooked pasta is left after Alex eats?</i>).</p>	<p> Don't let language interfere with learning mathematics. Analyze curriculum materials as well as problems that you write to ensure mathematical tasks or problems do not include acronyms, misleading images, or confusing text. Consider using math language routines such as Three Reads.⁷ See Dieckmann & Skarin for descriptions of additional math language routines.</p>

Endnotes

- 1 Khisty, L. L. (1995). Making inequality: Issues of language and meanings in mathematics teaching with Hispanic students. In W. G. Secada, E. Fennema, & L.B. Adajian (Eds.), *New directions for equity in mathematics education* (pp. 279-297). Cambridge University Press.

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- 2 Chval, K.B., Smith, E., Trigos-Carrillo, L., & Pinnow, R.J. (2021). *Teaching math to multilingual students: Positioning English learners for success*. Thousand Oaks, CA: Corwin Press.
- 3 García, O., & Lin, A. M. Y. (2017). Translanguaging in bilingual education. In O. García, A. M.Y. Lin, & S. May (Eds.), *Bilingual and multilingual education* (pp. 117-130): Springer.

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- 4 Gutierrez, R. (2002). Beyond essentialism: The complexity of language in teaching mathematics to Latina/o students. *American Educational Research Journal*, 39(4), 1047-1088.
- 5 Gibbons, P. (2015). *Scaffolding language, scaffolding learning* (2nd ed.). Heinemann.
- 6 Abedi, J., & Lord, C. (2001). The language factor in mathematics tests. *Applied Measurement in Education*, 14, 219-234.
- 7 Kelemanik, G, Lucenta, A & Creighton, S.J. (2016). *Routines for reasoning: Fostering the mathematical practices in all students*. Portsmouth, NH: Heinemann.

Based on the research and ELSF guidelines, we suggest the following:

<p> Compare and contrast language (e.g., words and phrases) that has multiple meanings,⁸ as well as words that look or sound similar. Write them on the board and illustrate them as you discuss them in context. For example, Ms. Bristow’s students discussed the different meanings of “lose” and “loose” during a place value lesson.</p>	<p> Don’t assume students understand the language that occurs during mathematics lessons. Assess understanding by asking:</p> <ul style="list-style-type: none"> • What does this word/phrase mean to you? • Have you used this word/phrase before? • When have you used this word/phrase? • What do you think of when you hear this word/phrase? Give me some examples. • Can you draw or make a list of what you think of when you hear this word/phrase?
<p> Unpack language by engaging students in a discussion of everyday and mathematical meanings (e.g., “rounds” in boxing or video games, “rounding” up cattle, and “round” circles vs. “rounding” in mathematics). As you introduce language, pair mathematical and everyday meanings (e.g., pair “efficient” with “fast” to scaffold student understanding) until the need to pair the words is no longer necessary.</p>	<p> Don’t focus solely on teaching particular words or phrases in isolation, as this is unproductive for student learning and an inefficient use of instructional time.⁹ Mastering words or phrases alone does not ensure students can effectively engage in mathematical discourse.¹⁰</p>
<p> Use stories from your own experiences as well as student-generated stories, with visuals to build interest, contextualize mathematical topics, and amplify language for multilingual learners.¹¹</p>	<p> Don’t limit your verbal explanations to oral discourse. Use gestures and other visuals (pictures, graphs, videos, etc.), and encourage students to use them to reinforce verbal messages and important characteristics in mathematical representations and concepts.¹²</p>
<p> Provide concrete resources to support students as they enact classroom norms and make language connections.¹³ For example, tape a bookmark with sample questions and compliments on each student’s desk. As students work with partners, they can refer to it for specific ideas about what to say.</p>	

It is recommended that these practices be part of a comprehensive approach to EL instruction and not in isolation as laid out in our [Guidelines for Improving Math Materials for English Learners](#).

Endnotes

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9 Gibbons, (2015).

10 Moschkovich, J. (2002). A situated and sociocultural perspective on bilingual mathematics learners. *Mathematical Thinking and Learning*, 4, 189–212.

11 Gutierrez, (2002).

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13 Chval, K. B., Pinnow, R. J., Smith, E., & Rojas Perez, O. (2018). Promoting equity, access, and success through productive student partnerships. In S. Crespo, S. Celedon-Pattichis, & M. Civil, (Eds.), *Access and equity: Promoting high quality mathematics in grades 3–5*. (pp. 115–132). Reston, VA: National Council of Teachers of Mathematics.

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