

Increasing Access to Math Language Routines

This resource offers scaffolding and instructional strategy suggestions that support both **academic language development** and **access to grade-level math content**, particularly in conjunction with the **Math Language Routines (MLRs)** integrated in curricular materials. When built into regular daily instruction, these strategies can benefit *all* students and are especially critical for Multilingual Learners/English Language Learners (MLs/ELLs) who may require additional language support to fully engage with instruction.

These supports are particularly important for students in the early stages of English language development and students who benefit from support with academic language development, as they promote access to rigorous content while honoring and building upon the rich linguistic and cultural assets students bring to the classroom. Teachers can select supports in response to the needs and strengths of students alongside the language demands of the task, being mindful of overscaffolding which can limit students' growth.

Some of these are scaffolds which should be gradually removed as students develop the language proficiency and academic skills needed to participate independently, while others are enduring supports that increase accessibility for all learners. Through the use of scaffolds and supports, students may also gain the ability to recognize which scaffolds and supports help them most, thereby developing lifelong learning strategies by recreating these scaffolds and supports when most helpful.

Resource Overview

Research-backed, classroom-tested scaffolds and supports for multilingual learners, their purpose, common pitfalls to avoid, and guidance on most effective use are outlined in tables below and embedded in MLR-specific curricular examples that follow. The non-exhaustive idea banks are organized around the support goal. Terms that appear in this resource that may be unfamiliar are linked in the [glossary](#).

Click below for scaffolds and supports that ensure students have access to MLRs in order to:

- [Understand tasks and directions](#)
- [Build background knowledge and vocabulary](#)
- [Demonstrate knowledge and express ideas](#)

Math Instructional Routines

Utilizing MLRs in Practice

Decisions are made about integration of MLRs in practice at the discretion of the teacher, with the curricular materials and knowledge of student needs at the forefront of decision making. The table below illustrates particular types of tasks that may be best served by specific MLRs:

Math Language Routine	High Leverage Opportunities for MLR Integration		
	Launching a concept or task	Analyzing Strategies	Articulating Mathematical Thinking
Stronger & Clearer Each Time			✓
Collect and Display		✓	✓
Critique, Correct, Clarify		✓	✓
Information Gap			✓
Co-Craft Questions and Problems	✓		✓
Three Reads	✓		
Compare and Connect		✓	✓
Discussion Supports*	✓	✓	✓

**Discussion Supports, in contrast to the other MLRs, are not a specific routine, but rather a collection of pedagogical strategies and teacher moves that can be combined to support discourse during almost any classroom activity, including during other MLRs.*

Supporting Students to Understand Tasks and Directions

These scaffolds and supports help students make sense of what they are asked to do within an MLR by clarifying directions, expectations, task structure, and problem context.

Scaffolds & Supports	Purpose	Pitfalls to Avoid	Most Effective Use
Give clear, concise directions orally and in writing with visuals accompanying them.	Helps students better understand instructions by reinforcing directions with visual cues.	Using visuals that are unclear or unrelated to the task can distract or mislead students. Using too many visuals can be overstimulating and distracting.	The most effective visuals added to directions give clues about the directions themselves. <i>(e.g. If students are expected to write a response, embed a picture of a pencil and paper; if students are expected to work with a partner, insert a picture of two people talking.)</i>
Provide and encourage use of bilingual glossary or dictionary .	Supports vocabulary development and content understanding by allowing students to access key terms in both English and their home language.	Providing glossaries without teaching how to use them and/or using them as a stand-alone resource. Assuming students have academic language fluency in home language to make sense of dictionary definitions. New concepts and vocabulary may be unfamiliar in a student's home language, making direct translation unhelpful. Assuming translating sentences word-for-word is the same as interpreting their meaning.	Utilize bilingual dictionaries and glossaries <i>in context</i> to support meaning making, reminding students of a word they've forgotten or helping to make sense of a word in a larger piece of writing.
Translate tasks or key terms into home language as one way to support comprehension. <i>OML resource: Home Language Use in Diverse Classroom Settings</i>	Increases access to grade-level content by connecting new learning to students' existing linguistic knowledge. Supports students in maintaining and growing their biliteracy.	Using a tool like Google Translate without checking the translation; translation tools sometimes produce nonsense sentences. Using translation without intentionally supporting students in leveraging their full linguistic repertoire and using all their tools to make meaning. Assuming students have academic language fluency in their home	Use this temporary scaffold to help students make sense of a task in the moment <i>alongside the English language instructions</i> so students make connections across languages. Translate key terms to support students in understanding a problem context, directions, or some key terms as needed. If possible, double check the translation of key terms with a fluent speaker.

Scaffolds & Supports	Purpose	Pitfalls to Avoid	Most Effective Use
		language to make sense of translated tasks or terms; if concepts and vocabulary are unfamiliar in home language, a direct translation is unhelpful.	
Utilize flexible seating, partnerships, and groupings based on the demands of the task and students' strengths and needs.	Promotes engagement and collaboration by creating supportive learning environments tailored to students' diverse needs.	Grouping students without providing guidance, expectations, or structures for meaningful collaboration. Without intentional support, peer interactions may reinforce misconceptions or limit meaningful participation. <i>Always</i> grouping students with a same-language peer may reinforce negative stereotypes and limit students' language development in the target language.	Use a variety of groupings based on the demands of the task and the strengths students bring to the task, as well as to allow students the opportunity to practice using language with different people (including peers who do not share a home language).
Chunk grade-level tasks and directions into manageable steps to help students focus on one part of the cognitive and language demand at a time.	Reduces overwhelm and builds confidence by breaking complex tasks into simpler, sequential steps.	Chunking tasks in ways that reduce rigor or prevents students from engaging in the full thinking process. Over-simplified tasks can limit students' opportunities to engage with complex ideas and express their thinking, creating a step-by-step recipe model that limits student thinking opportunities.	Chunk tasks and directions <i>without changing the original content</i> . Present content / tasks in smaller portions or through a slow reveal process, allowing students to make meaning gradually.

Supporting Students to Build Background Knowledge and Vocabulary

These scaffolds provide entry points into the MLR by activating prior knowledge and supporting content and language development.

Scaffolds & Supports	Purpose	Pitfalls to Avoid	Most Effective Use
Use visuals, drawings, diagrams, realia, and storyboards.	Supports students in both understanding unfamiliar context and developing background knowledge and vocabulary.	Using visuals that are too cluttered or lack clear explanation. Overly busy or unexplained visuals can overwhelm students and hinder their understanding of key concepts.	Anticipate challenging vocabulary and prepare visuals or tangible real-world examples to support understanding. If possible, collaborate with students to co-create visual supports to make sense of contextual and abstract concepts.
Show videos to demonstrate concepts and words.	Reinforces comprehension by providing dynamic, contextual examples of vocabulary and ideas in action.	Showing videos without pausing to explain, discuss, or check understanding. Students may miss key information, be distracted by less important details, or not absorb information aligned to the intended purpose without guided support. Selecting a video without taking developmental level into account – instead, ensure the video is matched well with the student age/experience (<i>e.g. some cartoons may seem infantilizing to older students</i>).	Anticipate challenging vocabulary or contexts and select short videos that clearly demonstrate these ideas. Pause to explain, discuss, and check understanding.

Scaffolds & Supports	Purpose	Pitfalls to Avoid	Most Effective Use
Collaborate with students to create language-focused anchor charts with cognates , visuals, and students' everyday and/or home language.	Builds shared reference tools that support language development by visually linking new words to known language and concepts.	Creating vocabulary anchor charts without student input or meaningful engagement. Students are less likely to remember or use the charts if they don't feel ownership or understand the content.	When presenting new vocabulary, solicit student knowledge of the concept before defining it. Record students' words publicly on an anchor chart <i>and then</i> connect it to the disciplinary vocabulary. Anchor charts show both academic language and students' home language, visuals, and cognates, remaining visual in the classroom as long as students are expected to produce the target language.
Make connections to real-world contexts , students' lived experiences, cultural backgrounds, communities, and/or prior knowledge.	Increases relevance and engagement by anchoring learning in what students already know and value.	Making superficial or irrelevant connections that don't reflect students' realities or interests, which can reduce engagement. Superficial connections can promote negative stereotypes.	By relying on knowledge of students and their experiences, teachers avoid assumptions about what may "feel familiar" and use knowledge of the students' lived experience and interests to connect the learning to their experiences through examples, visuals, and language.
Support students in identifying and analyzing cognates to deepen understanding of academic language across languages.	Strengthens vocabulary and cross-linguistic connections by helping students recognize familiar word roots and meanings.	Assuming all cognates have identical meanings or usage without guiding students to examine them critically. False cognates or unexamined assumptions can lead to misunderstandings.	Identify cognates with students, relying on familiar word roots and meanings in their home language, when possible. List cognates on a language-focused anchor chart, visible to students throughout the unit.

Scaffolds & Supports	Purpose	Pitfalls to Avoid	Most Effective Use
Incorporate purposeful gestures and movement to help students visualize and internalize key concepts and language.	Enhances memory and understanding by linking physical movement to new vocabulary and ideas.	Using gestures or movement without linking them explicitly to vocabulary or concepts; relying on a student's inherent ability to make connections between movement and meaning. Avoid using gestures alone for concepts that require a lot of background knowledge to understand (<i>e.g. for a complex concept such as normal distribution, "air drawing" a normal distribution physically should be paired with a supporting visual</i>).	Use simple gestures to emphasize language used (e.g., move hand down sharply to represent a steep slope or open arms wide to represent something large). Try to repeat gestures and, if you notice students using gestures in their explanations, copy these.

Supporting Students to Demonstrate Knowledge and Express Ideas

These scaffolds promote student voice by supporting the development and communication of ideas through speaking, writing, and multimodal representation as they engage in MLRs.

Scaffolds & Supports	Purpose	Pitfalls to Avoid	Most Effective Use
Provide <u>wait time</u> for oral/written responses.	Promotes more equitable participation by allowing students time to process language and formulate thoughtful and complete responses.	Not building up to sufficient wait time slowly.	Establish classroom norm: After presenting a question or task, a period of wait time will be provided to intentionally enable everyone to think. Consider counting silently to help provide the wait time. Build up to the full amount of wait time needed over time (<i>e.g. if 2 minutes of think time is needed, build it slowly - first offering 30 seconds and building on</i>). If students would benefit from support to honor wait time, encourage them to write down their thinking, find additional ways to frame their thinking, and/or use a fidget tool.
Encourage students to write before sharing their ideas orally .	Supports clarity of thought and language by allowing students to organize their ideas before speaking, promoting equitable participation and supporting language development.	Emphasizing written accuracy over idea development; emphasizing full sentences and grammatical correctness may increase anxiety and hinder the development of ideas during this phase.	Provide students with scratch paper/whiteboard and encourage them to jot down ideas, emphasizing this is draft writing with the purpose of helping them prepare what they want to say. Consider providing sentence frames or word banks to support students.
Provide graphic organizers to help students capture and organize their ideas.	Aids comprehension and expression by visually structuring information and supporting planning, academic language	Using graphic organizers that are too complex, misaligned to the task, or are overly-structured can limit independent thinking and foster dependence.	Decide on a few graphic organizers to use throughout the year. The first time each is used, have students collaboratively complete with peers or full class. The common graphic organizers become a tool students can quickly and easily use to organize their

Scaffolds & Supports	Purpose	Pitfalls to Avoid	Most Effective Use
	use and deeper understanding.		thinking regardless of task.
Give students opportunities to revise responses after receiving feedback that helps students refine their thinking, language use, and approach to the task.	Focused feedback promotes growth, builds confidence and metacognition, and helps students clarify their understanding. Feedback either provides encouragement to students, affirms student effort and/or productive struggle, or is math-specific.	Providing revision time without clear, actionable feedback.	Provide feedback orally and in writing so students can reference it as they revise. Feedback builds on strengths in students' initial work and moves them towards clearer explanations and the use of academic and disciplinary language.
Provide sentence stems & paragraph frames .	Stems and frames help students structure their thinking, express ideas, and engage in academic discourse and academic language development. Allowing students to choose whether to use these scaffolds promotes metacognition and agency.	Over-reliance on sentence stems limits original expression. Students should choose whether or not to use stems and frames.	Provide sentence stems orally and in written form that explicitly connect to mathematical discourse practices, such as explanation, generalization and justification. Identify mathematical language and amplify that language in sentence stems (e.g. "If we assume x is ___, then ___.") or paragraph frames to support organizing thinking (e.g. "First ___, then ___, last ___.")
Encourage students to use their home languages , to process, discuss,	Home and everyday language use can deepen understanding, support concept	Sending an explicit or implicit message that students cannot use their home or everyday language and/or that it is not valuable in the math classroom.	When helpful, explicitly state to students "Discuss this in English and in ___ (home language)," showing respect for the value a students' home language brings to the classroom.

Scaffolds & Supports	Purpose	Pitfalls to Avoid	Most Effective Use
and represent ideas.	development and affirm students' identities, especially when strategically integrated into instruction.		If the teacher or a peer speaks the same home language, encourage re-voicing in English to honor the student's contribution.
Model how to use translation tools strategically to support comprehension, language development, and task engagement.	Empowers students to use technology as an aid by showing how it can support learning when used thoughtfully, promoting positive identity development and biliteracy.	Providing translation tools without guidance, which can lead to mistranslations, over-reliance, or surface-level understanding.	Model using tools with a student, using think-alouds to illustrate the steps and purpose behind each move. Create an anchor chart to support students with metacognitive questions to ask themselves while using the tool.
Intentionally group students and structure partner work to help students structure their thinking, express ideas, and engage in academic discourse.	Fosters meaningful collaboration and language development by creating purposeful opportunities for interaction and peer support.	Grouping students without considering their strengths and needs, or demands of the task, and without modeling/scaffolding how to engage productively. Grouping students based exclusively on English language proficiency without consideration of mathematics strengths and needs. <i>Always</i> grouping students with a same-language peer may reinforce negative stereotypes and limit students' language development in the target language.	Use a variety of groupings based on the demands of the task and the strengths students bring to the task, allowing students the opportunity to practice using language with different people (including peers who do not share a home language).
Provide a word	Supports vocabulary	Offering word banks without	After students have developed understanding

Scaffolds & Supports	Purpose	Pitfalls to Avoid	Most Effective Use
bank aligned to content & language objectives.	acquisition and academic language use by providing students targeted words to use during reading, writing, and discussion.	instruction on usage or before vocabulary has been introduced in context. Assuming students know how or when to use vocabulary included in a word bank. Premature use of mathematical vocabulary can sometimes mask a lack of conceptual understanding.	of a mathematical concept, offer a word bank with vocabulary that students will see for the first time. Use the word bank alongside sentence stems and paragraph frames to support students' use of academic language. Be explicit about their use of the word bank if it is an expectation for them to embed words from the bank in their responses.
<u>Warm call</u> students in discussion.	Encourages equitable participation and engagement while limiting anxiety around speaking in front of the class.	<i>Always</i> using warm-calling may result in students mentally checking out if they know they won't be asked to speak, so use strategically.	After listening in on student conversation and providing real-time feedback, prime students for oral participation (e.g. <i>"Everyone can learn from that strategy; I'm going to ask you to share it with the class in a moment," "Smart thinking! I'm going to ask you to share your answer second,"</i>)

Glossary

Cognates: Words that share an origin and therefore may look similar, sound similar and have similar meanings. Examples include: angle/*el angulo* and capacity/*la capacidad* in Spanish, association/*asosyasyon* and compare/*konpare* in Haitian Creole, and aggregate/*agregat* and fraction/*fraction* in French. Beware of false cognates – while million in Spanish is *millón*, billion is *mil millones* and trillion is *billón*!

Cross-Linguistic Connections: An element of metalinguistic awareness, cross-linguistic connections occur students notice features across languages and use that knowledge to support understanding. A teacher can intentionally invite and extend these comparisons to deepen understanding. Examples include noticing how the letter *j* makes different sounds in English and Spanish, identifying cognates, and comparing grammatical structures (e.g., greater than and *mayor de* have similar grammatical structures). These connections help students leverage what they already know in one language to build understanding in another.

Full Linguistic Repertoire: A person's full linguistic repertoire refers to the complete range of their communicative practices. It includes home language(s), academic and informal/everyday language, and non-verbal communicative practices (e.g., gestures, eye-contact, symbolic representations). [Translanguaging](#) is a way that students make use of this repertoire. A student's repertoire is dynamic and fluid, shifting depending on the context, audience, and task. An example might be a student using words and gestures to describe exponential functions. Consider the following transcript from a high school classroom in which a student named Linh uses words, gestures, and informal language to talk about exponential functions:

Teacher: Good morning, everyone! Today we're exploring exponential functions. I want to start with something you all know about. How many of you have seen a video go viral on social media?

Several students raise hands

Linh: Yes, teacher. My cousin, she make video of cooking and... *[makes explosive hand gesture, fingers spreading outward]* ...many people see!

Teacher: Perfect, Linh! That spreading motion you just made *[mimics Linh's gesture]* - that's exactly what exponential growth looks like. Can you tell us more about how the video spread?

Linh: First day, maybe 50 people watch. Next day...200? Then 800? Very fast!

Teacher: *[writes on board: Day 1: 50, Day 2: 200, Day 3: 800]* Excellent! Let's look at this pattern. What do you notice about these numbers?

Linh: Each day is... *[pauses, searching for words]* ...times four? 50 times 4 is 200, 200 times 4 is 800?

Teacher: Great observation! So if we continue this pattern, how many views on day 4?

Linh: *[uses calculator]* 800 times 4... 3,200! *[spreads arms wide to show "big"]* Very big number!

Teacher: Yes! This is exponential growth. The base number - 4 in this case - is called the growth factor. *[draws exponential curve on board]* The graph looks like this. What does this remind you of?

Realia: Real-life objects that support vocabulary acquisition and language comprehension (e.g., one can display actual containers such as soda bottles or canned foods to support learning about capacity).

Re-voicing: A talk move where the teacher repeats or rephrases a student's idea and then checks that the interpretation is correct. Re-voicing can clarify thinking, highlight important ideas, and model academic vocabulary. It also positions students as sensemakers by giving authority to their contributions. In the transcript above, the teacher revoices Julian's response to introduce the mathematical term parallel.

Translanguaging: The strategic use of MLs/ELLs [full linguistic repertoire](#) to communicate, learn, and make meaning. Rather than treating languages as separate systems, translanguaging recognizes that bilingual and multilingual students draw fluidly all their resources as one interconnected system. For example, a student might use both Spanish and English while explaining a mathematical concept. Translanguaging does not reflect a lack of communicative ability; instead, it is evidence of students leveraging their full linguistic repertoire. Consider the following transcript from a 3rd grade classroom in which the student named Julian is translanguaging when he uses English and Spanish to describe the properties of rectangles and parallel lines (Moschkovich, 1999).

Teacher: Today we are going to have a very special lesson in which you really gonna have to listen. You're going to put on your best, best listening ears because I'm only going to speak in English. Nothing else. Only English. Let's see how much we remembered from Monday. Hold up your rectangles . . . high as you can. (Students hold up rectangles) Good, now. Who can describe a rectangle? Eric, can you describe it [a rectangle]? Can you tell me about it?

Eric: A rectangle has . . . two . . . short sides, and two . . . long sides.

Teacher: Two short sides and two long sides. Can somebody tell me something else about this rectangle, if somebody didn't know what it looked like, what, what . . . how would you say it.

Julian: *Paralela* [holding up a rectangle, voice trails off].

Teacher: It's parallel. Very interesting word. Parallel. Wow! Pretty interesting word, isn't it? Parallel. Can you describe what that is?

Julian: Never get together. They never get together [runs his finger over the top side of the rectangle].

Teacher: What never gets together?

Julian: The *paralela* . . . they . . . when they go, they go higher [runs two fingers parallel to each other first along the top and base of the rectangle and then continues along those lines], they never get together.

Antonio: Yeah!

Teacher: Very interesting. The rectangle then has sides that will never meet. Those sides will be parallel. Good work. Excellent work.

Wait time: This generally refers to a three to five+ second pause after a question or after a student's response. The purpose is to allow students time and space to think and can increase students' participation in class.

Warm Call: A term derived from "cold call" that essentially means giving students advance warning that they will be called upon to speak during a discussion, often after a facilitator has helped prepare them for the moment by supporting their processing of the idea to share.