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Supporting English Language Learners

An annotated bibliography curated by Student Achievement Partners

Student Achievement Partners believes in the power of instruction, instructional materials, and assessments aligned to college- and career-ready (CCR) standards to improve outcomes for *all* students, including the 4.6 million[1] students identified as English Language Learners (ELLs) in the United States. This document outlines the research studies and existing criteria which have influenced the guidance for ELLs we include in our tools and resources.

Approach

Expectations for ELLs are often lower than they should be, and, as a result, in many settings ELLs are denied access to high-quality, grade-level content. The evidence-based guidance in our resources and tools reflects scaffolds that support students receiving Shifts-aligned, college- and career-ready instruction. We strongly believe ELLs must be given the opportunity to access rigorous Shifts-aligned practices such as citing evidence from text in ELA or focusing on Major Work of the Grade topics in mathematics. As a result, guidance for ELLs in our CCR-aligned materials is grounded in the following:

- ELLs deserve access to challenging, grade-level content.[2]
- ELLs can and should develop English language skills by engaging with grade-level content. The Discipline-Specific Language Development[3] that comes with grade-level content is a crucial component of any comprehensive language development strategy.
- ELLs' languages other than English should be considered a valuable asset, and leveraging ELLs' first language in the classroom is essential.
- ELLs will require different support based on their individual learning needs and their progress along the continuum of language development.

The classroom resources and tools on Achieve the Core are exemplars, not comprehensive sets of materials. We have included guidance in these classroom resources for ELLs based on the research studies and criteria referenced in this document. This document is not an all-inclusive list of best practices nor is it meant to replace or compete with existing criteria; rather, it looks to those sources as a foundation and evidence base.

Some scaffolds, depending on the learner, will require different sorts of resources than the ones on Achieve the Core. The scaffolds included in our resources are intended to support students receiving grade-level content instruction within a whole-class setting that includes both native speakers and ELLs. These types of resources won't be appropriate in every setting. Students brand new to English, for example, who are receiving pull-out Focused Language Study[4] support in lieu of whole-class instruction, are not the intended audience for these supports.

This document is organized around **Objectives** that illustrate the Shifts-aligned, researched-based learning opportunities we believe ELLs are capable of undertaking, and which are reflected in our resources and tools. The **Supporting Actions** beneath each Objective represent the concrete scaffolds and activities that will make these Objectives, and the ability to access college- and career-ready instruction in general, possible for ELLs. Beneath each Supporting Action, you'll find research explaining why it is effective.

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[1] National Center for Education Statistics. Fast Facts: English language learners. https://nces.ed.gov/fastfacts/display.asp?id=96. Retrieved April 24, 2018.

[2] As noted in the Council of the Great City Schools' *A Framework for Raising Expectations and Instructional Rigor for English Language Learners* (2014), instructional materials must: "Provide ELLs with the necessary rigor in language development, provide ELLs with full access to grade-level instructional content, integrate scaffolding for ELLs without compromising rigor or content, [and] provide ELLs access to text that increases in complexity, with intentional connections between ESL and ELA instruction, all anchored in the CCSS."(pg. 13)

[3] https://www.cgcs.org/cms/lib/DC00001581/Centricity/Domain/4/CGCS_ReinvisEngLang_pub_final.pdf

[4] https://www.cgcs.org/cms/lib/DC00001581/Centricity/Domain/4/CGCS_ReinvisEngLang_pub_final.pdf

The Big Picture

Comprehensive support for ELLs encompasses many components: professional development for teachers, standards-aligned, full-course instructional materials across content areas that reflect best practice for English language development, and a structured district-driven plan to support all ELLs that includes both Focused Language Study and Discipline-Specific Language Development. Student Achievement Partners' work will not address all of these needs, and we rely on other experts and expert practitioners to lead work to create a holistic system of supports for ELLs.

For districts and schools looking to select new curricular materials or examine their comprehensive support for ELLs, the Council of the Great City Schools' *A Framework for Raising Expectations and Instructional Rigor for English Language Learners* (2014), *A Framework for Re-envisioning Mathematics Instruction for English Language Learners* (2016), and *Re-envisioning English Language Arts and English Language Development* (2017) are resources for study and application.

Acknowledgements

Student Achievement Partners is grateful for the support, guidance, and feedback of a small group of experts in English Language Learner (ELL) instruction who served as valuable thought partners. From sharing criteria and research to reviewing our Objectives and adaptations, their insights were invaluable.

We'd particularly like to acknowledge George Bunch (University of California Santa Cruz), Amanda Kibler (University of Virginia), Crystal Gonzales (English Learners Success Forum), and Giselle Lundy-Ponce (American Federation of Teachers) for their ongoing guidance throughout the course of the project. Additionally, we're grateful for David Abel (UnboundEd/TNTP), Peter Coe (UnboundEd), Grace Kelemanik (Fostering Math Practices), Amy Lucenta (Fostering Math Practices), Luis-Gustavo Martinez (National Education Association), Renae Skarin (English Learners Success Forum), and Gabriela Uro (The Council of the Great City Schools), who advised us at key points throughout the project. Lastly, we'd like to thank our educator advisory panel—classroom teachers, administrators, and ELL specialists—who took time to explain their needs regarding ELL support and provide feedback on our resources and tools.

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ELA English Language Learner Objectives

In ELA, the Objectives are grounded in two underlying concepts:

1. ELLs must be given access to academically rigorous, grade-level appropriate, standards-aligned instruction that simultaneously builds their background knowledge, conceptual understanding, and language competence.
2. Scaffolds, supports, and teacher guidance that are consistent with the research, need to be provided to ELLs to supplement—not supplant—core instruction and ultimately foster student independence.

Objective 1: Provide English Language Learners with regular opportunities to negotiate meaning from grade-level complex texts, share their analyses, and argue from evidence, by integrating into instruction features that support English Language Learners to make the content comprehensible for themselves.

Supporting Actions

1A. Select grade-level complex anchor texts that:

- Are brief and engaging to students.
- Feature a variety of academic vocabulary words for potential study.
- Are connected to a given unit of study and build student knowledge on the topic.
- Provide details and examples that help students understand new concepts and vocabulary.
- Contain ideas that lend themselves to students thinking, writing, and talking about the text from a variety of perspectives.

Key Source: Council of the Great City Schools. (2017). *Re-envisioning English Language Arts and English language development for English language learners.*

This report from the Council of the Great City Schools explains what is needed to master content across grades and helps educators determine if their instructional materials are appropriate for ELLs, all while taking into consideration the requirements of college- and career-ready standards.

Notable Points:

- In regard to text selection, the report argues that:
  - "Engaging in complex thinking, reading, and engaging with complex text (reading and writing)" are what ELLs are capable of and educators should expect that these students will perform at high levels (p. 11).
  - Giving ELLs the opportunity to learn with grade-level appropriate, complex text will help them "acquire the reasoning, language skills, and academic registers they need to be successful across the curriculum and throughout the school day" (p. 11).
- The report also features criteria for text selection appropriate to instruction with English Language Learners. Applicable criteria include:
  - "1A: Materials include a range of grade-level and age-appropriate instructional texts (e.g., small group, guided and independent reading texts along a staircase of reading and linguistic complexity)." (pg. 24)
    - "Text sets are consistent with grade-appropriate content, themes, and topics, and promote the development of grade-level academic language and content." (pg.24).

- "1D: Materials provide sustained time on the themes, with opportunities (texts, tasks, talk) to reinforce conceptual development and extend the academic language that frames those concepts." (pg.24)
- "1E: Materials include "just-right" pre-reading activities that offer visuals and other types of supports and scaffolds for building essential and pertinent background knowledge on new or unfamiliar themes/topics." (pg.24)
- "1F: Materials include instruction in which text complexity is called out or highlighted, with specific emphasis on linguistic or structural complexity." (pg.24)

1B. Engage students in reading auxiliary texts and reviewing resources (illustrations, photographs, video clips) on the topic tied to the anchor text to build the knowledge and vocabulary necessary for students to tackle grade-level complex text.

Key Source: August, D., Fenner, D. S., & Snyder, S. (2014). *Scaffolding instruction for English language learners: A resource guide for English Language Arts*. Washington, DC: American Institutes for Research. Retrieved from https://www.engageny.org/resource/scaffolding-instruction-english-language-learners-resource-guides-english-language-arts-and

This resource guide outlines a series of research-cited best practices that help support ELLs in learning words, understanding complex sentences, and comprehending complex text. The document guidance is aimed at users of the EngageNY ELA curriculum, and several example lessons are included to illustrate what the recommendations look like in practice.

Notable Points

- The authors of the paper suggest having students read short texts to build background knowledge and vocabulary before tackling the main text. The text becomes much more accessible if the students have background knowledge beforehand.
- "The importance of providing ELLs with opportunities to read for multiple purposes is supported by research (August & Shanahan, 2008). First, if the text contains cultural, historical, or thematic information ELLs are unlikely to have acquired, they read short supplementary texts to help them acquire such knowledge" (p. 8).

Key Source: Council of the Great City Schools (2017). *Re-envisioning English Language Arts and English language development for English language learners*. Retrieved from https://www.cgcs.org/cms/lib/DC00001581/Centricity/Domain/4/CGCS_ReinvisEngLang_pub_final.pdf

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Notable Points:

- In regard to the use of auxiliary texts, Criterion 1B of the report's *Instructional Materials for ELLs: Evaluation Matrix* describes the need for text sets "connected by an essential question or overarching theme." (pg. 24)
- Criterion 1C says "text sets address and support ELA/ELD standards and language progressions in a spiraling and reciprocal manner without sacrificing content or rigor, providing abundant opportunities for students to hear, read, and experience the rhythms and patterns of English." (pg.24)

1C. Engage in a read-aloud of the text, perform choral reading, and/or utilize recordings of the text, before having students work with the text alone or in groups. Read-alouds can also be used to reinforce understanding and support fluency at subsequent points in working with a text.

Key Source: Solari, E. J., & Gerber, M. M. (2008). Early comprehension instruction for Spanish-speaking English language learners: Teaching text-level reading skills while maintaining effects on word-level skills. *Learning Disabilities Research & Practice, 23*(4), 155-168.

In this study of 82 ELL kindergarten students from four different classes in California, students were given interventions structured in three different ways:

- Group 1: Listening Comprehension Concentration - 70% of time was spent on listening comprehension and vocabulary, 10% on alphabetic knowledge, and 20% on phonological awareness.
- Group 2: Phonological Awareness Concentration - 70% of time was spent on phonological awareness, 10% on alphabetic knowledge, and 20% on listening comprehension and vocabulary.
- Group 3: Only Phonological Awareness and Alphabet Knowledge - received only word-level skill instruction; 20% of the time was allotted to alphabet knowledge, and 80% of the time was spent on phonological awareness.

Notable Point:

- The Listening Comprehension group (Group 1) performed better on nearly all measures of a post-test, including phonological awareness (the focus of Group 2), showing the importance of listening comprehension in all aspects of literacy instruction.

Key Source: August, D., Fenner, D. S., & Snyder, S. *Scaffolding instruction for English language learners: A resource guide for English Language Arts*. Washington, DC: American Institutes for Research. Retrieved from https://www.engageny.org/resource/scaffolding-instruction-english-language-learners-resource-guides-english-language-arts-and

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Notable Points:

- The authors recommend engaging in a routine of reading that involves five types of reading:
    - Engaging in reading of short supplementary texts to build background knowledge to engage with the anchor text.
    - Listening to a fluent read-aloud prior to engaging in reading themselves.
    - Reading and answering comprehension questions about key details.
    - Rereading to identify vocabulary and content they did not understand on a first read.
    - Revisiting the text to analyze craft and structure.

1D. Ask students to answer questions about relevant sections of the anchor text to engage students with the text; clarify the wording of questions if necessary, without reducing their conceptual rigor.

Key Source: Baker, S., Lesaux, N., Jayanthi, M., Dimino, J., Proctor, C. P., Morris, J., Gersten, R., Haymond, K., Kieffer, M. J., Linan-Thompson, S., & Newman-Gonchar, R. (2014). *Teaching academic content and literacy to English learners in elementary and middle school* (NCEE 2014-4012). Washington, DC: National Center for Education Evaluation and Regional Assistance (NCEE), Institute of Education Sciences, U.S. Department of Education. Retrieved from the NCEE website: http://ies.ed.gov/ncee/wwc/publications_reviews.aspx

After reviewing many rigorous studies of instructional interventions for ELL students, a panel compiled four recommendations (and accompanying instructional strategies) that are supported by causal evidence as effective for supporting ELLs. The document is intended as practitioner guidance for educators teaching elementary and middle school ELLs.

Notable Points:

- In regard to clarifying the wording of text-dependent questions, the panel recommended that:
    - Students be provided with a student-friendly dictionary to allow them to clarify the meaning of words in questions.
    - Teachers consider rephrasing a complex inferential question into one that is more clearly and explicitly written yet requires the same cognitive load in the student response. For example: "How do you think this historical event affects Mexico today?" could be rephrased as "How do you think Mexico changed because of the Aztec period? What examples of the changes do you still see today?"

1E. Provide opportunities for English Language Learners to reread the text with different purposes, foci, questions, and activities each time.

Key Source: August, D., Fenner, D. S., & Snyder, S. (2014). *Scaffolding instruction for English language learners: A resource guide for English Language Arts*. Washington, DC: American Institutes for Research. Retrieved from https://www.engageny.org/resource/scaffolding-instruction-english-language-learners-resource-guides-english-language-arts-and

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    - Revisit the text to analyze craft and structure.

Key Source: English Learners Success Forum. (2017). *Draft guidelines for improving English Language Arts materials for English learners and draft guidelines for improving mathematics materials for English learners.*

This guidance was developed by a working group of English Language Learner experts and includes research-based supports for ELLs that should be included in instructional materials.

Notable Points:

- Within the guidance, it is recommended that text is rarely, if ever, simplified for ELLs; instead, texts should include appropriate supports to help students access the unaltered text. When working with the text, students should read and reread, engaging with different foci. Teachers should make use of the following scaffolds to support these different reading purposes:
    - Applying text engineering (chunking a text in meaningful units, inserting headings, inserting questions) to alert students to key queries to keep in mind while reading the next chunk of texts. (Resource: Chunking Texts) (pg. 12)
    - Helping teachers indicate to students what is essential to understand. (pg.12)
    - Grouping of students for productive discussions about complex texts. (Resource: Assigning Roles) (pg.12)
    - Including parenthetical explanations, definitions, or a student-friendly glossary. (pg.12)
    - Using multiple texts (including multimedia) to build background knowledge on crucial topics and disciplinary practices. (pg.12)
    - Engaging in regular and explicit syntax development within reading tasks. That focus should occur in the context of collaboratively grappling with meaningful texts. (pg.12)
    - Focusing on vocabulary in reading tasks in the context of meaning-making and communicating. Materials should draw students' attention to high-value vocabulary words that are either essential for understanding the reading or that represent words students will encounter frequently along their educational journey. These are often referred to as Tier 2 and Tier 3 vocabulary. (Resources: Vocabulary Development; Word Wall; Context Clues; Tiered Vocabulary) (pg.13)

1F. Provide graphic organizers (or other tools, such as in-text highlighting and annotating) to help students capture and reflect on new knowledge. Graphic organizers can support students in preparing for content-focused writing and discussion.

Key Source: August, D., Branum-Martin, L., Cardenas- Hagan, E., & Francis, D. J. (2009). The impact of an instructional intervention on the science and language learning of middle grade English language learners. *Journal of Research on Educational Effectiveness, 2*(4), 345-376. doi:10.1080/19345740903217623

This study looked at the effectiveness of interventions designed to build knowledge and academic vocabulary within a whole class setting (both ELLs and native speakers). The study involved 890 sixth-grade students (562 were ELLs; 328 were English-proficient based on district language proficiency testing) in a high-poverty district in the Rio Grande Valley. Students were taught word-learning strategies such as using information from context, morphology, multiple meanings, and cognates to infer meaning. In addition to participating in biweekly meetings, teachers received detailed/semi-scripted plans, overhead transparencies, worksheets, homework assignments, and reading items.

Notable Points:

- Teachers found that scaffolds designed to support ELL students were effective in helping all students (both native and non-native speakers) increase their vocabulary.

Table 3. Descriptive statistics for vocabulary and science CBM assessments

Assessments and Language Group	Treatment Group	Pretest		Posttest		
		M	*SD*	*M*	*SD*	*N*
Vocabulary						
English proficient	Treatment	15.43	13.61	24.88	17.56	158
	Control	17.45	13.60	21.23	16.10	170
ELL	Treatment	8.41	9.14	15.22	14.23	266
	Control	9.24	9.62	12.22	12.59	296
Science						
English proficient	Treatment	9.36	4.00	14.06	7.42	158
	Control	9.93	4.51	13.88	7.10	170
ELL	Treatment	8.05	3.68	11.77	6.03	266
	Control	8.36	4.01	11.11	5.61	296

Note. CBM = curriculum-based measurement; LEP = Limited English proficient.

- Examples of the scaffolds used:
  - Visuals, including graphic organizers.
  - Opportunity for students to preview activities to ensure they understood what to do.
  - Explicit vocabulary instruction of both general and domain-specific words:
    - Glossaries with visuals, definitions, and Spanish translations.
    - Teacher-taught strategies to improve word learning.
  - Pairing of students with a native speaker.

Key Source: Baker, S., Lesaux, N., Jayanthi, M., Dimino, J., Proctor, C. P., Morris, J., Gersten, R., Haymond, K., Kieffer, M. J., Linan-Thompson, S., & Newman-Gonchar, R. (2014). *Teaching academic content and literacy to English learners in elementary and middle school* (NCEE 2014-4012). Washington, DC: National Center for Education Evaluation and Regional Assistance (NCEE), Institute of Education Sciences, U.S. Department of Education. Retrieved from the NCEE website: http://ies.ed.gov/ncee/wwc/publications_reviews.aspx

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Notable Points:

- In regard to supporting ELL students in organizing and reflecting on new knowledge and concepts, the panel recommendations include:
  - "Clarifying and reinforcing vocabulary definitions using concrete examples and non-examples, graphic organizers, pictures, gestures, and actions" (p. 19).
  - "Anchoring new learning with videos, visuals, and graphic organizers" (p. 33).
  - "Supporting brainstorming activities, helping students make connections, understand patterns, and recognize relationships between facts, terms, and concepts" (p. 33).

Objective 2: Provide daily opportunities for students to talk (and listen to others talk) about content, anchored around topics present in the texts they are reading, to build their confidence and knowledge, and practice newly acquired skills.[5]

Supporting Actions

2A. Structure student groups around meaningful collaborative tasks (e.g., have students cite evidence from the text to support the position they take) that allow English Language Learners to use their full linguistic and cultural resources. This includes:

- Allowing English Language Learners to collaborate in their home languages to process content before participating in whole class discussions in English.
- Allowing English Language Learners to use English language that is still under development.
- Providing brief, additional comprehension and vocabulary instruction connected to the content being covered in small groups of English Language Learners who are struggling with language and literacy.

Key Source: English Learners Success Forum. (2017). *Draft guidelines for improving English Language Arts materials for English learners and draft guidelines for improving mathematics materials for English learners.*

This guidance was developed by a working group of English Language Learner experts and includes research-based supports for ELLs that should be included in instructional materials.

Notable Points:

- In this set of guidance, recommendations are made about strategic use of collaborative and group work, including:
  - "Units should include pair or group conversation activities which help students practice their abilities to develop and challenge ideas using evidence-based reasoning, allowing them to engage with ideas and engage with ELA practices (infer meaning from texts, make arguments, support claims with text evidence, organize ideas, etc.) before writing extensively about them." (Resources: Argumentation Activities; Fortifying Speaking and Listening Skills; Socratic Seminar; Jigsaw Project; Save the Last Word for Me) (pg.9)
  - "Teacher materials should include instruction on grouping strategies which encourage students to leverage their oral language resources to engage with complex disciplinary ideas and practices and to support each other in developing disciplinary language in English. This is especially important for newcomers for whom the cognitive load of simultaneous language and content knowledge development can prove to be a barrier to meaningful instruction. For example, homogeneous grouping by language background can allow the teacher to leverage bilingual language resources and accelerate content and language learning. Heterogeneous groupings can provide ELs with peer modeling of authentic communication and support by native English-speaking peers."(pg. 9)

[5] Note: This objective would not be applicable to mini-assessments where students are expected to work alone.

Key Source: Baker, S., Lesaux, N., Jayanthi, M., Dimino, J., Proctor, C. P., Morris, J., Gersten, R., Haymond, K., Kieffer, M. J., Linan-Thompson, S., & Newman-Gonchar, R. (2014). *Teaching academic content and literacy to English learners in elementary and middle school* (NCEE 2014-4012). Washington, DC: National Center for Education Evaluation and Regional Assistance (NCEE), Institute of Education Sciences, U.S. Department of Education. Retrieved from the NCEE website: http://ies.ed.gov/ncee/wwc/publications_reviews.aspx

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Notable Points:

- In regard to supporting ELL students, the authors recommend frequent use of small group instruction for the following reasons:
    - It allows students "the opportunity to listen and speak through critical conversations about text and content in collaborative settings" (p. 51).
    - It allows students to brainstorm and support each other in preparing for a writing activity they might otherwise struggle to prepare for alone.
    - It allows them to provide feedback and react to others' ideas.
- Using different types of grouping is recommended to serve various learning goals for ELLs:
    - Homogeneous groupings allow for targeted support of a students' identified needs that would otherwise not be possible in a whole-class setting.
    - Heterogeneous groupings allow students to benefit from hearing the ideas and oral expression of students at different proficiency levels.
- When groups are composed of English Language Learners, the study recommends providing brief, fast-paced additional comprehension and vocabulary instruction connected to the content being covered.

2B. Ask students to arrive at a reasonable interpretation of extended discourse, rather than being asked to process every word literally.

Key Source: Bunch, G. C., Kibler, A., & Pimentel, S. (2012). *Realizing opportunities for English learners in the Common Core English Language Arts and Disciplinary Literacy Standards.*

This paper offers research-based recommendations for how to help English Language Learners achieve the requirements of college- and career-ready standards in ELA. The recommendations focus on four areas: Reading, Writing, Speaking and Listening, and Language.

Notable Points:

- College- and career-ready standards require students to be able to interpret information and use it to make claims. Similarly, it requires students to discern the most important or pertinent pieces of information within a text that can be used to construct logical claims.
- Preparing for and engaging in oral discourse in which students listen to others and make their own oral claims is especially valuable for language development of ELLs.
- It is important that ELLs are able to participate in discussions and other opportunities to formulate and deliver oral claims. To allow ELLs with still-developing English language skills to participate, teachers should "help ELs to "arrive successfully at a reasonable interpretation of extended discourse" (Brown & Yule, 1983, p. 57) rather than to process every word literally, which is impossible even for native English speakers to do (p. 7).

2C. Scaffold questions for discussions so that questioning sequences include a mix of factual and inferential questions and a mix of shorter and more extended responses.

Key Source: Baker, S., Lesaux, N., Jayanthi, M., Dimino, J., Proctor, C. P., Morris, J., Gersten, R., Haymond, K., Kieffer, M. J., Linan-Thompson, S., & Newman-Gonchar, R. (2014). *Teaching academic content and literacy to English learners in elementary and middle school* (NCEE 2014-4012). Washington, DC: National Center for Education Evaluation and Regional Assistance (NCEE), Institute of Education Sciences, U.S. Department of Education. Retrieved from the NCEE website: http://ies.ed.gov/ncee/wwc/publications_reviews.aspx

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Notable Points:

- In regard to scaffolding question sequences, the panel recommended:
    - Introducing a mix of factual, more straightforward questions, with more complex inferential questions.
    - Examples: "Why did the Aztecs destroy their capital city rather than destroy the causeway?" (Factual) vs "Why do you think the Aztecs realized the Spanish were not gods?" (Inferential).
- Factual questions will help students hone in on key pieces of information from the text that can facilitate their discussion and can feature in their responses to more complex inferential questions.

2D. Present directions and tasks orally and visually; repeat often; and ask English Language Learners to rephrase.

Key Source: Echevarria, J., Vogt, M. J., & Short, D. J. (2012). *Making content comprehensible for English learners: The SIOP model* (4th edition). New York: Pearson Education.

The Sheltered Instruction Observation Protocol model (SIOP) is one model of instruction for ELLs. Based on empirical research, it aims to integrate content and language instruction for students learning a new language.

Notable Points:

- Features of the SIOP model related to student directions include:
    - Crafting clear explanations for what students are being asked to do:
        - Provide routines—the more practice students have with the types of tasks found in content classes, the better they will perform in class.
        - Present instructions in a step-by-step manner, preferably modeled or demonstrated.
        - Show a finished product—this allows students to know what the task entails.
        - Accompany oral directions with written ones so ELLs can refer back to them at a later point in time as they complete the assignment or task.
        - Go over every aspect of the lesson, showing visuals with each step, if needed.
        - Write out directions as you would for your students and ask a colleague to follow them as a check of how clear your task explanations are.
    - Using gestures, body language, pictures, and objects to accompany speech. Gestures and visual aids assist students in organizing and making sense of information that is presented verbally.
    - Providing a model of a process, task, or assignment. Doing so as the students are taken through the task verbally eliminates ambiguity and gives the message in more than one way.
    - Writing lesson-level objectives and using student-friendly language that suits the age and proficiency levels in the class.

- Writing objectives in terms of student learning, not as an agenda item. For example:
  - Students will be able to…
  - Students will…
  - We will…
  - Today I will…
  - The learning will…
  - Our job is to…
- Limiting the number of content objectives to only 1 or 2 per lesson to reduce the complexity of the learning task and to ensure that instruction can meet the objectives.
- Sharing objectives with the students orally and in writing.
- Reviewing the objectives at the end of the lesson to determine if students have mastered them.

Objective 3: Engage in intense academic vocabulary work before, during, and after reading over the course of several lessons.[6]

Supporting Actions

3A. Provide explicit instruction, using multiple modalities, on selected vocabulary words (e.g., 5-8 for a given text) that are central to understanding the text.

Key Source: Vaughn, S., Martinez, L. R., Linan-Thompson, S., Reutebuch, C. K., Carlson, C. D., & Francis, D. J. (2009). Enhancing social studies vocabulary and comprehension for seventh-grade English language learners: Findings from two experimental studies. *Journal of Research on Educational Effectiveness, 2*(4), 297-324.

This two-year study of more than 800 seventh-grade social studies students (both ELLs and native speakers) in Texas found improvement in word knowledge and comprehension for all students (ELLs and native speakers) receiving supports typically thought of as best practices for ELL instruction.

Notable Points:

- Among other interventions, the study included the following protocol:
  1. Teachers pronounced the word, identified a Spanish cognate or Spanish translation, gave a student-friendly definition, and used a visual representation.
  2. Teachers shared two sentences using each vocabulary word (one in a historical context from class text and one with the word based on students' experiences).
  3. Students then used the word and applied its meaning by discussing a prompt with their student partner.
- Teachers also employed graphic organizers, structured paired reading, introduction of questions prior to read-alouds, and use of media to reinforce vocabulary.
- The combination of vocabulary and concept instruction shifted the instructional emphasis from learning historical facts to using language and understanding the content.

[6] Note: Not all strategies must be addressed in set of adaptations.

Key Source: Baker, S., Lesaux, N., Jayanthi, M., Dimino, J., Proctor, C. P., Morris, J., Gersten, R., Haymond, K., Kieffer, M. J., Linan-Thompson, S., & Newman-Gonchar, R. (2014). Teaching academic content and literacy to English learners in elementary and middle school (NCEE 2014-4012). Washington, DC: National Center for Education Evaluation and Regional Assistance (NCEE), Institute of Education Sciences, U.S. Department of Education. Retrieved from the NCEE website: http://ies.ed.gov/ncee/wwc/publications_reviews.aspx

After reviewing many rigorous studies of instructional interventions for ELL students, a panel compiled four recommendations (and accompanying instructional strategies) that are supported by causal evidence as effective for supporting ELLs. The document is intended as practitioner guidance for educators teaching elementary and middle school ELLs.

Notable Points

- In regard to vocabulary instruction, recommendations from the panel include:
  - Selecting a small number of words for intensive instruction over the course of several lessons to increase students' vocabularies. Evidence shows that when ELL students are taught large numbers of words in one day, they have only shallow understanding. Between 5–8 words should be selected for intensive instruction to allow for deep, meaningful learning.
  - Attending to these six criteria for choosing words for instruction with ELLs—words should:
    - Be central to understanding the text.
    - Be frequently used in the text.
    - Appear in other content areas.
    - Have multiple meanings.
    - Have affixes.
    - Have cross language potential, such as cognates.
  - Teaching vocabulary using multiple modalities (writing, speaking, and listening) with the goal of having students understand how the word is used in context, rather than having them memorize definitions.
  - Providing explicit instruction on vocabulary to help students pinpoint the word's meaning, using tools and strategies such as student-friendly glossaries, examples/non-examples, and concrete examples/visuals.
  - Providing multiple ways for students to practice with vocabulary and show their understanding, such as class discussion, written work, and games like crosswords or charades. This will allow for deep processing of the words' meanings, create a variety of experiences (reflecting how words are used in the real world), and keep students interested.
  - Teaching word-learning strategies to increase students' understanding of how words work, and how they can determine meaning independently.

3B. Read the text aloud, and then facilitate a discussion about specific words in the text.

Key Source: English Learners Success Forum. (2017). *Draft guidelines for improving English Language Arts materials for English learners and draft guidelines for improving mathematics materials for English learners.*

This guidance was developed by a working group of English Language Learner experts and includes research-based supports for ELLs that should be included in instructional materials.

Notable Points:

- Recommendations regarding the strategic integration of vocabulary work through text-based discussions include:
  - Vocabulary should be a regular focus in reading tasks but should be presented in the context of meaning-making and communicating, and not merely to acquire academic English. Materials should draw students' attention to high-value vocabulary words that are either essential for understanding the reading or that represent words students will encounter frequently along

their educational journey. These are often referred to as Tier 2 and Tier 3 vocabulary. (Resources: Vocabulary Development; Word Wall; Context Clues; Tiered Vocabulary)

Key Source: Echevarria, J., Vogt, M. J., & Short, D. J. (2012). *Making content comprehensible for English learners: The SIOP model* (4th edition). New York: Pearson Education.

The Sheltered Instruction Observation Protocol model (SIOP) is one model of instruction for ELLs. Based on empirical research, it aims to integrate content and language instruction for students learning a new language.

Notable Points:

- The SIOP model includes a variety of ways to effectively review academic vocabulary with students during a lesson:
    - Use analogies, the process of relating newly learned words to other words with the same structure or pattern. For example, using the root *photo* (meaning light) in a lesson on photosynthesis to refer students to other words with the same word root (photography, photocopy).
    - Point out multiple meanings, such as those that have one meaning in conversational English and another that is disciple specific (e.g., "the cleaning *product* I want to buy has bleach in it" v. "the *product* of 25 X 4 is 100").
    - Point out synonyms and antonyms for key vocabulary, when possible. Four corner charts can be helpful for review when they include (1) the vocabulary word, (2) a synonym, (3) an antonym, and (4) "what the word is not."
    - Draw students' attention to how words are used in various contexts (pragmatics), because they may differ across cultures and languages. It is important to talk to students about how language is used in different contexts and how what might be appropriate in one context may be inappropriate in another.
    - Repeat academic words and terms because doing so has benefits to students. Provide multiple exposures to new terminology to build familiarity, confidence, and English proficiency.
    - Include a final vocabulary review at the conclusion of a lesson. Students may share understandings with a partner while teachers check their explanations. Have students write a quick definition (in student speak) on individual white boards and hold them up to show; do a match of words and definitions on the board or in an interactive presentation on devices; write two to three sentences including the words on an exit slip that they turn in as they leave the classroom.

3C. Emphasize meanings of everyday words that are not necessarily part of the academic curriculum.

Key Source: Baker, S., Lesaux, N., Jayanthi, M., Dimino, J., Proctor, C. P., Morris, J., Gersten, R., Haymond, K., Kieffer, M. J., Linan-Thompson, S., & Newman-Gonchar, R. (2014). *Teaching academic content and literacy to English learners in elementary and middle school* (NCEE 2014-4012). Washington, DC: National Center for Education Evaluation and Regional Assistance (NCEE), Institute of Education Sciences, U.S. Department of Education. Retrieved from the NCEE website: http://ies.ed.gov/ncee/wwc/publications_reviews.aspx

After reviewing many rigorous studies of instructional interventions for ELL students, a panel compiled four recommendations (and accompanying instructional strategies) that are supported by causal evidence as effective for supporting ELLs. The document is intended as practitioner guidance for educators teaching elementary and middle school ELLs.

Notable Points:

- In regard to supporting ELLs with everyday vocabulary, the panel found that:
    - Because ELLs are new to English, they may struggle with vocabulary words that do not hinder native speakers and that do not justify instructional time yet may impact ELLs overall comprehension:

        - It is likely that ELLs will still find unfamiliar vocabulary within texts they are asked to read, even after teachers engage in direct vocabulary instruction on a small number of new vocabulary words.
        - Students may turn to dictionaries or glossaries to find the meaning of these words but find that these dictionaries are also well-beyond their reading ability.
        - Teachers should be conscious of the fact that vocabulary words native speakers have learned through everyday speech have not yet been encountered by ELLs and may pose barriers to comprehension.
    - Reinforcing the meaning of these words through whole-class discussion or one-on-one work can help bolster that vocabulary knowledge, even if these words do not warrant in-depth instruction activities.

3D. Explicitly clarify and reinforce definitions of words using examples, non-examples, synonyms, antonyms, and concrete representations.

Key Source: Baker, S., Lesaux, N., Jayanthi, M., Dimino, J., Proctor, C. P., Morris, J., Gersten, R., Haymond, K., Kieffer, M. J., Linan-Thompson, S., & Newman-Gonchar, R. (2014). *Teaching academic content and literacy to English learners in elementary and middle school* (NCEE 2014-4012). Washington, DC: National Center for Education Evaluation and Regional Assistance (NCEE), Institute of Education Sciences, U.S. Department of Education. Retrieved from the NCEE website: http://ies.ed.gov/ncee/wwc/publications_reviews.aspx

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Notable Points:

- In regard to supporting ELLs with vocabulary acquisition, the panel found that:
    - It is valuable to use example and non-examples, tying a word to a concrete visual (e.g., "dinosaur" and "skyscraper" as examples and "ant" and "baby" for non-examples of *enormous.*
        - Examples and non-examples may also be reinforced by using gestures or actions.
    - Synonyms and antonyms of a new vocabulary word can help students hone in on meaning and place the new word in the context of their existing vocabulary.
    - In writing activities, asking students to check their written work by ensuring the sentence still makes sense when they inserted a synonym reinforces definitions.
    - Synonyms can also be used to create a student-friendly dictionary.

3E. Provide opportunities to practice using newly acquired vocabulary in the context of their discussions and writing:

- Provide a range of engaging activities (e.g., crosswords, charades, sketching) to represent word meanings in texts they are reading.
- Ask students to respond to questions where they have to show their understanding of subtle differences in usage and meaning.

Key Source: Baker, S., Lesaux, N., Jayanthi, M., Dimino, J., Proctor, C. P., Morris, J., Gersten, R., Haymond, K., Kieffer, M. J., Linan-Thompson, S., & Newman-Gonchar, R. (2014). *Teaching academic content and literacy to English learners in elementary and middle school* (NCEE 2014-4012). Washington, DC: National Center for Education Evaluation and Regional Assistance (NCEE), Institute of Education Sciences, U.S. Department of Education. Retrieved from the NCEE website: http://ies.ed.gov/ncee/wwc/publications_reviews.aspx

After reviewing many rigorous studies of instructional interventions for ELL students, a panel compiled four recommendations (and accompanying instructional strategies) that are supported by causal evidence as effective for supporting ELLs. The document is intended as practitioner guidance for educators teaching elementary and middle school ELLs.

Notable Points:

- ELL students benefit from repeated exposure to new vocabulary through a variety of interactions.
- Providing a range of activities helps students review previously taught vocabulary and further cements those words in their working knowledge.
- These strategies (if not overused) can also boost engagement for students.

Key Source: Lesaux, N. K., Kieffer, M. J., Faller, S. E., & Kelley, J. G. (2010). The effectiveness and ease of implementation of an academic vocabulary intervention for linguistically diverse students in urban middle schools. *Reading Research Quarterly, 45*(2), 196-228. doi:10.1598/ RRQ.45.2.3

This study was conducted over the course of the 2007–2008 academic year in 21 classrooms in seven middle schools in a large urban district with 476 sixth-grade students (346 ELLs and 130 native English speakers). It showed the positive effects of strategic academic vocabulary instruction. The study was 18 weeks in length and consisted of multiple "units" based around an informational text and 8–9 high-utility vocabulary words per unit.

Notable Points

- Instruction was designed to build knowledge of words incrementally by providing multiple exposures to the words in different forms and in different meaningful contexts. The intervention included a variety of whole-group, small-group, and independent activities designed to promote deep processing through opportunities for listening, speaking, reading, and writing with the words.
- The intervention resulted in statistically significant effects on several aspects of vocabulary knowledge (for both ELLs and native speakers), including meanings of taught words, morphological awareness, and the word meanings as presented in expository text. The intervention also yielded marginally significant but promising effects on both a depth of word knowledge measure and a norm-referenced measure of reading comprehension.

3F. Teach English Language Learners strategies that help them determine word meanings on their own by focusing on:

- cognates;
- word parts;
- context clues;
- Looking at a word as different part of speech (e.g., environment, environmental, environmentally).

Demonstrate and model how to use word parts (prefixes, affixes, roots) to build an understanding of new words. Highlight words in materials that should be prioritized for this purpose.

Key Source: Francis, D., Rivera, M., Lesaux, N., Kieffer, M., & Rivera, H. (2006). *Practical guidelines for the education of English language learners: Research-based recommendations for serving adolescent newcomers* (Under cooperative agreement grant S283B050034 for U.S. Department of Education). Portsmouth, NH: RMC Research Corporation, Center on Instruction. Retrieved from: https://www2.ed.gov/about/inits/ed/lep-partnership/newcomers.pdf

These guidelines are based on a literature review for best practices in supporting adolescent newcomer ELL students.

Notable Points:

- The research points to the need for students to learn meaning-making strategies for encountering new vocabulary. Teaching of definitions and copying sentences, while the most common strategies for vocabulary instruction are not sufficient. Strategies recommended by the authors include:
    - Using glossaries and dictionaries.
    - Using cognates (estimates show that more than 30% of English words are cognates of Spanish words).
    - Breaking up words.
    - Using context.

Key Source: Echevarria, J., Vogt, M. J., & Short, D. J. (2012). *Making content comprehensible for English learners: The SIOP model* (4th edition). New York: Pearson Education.

The Sheltered Instruction Observation Protocol model (SIOP) is one model of instruction for ELLs. Based on empirical research, it aims to integrate content and language instruction for students learning a new language.

Notable Points:

- Features of the SIOP model related to helping students determine word meanings independently include:
    - Analyzing and using forms and patterns in English, such as the prefix + root + suffix pattern.
    - Making logical guesses based on contextual and syntactic information.
    - Purposefully grouping and labeling words.
    - Pointing out cognates to promote comprehension for students whose native language has a Latin base.

Key Source: Carlo, M., August, D., Snow, C., Dressler, C., McLaughlin, B., Lippman, D., Lively, T., & White, C. E. (2004). Closing the gap: Addressing the vocabulary needs of English language learners in bilingual and mainstream classrooms. *Reading Research Quarterly, 39*(2), 188-215.

This 15-week study looked at literacy intervention for approximately 200 emerging bilingual and monolingual fifth-grade students. The intervention strategy focused on teaching strategically-chosen words and word-learning strategies.

Notable Points:

- Teachers taught 10–12 words weekly. Each day had a structure and flow to promote depth of word knowledge, and words were encountered several times in different tasks/contexts.
- Instruction focused on depth of meaning, polysemy, morphological structure, and cross-language relationships (cognates).
- Students received explicit instruction in using context to infer word meaning, including strategies to understand words with multiple meanings, using prefixes and affixes to determine meaning, and understanding subtle differences in usage and meaning.
- Students were tested in the fall and spring on:
    - Reading comprehension
    - Word mastery
    - Morphology
    - Word association
- Growth occurred for ELLs and English-only speakers in the tested areas and demonstrated the potential for increased vocabulary knowledge and comprehension by teaching word-analysis strategies.

3G. Provide student-friendly dictionaries that will allow English Language Learners to look up words essential to comprehending the texts they are reading.

Key Source: Francis, D. J., Rivera, M., Lesaux, N., Kieffer, M., & Rivera, H. (2012). *Research-based recommendations for the use of accommodations in large-scale assessments: Practical guidelines for the*

education of English language learners. **Houston, TX: Texas Institute for Measurement, Evaluation, and Statistics at the University of Houston for the Center on Instruction.**

These guidelines drew upon research looking at accommodations on large-scale assessments such as NAEP and state summative assessments.

Notable Points:

- In looking at various accommodations, the researchers found that providing English dictionaries to students during assessments improved their performance and ability to access the test content.

Accommodation	Results for Fixed Effects Analysis									
	Number of Samples	Effect Size and 95% Confidence Interval				Test of Mean Effect = 0		Test of Heterogeneity in Effect Sizes		
		Mean Effect Size	s.e.	Lower Limit	Upper Limit	Z	p	Q	df(Q)	p(Q)
Bilingual Dictionary-Glossary	5	-.096	.065	-.223	.031	-1.479	.139	13.53	4	.009
Dual Language Booklet	1	-.177	.148	-.467	.112	-1.199	.231			
Dual Language Questions + Read Aloud in Spanish	1	.273	.195	-.109	.654	1.401	.161			
English Dictionary-Glossary	11	.146	.043	.063	.230	3.427	.001	14.804	10	.139
Extra Time	2	.209	.142	-.069	.488	1.473	.141	0.155	1	.693
Simplified English	15	.020	.043	-.064	.104	.473	.637	19.830	14	.136
Spanish Version[h]	2	-.263	.102	-.463	-.062	-2.572	.010	14.465	1	<.001
TOTAL WITHIN								62.789	30	<.001
TOTAL BETWEEN								25.540	6	<.001
OVERALL MEAN	37	-.034	.025	-.016	.084	-1.342	.180	87.330	36	<.001

Key Source: Fenner, D. S. (2014). ***Advocating for English learners: A guide for educators.*** **Thousand Oaks, CA: Corwin.**

This book is dedicated to supporting teachers in advocating for ELLs inside and outside the classroom. It makes recommendations on strategic collaborations between classroom teachers and ELL specialists, offers ideas for working with school and district administrations, makes recommendations on how to involve families, and offers practical guidance on supporting ELLs through effective instruction and assessment.

Notable Points:

- Student friendly-dictionaries can be organized in a variety of ways to help ELLs make meaning of new vocabulary, including:
    - Presenting visuals to illustrate words.
    - Providing straight explanations/student-friendly definitions.
    - Providing synonyms.

Objective 4: Engage English Language Learners in instructional conversations in which their attention is drawn to words, phrases, and clauses in texts they are working with.

Supporting Actions:

4A. Highlight "juicy" sentences that feature grade-appropriate complex structures, vocabulary, and language features. Guide students to break apart these sentences, analyze different elements, and determine meaning:

- Create questions that help to build English Language Learners' understanding of syntax and how it can be used to determine word meanings.
- Focus on pronouns and their use.

Key Source: Fillmore, L. W., & Fillmore, C. J. (2012). *What does text complexity mean for English language learners and minority students?* Retrieved from http://ell.stanford.edu/sites/default/files/pdf/academic-papers/06-LWF%20CJF%20Text%20Complexity%20FINAL_0.pdf

In this white paper, the authors argue that complex text poses particular challenges to ELLs and other students who struggle with language. Because written and spoken language vary significantly, many students will only be exposed to the features of academic, written English at school. The paper explains why academic language acquisition is so important and offers recommendations for building language within the context of reading and writing.

Notable Points:

- ELLS and Language Minority students (LMs) do not receive access to the academic language used in writing via conversational English.
    - In a study of classroom transcripts from lesson videos compiled by the Trends in International Mathematics and Science Study (TIMSS), even the language spoken by teachers in the context of instruction doesn't constitute academic language.
- Written English includes many features not found in spoken English such as much greater informational density (each phrase is packed with information critical to making meaning), heavy noun phrases (phrases containing nouns which are modified or expanded upon), and metaphors.
    - Elaboration of nouns is far less common in spoken rather than written English. In informational and expository writing, 60% of nouns are elaborated upon, while in spoken English it is, on average, only 15%.
- After third grade, instructional texts shift from helping students learn to read to *learning from what is read.* This means that students are no longer scaffolded by features such as easily decodable words, simple sentences patterns, and high-frequency words learned mostly by sight.
- To ensure students are able to access the more complex writing they will see, it is important for students to engage in structured discussions around complex features of writing.
- Teachers in high school lab sites in New York saw increased numbers of ELLs passing the ELA proficiency test (and even outperforming non-ELLs) after engaging in 15–20 minutes per day of this kind of close analysis of a single sentence or phrase.

Key Source: August, D., Fenner, D. S., & Snyder, S. (2014). *Scaffolding instruction for English language learners: A resource guide for English Language Arts.* Washington, DC: American Institutes for Research. Retrieved from https://www.engageny.org/resource/scaffolding-instruction-english-language-learners-resource-guides-english-language-arts-and

This resource guide outlines a series of research-cited best practices that help support ELLs in learning words, understanding complex sentences, and comprehending complex text. The document guidance is aimed at users of the EngageNY ELA curriculum, and several example lessons are included to illustrate what the recommendations look like in practice.

Notable Points:

- ELLs will benefit from additional support because of the complexities of English language writing including reference chains where the same people, things, or events are linked throughout a text and the use of pronouns (e.g., he, they, it).

- An example of pronoun work to support ELL instruction is included below as a supplement to a traditional curriculum:

Syntactic Awareness Activity

AIR Additional Supports

Supplement the CK activities that teach singular personal pronouns with an activity that includes concrete objects. An example follows:

- Ask three students to come to the front of the class. Make sure there is a mix of boys and girls. Give each student an object. Have each student enact the following routine: I am _____. I have a _____. I have it. He is _____ [Robert]. He has a _____. He has it. She is _____ [Maria]. She has a _____. She has it. Let them switch objects and the next child talks through the routine.

Objective 5: Provide regular, structured writing opportunities anchored in content to build, extend, and solidify student learning and knowledge.

Supporting Actions:

5A. Allow ELLs to use their home language as they prepare for writing—including researching, discussing, reading, and writing on the topic in their home language prior to writing in English.

Key Source: Baker, S., Lesaux, N., Jayanthi, M., Dimino, J., Proctor, C. P., Morris, J., Gersten, R., Haymond, K., Kieffer, M. J., Linan-Thompson, S., & Newman-Gonchar, R. (2014). *Teaching academic content and literacy to English learners in elementary and middle school* (NCEE 2014-4012). Washington, DC: National Center for Education Evaluation and Regional Assistance (NCEE), Institute of Education Sciences, U.S. Department of Education. Retrieved from the NCEE website: http://ies.ed.gov/ncee/wwc/publications_reviews.aspx

After reviewing many rigorous studies of instructional interventions for ELL students, a panel compiled four recommendations (and accompanying instructional strategies) that are supported by causal evidence as effective for supporting ELLs. The document is intended as practitioner guidance for educators teaching elementary and middle school ELLs.

Notable Points:

- In regard to supporting ELL students, the panel recommended frequent use of small group instruction for the following reasons:
  - It allows students "the opportunity to listen and speak through critical conversations about text and content in collaborative settings" (p. 51).
  - It allows students to brainstorm and support each other in preparing for a writing activity they might otherwise struggle to prepare for alone.
  - It allows them to provide feedback and react to others' ideas.
- Using different types of grouping is recommended to serve various learning goals for ELLs:
  - Homogeneous groupings allow for targeted support of a students' identified needs that would otherwise not be possible in a whole-class setting.
  - Heterogeneous groupings allow students to benefit from hearing the ideas and oral expression of students at different proficiency levels.
- When groups are composed of English Language Learners, the study recommends providing brief, fast-paced additional comprehension and vocabulary instruction connected to the content being covered.

5B. Provide students with meaningful exposure to writing exemplars/mentor texts that highlight specific elements of a well-structured response.

Key Source: Council of the Great City Schools. (2017). *Re-envisioning English Language Arts and English language development for English language learners.*

This report from the Council of the Great City Schools explains what is needed to master content across grades and helps educators determine if their instructional materials are appropriate for ELLs, all while taking into consideration the requirements of college- and career-ready standards.

Notable Points:

- The report features criteria for materials to be used with English Language Learners. Criterion 6C reads: "Mentor texts across writing genres and registers are routinely used as vehicles for instruction and models for students, as they learn to determine the appropriate register for each writing task (e.g., formal, casual, content-specific)." (pg.26)

Key Source: Bunch, G. C., Kibler, A., & Pimentel, S. (2012). *Realizing opportunities for English learners in the Common Core English Language Arts and Disciplinary Literacy Standards.*

This paper offers research-based recommendations for how to help English Language Learners achieve the requirements of college- and career-ready standards in ELA. The recommendations focus on four areas, one of which is writing.

Notable Points:

- One of the recommendations is to "provide ELs with meaningful exposure to the types of texts they will be writing, guiding students through the linguistic and rhetorical patterns found in different genres" (p. 6).

5C. Provide language-based supports (e.g., linking phrases, sentence frames, word banks) to facilitate students' entry into, and continued development of, writing. (Note: These should not be mandated "fill in the blanks" exercises.)

Key Source: Baker, S., Lesaux, N., Jayanthi, M., Dimino, J., Proctor, C. P., Morris, J., Gersten, R., Haymond, K., Kieffer, M. J., Linan-Thompson, S., & Newman-Gonchar, R. (2014). *Teaching academic content and literacy to English learners in elementary and middle school* (NCEE 2014-4012). Washington, DC: National Center for Education Evaluation and Regional Assistance (NCEE), Institute of Education Sciences, U.S. Department of Education. Retrieved from the NCEE website: http://ies.ed.gov/ncee/wwc/publications_reviews.aspx

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Notable Points:

- In regard to supporting ELL students in developing writing skills, the panel recommends:
    - The use of language-based supports such as graphic organizers to support students at the start of writing assignments (e.g., a compare and contrast graphic organizer before a related writing prompt).
    - The use of sentence starters for text-based analytical writing to help students summarize and analyze material for the assignment.

5D. Provide positive substantive feedback that is specific, constructive, and narrowly tied to the lesson's or week's instructional objectives (i.e., do not assess spelling, grammar, and accuracy of understanding all in one piece of writing--that is an overwhelming amount of feedback).

Key Source: Baker, S., Lesaux, N., Jayanthi, M., Dimino, J., Proctor, C. P., Morris, J., Gersten, R., Haymond, K., Kieffer, M. J., Linan-Thompson, S., & Newman-Gonchar, R. (2014). *Teaching academic content and literacy to English learners in elementary and middle school* (NCEE 2014-4012). Washington, DC: National Center for Education Evaluation and Regional Assistance (NCEE), Institute of Education Sciences, U.S. Department of Education. Retrieved from the NCEE website: http://ies.ed.gov/ncee/wwc/publications_reviews.aspx

After reviewing many rigorous studies of instructional interventions for ELL students, a panel compiled four recommendations (and accompanying instructional strategies) that are supported by causal evidence as effective for supporting ELLs. The document is intended as practitioner guidance for educators teaching elementary and middle school ELLs.

Notable Points:

- In regard to teacher feedback on writing assignments for ELLs, the panel recommends:
    - Providing feedback tied to the lesson's or week's instructional objective, rather than on multiple objectives (e.g., if the focus of the lesson is on subject-predicate agreement, then do not also provide feedback on spelling and capitalization).
    - Assessing ELL students periodically using a set of pre-shared objectives to determine instructional focus needs.

5E. Focus explicit lessons on meaning-critical grammatical structures and text structure (e.g., transitions and linking phrases).

Key Source: Aguirre-Muños, Z., Park, J. E., Amabisca, A., & Boscardin, C. K. (2008). Developing teacher capacity for serving ELLs' writing instructional needs: A case for systematic functional linguistics. *Bilingual Research Journal, 31*, 295-322.

This study explains Systemic Functional Linguistics (SFL) Theory in the context of training teachers to use the features of the theory to support English Language Learners.

Notable Points:

- The authors describe academic writing in terms of the lexical and grammatical choices made to create ideational, interpersonal, and textual meanings and advocate for explicit instruction on these choices/features:
    - Field: how ideas (or content) are expressed through content words such as participants (noun groups), processes (verbal groups), and adverbial expressions.
    - Tenor: the way that the writer (or speaker) conveys to the reader (or listener) a stance toward the text being created. Such interpersonal meanings are rendered through modal verbs/adverbs, evaluation-laden lexical choices, and constructions such as "I think that…"
    - Mode: the way that language is delivered, rendering textual meanings.
- The authors argue that the SFL approach benefits academic language growth because it deconstructs linguistic structures, making academic language linguistic expectations explicit and discernable to students.

Key Source: Francis, D., Rivera, M., Lesaux, N., Kieffer, M., & Rivera, H. (2006). *Practical guidelines for the education of English language learners: Research-based recommendations for serving adolescent newcomer*s (Under cooperative agreement grant S283B050034 for U.S. Department of Education). Portsmouth, NH: RMC Research Corporation, Center on Instruction. Retrieved from: https://www2.ed.gov/about/inits/ed/lep-partnership/newcomers.pdf

These guidelines are based on a literature review of best practices in supporting adolescent newcomer ELL students.

Notable Points:

- In regard to writing instruction:
    - The report found that "explicit grammar instruction that is taught in isolation, outside of meaningful contexts—a fairly common practice in English-as-a-Second-Language classrooms—has not been shown to be effective and can actually detract from writing proficiency" (p. 19).
    - The authors argue that a more effective method than isolated grammar instruction is to encourage students to use grammatical elements within the context of writing to communicate meaning. For example: sentence combing—a method by which students are encouraged to use more complex syntax through combining two or more sentences—can be more effective.

Objective 6: Provide focused direct instruction to English Language Learners using a systematic approach to phonological awareness, phonics, and reading fluency, even for those learners who don't have oral proficiency in English.

Supporting Actions:

6A. Provide daily, targeted instruction to ELLs using a systematic scope and sequence for taught phonological awareness, phonics, and reading fluency skills for 30 to 50 minutes, depending on the need.

Key Source: Gersten, R., Baker, S.K., Shanahan, T., Linan-Thompson, S., Collins, P., & Scarcella, R. (2007). *Effective literacy and English language instruction for English learners in the elementary grades: A practice guide* (NCEE 2007-4011). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. Retrieved from https://ies.ed.gov/ncee/wwc/Docs/PracticeGuide/20074011.pdf

In this Institute of Education Sciences practice guide, the authors formulate specific and coherent evidence-based recommendations for use by educators. They outline actionable recommendations to improve outcomes for English Language Learners. Relevant recommendations include use of formative assessment, targeted small group intervention, and time for student practice (recommendations 1 and 2).

Notable Points:

- For students in kindergarten and grade 1, use early screening for phonological awareness, letter knowledge and letter-sound correspondence, and assessment of single word reading and phonics rules. For middle first grade and beyond, assess accurate and fluent reading of connected text. In grades 2 through 5, screen for oral reading fluency.
- Provide additional instructional support for students who demonstrate areas of need and continue to monitor progress.

- Provide intensive, small-group, explicit, direct reading instruction daily, starting in grade 1. These small groups should be made of students at the same reading skill level but can be a mix of both ELLs and native speakers. This should take place for 30 to 50 minutes depending on the degree of risk or weakness. For these students, explicit and direct instruction should be the primary means of instructional delivery. These groups should utilize an intervention program with explicit instruction on the five core reading elements (phonological awareness, phonics, reading fluency, vocabulary and comprehension) and multiple practice opportunities for students.
- Emphasize vocabulary instruction throughout all content areas. Teach essential selected words, connected to core content, in depth and explicitly. Instruct on the meaning and use of everyday words.
- Schedule about 90 minutes a week in which pairs of students at different English language proficiencies work together on academic tasks that practice and extend what has been taught.

6B. Utilize focused, intensive small group direct reading instruction in phonics, phonological awareness, and reading fluency in small homogeneous groups (made-up of ELLs and native speakers).

Key Source: Baker, S., Lesaux, N., Jayanthi, M., Dimino, J., Proctor, C. P., Morris, J., Gersten, R., Haymond, K., Kieffer, M. J., Linan-Thompson, S., & Newman-Gonchar, R. (2014). *Teaching academic content and literacy to English learners in elementary and middle school* (NCEE 2014-4012). Washington, DC: National Center for Education Evaluation and Regional Assistance (NCEE), Institute of Education Sciences, U.S. Department of Education. Retrieved from the NCEE website: http://ies.ed.gov/ncee/wwc/publications_reviews.aspx

After reviewing many rigorous studies of instructional interventions for ELL students, a panel compiled four recommendations (and accompanying instructional strategies) that are supported by causal evidence as effective for supporting ELLs. The document is intended as practitioner guidance for educators teaching elementary and middle school ELLs.

Notable Points:

- In regard to supporting ELL students, the panel recommended frequent use of small group instruction for the following reasons:
    - It allows students "the opportunity to listen and speak through critical conversations about text and content in collaborative settings" (p. 51).
    - It allows students to brainstorm and support each other in preparing for a writing activity they might otherwise struggle to prepare for alone.
    - It allows them to provide feedback and react to others' ideas.
- Using different types of grouping is recommended to serve various learning goals for ELLs:
    - Homogeneous groupings allow for targeted support of a students' identified needs that would otherwise not be possible in a whole-class setting.
    - Heterogeneous groupings allow students to benefit from hearing the ideas and oral expression of students at different proficiency levels.
- When groups are composed of English Language Learners, the study recommends providing brief, fast-paced additional comprehension and vocabulary instruction connected to the content being covered.
- For students who struggle with foundational skills such as phonemic awareness and decoding, use small-group time to bolster these skills. Couple foundational skills support with vocabulary development, listening, and reading comprehension.

6C. Use systematic assessment, weekly or biweekly, to monitor ELLS at high risk of reading problems.

Key Source: Gersten, R., Baker, S. K., Shanahan, T., Linan-Thompson, S., Collins, P., & Scarcella, R. (2007). *Effective literacy and English language instruction for English learners in the elementary grades: A practice guide* (NCEE 2007-4011). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. Retrieved from https://ies.ed.gov/ncee/wwc/Docs/PracticeGuide/20074011.pdf

In this Institute of Education Sciences practice guide, the authors formulate specific and coherent evidence-based recommendations for use by educators. They outline actionable recommendations to improve outcomes for English Language Learners. Relevant recommendations include use of formative assessment, targeted small group intervention, and time for student practice (recommendations 1 and 2).

Notable Points:

- For students in kindergarten and grade 1, use early screening for phonological awareness, letter knowledge and letter-sound correspondence, and assessment of single word reading and phonics rules. For middle first grade and beyond, assess accurate and fluent reading of connected text. In grades 2 through 5, screen for oral reading fluency.
- Provide additional instructional support for students who demonstrate areas of need and continue to monitor progress.
- Provide intensive, small-group, explicit, direct reading instruction daily, starting in grade 1. These small groups should be made of students at the same reading skill level but can be a mix of both ELLs and native speakers. This should take place for 30 to 50 minutes depending on the degree of risk or weakness. For these students, explicit and direct instruction should be the primary means of instructional delivery. These groups should utilize an intervention program with explicit instruction on the five core reading elements (phonological awareness, phonics, reading fluency, vocabulary and comprehension) and multiple practice opportunities for students.
- Emphasize vocabulary instruction throughout all content areas. Teach essential selected words, connected to core content, in depth and explicitly. Instruct on the meaning and use of everyday words.
- Schedule about 90 minutes a week in which pairs of students at different English language proficiencies work together on academic tasks that practice and extend what has been taught.

Math English Language Learner Objectives

In mathematics, the Objectives are grounded in two underlying concepts:

1. ELL students must be given access to grade-level appropriate, standards-aligned mathematics content. All adaptations and guidance must be in service of helping ELLs access mathematics content. Watered-down or extraneous activities not tied to the mathematics itself are not acceptable.
2. All routines and activities to support ELLs must have a mathematical purpose (i.e., they should enhance, not distract from, the mathematics learning).

Objective 1: Support the majority of mathematical language acquisition within the context of the mathematical learning. Limit explicit language instruction to the occasions when the necessary terminology is a prerequisite for engaging with the content.[7]

Supporting Actions

1A. Provide, and invite students to produce, multi-modal representations of terms and concepts, including: pictures, diagrams, presentations, written explanations, gestures, and non-examples.

Key Source: Council of the Great City Schools. (2016). *A framework for re-envisioning mathematics instruction for English language learners.*

This document seeks to define a new vision for mathematics instruction that addresses the learning needs of ELLs. Based on the belief that grade-level mathematics are for ALL students, the framework articulates a theory of action for allowing ELLs to participate fully in grade-level instruction, identifies instructional practices that allow ELLs to participate, and lays out criteria that should be present in instructional materials supportive of ELLs.

Notable Points:

Specifically related to the concepts of multi-modal representations, the framework says that:

- "Students' understanding deepens when they are given the opportunity to create and analyze diagrams, tables, and graphs to represent a problem concretely or pictorially, as well as verbally or in writing, and to make explicit connections between and among these various representations" (p. 14).
- Developing a classroom culture that frequently makes use of multi-modal communication and representations in teacher talk, problem annotations, written explanations, and classroom discourse support and advance students' understanding of mathematics.
- "It is important to keep in mind that 'multi-modal' and 'multiple representations' mean more than just listening, speaking, reading, and writing. For example, teachers' use of visual representations—such as gestures, drawings, mathematical symbols, models, and diagrams—can support mathematical thinking for ELLs and other students with language-related needs" (p. 14).

[7] Note: Not all strategies must be addressed in every set of adaptations.

1B. Acknowledge words with multiple meanings (polysemy) and support students in identifying which is the mathematical definition (e.g. round, left, product).

Key Source: Key Source: Driscoll, M., Nikula, J., & DePiper, J. N. (2016). *Mathematical thinking and communication access for English learners.* Portsmouth, NH: Heinemann.

Created out of a decade of work with mathematics teachers, this book explores the role of language in learning mathematics.

Notable Points:

- In discussing the development of academic language in context, the authors clarify the various components of mathematical language within classroom discourse.
- The words and phrases in mathematics take on a variety of forms: "words referring to thinking and communicating (e.g., analysis, deny); words common across subjects but with different meanings depending on subject (e.g., base, element); and words that have common meanings that differ from discipline-specific meanings (e.g., prove, property)" (Driscoll, Heck, and Malzahn, 2012, p. 170).
- They introduce a language routine entitled Clarifying Vocabulary that requires teachers to anticipate which terms or phrases in a problem need clarification and which do not, and when and how during the lesson specific terms or phrases should be clarified. Identifying when clarity and formal definitions are necessary within a lesson aids students in acquiring new language related to the problem at hand while providing them freedom to use imprecise language as they develop mathematical understanding.
- "Defining terms should not replace students' involvement in the mathematical work of the lesson but instead should help students understand formal or informal definitions of words to strengthen both students' communication and their understanding of the task."

1C. Listen for students' articulation of concepts and do not penalize students for using imprecise language. Build on students' contributions through revoicing imprecise student language into precise mathematical language.

Key Source: Khisty, L., & Chval, K. (2002). *Pedagogic discourse and equity in mathematics: When teachers' talk matters.*

This paper analyzes the pedagogy of a fifth-grade math teacher and her "rich and powerful use of talk" within the classroom to support students develop language and mathematical meaning.

Notable Points:

- "Ms. Martinez frequently used mathematical words in her talk and students began using these same words in written and oral discourse." She helps students construct meaning of mathematical language in the context of a problem. Through mathematical discourse, the teacher then builds off of imprecise student language to more formal mathematical language.
- The teacher generalizes student thinking for the benefit of the class, extends that thinking and connects it to meaning of mathematical vocabulary from the problem. She is "teaching the academic second language through content."
- "Ms. Martinez guides her entire class in thinking via her questions and when she provides oral examples of mathematical discourse – and in general, academic talk in their second language….She has made speaking mathematically a critical part of learning mathematics."

Key Source: Moschkovich, J. (2012). *Mathematics, the Common Core, and language: Recommendations for mathematics instruction for ELs aligned with the Common Core*. Retrieved from http://ell.stanford.edu/sites/default/files/pdf/academic-papers/02-JMoschkovich%20Math%20FINAL_bound%20with%20appendix.pdf

This paper outlines recommendation for designing college- and career-ready math instruction for ELLs. The recommendations are not intended to be "quick-fixes" but rather principles to help educators, curriculum developers, and teacher trainers to develop their own principles based on a strong foundation of research.

Notable Points:

- The first recommendation, aimed at connecting mathematics content to language, is to "Focus on students' mathematical reasoning, not accuracy, in using language." Moschkovich explains that when engaging in the mathematical practices, students are likely to use imperfect English. Teachers should not be sidetracked by correcting language but instead focus on the meaning of students' contributions and their ability to exhibit the mathematical practices.
- Eventually, after students have exhibited proficiency in the mathematical practices, teachers can move students toward accuracy in language.
- It can be difficult to understand what errors in students' contributions are due to language development and which are due to lack of conceptual understanding, but teachers can employ strategies such as asking for clarification, re-phrasing student statements, accepting and building on what students say, and probing what students mean. It is important, when probing or clarifying, to focus on the content, not directly on vocabulary.

1D. Provide opportunities for students to practice and refine their use of mathematical language through using the Four Skills approach: Reading, Writing, Speaking, and Listening (e.g., in modalities such as small group and class discussion, written work, classroom activities).

Key Source: Zwiers, J., Dieckmann, J., Rutherford-Quach, S., Daro, V., Skarin, R., Weiss, S., & Malamut, J. (2017) *Principles for the design of mathematics curricula: Promoting language and content Development*. Retrieved from http://ell.stanford.edu/sites/default/files/u6232/ULSCALE_ToA_Principles_MLRs__Final_v2.0_030217.pdf

Developed by faculty from Stanford University's Graduate School of Education, this report offers guidance to mathematics teachers as they support students' "language development processes in the context of mathematical sense making." Four design principles (support sense making, optimize output, cultivate conversation, maximize linguistic and cognitive meta-awareness) are the framework put forth to guide curriculum development and planning, and execution of instruction. From these design principles a series of eight language routines were developed for teachers to use in the classroom.

Notable Points:

- Mathematical Language Routine 1: Stronger and Clearer Each Time
  - In this routine, "students think or write individually about a response, use a structured pairing strategy to have multiple opportunities to refine and clarify the response through conversation, and then finally revise their original written response. Throughout this process, students should be pressed for details, and encouraged to press each other for details. Subsequent drafts should show evidence of incorporating or addressing new ideas or language. They should also show evidence of refinement in precision, communication, expression, examples, and/or reasoning about mathematical concepts." (pg. 9)
- Mathematical Language Routine 4: Information Gap
  - In this routine, "teachers facilitate meaningful interactions by giving partners or team members different pieces of necessary information that must be used together to solve a problem or play a game. With an information gap, students need to orally (and/or visually) share their ideas and

information in order to bridge the gap and accomplish something that they could not have done alone. Teachers should model how to ask for and share information, clarification, justification, and elaboration. This routine cultivates conversation." (pg. 13)

Key Source: Kelemanik, G., Lucenta, A., & Creighton, S. (2016). *Routines for reasoning.* Portsmouth, NH: Heinemann.

This book outlines practical mathematical routines teachers and students can do repeatedly "until the steps to follow, thinking skills to employ, and questions to ask become automatic — enabling *all* students to engage more fully in learning opportunities while building crucial mathematical thinking habits."

Notable Points:

- The authors highlight *providing a language-rich learning environment* as one of five guiding principles of instruction that promote the Standards for Mathematical Practices, with a particular focus on the needs of ELLs and students with learning disabilities.
- "Providing opportunities through instructional techniques such as think-pair-share and turn-and-talks is not only critical to student sense making, it is essential to developing two of the math practices – *construct viable arguments and critique the reasoning of others* and *attend to precision."*
- The authors introduce four instructional routines that promote mathematical thinking and reasoning through a repetitive structure. All routines contain core elements, including:
    - individual think time
    - partner work
    - full-group discussion of ideas

Key Source: Chval, K. B., & Chávez, O. (2011). Designing math lessons for English language learners. *Mathematics Teaching in the Middle School*, *17*(5), 261-265. Retrieved from http://www.jstor.org/stable/10.5951/mathteacmiddscho.17.5.0261

The authors of this paper provide recommendations for mathematics teachers to enhance and adapt their pedagogy and curricular materials for English Language Learners through a four-part instructional practice routine.

Notable Points:

- The relevant step of this four-part process is: "establish, facilitate, and maintain productive classroom interactions." (pg. 264)
- One recommendation is for teachers to look for opportunities for ELLs to share their work during whole-class discussions, for example, by displaying tasks on the SMART Board while students share their solution strategies. To implement this specific strategy, the teachers needed to change their beliefs that such experiences would make ELLs feel uncomfortable.
- Teachers must also change their expectations and adjust their practice to take into account highlighted research-based strategies. For example, teachers should carefully select partnerships, recognizing that some students who dominate partnerships would not help ELLs gain confidence in group activities.

Objective 2: Provide supports to allow all English Language Learners access to the mathematical concepts being introduced.[8]

2A. Build in opportunities for students to demonstrate understanding through activities tailored to student needs

1. Check for understanding by encouraging students to rephrase or demonstrate (via acting out or drawing) their understanding of the problem.
2. Encourage use of pictures/graphics (e.g. graphs, tables, formulas) as a way to make sense of a task versus only as a method for getting an answer.
3. Build in opportunities for whole class, small group, and paired discussion for the purpose of developing mathematical concepts and language.
4. Integrate structures and frames within student-facing work to help them demonstrate their mathematical work and thinking, while being careful to avoid over-scaffolding or over-proceduralization of tasks.

Key Source: Chval, K. B., & Chávez, O. (2011). Designing math lessons for English language learners. *Mathematics Teaching in the Middle School, 17*(5), 261-265. Retrieved from http://www.jstor.org/stable/10.5951/mathteacmiddscho.17.5.0261

The authors of this paper provide recommendations for mathematics teachers to enhance and adapt their pedagogy and curricular materials for English Language Learners through a four-part instructional practice routine.

Notable Points:

- The steps in the process are:
  - Support the development of mathematics.
    - Use gestures, drawings, or students' native language to make meaning of the mathematics.
    - Develop language skills and vocabulary in the context of mathematical learning.
  - Support the development of language.
    - Do not reduce the rigor or complexity of the content.
    - Create a language-rich classroom, writing essential terminology on the board, and having students discuss and revise their work.
    - Do not avoid using math vocabulary when discussing problems; build it over time.
    - Discuss multiple meanings of words, including the mathematical definition.
  - Enhance mathematical tasks.
    - Use visual supports to help build contextual meaning.
    - Create problem sets that have a single context to allow the focus to be on the mathematics, not understanding varied contexts and vocabulary.
    - Build and enhance vocabulary within the context of the mathematics.
  - Establish, facilitate, and maintain productive classroom interactions.
    - Strategically select groups and partnerships to allow ELLS to gain confidence and engage in group work.
    - Create opportunities for ELLs to share their work during whole-class discussions.

Key Source: Brooks, F. B., & Donato, R. (1994). Vygotskyan approaches to understanding foreign language learner discourse during communicative tasks. *Hispana, 77*(2), 262-274.

In this study of third-year high school students, student pairs sat opposite from each other with a wooden barrier between them & were directed to work together in a second language on an information-gap, jigsaw

[8] Note: Not all strategies must be addressed in a set of adaptations.

task to find and draw in what the other had on his or her part of a diagram that was both similar to and different from the other's diagram. When finished, the partners (theoretically) will each have drawn a representation of the same diagram.

Notable Points

- When individuals are faced with a task, they sometimes need to speak in their own language to externalize the goal or end result of their activity. Even though teachers (and researchers) often provide task goals, there are moments where confusion still exists.
    - An example from the data shows a participant who—after being given instructions—felt compelled to interrupt his own talk and use his first language to reacquaint himself with the purpose of the activity. He took control of the activity to reorient himself to the task goal.
- The authors agree that use of the first language during an assignment intended to be done in a second language is a natural and necessary part of the process, and actually supports use of the second language in the long-term.
- Allowing use of the second language increases student engagement and gives students control over the communicative interactions—thus allowing them to engage more meaningfully with the tasks rather than simply using a second language.

2B. Highlight the tier two words that cut across all subjects that may be challenging for ELLs (describe, illustrate, etc.). Prompt teachers with strategies to help students practice tier two vocabulary in an authentic way within the math classroom.

1. Use synonyms when introducing new tier two words.
2. Model the action described by a tier two word before asking students to engage in it (e.g. model what it means to "interpret" data).

Key Source: Francis, D., Rivera, M., Lesaux, N., Kieffer, M., & Rivera, H. (2006). *Practical guidelines for the education of English language learners: Research-based recommendations for serving adolescent newcomers* (Under cooperative agreement grant S283B050034 for U.S. Department of Education). Portsmouth, NH: RMC Research Corporation, Center on Instruction. Retrieved from https://www2.ed.gov/about/inits/ed/lep-partnership/newcomers.pdf

In this literature review, the authors outline several evidence-based practices for helping ELLs develop the academic language skills they need in order to access content across subject areas

Notable Points:

- Content-area instruction must include support for the language and literacy demands of material. A content-based literacy approach incorporates explicit instruction in language and literacy, addresses the needs of all adolescent learners, and can draw on the cognitive skills and knowledge of many newcomers.
- Content-based support for language acquisition features several components:
    - Pre-identification of potential sources of students' comprehensions difficulties.
    - Explicit instruction on language and literacy skills within the context of meaningful content-specific work.
    - Instruction focused on the demands facing students in their grade-level work, not remediation of "basic" reading skills.
    - Planning that includes pre-identification of the content knowledge and concepts students need to learn in a particular lesson and then identification of potential challenges.
    - Development of two goals for each lesson: a content knowledge goal and a language/literacy objective.

2C. Write essential ideas/concepts on the board as a reference for students.

Key Source: Chval, K. B., & Chávez, O. (2011). Designing math lessons for English language learners. *Mathematics Teaching in the Middle School*, *17*(5), 261-265. Retrieved from http://www.jstor.org/stable/10.5951/mathteacmiddscho.17.5.0261

The authors of this paper provide recommendations for mathematics teachers to enhance and adapt their pedagogy and curricular materials for English Language Learners through a four-part instructional practice routine.

Notable Points:

- The authors develop a four-part process for designing math lessons for ELLs. Based on experience working with teachers, the array of supports can seem overwhelming, so these inter-connected steps are intended to streamline support. The authors cite seven research-backed strategies to support the different stages of the process. The sixth strategy is "Write essential ideas, concepts, representations, and words on the board without erasing so that students can refer to them throughout the lesson."

Fig. 1 These 7 research-based strategies are key to supporting ELLs' mathematical proficiency.

1. Connect mathematics with students' life experiences and existing knowledge (Barwell 2003; Secada and De La Cruz 1996).
2. Create classroom environments that are rich in language and mathematics content (Anstrom 1997; Khisty and Chval 2002).
3. Emphasize meaning and the multiple meanings of words. Students may need to communicate meaning by using gestures, drawings, or their first language while they develop command of the English language and mathematics (Moll 1988, 1989; Morales, Khisty, and Chval 2003; Moschkovich 2002).
4. Use visual supports such as concrete objects, videos, illustrations, and gestures in classroom conversations (Moschkovich 2002; Raborn 1995).
5. Connect language with mathematical representations (e.g., pictures, tables, graphs, equations) (Khisty and Chval 2002).
6. Write essential ideas, concepts, representations, and words on the board without erasing so that students can refer to them throughout the lesson (Stigler, Fernandez, and Yoshida 1996).
7. Discuss examples of students' mathematical writing and provide opportunities for students to revise their writing (Chval and Khisty 2009).

2D. Point out metacognitive strategies, such as making connections to other concepts and prior learning.

Key Source: Zwiers, J., Dieckmann, J., Rutherford-Quach, S., Daro, V., Skarin, R., Weiss, S., & Malamut, J. (2017) *Principles for the design of mathematics curricula: Promoting language and content development*. Retrieved from http://ell.stanford.edu/sites/default/files/u6232/ULSCALE_ToA_Principles_MLRs__Final_v2.0_030217.pdf

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conversation, maximize linguistic and cognitive meta-awareness) are the framework put forth to guide curriculum development and planning, and execution of instruction. From these design principles a series of eight language routines were developed for teachers to use in the classroom.

Notable Points:

- Principle 4 is: Maximize Meta-Awareness: Strengthen the meta-connections and distinctions between mathematical ideas, reasoning, and language.
    - "Meta-awareness is consciously thinking about one's own thought processes or language use." (pg. 8)
    - Meta-awareness is developed through classroom activities or discussion about how students can improve communication and reasoning about mathematical concepts.
    - An example of a meta-awareness activity is to ask students to explain their strategies in solving a multi-step problem since students must think about how to convey their thought processes.
    - Metacognitive questions (e.g., How does yesterday's method connect with the method we are learning today?) help students reflect on their own and others' learning.
    - Students can also compare the language they use to describe their work to that of their peers; this is known as meta-linguistic work.
- The Mathematical Language Routines are a "structured but adaptable format for amplifying, assessing, and developing students' language," (pg. 9) and they support students in learning mathematical content, practices, and language. Each MLR is accompanied by example scenarios derived from educators and researchers to support classroom implementation. There are eight MLRs in total, two of which include:
    - Mathematical Language Routine 2: Collect and Display – "The teacher listens for, and scribes, the language students use during partner, small group, or whole class discussions using written words, diagrams and pictures. This collected output can be organized, revoiced, or explicitly connected to other language in a display that all students can refer to, build on, or make connections with during future discussion or writing…This routine provides feedback for students in a way that increases sense-making while simultaneously supporting meta-awareness of language." (pg. 11)
        - Example 1 – Gather and Show Student Discourse (Dieckmann, 2017) – "During pair/group work, circulate and listen to student talk during pair work or group work, and jot notes about common or important words and phrases, together with helpful sketches or diagrams. Scribe students' words and sketches on visual display to refer back to during whole class discussions throughout the unit. Refer back to these words, phrases, and diagrams by asking students to explain how they are useful, asking students to clarify their meaning, and asking students to reflect on which words and visuals help to communicate ideas more precisely." (pg. 11)
    - Mathematical Language Routine 7: Compare and Connect – "Students should be prompted to reflect on and linguistically respond to these comparisons (e.g., exploring why or when one might do/say something a certain way, identifying and explaining correspondences between different mathematical representations or methods, wondering how an idea compares or connects to other ideas and/or language.) Teachers should model thinking out loud about these questions. This routine supports meta-cognitive and meta-linguistic awareness, and also supports mathematical conversation." (pg. 16)
        - Example 2 – Which One Doesn't Belong? "Pairs of students are provided with sets of four numbers, equations, expressions, graphs, or geometric figures. They must decide together how to group the sets so that three of the items fit within a category they have created and one does not. Both partners should be prepared to explain to a different group how they agreed on a category and justify which item did not fit." (pg. 17)

Key Source: Kelemanik, G., Lucenta, A., & Creighton, S. (2016). *Routines for reasoning.* Portsmouth, NH: Heinemann.

This book outlines practical mathematical routines teachers and students can do repeatedly "until the steps to follow, thinking skills to employ, and questions to ask become automatic — enabling *all* students to engage more fully in learning opportunities while building crucial mathematical thinking habits."

Notable Points:

- The authors introduce four instructional routines that promote mathematical thinking and reasoning through a repetitive structure, including Connecting Representations**.** This routine is used to support students in the metacognitive work of identifying and connecting equivalent representations with a focus on mathematical structure through a series of consistent steps (e.g., launch routine, interpret and connect representations, create representations, discuss representations, and reflect on your thinking).
    - This routine is designed to help students see mathematical connections between representations to support learning.
    - The sentence starters and sentence frames that are embedded in this routine help students communicate structural elements of representations.
    - "The same language that supports the development of structural thinking poses challenges for ELLs. However, throughout this routine, whenever language is spoken, it is also supported with gestures, annotation, and/or recording."

2E. Provide students with support in negotiating written word problems through multiple reads and multi-modal interactions with the problem.

Key Source: Driscoll, M., Nikula, J., & DePiper, J. N. (2016). Mathematical thinking and communication access for English learners. Portsmouth, NH: Heinemann.

Created out of a decade of work with mathematics teachers, this book explores the role of language in learning mathematics. The authors introduce four principles for designing instruction: challenging tasks, multimodal representations, development of mathematical communication, and repeated structure practice are meant to serve as guidance for teachers to create access to mathematics for English Language Learners.

Notable Points:

- "Multimodal mathematical communication refers to the various ways in which students convey their mathematical thinking, including language, gestures, drawings, or the use of tools (e.g., physical models, manipulatives, and technology)."
- Acting Out and Realia are two language routines described in the book wherein students and teachers can use physical objects or simply pretend as they act out a mathematical problem. Seeing objects and actions as students listen to the vocabulary of the problem in context supports meaning making for English Language Learners.

Key Source: Kelemanik, G., Lucenta, A., & Creighton, S. (2016). *Routines for reasoning.* Portsmouth, NH: Heinemann.

This book outlines practical mathematical routines teachers and students can do repeatedly "until the steps to follow, thinking skills to employ, and questions to ask become automatic — enabling *all* students to engage more fully in learning opportunities while building crucial mathematical thinking habits."

Notable Points:

- The authors introduce four instructional routines that promote mathematical thinking and reasoning through a repetitive structure, including:
    - Three Reads - This routine is used to support students to make sense of word problems and is typically used when introducing a mathematics problem to a class. Between each read there is a time for partner and full group share-out.
        - The first read is to get a sense of what the problems is about. Students should not focus on the quantities or relationships between them during this reading.
        - The second read is to figure out the question. The problem is read again in its entirety, looking specifically for information that answers the question, "What am I trying to find out?"
        - The third read is to identify important information that is needed to solve the problem.

Objective 3: Write tasks with care to allow English Language Learners to engage with the mathematical concepts.

3A. Avoid unnecessarily complex language that impedes students from accessing the mathematics of the lesson and consider:

1. Using active instead of passive voice.
2. Using short, simple sentences -- splitting apart complex sentences or ones that have conditional clauses into two sentences.
3. Including terms that point directly to what is being asked for in the mathematics (e.g. "what fraction of the pasta is left?" if the answer should be a fraction.
4. Using present tense and simple past tense verbs instead of more complex tenses.

Key Source: Young, J. W., Pitoniak, M. J., King, T. C., & Ayad, E. (2012). *Smarter Balanced Assessment Consortium: Guidelines for accessibility for English language learners*. Retrieved from https://portal.smarterbalanced.org/library/en/guidelines-for-accessibility-for-english-language-learners.pdf

This presentation lays out best practices for allowing ELLs to access large-scale, grade-level assessments.

Notable Points:

- The authors make the following recommendations within the presentation:
    - Design test directions to maximize clarity and to minimize the potential for confusion.
    - Use vocabulary in test items that is widely accessible to all students and avoid unfamiliar vocabulary that is not directly related to the construct (August, Carlo, & Snow, 2005; Bailey, Huang, Shin, Farnsworth, & Butler, 2007).
    - Avoid the use of syntax or vocabulary that is above the test's target grade level (Borgioli, 2008). The test item should be written at a vocabulary level no higher than the target grade level, and preferably at a slightly lower grade level, to ensure that all students understand the task presented (Young, 2008).
    - Keep sentence structures as simple as possible while expressing the intended meaning. In general, ELLs will find a series of simpler, shorter sentences to be more accessible than longer, more complex sentences (Pitoniak, Young, Martiniello, King, Buteux, & Ginsburgh, 2009).
    - Consider the impact of cognates (words with a common etymological origin) when developing test items. More importantly, be particularly aware of false cognates (or more precisely, false friends), which are word pairs or phrases that appear to have the same meaning in two or more languages, but in fact, do not. Spanish and English share literally thousands of cognates, and because the large majority of ELLs speak Spanish as their first language (nationally, more than

75%), the presence of cognates can inadvertently confuse students and alter the skills being assessed by a test item. Examples of false cognates include: billion (the correct Spanish word is *mil millones*; not billón, which means trillion); deception (*engaño*; not decepción, which means disappointment); large (*grande*; not largo, which means long); library (*biblioteca*; not librería, which means bookstore).
    - Do not use cultural references or idiomatic expressions (such as "being on the ball") that are not equally familiar to all students (Bernhardt, 2005).
    - Avoid sentence structures that may be confusing or difficult to follow, such as the use of passive voice or sentences with multiple clauses (Abedi & Lord, 2001; Forster & Olbrei, 1973; Schachter, 1983).
    - Do not use syntax that may be confusing or ambiguous, such as using negation or double negatives in constructing test items (Abedi, 2006; Cummins, Kintsch, Reusser, & Weimer, 1988).
    - Minimize the use of low-frequency, long, or morphologically complex words and long sentences (Abedi, 2006; Abedi, Lord & Plummer, 1995).

3B. Allow for multi-modal representations

Key Source: Council of the Great City Schools. (2016). *A framework for re-envisioning mathematics instruction for English language learners*.

This framework lays out research-based criteria that should be present in instructional materials supportive of ELLs.

Notable Points:

- Criteria related to multi-modal representations include:
    - 1.8 - Materials reference and require students to make connections between linguistic and non-linguistic representations. This includes using a student's primary language, mathematical symbols, and using a variety of representations such as pictures, diagrams, drawings, graphs, tables, etc.
    - 2.5 - Materials strategically use a variety of representations for students to make meaning of procedural skills as they engage in repeated practice.
    - 3.6 - Materials facilitate students making sense of quantities expressed in different representations for solving problems.
    - 3.7 - Materials reference and require students to make connections between linguistic and non-linguistic representations.
    - 4.5 - Materials highlight opportunities for students to make connections between representations, generate and discuss multiple representations of mathematical concepts or procedures, communicate their thinking about multiple representations, and justify their reasoning while using multiple representations.
    - 5.7 - Materials prompt teachers to prepare for a lesson by considering ahead of time how students might use multiple representations to describe, analyze, critique mathematical reasoning, and correct errors in problem solving.
    - 5.8 - Materials encourage students to relate multiple representations to academic language by requiring them to use multiple approaches and mathematical representations in solving problems and describing their reasoning.
    - 6.8 - Materials provide alternative ways to acquire new information, share mathematical reasoning, and participate in mathematical practices such as listening, reading, speaking, and writing in addition to engaging students in multiple modes of input (e.g., visual, kinesthetic).
    - 6.9 - Materials use multi-modal representations to support development of academic language and mathematical concepts, and materials model for students how to use the various representations to communicate their knowledge.

- 6.10 - Materials require that students use multiple representations (talk, text, drawings, diagrams, math symbols, graphs, tables, etc.) as an intermediate step between the text (for example, a word problem or textbook passage) and the symbolic (math symbols such as numbers, operations, or variables) phases of solving a mathematical task.

3C. Elicit evidence of thinking both verbally and in written form (e.g., explain your thinking, draw a picture to illustrate your solution).

Key Source: Moschovich, J. (2012). *Mathematics, the Common Core, and language: Recommendations for mathematics instruction for ELs aligned with the Common Core*. University of California, Santa Cruz. Retrieved from http://ell.stanford.edu/sites/default/files/pdf/academic-papers/02-JMoschkovich%20Math%20FINAL_bound%20with%20appendix.pdf

This paper outlines recommendation for designing college- and career-ready math instruction for ELLs. The recommendations are not intended to be "quick-fixes" but rather principles to help educators, curriculum developers, and teacher trainers to develop their own principles based on a strong foundation of research.

Notable Points:

- Recommendation three is: Recognize and support students to engage with the complexity of language in math classrooms.
  - Language in mathematics classrooms should involve multiple modes (oral, written, receptive, expressive).
  - Language needs to go beyond talking and consider the interaction of: natural language, mathematics symbol displays, and visual displays.
- Mathematical Language Routine 1, Stronger and Clearer Each Time, provides a "structured and interactive opportunity for students to revise and refine both their ideas and their verbal and written output" (Zwiers, 2014).
- This routine provides a purpose for student conversation as well as fortifies output. The main idea is to have students think or write individually about a response, use a structured pairing strategy to have multiple opportunities to refine and clarify the response through conversation, and then finally revise their original written response.
- Throughout this process, students should be pressed for details, and encouraged to press each other for details….They should also show evidence of refinement in precision, communication, expression, examples, and/or reasoning about mathematical concepts.
  - Example 2 – Convince Yourself, a Friend, a Skeptic: "Students create three iterations of a mathematical argument or justification for three different audiences.
    1. For the first draft, students explain or justify their argument in whatever way initially makes sense to them.
    2. In the second draft, students are encouraged to explain WHAT they know and HOW they know it is true. Their explanations should include words, pictures, and numbers. They trade their written arguments with a peer who acts as a 'friend' giving feedback on these components (WHAT and HOW).
    3. In the third draft, students are encouraged to explain WHY what they know is true by supporting their claims with evidence. Their explanations should include words, pictures, numbers, and examples. They should include examples that look like they might not be true but actually are. They should anticipate and address counter-arguments. They trade their written arguments with a peer who acts as a 'skeptic' giving feedback on these components (WHY, examples, counter-arguments)."

Key Source: Council of the Great City Schools. (2016). *A framework for re-envisioning mathematics instruction for English language learners*.

This document seeks to define a new vision for mathematics instruction that addresses the learning needs of ELLs. Based on the belief that grade-level mathematics are for ALL students, the framework articulates a theory of action for allowing ELLs to participate fully in grade-level instruction, identifies instructional practices that allow ELLs to participate, and lays out criteria that should be present in instructional materials supportive of ELLs.

Notable Points:

- Criteria related to the speaking and writing about mathematics include:
    - 4.5 - Materials highlight opportunities for students to make connections between representations, generate and discuss multiple representations of mathematical concepts or procedures, communicate their thinking about multiple representations, and justify their reasoning while using multiple representations.
    - 4.6 - Materials and assignments provide abundant and diverse opportunities for speaking, listening, reading, and writing, encouraging students to take risks, construct meaning, and seek reinterpretations of knowledge.
    - 4.8 - Materials afford students the opportunity to actively use mathematical language to master the major work of the grade, focusing on students' mathematical reasoning, not on accuracy of language.

Mathematical Routines

As in other subjects, math students must be able to read, write, listen, speak, and discuss the subject at hand. Often, these multimodal ways of learning and using math skills are given too little attention in curricular materials, and teachers may want to supplement with classroom activities that provide opportunities for students to use language to discuss the math content they're learning.

The routines below are designed to support a variety of language-focused skill growth: from reinforcing mathematical terminology to scaffolding conversations to providing opportunities for students to deepen their conceptual understanding by describing their work.

These routines, done regularly, can benefit *all* students, though they are particularly supportive of English Language Learners or those struggling with the linguistic components of math. The routines below are from the Understanding Language/Stanford Center for Assessment, Learning, and Equity's Principles for the Design of Mathematics Curricula: Promoting Language and Content Development and the website Fostering Math Practices. The descriptions below come directly from these sources and more detailed descriptions, step-by-step guidance, examples, and applicable classroom handouts can be found on these websites.

Mathematical Language Routines

A 'math language routine' refers to a structured but adaptable format for amplifying, assessing, and developing students' language. More information and examples of each of these routines can be found here.

MATHEMATICAL LANGUAGE ROUTINE 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).

This routine provides a purpose for student conversation as well as fortifies output. The main idea is to have students think or write individually about a response, use a structured pairing strategy to have multiple opportunities to refine and clarify the response through conversation, and then finally revise their original written response. Throughout this process, students should be pressed for details, and encouraged to press each other for details. Subsequent drafts should show evidence of incorporating or addressing new ideas or language. They should also show evidence of refinement in precision, communication, expression, examples, and/or reasoning about mathematical concepts.

MATHEMATICAL LANGUAGE ROUTINE 2: COLLECT AND DISPLAY

Purpose: To capture students' oral words and phrases into a stable, collective reference.

The intent of this routine is to stabilize the fleeting language that students use in order for their own output to be used as a reference in developing their mathematical language. The teacher listens for, and scribes, the language students use during partner, small group, or whole class discussions using written words, diagrams and pictures. This collected output can be organized, revoiced, or explicitly connected to other language in a display that all students can

refer to, build on, or make connections with during future discussion or writing. Throughout the course of a unit, teachers can reference the displayed language as a model, update and revise the display as student language changes, and make bridges between student language and new disciplinary language. This routine provides feedback for students in a way that increases sense-making while simultaneously supporting metaawareness of language.

MATHEMATICAL LANGUAGE ROUTINE 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.

The intent is to prompt student reflection with an incorrect, incomplete, or ambiguous written argument or explanation, and for students to improve upon the written work by correcting errors and clarifying meaning. Teachers can model how to effectively and respectfully critique the work of others with meta-think-alouds and press for details when necessary. This routine fortifies output and engages students in metaawareness.

MATHEMATICAL LANGUAGE ROUTINE 4: INFORMATION GAP

Purpose: To create a need for students to communicate (Gibbons, 2002).

This routine allows teachers to facilitate meaningful interactions by giving partners or team members different pieces of necessary information that must be used together to solve a problem or play a game. With an information gap, students need to orally (and/or visually) share their ideas and information in order to bridge the gap and accomplish something that they could not have done alone. Teachers should model how to ask for and share information, clarification, justification, and elaboration. This routine cultivates conversation.

MATHEMATICAL LANGUAGE ROUTINE 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 situations.

Through this routine, students are able to use conversation skills to generate, choose (argue for the best one), and improve questions, problems, and situations as well as develop meta-awareness of the language used in mathematical questions and problems. Teachers should push for clarity and revoice oral responses as necessary.

MATHEMATICAL LANGUAGE ROUTINE 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).

This routine supports reading comprehension, sense-making, and meta-awareness of mathematical language. It also supports negotiating information in a text with a partner in mathematical conversation.

MATHEMATICAL LANGUAGE ROUTINE 7: COMPARE AND CONNECT

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

Students should be prompted to reflect on and linguistically respond to these comparisons (e.g., exploring why or when one might do/say something a certain way, identifying and explaining correspondences between different mathematical representations or methods, wondering how an idea compares or connects to other ideas and/or language.) Teachers should model thinking out loud about these questions. This routine supports meta-cognitive and meta-linguistic awareness, and also supports mathematical conversation.

MATHEMATICAL LANGUAGE ROUTINE 8: DISCUSSION SUPPORTS

Purpose: To support rich and inclusive discussions about mathematical ideas, representations, contexts, and strategies (Chapin, O'Connor, & Anderson, 2009).

The examples provided can be combined and used together with any of the other routines. They include multi-modal strategies for helping students make sense of complex language, ideas, and classroom communication. The examples can be used to invite and incentivize more student participation, conversation, and meta-awareness of language. Eventually, as teachers continue to model, students should begin using these strategies themselves to prompt each other to engage more deeply in discussions.

Instructional Routines

Instructional Routines are specific and repeatable classroom structures that enable all students to engage more fully in learning opportunities that develop their mathematical thinking and reasoning. More information on each of these routines can be found here.

CONTEMPLATE THEN CALCULATE

Contemplate then Calculate is an instructional routine designed to shift attention away from mindless calculations and toward necessary structural interpretations of mathematics. This routine fosters structural thinking, MP 7. Additional resources can be downloaded free-of-cost, here. An example of this routine, applied to a Student Achievement Partners' math task, can be found here:

- Looking For and Making Use of Structure – Quadratic Equations 1 A-REI.B.4

CAPTURING QUANTITIES

Capturing Quantities is an instructional routine designed to focus students' attention on important quantities and relationships in problem situations. The goal of the routine is to develop students' ability to reason abstractly and quantitatively, MP2. Additional resources can be downloaded free-of-cost, here. Examples of this routine, applied to Student Achievement Partners' math tasks, can be found here:

- Banana Pudding 5.NF.B.7

- Sharing Chocolate 5.NF.A, 5.NF.B.3, and 4.NF.B.3d

CONNECTING REPRESENTATIONS

Connecting Representations is an instructional routine that positions students to think structurally as they connect two representations by articulating the underlying mathematics. An essential goal of this routine is expanding students' repertoire of structural noticings, MP7. Additional resources can be downloaded free-of-cost, here. Examples of this routine, applied to Student Achievement Partners' math tasks, can be found here:

- Delivering the Mail 8.F.B.4
- Profit of a Company A-SSE.B.3

RECOGNIZING REPETITION

Recognizing Repetition is an instructional routine that supports the difficult road to generalizing problem situations. Students enlist multiple modalities while they attend to the repetition in their counting, calculating, and constructing processes. In doing so, they leverage their repeated reasoning to make abstract generalizations, MP8. Additional resources can be downloaded free-of-cost, here.

THE 3 READS

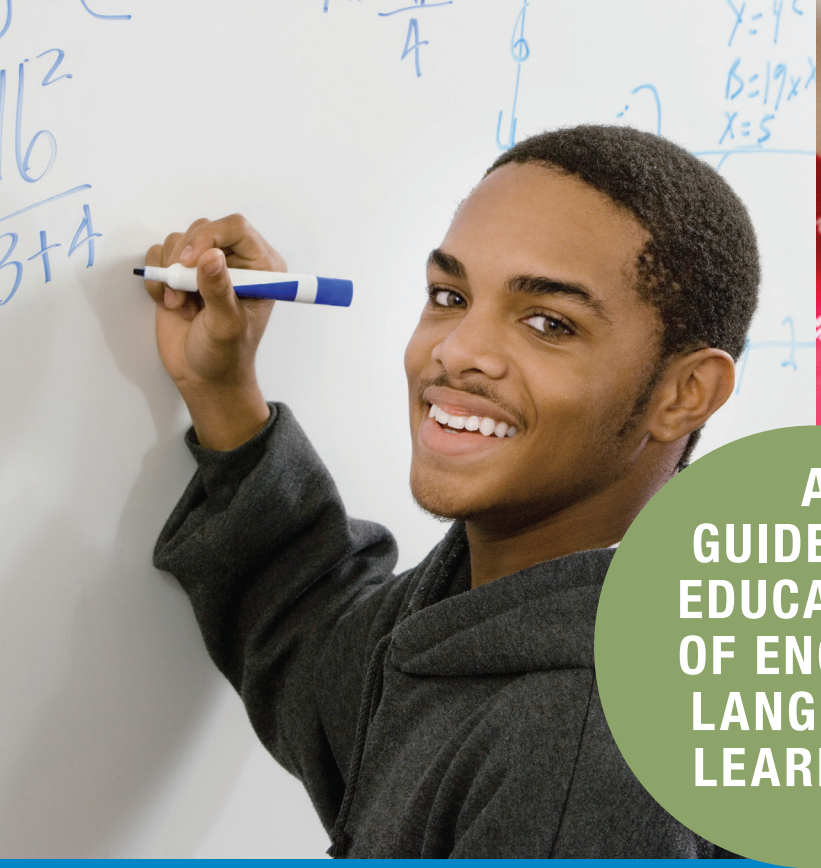
The 3 Reads instructional routine is designed to develop students' ability to make sense of problems by deconstructing the process of reading mathematical situations. Over time, students will internalize this process, thereby creating a heuristic for reading and making sense of mathematical story problems, MP1. Additional resources can be downloaded free-of-cost, here. Examples of this routine, applied to Student Achievement Partners' math tasks, can be found here:

- How Many Teams Part One 4.OA.A, 4.NBT.B, 4.OA.A.3, 4.NBT.B.6
- How Many Teams Part Two 4.OA.A, 4.NBT.B, 4.OA.A.3, 4.NBT.B.6
- Box of Clay 5.MD.C
- Delivering the Mail 8.F.B.4

DECIDE AND DEFEND

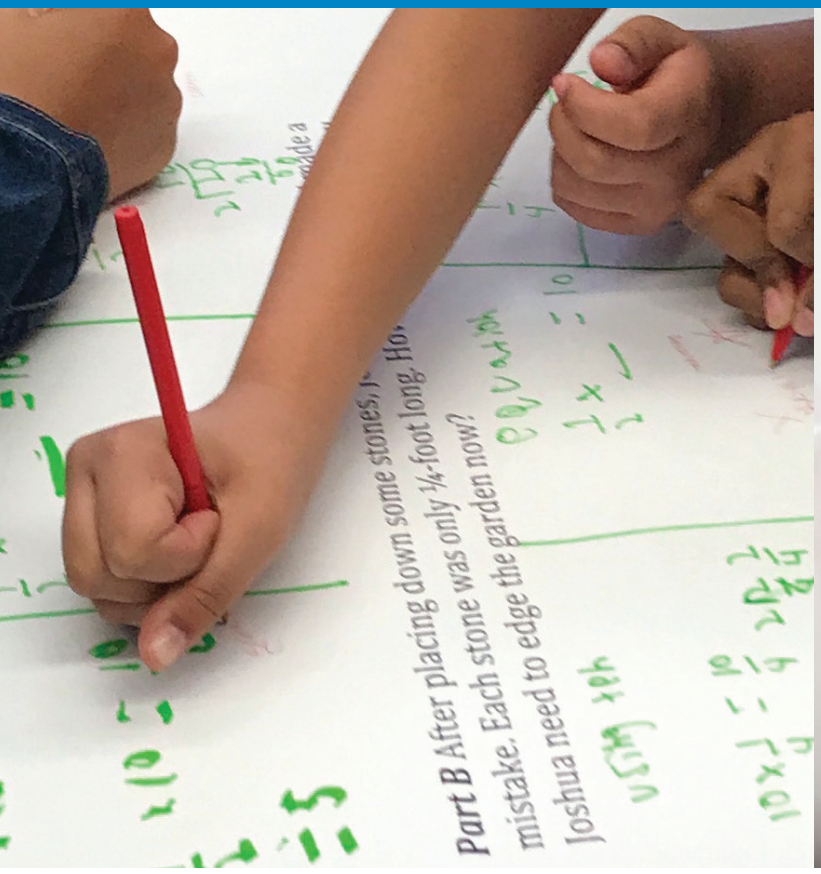
Decide and Defend is an instructional routine in which students make sense of another's line of mathematical reasoning, decide if they agree with that reasoning, then draft an argument defending their decision. The routine fosters MP3, construct viable arguments and critique the reasoning of others. Additional resources can be downloaded free-of-cost, here. Examples of this routine, applied to Student Achievement Partners' math tasks, can be found here:

- Three Composing/Decomposing Problems (Jose) 2.NBT.A
- Fraction Comparisons with Pictures 3.NF.A.3d
- Cup of Rice 6.NS.A.1, 5.NF.B.7



A GUIDE FOR EDUCATORS OF ENGLISH LANGUAGE LEARNERS

Supporting Academic Language and Content in Mathematics



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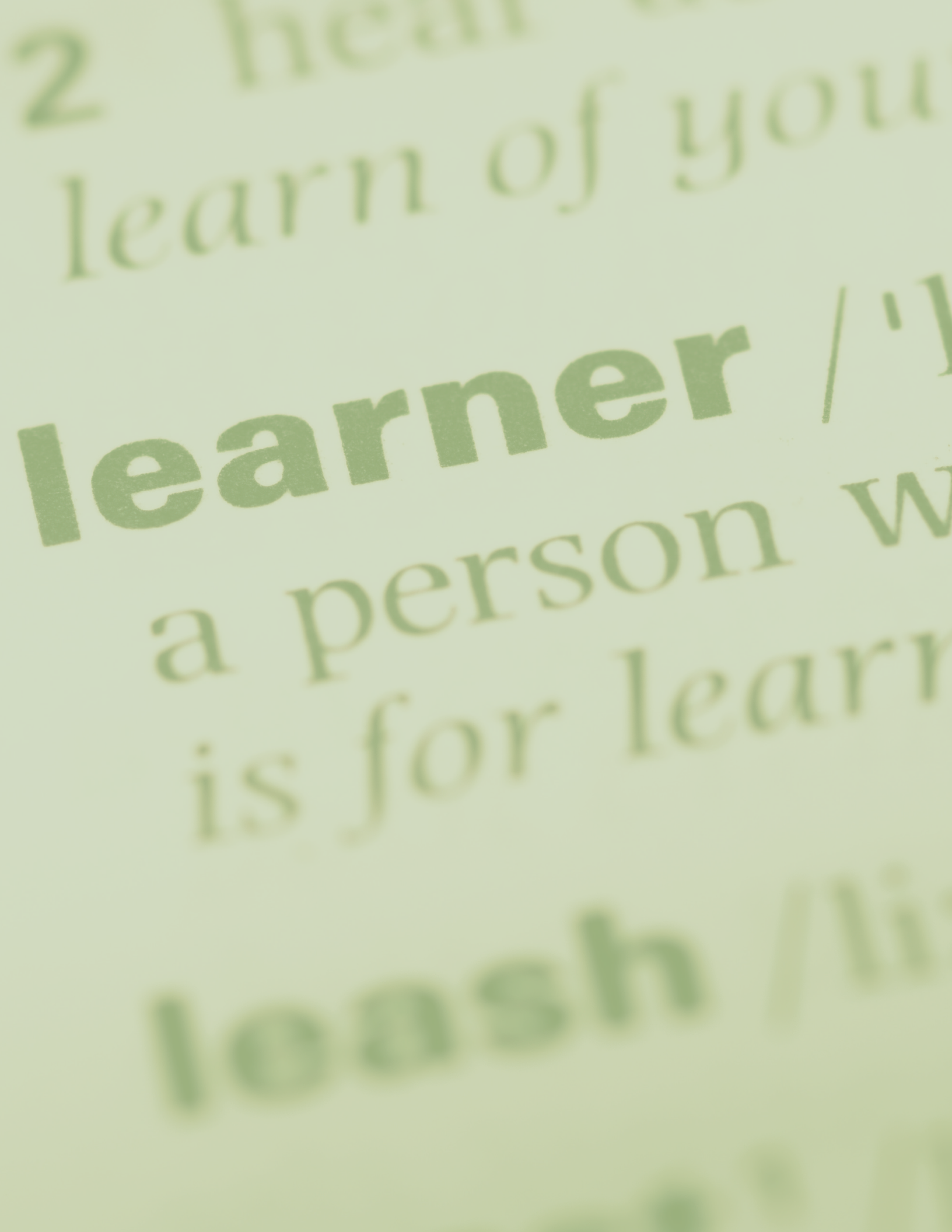
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Supporting Academic Language and Content in Mathematics

A Guide for Educators of English Language Learners

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Purpose

The mathematics classroom provides an opportunity to learn both content and its disciplinary language. The purpose of this document is to provide instructional guidance for English as a New Language (ENL) teachers and content classroom teachers (i.e., math teachers) to support academic language development in mathematics for New York City (NYC) students designated as English Language Learners (ELLs).

Although many models for ENL and classroom teacher collaboration are currently in use throughout the NYC system, each one adapted to local staffing needs, this document aims to distill a clear set of instructional recommendations to help teachers give greater attention and intention to the teaching of academic language within mathematics.

Incorporating the recommendations outlined in this document into the instructional core will allow ELLs to access equitable and effective language and content learning opportunities as integral parts of their mathematical experience.

This document represents a streamlined and feasible set of teaching recommendations, but, of course, schools can, and should, build on these strategies, augmenting them with additional coordinated support.

At a systems level, the instructional recommendations within this document will also guide the professional teacher learning, instructional coaching, and building-level administrative support necessary for successful implementation.

A message from Jack Dieckmann: **https://vimeo.com/272643845/14a0050aa0**

A message from Phil Daro: **https://vimeo.com/276912258/0c290b309e**

Current Challenges

Clarity of Roles to Mutually Support English Language Learners

The current challenges to successful ENL/math teacher collaboration span many factors. Although both math teachers and ENL teachers share responsibilities for ELLs' academic success in mathematics, a shared understanding of how each teacher can contribute to language development goals may not be established. This is likely driven by logistical and scheduling decisions made at the programmatic level in response to policy mandates that are time-based. Without addressing the unintended consequences of such policies, both ENL and math teachers will continue to be hindered in their ability to support New York City ELLs' language development in mathematics.

ENL Teachers' Distributed Responsibilities

ENL teachers may have distributed responsibilities across multiple content areas, making it difficult for ENL and math teachers to co-plan mathematics instruction on a consistent basis. Insufficient opportunity for joint planning limits both teachers in developing a repertoire of specific instructional routines and strategies to develop academic language in mathematics. The domino effect results with ENL teachers not having a defined and clear instructional role within the classroom. ENL teachers may attempt to support ELLs in ways that interrupt ongoing instruction ("squat and whisper" or simultaneous translation), they may take on a tutoring role, and without intending to, the ENL teacher may overly emphasize task completion or procedural knowledge.

Perception of Language Gap

Math teachers are similarly hampered by a lack of joint planning with English as a New Language (ENL) teachers. Math teachers may not be aware of the vast language demands that their instruction places on English Language Learners (ELLs), nor know how to support ELLs at varying levels of English language proficiency. Language demands can include language function, vocabulary and discourse practices, syntax, and precision (edTPA, 2015). Given the multiple demands of running a classroom, math teachers may not systematically track the wealth of language competencies that their students bring to school that can be applied to the learning of mathematics. Without such information, math teachers are likely to fall into a "gap mindset," emphasizing only what is lacking in ELLs. What ELLs need from instruction must be balanced with what they already have in their linguistic toolkit. We emphasize this since a "gap mindset" can inadvertently underestimate ELLs and result in lower expectations.

Thus, both ENL and math teachers have much to gain from clearer guidance and support to fine-tune their instructional efforts, leveraging their existing knowledge of language and mathematical content to optimize ELL learning and academic success.

Vision

Like all students, English Language Learners need access to a high-quality mathematics program that balances conceptual, procedural, and applications of mathematics. In a balanced program, students learn to be flexible in their mathematical thinking and communication, often called the math register. By register, we mean the way in which students adjust their language to fit a particular setting, purpose, and audience, with appropriate attention to established conventions.

ELLs need access to the language and representations that are specific to mathematics as well as to the language necessary to make sense of mathematics. Like all students, ELLs bring a range of experiences with schooling opportunities, some resulting in the need for extra support to approach grade-level instructional targets. Like all students, ELLs benefit from instruction that values and uses their existing language competencies to learn new content. Math teachers use students' everyday language to build a bridge toward academic language in the discipline of mathematics in an additive way. With access to new ideas and challenging content, ELLs will be able to revise prior knowledge to accommodate new math learning. Most importantly, regardless of language differences, ELLs need opportunities to be heard and listened to as they engage with mathematics, gain their footing, and assume powerful identities as learners and doers of mathematics.

To envision how students use their mathematical register, we provide two scenarios:

1. A student talking to her group about her solution strategy would likely use everyday language, point to her scratch work, and even use gestures to communicate orally to her group. Her group might ask questions to clarify meanings.
2. In contrast, if the same student were trying to explain her thinking as a recommendation to someone outside the classroom—a community member, for example—she would need to explain in writing, and would use more standardized math terms to avoid confusion. Since she

cannot rely on gestures, she would need to capture her reasoning in writing—but she could include graphs, tables, equations, and diagrams to help her reader follow her thinking.

Both of these scenarios are mathematically valid, but take different forms appropriate to the settings, purposes, and audiences.

Theory of Action

Our theory of action is predicated on the assertion that both the ENL teacher and the math teacher bring distinct and essential knowledge to the teaching of English Language Learners. Classroom teachers understand grade-level math content standards from which curriculum, teaching, and assessments are organized. Similarly, ENL teachers understand the process of English language development for learners at various stages of language acquisition. If schools create structures that support professional development in feasible strategies along with administrative support, then ENL teachers will be empowered with knowledge of focused math language support strategies in the classroom. Collaborative planning with the math teacher will allow ENL to play a clearer role in math instruction so that together they can provide a more discipline-focused language support. These processes will support the mutual goals of ELLs' academic success in mathematics and increased language proficiency in English.

Enhancing the Impact of ENL Teachers in the Math Classroom: Recommendations

In general, the design of learning activities and teacher responses to student actions should lead students through the learning experiences needed to help students reach established learning goals. Without clear learning goals, instruction may meander. In addition, instruction aimed to support ELLs in mathematics must also be targeted and intentional at language development goals, and shared by both the ENL and the math teachers as an instructional team. Informed by those language development goals, the instructional team can make decisions about how to maximize student interactions, which mathematical language forms to make explicit for students, and how to assess formatively students' academic language development over time, and adjusting instruction based on that information. Throughout the teaching and learning process, we draw attention to the importance of building of powerful learners of mathematics, specifically of positive and productive mathematical learners.

The framework below outlines five major recommendations of this joint work by ENL and math teachers: 1) establish academic language development goals; 2) maximize student-to-student interactions; 3) pay attention to mathematical language forms; 4) engage in formative assessment of disciplinary language development using it to refine instruction; and 5) facilitate students' mathematical identity and agency.

1. Establish Academic Language Development Goals

At broad instructional level (the unit level, for example), language development goals need to be established to guide classroom instructional and language support. Such goals are derived from an analysis of the various language demands embedded in the curricular materials, tasks, activities, and assessments that are used. To begin, ENL teachers can scan the unit for the language demands that students will encounter in math instruction to then suggest

language goals for the English Language Learners in the classroom. Language demands could be at the sound, word, or sentence level. We have listed some illustrative examples of language demands below.

Mathematics contains words with specialized meanings (e.g., plane, product, even) and specialized imperatives (e.g., estimate, plot, find a solution) that may cause confusion (Zwiers, 2014). ENL teachers may be able to identify such double-meaning words and check students' for their understanding. Teachers who teach math every day may not be as highly aware of the possible confusions.

The language goals should extend beyond the knowing the definition of a vocabulary list and should focus on how to use these words to clarifying their thinking and to understand the thinking of others.

For example, for a unit on place value, students may come across a range of terms for comparing and ordering numbers*: greatest, greater than, smaller than, smallest, less than, more than, bigger, biggest*, etc. When combined with symbols (e.g., $4.3 < 4.34$) and that English is read from left to right, ELLs' lack of knowledge of English language grammar may impede their conceptual understanding. ELL students may not realize that "er" and "est" are suffixes that can signal comparative and superlative degrees.

In this example, a language goal at the unit level could be: ***Student will learn to use the language of comparisons to reason about the size of a number compared with other numbers***. This is meant to be an example of a working language goal, not a rigid template to follow. Note that goal is longer term, not a lesson-level goal, so that student have many opportunities to develop a linguistic range for comparing numbers. This range builds from their working language and might include informal language (3 is *more higher* than 2, or 7.6 *beats* 6.2). Across the unit, teachers can build from this to include more standard forms found in mathematics.

The language goals in math should also be informed by other literacy initiatives underway at the school. Key vocabulary may have already been identified at the grade level—for example, connecting with colleagues optimizing the efficiency of identifying high-leverage words and methods to develop full command of them (Lesaux, Galloway and Marietta, 2016).

Once the language goals are set, teachers can begin to look for places to embed key vocabulary, provide a variety of places to use the terms, and help ELLs attend to word features such as prefixes, suffixes, and root words that deepen their understanding of the mathematical language (Lesaux et al., 2016).

A. Are the goals specific enough?

B. Is the language goal closely related to the content goal?

C. Does the language goal include general academic vocabulary as a vehicle to deliver the discipline-specific vocabulary?

2. Maximize Student-to-Student Interactions

Making sense of ideas together with peers provides a powerful scaffold for both learning new content and developing language. Teachers can support ELL students across various participation structures, including individual work time, collaborative group work, and whole-class discussions.

A. Individual work time: By way of preparing ELLs to engage in interactions with peers on a mathematical task, math teachers need to provide students with *sufficient individual* time to

orient themselves with the problem, make sense of it, and organize their initial thoughts on the problem and organize their initial thoughts to bring to the group. During individual work time, teachers can identify students who may be struggling and need additional support.

Provide linguistic support for ELLs to understand what has been assigned for individual work and to comprehend the language in the assignment prompts and problems.

1. Facilitate the reading comprehension demands of the assignment, not the math demands. Help comprehend word problems.
2. Support student understanding of what product the student is assigned to produce.
3. If collaboration is allowed, facilitate collaboration linguistically.
4. Having thoughts of one's own gives one something to talk about. Help students formulate their own thoughts in language, including the language of visual diagrams.

B. Collaborative group work: In designing opportunities for *collaborative learning*, teachers attend to the purpose and composition of groups, how to structure and monitor interaction for equitable participation (group roles and group norms, for example), and how to provide appropriate levels of language scaffolding if and when needed. The quality of the group talk is enhanced when students work on challenging math tasks, or when engaged in peer response and editing of math writing, for example.

Encourage and facilitate linguistically the ELL students' engagement in discourse with other students during partner or group work. Help the ELL student to:

1. Ask questions of partner or group members: "Why did you multiply by 5?" "Why …?"
2. Contribute ideas to the group: "I have an idea ...."
3. Build on the ideas of others: "We can draw a rectangle to show the way you multiplied."
4. Comprehend other students: "What do you mean when you say 'in each group'?"
5. Speak on behalf of the group: "We talked about how to show how many and decided to make this diagram."
6. Write own and group's ideas using multiple representations: "Let's show this another way. Can we make a table? Can we make an array?"

C. Whole-class discussions: During *whole-class discussions*, teachers support language development by facilitating the sharing of students' ideas and the negotiating of meaning around those ideas. Teachers can also highlight the range of language forms and expressions that students used in groups as part of the class discussion.

Encourage and linguistically facilitate ELL students' participation in whole-class discussion. Help these students:

1. Ask questions of other students.
2. Ask questions of the teachers.
3. Contribute ideas to discussion.
4. Build on the ideas of other students.
5. Comprehend other students.
6. Comprehend the teachers' questions and prompts.

3. Pay Attention to Mathematical Language Forms: Genres[1]

Like other disciplines, mathematics is an encoded register with particular genre, conventions, syntax, and standard forms of expression. Mathematics has its own grammar as well. We provide an extended discussion of how parentheses are used in math to clarify ones thinking.

Consider the following relationship in the comparative heights of Carlos and Angela:

Five inches more than Carlos's height is twice Angela's height.

By letting C represent Carlos's height in inches, we can express, "Five inches more than Carlos's height" as $C + 5$.

But how can we express Angela's height as half of "5 inches more than Carlos's height"? Here is where parentheses can help: $5(C + ½)$.

The parentheses help us makes sense of the two quantities. We note how $(C + 5)$ is a noun phrase, referring to a height, which is double Angela's; halving it gives Angela's height.

But sometimes parentheses are not shown when they could or should be. For example, when the fraction bar is used it implies that the expression in the denominator is grouped as a noun phrase.

For example:

$\frac{x+4}{2}$ is read: The quantity "x plus 4" divided by 2.

Furthermore, because the parentheses group the expression into a noun phrase that refers to a number, the syntax associated with symbols for numbers can be used. Thus, just as xy means x times y, $(2x + 1)(3x + 2)$ means $(2x + 1)$ times $(3x + 2)$.

In more advanced mathematics, parentheses are used to express the argument of a function, as in the notation $f(x)$, adding to the multiple ways students must understand parentheses in specific math contexts.

Aside from natural language (words), mathematics also includes symbols and visual displays such as graphs and diagrams. To gain control over the richness of the mathematical register, we need to master the genres of mathematics. Genres are ways in which text specific to any discipline is canonically organized, and thus recognizable by its features.

The most important **genres** used in mathematics class are these:

A. Word problems

B. Argument

C. Explanation

D. Procedure

Each genre has its own conventions and implicit agreements with the reader. Mathematics students have to learn to read and write each genre. As with learning any genre in any field,

1 https://vimeo.com/277123921/5e14c9544d

multiple encounters with the genre in instructional settings rich in peer discourse are the basic learning experiences.

The math and ENL teacher can scaffold the learning of each genre by providing language support. Questions are powerful supports that open thinking and linguistic processing space for the student while helping them focus productively. When a student needs more than a question, a sentence starter can work well. After asking the question, give the student the starting phrase(s) of a suitable answer. If more support is needed, a sentence frame can provide it. The blanks within the sentence frame should be where the mathematical reasoning is set in the frame of language.

A. Word Problems

Word problems are usually about how many or how much (i.e., quantities). They are not about people, their character or motives. Learning to comprehend word problems means learning to pay attention to how many or how much rather than to the personalities of the characters, as you might when comprehending a story. Word problems are about the numbers, not the people; word problems are about the relationship between the numbers, not the relationship between the people.

The relevant prior knowledge to activate is prior knowledge of similar quantitative situations. For example, if a word problem is about comparing the height of two waterfalls, the relevant prior knowledge is prior experiences comparing heights, not prior knowledge of waterfalls: "Have you ever compared your height with your mom's height?" *not* "Have you ever seen a waterfall?" The word problem is not about waterfalls; it is about heights. It is about how many meters tall something is. It could be two buildings, or two people—it doesn't matter. What matters is the comparison of how many meters one is compared with the other.

Here are some important questions to use with ELLs to help them engage in talk with peers while working on word problems, problem solving, or modeling:

- What is this problem about?
- What can you count or measure in this situation?
- What units of measurement (e.g., inches, centimeters, minutes) are you using for that?
- What numbers are given? What are the units for the given numbers?
- What could be counted or measured that isn't given?
- Can you think of any relationships between the quantities you just named?
- What is the question they are asking you to answer?
- What are the units of the answer?
- Can you write an equation that shows how to get the answer?
- Can you draw a diagram that shows how the quantities are related?
- Can you make a table? Sketch a graph? Write an equation that will help you think about this problem?
- Show me what you mean with your tiles (or other concrete manipulatives), on your graph, in your table, in your equation.

- How can you revise your work so it makes more sense to you and others?
- How can you say that in words?

Notice these questions help focus the students on the quantities in the problem rather than on the people and their story. The genre conventions of word problems need to be learned. It is important for students learn that word problems are about quantities, calculations, equations, and multiple mathematical representations. They are not really about the context.

B. Argument

Mathematical argument is related to argument in other fields, but also distinct. The most important difference between mathematical argument and other fields is this: Mathematics does not allow the use of evidence in arguments, except the use of counterexamples to disprove something. The warrants for mathematical claims are limited to established (in earlier lessons and grades) definitions, properties, and results. For students in grades K-8, the basic idea of mathematical argument should be developed informally.

Examples used as evidence can be good illustrations of reasoning even though they don't prove anything. Examples can be tools to investigate and uncover underlying principles (i.e., axioms and theorems), and principles can be used as evidence when building an argument in mathematics.

Peer interaction in whole-class discussion, groups, and partners is very natural and productive for constructing viable arguments. Two useful teaching strategies for developing expertise in argument and the language of argument are these:

1. Is this sometimes, always, or never true?

Investigate under what conditions something is true. This strategy can be used with a planned claim. For example: "When you add fractions, it's just like adding whole numbers. 5 apples + 3 apples = 8 apples is the same as 5 thirds + 3 thirds = 8 thirds. Is this sometimes, always, or never true?" Students can investigate and determine it is sometimes true: it is true when you add fractions with the same denominator, but not when the denominators are different.

2. Convince yourself, convince a friend, convince a skeptic.

Model asking "skeptic" questions, and explicitly prompt students to ask "skeptic" questions. For example, claim 3/4 is more than 3/5 because 1/4 is more than 1/5. Ask the class: "Do you agree?" If the whole class agrees, prompt students to ask a skeptic's question. If they are quiet, have them turn and talk for one minute to think up a skeptic's question. Here is a good skeptic's question: "How do you know 1/4 is more than 1/5?"

The skeptic's question drives students deeper into the logic of mathematics at the same time it re-engages earlier learning. This creates an opportunity for some to finish unfinished learning from earlier grades even while others are developing a deeper understanding of the logical coherence of mathematics. The same activity develops expertise in mathematical argument and helps students finish unfinished learning from earlier grades.

While students are working on constructing arguments and justifications through interaction with peers, scaffold participation in discourse with the following questions:

1. Do you agree? Disagree?
2. Is that always true?
3. Is it sometimes true? When is it true?
4. Is it never true?
5. Can you find a counterexample?
6. Ask a skeptic's question.
7. What do you think is true? How can we say that?
8. What do you wonder that might be true?

C. Explanation

The elements of a mathematical explanation differ from those of a literary or historical explanation. A good explanation makes sense; that is, a good explanation helps me make sense to myself. Students can do a lot of the work of making sense by constructing explanations. Explicitly assign students to write explanations for the major mathematics of each unit and the important problems in each unit.

Written explanations in mathematics need to be based on prior social interaction—talking and listening to peers as would be done in teaching any writing assignment. Help students participate in this pre-writing talk by assisting them to put their own thinking into language. As with any writing assignment, purpose and audience needs to be defined. For mathematics, the most productive audience is the other students in the class, *not* the teacher. The purpose is so the other students can understand your thinking. Prompt students who "finish" writing their explanations too quickly by asking them to "revise your explanation so that more students will understand it. Try it out on Alexander to get some good ideas for revision."

Some good questions to ask students to help them participate in discussions of explanations are these:

1. **When discussing the ideas of others:**
   - Do you agree?
   - Does it make sense?
   - Can you give an example that shows what you think?
   - How is your way of thinking the same? Different?
   - Does it remind of anything from earlier?
   - Is that always true? Sometimes true? Never true?
   - Your idea sounds interesting. Share it with the group or class.
   - How can you use your words so it makes more sense to you and others?

2. When students are writing:

- Encourage revision based on reader responses from other students.
- Encourage getting good ideas from other students.
- Encourage multiple representations with labels.
- Ask what the student likes about another student's writing.
- Ask what they like about their own.

D. Procedure

Procedure is a genre that tells how to do something. It is step by step in chronological order. In many ways, it is the simplest form of narrative structure. The language is in the imperative voice: "Do this, then this, then this …" Some procedures are very important in mathematics, such as the procedures for adding and subtracting multi-digit numbers. Once you have learned a procedure, you don't have to think about it; you can perform a calculation without understanding the mathematics. But most mathematics is not procedural. Therefore, we want students to understand the mathematics, and we want them to think with and about mathematics. Nonetheless, procedures are part of mathematics.

The answer to the question "How did you do it?" is usually in the procedural genre. Text that shows you how to perform a certain calculation is often in the procedural genre. In working on problems during class, the procedural genre should usually be embedded within one of the other genre. While problem solving, there comes a time to carry out a calculation. Often, a procedure is used to carry out the calculation. A student might be asked by another student, "How did you do that?" The answer will take the form of showing the steps taken, showing your work.

As we have shown, mathematics has its own linguistic registers for problem solving, argument, explanation, and procedures. When teachers explicitly give students access to these codes of mathematics, ELLs expand their existing linguistic repertoire to include the academic language of mathematics. As with the learning of the English language, attention to the structure of mathematical language develops a meta-awareness in students. In addition to students understanding the structure of mathematical language, they also benefit from consistent feedback on their math language for how well it communicates their mathematical reasoning.

The focus of the ENL teacher in math instruction should be: 1) on linguistic facilitation of the ELL students' engagement in the social processes of the pedagogic activities of the lesson; 2) to help develop the ELL students' sense of belonging to the group of math learners; and 3) drawing the students' attention to the pedagogic community.

Teaching the Genres of Mathematics: Teachers' Ideas[2]

A group of teachers brainstormed the following ideas with Phil Daro:

- Hide the question.
- Ask questions that probe the relationship between the quantities.
- Author a word problem.
- Sentence starters
- Sentence frames
- Paragraph frames
- Build opportunities for oral discourse specific to the genres.
- Model the academic language of each genre.

4. Engage in Formative Assessment of Disciplinary Language Development, Using It to Refine Instruction

Effective teaching includes not only planning and implementing, but also regularly assessing the impact of instruction and deciding what to do next in teaching. The same holds true for assessing and refining instruction that develops disciplinary language. Teachers can collect information at the student, group, and class levels to determine progress toward the language goals established for the unit of instruction. Collecting and analyzing student work samples, including student language samples, provides rich data of their linguistic competencies and areas that need further support.

ENL and math teachers can collect evidence to answer questions such as:

A. How equitable are the group interactions for ELLs? What might improve it?

B. How are ELLs incorporating specific language models given in class? What can increase the use?

C. Which ELLs are ready for less language scaffolding?

D. What language scaffolds are not effective? Why?

While math teachers are accustomed to assessing and communicating students' content understanding to parents and caregivers, they are less accustomed to conveying progress in math language development.

We draw on the work Heritage (2009) in the ways we frame **"formative" assessment**[3] as an ongoing process designed to: 1) evoke evidence of content and language learning (in our case); and 2) provide feedback about learning to teachers and students. Taken together, these must be used to help the learner achieve their next level of development. Far from a quiz on Friday to evaluate what students have learned at the end of an instructional unit, formative assessment is fluid in its forms (teacher notes, observations, close listening, close reading of student work), embedded in instruction (not a separate event), and actually used to make improvements in teaching.

2 https://vimeo.com/276971411/ba1ca16e19

3 https://vimeo.com/272619001/d4d0b7f1dd

Referring back to the language goal example in No. 1 (Establish Academic Language Development Goals)—Student will learn to use the language of comparisons to reason about the size of a number compared with other numbers—ENL teachers can help track the math language progress of students as they are learning about comparing numbers throughout the unit. ENL teachers could keep informal notes and work samples about the words that ELLs use to asses language development over time.

> Order the following numbers from least to greatest,
> and explain how you decided.
>
> **2.13, 2.41, 2.1**

Initially, an English Language Learner may produce very little language, choosing to observe and listen. ENL teachers know that students may be understanding more than they are letting on, since receptive skills usually outpace productive skills. The ELL student may be able to order the numbers by pointing or labeling, but not yet be able explain the rationale.

As the unit progresses, the ELL already begins to borrow phrases for comparing numbers that group members have used. He/she may say, "I look at first number after dot," and may have already developed a systematic method for comparing digits by place value. The ENL teacher can note this progress not only as output of language, but also as the beginning of forming an explanation. In collaborative planning, the ENL teacher and the classroom teacher can be sure to highlight more standard language while still valuing students' ways of making sense of mathematical ideas.

The ENL teacher can confer with the ELL to give appropriate feedback about the student's language progress: *"I noticed that you focused on the first number to the right of the decimal number (the 1, 4, and 1). It's very helpful to look at the same place value in each number."*

And the ENL teacher can also help the student with the next step by asking: "*What value is first number to the right of the decimal in each of the three numbers? How can that information help you figure out how to order these numbers from least to greatest?"*

This kind of closer listening over time gives ENL teachers a more focused role in the classroom and a source of valuable assessment information to math teachers to decide if additional language scaffolding is needed, or if scaffolding can begin to fade.

5. Facilitate Students' Mathematical Identity and Agency

Classroom environment influences students' identity as learners and doers of mathematics. The learning environment, the tasks, the interactions, norms, and practices all send powerful messages (implicit and explicit) about the *nature* of mathematics, what it means to *do mathematics*, and *who* can do mathematics. Positive and productive math student identities are supported when effort is valued, with reduced emphasis on rote memory and speed, as these tend to trigger unnecessary anxiety that hampers learning. ELLs, like all students, benefit from math instruction that engages with math as a discipline of connected ideas and relationships that have application within and outside of mathematics.

ENL teachers can proactively reinforce growth mindset messages to students (Dweck, 2006; Boaler, 2016). The table below provides examples for ENL teachers to use with students.

Connect effort to strategies:	*You are making a good effort! How is this strategy helping you make progress on the problem?*
Importance of challenge:	*Your brain is really growing with this challenging problem!*
Resourcefulness:	*What might help you get unstuck? What have you tried before?*
Collaboration:	*Have you talked to others about your ideas?*
Encouragement:	*You can do this! I believe in you!*
De-emphasis speed:	*It's not a race. Slow and careful thinking are important in math.*
Value mistakes:	*Mistakes happen when we stretch our learning! What can you learn from it?*

ENL teachers can also monitor for math anxiety when ELLs appear lost, disengaged, or acting out as means to cope with stressful situations.

Math classrooms where an "answer-getting" culture pervades is not conducive to deep learning of content or disciplinary language. In fact, focusing on "correct answers only" rather than the mathematical reasoning that leads to correct answers can increase ELLs' stress levels or negative emotions, and actually hinder their speaking up in class and their taking of risks by sharing of ideas still in development. This delays their language development. Even if particular math teachers do not promote an "answer-getting" culture in their own rooms, ELLs and other students develop deeply ingrained ideas about what it means to do well in math early on (Boaler, 2016). ENL teachers can remind ELLs of the importance of explaining one's reasoning that will lead to correct and complete answers. By valuing the language of mathematical reasoning, ENL teachers empower ELLs to powerful learners of mathematics.

Opportunities for Math and ENL Teachers to Collaborate

Below is a list of instructional collaboration opportunities for the math and ENL teacher.

1. **Build opportunities for oral language development within lessons and/or activities.**

   ELLs will benefit from having more opportunities to develop their oral language skills. It is important to consider selecting cognitively demanding mathematical task that promote oral language development.

   A. Where can we add more student talk?

   B. Which tasks or problems are discussion-worthy?

2. **Identify and use appropriate language scaffolds.**

   Although there are different understandings of what constitutes a "scaffold," it is important to emphasize, that in this document, the concept of a scaffold is used to describe a temporary

instructional support that provides access and moves the learning forward. Note that an "appropriate" scaffold does not degrade the rigor of a mathematical task, and does not shift the work and thinking away from the ELL student.

Consider these questions when providing scaffolds:

A. How is the scaffold providing access to the language and content?

B. How is the scaffold moving the learner?

C. What language support is needed, based on math teachers' observations?

D. What are students able to accomplish their own?

E. What is the impact of my scaffolds (self-regulation/metacognition)?

- As a result of the scaffolding, who is doing the work? *(Students should be doing the work.)*
- As a result of the scaffolding, who is doing the thinking? (*Students should be doing the thinking.)*

3. Promote language production.

When working with ELL students, it is common for math teachers' activities and support to focus on receptive language. While this is understandable, supporting language production is equally important.

A. Consider appropriate use of sentence frames.

B. Consider appropriate use of sentence starters.

C. Engineer more opportunities for discourse (both oral and writing).

D. Extend language production (e.g., Can you say more? Why? How do you know?).

4. Facilitate academic vocabulary development.

Developing mathematics academic vocabulary supports ELLs, expanding their abstract reasoning ability to move beyond operations to problem solving. Math vocabulary is inextricably bound with conceptual understanding of mathematics.

A. Choose a relatively small number of words with high utility.

B. Provide ample opportunities to learn these words in rich contexts.

C. Make explicit the difference between general and discipline-specific academic vocabulary. ELLs need to know the delivery words (e.g., analyze, explain) deeply to access the discipline-specific vocabulary (e.g., proportionality, inequalities).

5. Use "teaching moves"' that support ELLs.

Math teacher's moves that promote ELLs sense making and language development can be useful tools in supporting English Language Learners. Below we are providing three examples.

Example A: **Revoicing**

This "teaching move" serves to make and keep the discussion at an academic level. It can be a useful way to model the use of academic language for ELLs. In revoicing, a student statement is often reformulated in terms that are closer to the standard discourse practice in mathematics.

For ELLs, it is important to move back and forward between everyday and academic language so that cognitive mapping between these two is formed.

- Consider the appropriate time for revoicing.
- Choose carefully what part of students discourse are worth revoicing.
- Avoid interrupting students who are expressing an idea.

Example B: **Create high visibility.**[4]

This teacher's move can be very useful when students are working in groups on a mathematical task by allowing ELLs to make a connection between the teacher's oral instructions and their written form. Additionally, writing on a chart paper (or the board) student ideas that emerge during the class, ELLs can see how others are making sense of the mathematical task and compare this to their own ideas. They can begin working on the task while making progress on the content and learning the language.

- Provide a written statement of your question or assignment.
- Write up on the board or on chart paper what each student says with his or her name attached. Keep these student-generated comments visible for the duration of the lesson.
- Keep teacher talk to a minimum and if you need to re-group, demand that all students pay attention.

Example C: **Provide student feedback in the form of questions.**[5]

The focus of this teaching move is not to provide ELLs with information, but rather to support them in making sense by directing their attention to critical features of their thinking about the content and language in order to move their thinking forward. This teaching move is very useful when students are engage in a cognitively demanding task. Below you will find an example of a cluster of questions that could be used with an ELL who is having trouble getting started in the task. It is important to note that these questions should be appropriately timed and not released all at once. By providing time between the questions, ELLs are encouraged to continue thinking and persevering.

- What is this problem asking you to do?
- What information are you given?
- What could you find out?
- How did you arrive to this number?

Example D: **Avoid GPSing**.[6]

GPSing is telling students—step by step—how to solve a particular problem or carry out a general procedure, essentially acting like a GPS (Global Positioning System) device in a car that gives instructions for getting from point A to point B.

This is a very powerful metaphor coined by Ann Shannon that allows reflecting on our teaching practice. Think about our own experiences with a GPS navigation system. When we use this device to get from point A to point B, we often arrive at our destination with no idea about how

4 Ann Shannon (*Teaching Moves to Support ELLs in Mathematics, NYC)*

5 Ibid.

6 https://vimeo.com/277336244/d81a08dbcc

we have gotten there. Because we are following step-by-step instructions, we are not learning about the terrain or where we are with respect to landmarks and point of departure, failing to make connections to known locations. As a result, we need the GPS device to go back home because we cannot conceptualize where we are and how to return home.

Following a GPS is very different from studying a map or planning a route. When we study a map and use it to get from point A to point B, we develop knowledge of the landscape, resulting in long-lasting memory, because we must make sense and grapple with the terrain. Teachers of mathematics far too often give ELL students instructions just as a GPS device would, by providing instructions, turn by turn, for the ELL to follow blindly. As in the GPS scenario, the ELLs have no idea how they got their answer and fail to make deeper connections with the mathematics at hand. There are many ways in which students can be "GPSed" in a math class, with the three most common being:

- GPS by teachers: The teacher tells the students what to do, step by step.
- GPS by text: The assignment is written in such a way that it breaks a multi-step problem down into discrete steps.
- GPS by peers: Students are grouped heterogeneously, so that students who are perceived as not struggling tell students who are perceived as struggling what to do, step by step.

In each of these cases, the ELL student who really needs the opportunity to learn is deprived of the opportunity to think, and instead becomes dependent on his or her teacher, text, or peers to dictate a solution. ELL students need to be given the chance to think and to grapple with complexity. If the ELL student is just doing what the teacher says, or imitating the teacher, then he or she will have little opportunity to learn.

Instructional Routines

ELLs are often undernourished in experiences producing mathematical discourse (oral and written). Pedagogical routines that distribute the opportunities to produce language equitably are essential for English Language Learners. Explanations of these are found in Appendix A in the order of the table below.

Instructional Routines for ENL Teachers to Lead or Co-Facilitate | Mathematics Learning

ROUTINE	ELL Benefits	Role of ENL Specialist	Resources
1. "Three Reads" and "Problem Stem" Strategies	Teaches reading comprehension of word problems.	Linguistic facilitation of comprehension; encourage speaking.	**Language of Mathematics Task Templates**, Appendix D. Understanding Language: Stanford, Harold Asturias.
2. Think-Pair-Share	Pairs set up every student to speak/ listen.	Facilitate speaking, assisted listening.	Reinhart, S.C. (2002). **Never say anything a kid can say!** Mathematics Teaching in the Middle School, 5(8), 478.
3. Turn and Talk with Partner Swapping	Every student talks and listens; every student explains thinking of partner.	Promote listening to partner and speaking to partner.	https://www.teachingchannel.org/videos/second-set-partners-sfusd
4. Number Talks	Teacher focuses on listening to student's way of thinking; students see variety of ways of thinking. Student develops explanation and procedure genres.	Linguistic facilitation; encourage speaking.	Humphreys, C., & Parker, R. (2015). **Making Number Talks Matter: Developing Mathematical Practices and Deepening Understanding, Grades 4-10.** Stenhouse Publishers. Parrish, S. (2010). **Number talks: Helping Children Build Mental Math and Computation Strategies, Grades K-5.** Math Solutions.

ROUTINE	ELL Benefits	Role of ENL Specialist	Resources
5. Learning from Mistakes	Culture that mistakes are normal part of learning; "discovering" mistakes can contribute to class; safe to express thinking.	Record and facilitate expression of student's own ideas.	Jo Boaler **(Mathematical Mindsets**)
6. Using Journals in Math	Productive writing, revision of writing, learn how to study mathematics, read math writing of others; reflective and meta-cognitive expertise develops.	Provide feedback of students' writing of their ideas and guidance that improves their skills.	**Math Journals Boost Real Learning,** Marilyn Burns and Robin Silbey (2001)
7. Stronger and Clearer Each Time	Students practice giving their explanation to repeated partner-sharing, refining and improving their explanation with each successive pairing.	Encourage listening to peers' explanations and borrowing language to improve their own explanations.	Jeff Zweirs http://jeffzwiers.org/fortifying-speaking

Appendix A

Routine 1: "Three Reads"[7] and "Problem Stem"[8] Strategies for Word Problems

The Three Reads Routine[9]

Read the problem or problem stem three times, each time asking a different question:

1. What is this situation is about?
2. What can you count or measure in this situation? How are those quantities related?
3. What are all the possible mathematical questions we could ask of this situation?

1. What is this situation is about?

Hide the question at the end of the problem. Hiding the question helps students focus on the problem situation; it delays the rush to "answer-getting."

The first read should only be one minute or less. Read aloud, then ask what the basic idea is (e.g., What's going on?).

If there is an issue with a word, resolve it.

For example:
"Sara had a bag of candies. She gave 1/3 of her candies to Rebecca. Then Sara gave 1/4 of the candies she had left to John. After giving candies to Rebecca and John, Sara had 24 candies left in her bag."

The gist: "Sara had a bag of candies and gave some to her friends."

That's all you need from first read. Math words like "1/3" and "had left" should not be discussed as vocabulary. They will be discussed in the second read.

2. What can you count or measure in this situation?

This is worth time: 3–5 minutes. It is an essential strategy for comprehending the text of a word problem. Most students do not do this basic comprehension work unless they are taught how. They need this instruction for each new kind of word problem as they climb up the grades, just like they need comprehension instruction in ELA as text complexity increases up the grades.

Use a brainstorming routine: Students call out quantities that can be counted or measured; math teacher writes them on the board. Don't judge or discuss the relevance, just clarify what is meant—as you might in a Number Talk.

Student A: "How many candies in the bag?"

Teacher: "Before or after she gave some away?"

7 Adapted from Grace Kelemanik's Three Read Strategy.

8 Adapted from Moving Beyond Answer-getting at https://math.serpmedia.org.

9 https://vimeo.com/276929668/98aceb6260

Student A: “After.”

Teacher writes: “Number of candies after.”

Student B: “Number of candies before.”

Teacher writes: “Number of candies before”

Student C: “24.”

Teacher: “24 what?”

Student C: “Candies.”

Teacher writes: “24 candies.”

Note: Teacher does not point out that “24 candies = number of candies after.” Inferring the equality of the two phrases is the students’ problem-solving job; don’t do their thinking for them.

Student D: “1/3 of the candies.”

Teacher: “Which candies?”

Student D: “The candies in the bag.”

Teacher: “In the bag before or after?”

Student D: “Before.”

Note: This is a reading comprehension challenge that is worth being explicit about. To comprehend the situation, the reader must build a mental model of the basic chronology of events. It is not necessary to comprehend which friend got these candies, so don’t waste time on the “people.” The word problem genre is not about people; it is about quantities.

Teacher writes: “1/3 of candies before.”

Student E: “The sum of all the candies she took out of the bag.”

Teacher: “Very nice. That’s a number that is not mentioned in the text, but can be ‘inferred’ from comprehending the text. What does it mean when we ‘infer’ something when comprehending a text?”

Student C: “When it doesn’t say it, but you know it, because you know what is going on.”

Teacher: “I like that. Another way of saying what ‘infer’ means?”

Note: It is very important to probe for quantities that are not explicitly mentioned in the text of a problem. Most word problems after grade 3 have implicit quantities needed to solve the problem. All multiple-step problems have implicit quantities. Algebra and pre-algebra are focused on problems with implicit quantities. Get them ready!

Remember, in every situation, there are explicit quantities (e.g., 64 inches) and implicit quantities (e.g., John’s height). Look for both.

3. **What questions can you ask about the quantities (how many, how much) in this situation?**

   "_____will read the situation for us one more time. This time, I would like you to think about all the possible questions we could ask of this situation. Not what the people in the situation are wearing, but questions about the quantities and their relationships—questions that use the quantities to make a word problem."

   List the questions. Pick one or two for students to work on, OR reveal the question:

   > *"Sara had a bag of candies. She gave 1/3 of her candies to Rebecca. Then Sara gave 1/4 of the candies she had left to John. After giving candies to Rebecca and John, Sara had 24 candies left in her bag.* ***How many candies were in the bag to start?****"*

   Use your think-pair-share routine (see Routine 2, which follows) to have students prepare a presentation of their solution and sense-making.

   Remember, in every situation there are explicit quantities (e.g., 64 inches) and implicit quantities (e.g., John's height). Look for both.

Routine 2: Think-Pair-Share

Think-pair-share is a widely used routine that serves many pedagogic purposes well. The classroom management is straightforward. It is inherently motivating for students: *think* is motivated by anticipation of talking about your thinking to your partner; *pair* is motivated by anticipating sharing with the whole class; and *share* is motivated by the friendly attention of the audience.

Routine use of think-pair-share enables ELLs to recognize the routine, its roles, responsibilities, and actions without having to process new instructions in English. The language demands are concentrated in comprehending the problem, where language development takes place rather than in comprehending what the teacher expects.

The subject of the discussions and presentations is each student's way of thinking about the problem. It is not the student's recall of the teacher's way of thinking. Thus, the language challenge is the right one: express one's own thinking in language.

The student's own thinking is what is interesting to partners and the class because the teacher models interest in student thinking. The communication and associated language development begins with the student's thinking and then broadens to the thinking of other students, comparisons, and, finally, a teacher summary of the revised and correct mathematical thinking of the students.

There are many variations of think-pair-share. A whole lesson can be structured as a think-pair-share, or a quick cycle of think-pair-share can be used to open or close a lesson. Think-pair-share can be used to intervene and reset a lesson that breaks down, or to refresh a teacher weary of hearing his or her own voice.

Whatever version or purpose of think-pair-share, it is essential that you do not omit the minute of "think," that the "pair" is partners rather than groups, and that everyone, not just volunteers, is prepared to present. Below we describe a full version.

1. **Think:**

   A. Students work silently, solo for one minute or so making sense of the assigned problem. It is important that the ENL respect the silence of the thinking time for ELLs. It is hard to think when someone is whispering in your ear.

   B. End "think" time before students close in on solutions. Once an individual reaches a solution, he or she loses interest in discussing the mathematical thinking and has a hard time listening to the thinking of his or her partner. Students just want to show their answer and how they got it.

2. **Pair:**

   A. Students discuss their thinking with their partner (a pair is two students, not a group of four or more; three is OK, if necessary) and work together to solve it.

   B. Partners prepare a presentation to the class (the audience is other students, not the teacher) that shows how they made sense of the problem, how they solved it, and why they think their solution is valid. If they have not solved the problem, they prepare to explain their thinking and point of confusion. They prepare to share.

   C. The math teacher circulates and observes the variety of student thinking across the partnerships, intervening as needed to stimulate and sustain productive struggle. The ENL should also circulate, helping students with the language they need to express their own ideas.

3. **Share:**

   A. The math teacher selects three or four partnerships to share to the whole class.

      - Select three or four to best represent the variety of different ways of thinking present during the pair work.
      - Do not ask for volunteers. Preparing a presentation was an assignment for everyone, not just volunteers. Use your humanity to make selection respectful and warmly good-humored for students. Presenting is not a test. Don't evaluate the thinking: engage it, develop it.
      - Over time, spread presentations over all students. Presenting is a valuable opportunity to learn that every student deserves.
      - Model good listening: Active questioning that shows your interest in comprehending what speaker is trying to communicate, patience, empathy. Avoid "correcting," save that for the summary.
      - Order presentations to start with most concrete, least abstract—even if incomplete. End with presentation closest to grade-level target mathematics.

   B. Encourage questions and comments from audience directed to presenters.

      - "Do you agree?"
      - "Is there something that doesn't make sense?"
      - "What do you like about this way of thinking?"

C. Compare different presentations to bring out the common underlying mathematics.

- "How is this [pointing to a feature of student work] the same or different than this way of showing it [pointing to a different piece of student work]?"
- "How is this way of thinking the same or different from this other way of thinking?"

D. Summarize the mathematics from the lesson using the board work of the student presentations to illustrate the summary.

Think-pair-share is a rich and efficient pedagogic process for language development, as well as for development of mathematical expertise. Each student:

1. Thinks first.
2. Produces language in talk and writing for the partner.
3. Listens to the partner explain his or her thinking about the same problem.
4. Works collaboratively (talk, listen, write, and read) with partner, making sense of problem, solving, discussing mathematics, their thinking, and drafting presentation.
5. Presents to audience of classmates (a few times per month).
6. Participates in whole-class, teacher-led discussions of student thinking.

Routine 3: Turn and Talk with Swapping

Turn and talk with swapping is a very handy routine with many uses. It is efficient: you can do it anytime, it needs little preparation, and it only takes a minute or two.

The Mechanics

- Students should know who their partner is for the lesson, the week.
- Say: "Turn and talk to your partner about [Sonja's way of thinking]. Do you agree? Why?"
- Listen to the hum of talking, when it starts to die down …
- Say: "Switch. Listeners: talk. Talkers: listen."
- Listen to the hum. It will die down quicker. When it does …
- Say: "Swap partners. Tell your new partner …
  - … what your old partner thinks," or
  - … what you are thinking now."
- Swapping is optional.

Consider language proficiency when creating partners. Sometimes it is good for partners to speak the same language and swap partners to include more developed English proficiency with less.

Purposes

- When you want to stimulate thinking and language for whole-class discussion, turn and talk stimulates many students, giving them ideas they want to express.
- When someone says something important with respect to the target of the lesson, use turn and talk to focus thinking and language on the important idea.

- When many students are stuck on a problem, "make an expert" by calling on a student [Carlos], who isn't so stuck to explain his way of thinking. Then have all students turn and talk about Carlos's idea.
- When you don't know how to respond to a good question asked by a student, tell everyone to turn and talk about the question while you gather your thoughts.

Routine 4: Number Talks

Purpose

Number Talks is a structured routine developed to support mental math and computational thinking with students. Most students practice computational skills in math class, but many do not learn about the deep mathematical structures in order to approach those computations with increasing levels of sophistication and creativity. Number Talks have become very popular and there are many video examples and blogs of teachers conducting and adapting this routine with students. Increasingly, more Number Talks resources are addressing ELLs with sentence frames, open-ended questions to **build conversations**, **build fluency**, and **engage in productive struggle**.

Parish (2010) lists key benefits of sharing and discussion computation strategies to: 1) help students clarify their own thinking; 2) consider their peers' math strategies to see if they are logical; 3) to apply new strategies; 4) build a repertoire of math strategies; and 5) become aware and choose more efficient strategies for specific type of problems. All of these are important benefits to learning and language development. In this routine, ELLs have a chance to organize their thoughts, listen to the ideas of others, apply their ideas of others, and with the help of the teacher scribing, ELLs also get access to many visuals that will help them connect ideas and build their computational repertoire.

Humphreys and Parker (2015) have elaborated on Number Talks and have developed a set of principles for Number Talks. These are important to review regularly because they address the social norms and values that support all learners, but are critical to ELLs to be considered rightful members and contributors in the mathematics classroom.

1. All students have mathematical ideas worth listening to, and our job as math teachers is to help students learn to develop and express their ideas clearly.
2. Through our questions, we seek to understand students' thinking.
3. We encourage students to explain their thinking conceptually rather than procedurally.
4. Mistakes provide opportunities to look at ideas that might not otherwise be considered.
5. While efficiency is a goal, we recognize that whether or not a strategy is efficient lies in the thinking and understanding of each individual learner.
6. We seek to create a learning environment where all students feel safe sharing their mathematical ideas.
7. One of our most important goals is to help students develop social and mathematical agency.
8. Mathematical understandings develop over time.
9. Confusion and struggle are natural, necessary, and even desirable parts of learning mathematics.
10. We value and encourage a diversity of ideas.

Procedures

1. The math teacher provides the problem. The choice of problem depends on the instructional goal. For example, 49 x 30 might be a good problem if students are to use rounding and compensating. Math teachers can use number lines, dot figures, ten-frames, and other visuals that pose a problem.
2. Students solve the problem mentally. This gives students quiet time to organize their ideas. We know that ELLs benefit from individual thinking time before having to process the ideas of others.
3. Students show a visual cue when they are ready with a solution, such as holding a finger to their chest to indicate they have at least one method. ("Quiet" form of acknowledgment allows time for students to think, while the process continues to challenge those who already have an answer.)
4. The math teacher calls for answers and collects all answers—correct and incorrect—and records answers.
5. Students share strategies and justifications with peers. The math teacher's work is to faithfully capture students' ideas. At first, this may be challenging as students explanations can seem convoluted or disjointed. But with close listening, math teachers and students can negotiate meaning around students' ideas. Students who are speedy with calculations also benefit by considering a wider range of strategies.

The power of this strategy for ELLs is that it models close listening by the teacher, and gives several opportunities for students to clarify their thinking. Math teachers create deeper math community with the class when they attach student's names to particular methods. The teacher can say, "Let's use Jorge's method to solve this next problem," which elevates Jorge as a competent contributor to the mathematical work of the classroom.

Routine 5: Learning from Mistakes

Purpose

Deep-seated myths about what math is and how it is learned keep students anxious and afraid during math time (Boaler, 2016, Gross Mindset for Math-Mistakes, https://www.youtube.com/watch?v=LrgpKjiQbQw). Early experiences in math give students the message that being good at math means being fast and right as much as possible. If not, one is seen as slow and incompetent in math. The pressure to be fast and correct causes students to dread making "mistakes" for how it makes them feel about themselves and how others will view them. This, of course, flies in the face of what we know how about deep learning and the importance of making and learning from mistakes.

A related component to myths about mistakes is that if one struggles in math, then one is not a "math person," as if this were a trait that some possessed and not others. Research in neuroplasticity is challenging these outdated ideas, showing under proper conditions and support, students can learn far more than what was thought. When students engage in productive struggle and continue to persist, they strengthen neural pathways that help them learn more. Thus, struggle and mistake-making are necessary for learning, but are often at odds with the math teacher's desire to "help" students and ensure their quick success.

For ELLs, making mistakes is a double bind in that they may already be worried about their language skills, and now they must also be concerned about being not speaking unless they are sure they are correct. These worries stall language learning because students will be less inclined to produce language.

Below we provide three structures for harnessing the power of mistakes in mathematics.

1. **Explicitly establish and maintain classroom norms about mistakes.**

   Teachers establish norms in their classrooms, whether they are aware of them or not. These norms may be implicit or explicit. Because the power of mistakes may be still new to learners, we recommend that teachers take time to make the messages about mistakes clear and consistent.

   - Teachers can share kid-friendly resources about the importance of mistakes in math (Jo Boaler has a **free online student course** of short and engaging videos).
   - See the suggested activities for setting up norms around mistakes in **at youcubed.org**.

2. **My Favorite No** (See **My Favorite No: A Great Way to Celebrate Student Mistakes in Math at CollectEDNY.org**.)

   There are many variations to consider but here are some suggested steps for implementing "My Favorite No" routine:

   - The teacher poses a question/problem for students to answer on an index card. This could be done as an exit ticket at the end of a day or at the start of a lesson.
   - The teacher collects the cards and makes two piles: "Correct" and "Almost" ("Yes" and "No").
   - The teacher then chooses an "Almost" answer that is her "Favorite No." The choice is very intentional, based on common errors or misunderstanding from the group along with what is known about common misconceptions.
   - The math teacher can re-write the problem and post it on the board.
   - Students and the teacher analyze the problem together, asking, "What is done correctly?" It is important to focus on what is done right first! Students do a pair-share regarding what is done correctly before sharing out in whole-class discussions.
   - Then the group discusses the error made and what can be learned through this mistake. Once again, having students think independently and then discuss with a partner prior to discussing as a whole group can improve engagement and thinking about this error.

   Note: Math teachers can also share their own mistakes, letting students know that everyone learning makes mistakes.

   For ELLs, "My Favorite No" is beneficial because of the low risk in submitting a response to the initial problem. In addition, there numerous opportunities to discuss ideas with peers, allowing for productive and receptive language skills. These provide a safety net for ELLs to share their ideas in class. By using this structure regularly, the power of mistakes becomes helpful in learning, not just a platitude that teachers might say or put on a poster.

3. Emphasize "exploratory language."

Mercer (2012) describes "exploratory talk" that is useful when students are learning new ideas. Exploratory talk provides opportunities for students to:

- Share half-formed ideas.
- Share knowledge.
- Challenge ideas.
- Evaluate evidence.
- Consider more options.

This stands in contrast to "presentational" talk that is often used when students are called on to display knowledge, often for the teacher to assess understanding. In mathematics, when the over-emphasis on correct and speed answers, exploratory can be curtailed.

Math teachers can model this by using the following phrases that signal these ideas as tentative:

- "I'm not sure, but I think …"
- "I have a hunch that …"
- "This is what I have so far …"
- "Is there another way to think about …"
- "I don't understand. Can you say more about …"

These phrases give permission for students to share ideas even before they are sure they are correct. ELLs can use these types of phrases without the burden of having to be absolutely correct.

We know from brain research that errors can be powerful opportunities for learning language and mathematics. We need to tap into the brain's natural ability to learn from mistakes. The following video clips convey this idea:

- Jack Dieckmann, The Role of Errors: https://vimeo.com/272652231/0bdb10293d
- Phil Daro, Learning from Errors https://vimeo.com/275345528/d23a4016bf

Routine 6: Using Journals in Math[10]

A. A Journal or Notebook for Mathematics Serves Five Important Purposes

1. It says the student's math work belongs to the student and the purpose of the work is to learn; it preserves the work of the student, signifying that the work is valuable. Doing math on loose sheets of paper that get lost and tossed gives an awful message to students: Your math is not important. Your work is only to get credit from the math teacher.
2. It enables draft and revision. The student's initial understanding of a new concept is a draft understanding; it should be routine that the student gets feedback on the draft during pedagogic activities and revises the draft concept so it is more precise, correct, and insightful.
3. It enables pedagogic processes where students read and respond to each other's thinking as expressed in the journals. Students can walk around the room to get good ideas and good language from the journals of others. This is a very efficient way to differentiate and to scaffold language development.
4. A notebook is a basic tool for studying. Students need to learn how to study for a math test if they are going to pass algebra and beyond. Studying with peers using their notebooks is a basic skill.
5. It builds knowledge by providing opportunities for extended writing.

For ELL students, these purposes are best served by using a mix of English and home language.

B. Organization of the Journal

Each *unit* in the year's scope and sequence has a section in the notebook. Within the unit, each lesson has a few pages.

Outline for *each lesson*:

1. Name of lesson or topic, date, name of partner
2. Main problem(s):
   a. Problem
   b. Draft representations of quantities in problem, diagrams, tables, graphs, equations
   c. Draft approaches to solving problem and answering questions that have been posed
   d. Draft solution with revised representations
3. The work of others:
   a. Notes from discussions
   b. Representations of other students that made sense to me
   c. Approaches and solutions of other students that I liked
4. Revised solution with revised representations

10 https://vimeo.com/277133350/93ddb370ca

5. Summary or synthesis of what I learned today:
    a. Draft summary
    b. Notes from teacher led discussion
    c. Revised summary and study notes

Toward the *end of a unit*, students should write a unit summary and study guide in their journals. The study guide should summarize everything they might want to look up during the chapter test:

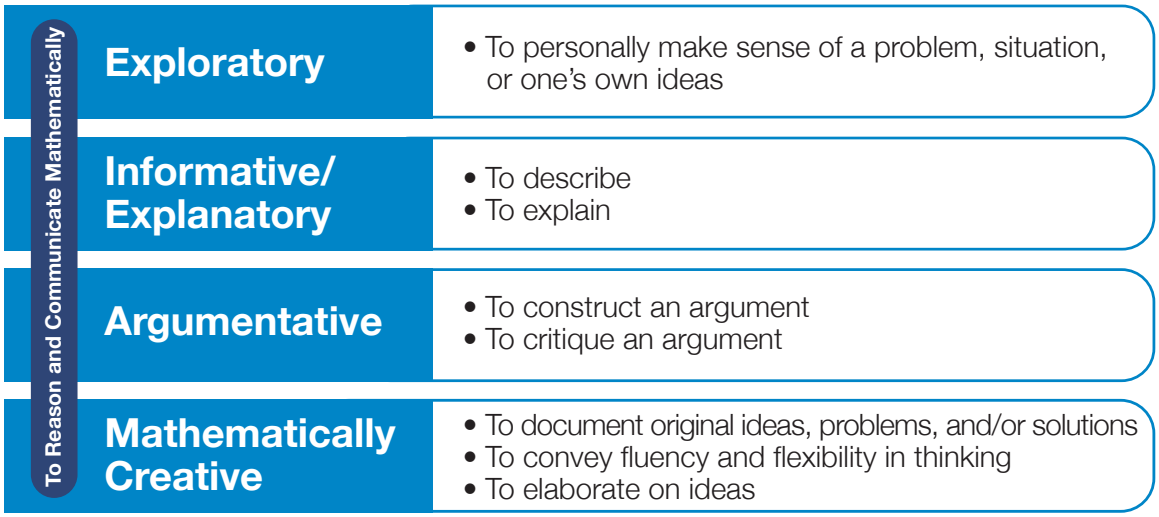
1. What I learned in this unit
2. Example problems and solutions
3. Important language for this mathematics, including symbolic notation, graphs, tables, charts

C. Types of Mathematical Writing

Since the 1970s, "writing across the curriculum" and "writing to learn" as school-wide approaches have been promoted as way to help student learn content. This writing movement included the use of student journals as one key strategy. In mathematics, the translation of writing and journaling work has been less successful, in part, because text types offered as examples in ELA classes tended to focus on narratives and self-expressive forms, without enough attention to more typical forms of mathematical writing such as to explain one's thinking, to formulate an argument, etc. Although leading national groups such as National Council of Teachers of Mathematics (NCTM) have advocated writing in math as a field, there has been little agreement on the forms of writing that are most central to mathematical learning.

In more recent years, a national expert panel was convened to identify and examine the types and purpose of mathematical writing. The results[11] of that convening are given in Figure 1 below. This typology can provide a more focused guide for how to use writing to develop mathematical thinking.

Figure 1. Overarching types of and purposes for elementary mathematical writing.



11 Casa, T. M., Firmender, J. M., Cahill, J., Cardetti, F., Choppin, J. M., Cohen, J., … Zawodniak, R. (2016). *Types of and purposes for elementary mathematical writing: Task force recommendations*. Retrieved from http://mathwriting.education.uconn.edu.

For ELLs, opportunities to capture their thinking usually takes the form of oral expression rather than written expression. So, journaling can promote students' literacy by having students write for a variety of authentic purposes. In terms of language development, in fact, we can re-interpret the bullets in Figure 1 as "language functions." Journals can provide a place to hold student ideas, explanations, drawings, and questions. With feedback, students can revise and refine their work over time. Samples of student math journal entries at various grade levels are available online, https://www.k-5mathteachingresources.com/math-journals.html.

D. Ideas for Math Journals

1. **Model** – Writing about mathematics will likely not come naturally to some students. In fact, many will resist, as this practice may be new, or students may continue to value "answers" rather than reasoning in math. ELLs have felt overwhelmed in trying to produce error-free written language. Thus, it's important for teachers to regularly model what math writing can look like, and that it's acceptable to write down your ideas and refine later.

2. **Writing Tasks** – Journals are best suited for tasks and prompts that required more elaborated thinking such as open tasks, questions about connections, etc. Routine exercises and calculations can be done in their math notebook or elsewhere.

3. **Encourage Visual Solutions** – Journaling is often associated with written sentence and paragraphs. But in math, we use a broader range of tools, such as equations, diagrams, number lines, ten-frames, and many other visual displays. Encouraging students to include visuals in their reasoning often helps them make deeper connections or notice patterns. For ELLs, the more connections, the better. See Figure 2 below for an example of mathematical work that uses color-coding on a task called "Painted Cube."

Figure 2: Painted Cube

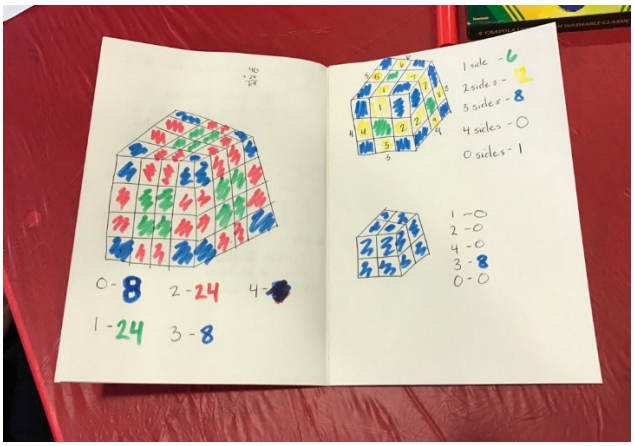


Photo by Jack Dieckmann 26 Jan 2017

4. **Metacognition** – Math teachers can also include short writing prompts that help students become more aware of their own thinking. Sample prompts include:
   - What was something new you learned to day in math?
   - What are you still wondering or confused about in math? Give an example.
   - What did you do to get "un-stuck" on today's math problem?
   - How does what we learned today relate to what we learned yesterday?
   - What do think would better help you learn math?

E. Classroom Management and Motivation of Journaling

Motivate the effort needed to work in the journal by making it serve a purpose for the student:

1. Encourage students to refer to their journals while working.
2. Encourage students to use their notebooks during all tests. The day(s) before a test, have students prepare fresh study guides in their journals. Their study guides make it easier to find important ideas and methods while taking the test. Have students circulate to read the journals of others to get good ideas to put in their own journals. Use sticky notes to have students stick suggestions into the journals of others. Review what students have entered in their study guides and amend the test to align better with what they thought was important. This will reward studying.
3. Encourage students to get good ideas from the journals of others. This can be especially useful if students get stuck or discouraged. Also, students who finish too quickly can be challenged to solve the problem a different way by looking for alternatives in the journals of others. In this way, many more students can get substantial feedback and guidance just in time. This is efficient differentiation.
4. Encourage students to get good ideas for language from the journals of others. Efficient language development.
5. If you are using journals in ELA or notebooks in science, use the same rituals and routines, the same language and expectations wherever it makes sense.

Routine 7: Stronger and Clearer Each Time

Purpose

The purpose of this strategy is to provide a structured but highly interactive opportunity for students to revise and refine both their ideas and their oral and written output.

This routine provides a more specific purpose for students to talk to each other. The main idea is to have students think or write individually about a response, use a structured pairing strategy to have multiple opportunities to refine and clarify the response through conversation, and then finally revise their original written response. Throughout this process, students should be pressed for details and encouraged to press each other for details. Subsequent drafts should show evidence of incorporating or addressing new ideas or language. ELLs have an opportunity to fortify their output by showing evidence of refinement in precision, communication, expression, examples, and/or reasoning about mathematical concepts. Below is an adapted excerpt with suggested procedures from Zwiers, Dieckmann, Rutherford-Quach, Daro, Skarin, and Malamut, 2017.

Procedures

1. **Pre-Write**: Have students, individually, look at a problem and write down their idea/reasoning for solving the problem a certain way, or any thoughts or questions about it. This is the pre-write sample so students can jot their ideas; there will be a post-write to see if the sharing with others makes a difference. [Optional language scaffold for emergent speakers: Provide part of an initial draft for students to begin with that contains the language needed for an important idea.]

2. **Think Time**: Then, give a minute for students to think about what they will say to the first partner to explain their mathematical thinking or their solution strategies. Encourage students to not to simply read from their notes, but to practice oral explanations.

3. **Structured Pairing**: Use a successive pairing structure. Remind students that oral clarity and explaining reasoning are important. Even if they have the right answer or they both agree, the goals are: 1) for the other person to truly understand the speaker's ideas, and 2) to be able to clearly explain their own ideas to others using the language of mathematics.

4. **In Pairs**: When one partner is listening, he or she can ask clarifying questions, especially related to justifying (*Why did you do that?*). The other person then also shares and the listener also asks clarifying questions to draw more language and ideas out of quiet partners if needed.

5. **Switch**: Partners switch one, two, or three more times, strengthening and clarifying their idea each time they talk to a new partner. Optionally, turns can emphasize strength (focus on math concepts and skills) or clarity (how to describe the math to others). Scaffolds can be removed with each successive pairing to build student independence.

6. **Post-Write**: Have students return to seats and write down their final explanations in sentences. (They can use drawings, too, explained by sentences.) Turn in.

7. **Meta-Linguistic Reflection**: Have students identify what elements they improved on in from their first to final drafts. Helping students become more aware of their language choices will help them gain more mastery of their mathematical register.

Appendix B

The Japanese Lesson Model

We stress the idea that English Language Learners can benefit from the Japanese lesson model. This format has a great potential to create a language-rich math classroom where ELLs can develop their academic language. It also opens many opportunities for the math and ENL teachers to collaborate in integrated ENL model. The flow of this *"lesson type*' (i.e., sequence of the lesson) plays to the strength and perspective of English Language Learners by taking advantage of the cultural background, home language, and prior knowledge they bring to the classroom.

The Essentials Components of This Model

Opening

This model is used about two-thirds of the time in Japan. The lesson always begins with an open-ended mathematical task that is cognitively demanding. During the task opening, it is important to create "suspense" that will sustain the students' attention and curiosity. Dan Meyer has done extensive work on the idea of creating suspense in a math lesson (The 3-Act Problems).

Work Time

Students then are challenged with creating an explanation that will make sense to other students. It is very important that they understand that their audience is not the teacher, but rather other students. Therefore, it is important, to keep reminding them who their audience is when they are writing and presenting their explanation. In essence, this is a writing assignment where students can combine writing, diagramming, and any other artifact that will help them accomplish the task—which is making their thinking be understood by the rest of the class.

Explain to Class

While all students should be ready to present, teachers should select three to five presentations from the class. Then, student pairs present to the whole class, keeping in mind that their thinking is the object of the presentation and making sure that other students understand how they made sense of the task. The key to a successful lesson flow is to choose carefully students' work that shows the mathematical progression. If the students presenting are trying to establish eye contact with teachers, remind them that their peers are the audience. Questions should flow between the presenters and the class. The ENL and math teachers should encourage and orchestrate this kind of atmosphere of student-to-student discourse.

Summary

In our experience, math teachers often fail to budget enough time to summarize their lesson and sometime even skip it altogether. However, in the *Japanese lesson model*, the summary is of paramount importance. Adequate time must be budgeted to this component. If necessary, speed up in the beginning of the lesson and slow down at the end. The summary is the closest to "direct instruction," where math teachers make sure to be explicit about the mathematics and the deep connections.

Lesson Structure, Flow, and Analysis[12]

Purpose	Management	Opportunities for ENL & Math Teachers to Collaborate
Opening Activity		
Pose problem; generate curiosity.	Class discussion Phil Daro modeling the opening: https://vimeo.com/275346372/e06904b4b3	**Before the lesson**: • Choose the problem **together**. • Work on possible solution paths together. • Plan how to create suspense about the task. • Make note of possible questions to ask ELLs to support their language development and sense-making related to the problem. **During the lesson:** • Scaffold language, not answer-getting. Use "Three Reads" when a new type of word problem is introduced. Focus on reading comprehension during posing of problem, not how to solve it.

12 **https://vimeo.com/277146952/d220a1aab6**

Purpose	Management	Opportunities for ENL & Math Teachers to Collaborate
Work Time		
Draft and revise explanation of math thinking. https://vimeo.com/275341975/dbe3942d4d	**Think-pair / draft / revise.** https://vimeo.com/275346775/e840bcc783 "Make an expert" / "turn and talk" if needed. Phil Daro modeling work time: https://vimeo.com/275346775/e840bcc783 Phil Daro – Make sure scaffolds are appropriate: https://vimeo.com/275348340/2d0bd2287e	**Before the lesson**: • If possible, make a note of student's prior ways of making sense about similar topics. (Know your ELLs.) **During the lesson**: • Help ELLs comprehend peers and peers comprehend ELLs. The "pair" process has to work in both directions. • Help ELLs find and formulate English phrases to express their own thinking. • Support ELLs' language development. • Provide language scaffolds that are appropriate. • Make sure that ELLs have quality environment to do the "think" part. • Ask questions that will encourage ELLs to "revise." • Slow down the flow of the work when fundamental and important ideas emerge and emphasize the connections. • Monitor their progress. • Remind them who their audience is (i.e., other students, and not the teacher).

Purpose	Management	Opportunities for ENL & Math Teachers to Collaborate
Explain to Class		
Understand each others' mathematical thinking.	Class discusses 3–5 presentations. (NOT: "Ooh, ooh, ooh, pick me!") Phil Daro models "Explain to the class": https://vimeo.com/275349254/903bef3ca8	**Before the lesson**: • Identify the features of a "good" explanation. • Plan for questions and opportunities to allow ELLs to revise their explanations. **During the lesson**: • Facilitate class comprehension of the ELL's presentation, focusing on language rather than mathematics. The mathematics should be the student's. Encourage ELL students to ask questions. • Encourage ELL students to ask questions. Plan ahead to make sure ELLs get opportunity to present, even though they may be reluctant. Set up the presentation to be successful by coaching their preparation during worktime. • Make decisions together on the order of the presentation that will advance the lesson. • Support ELLs in their in crafting their explanations (i.e., important ideas, order of these ideas, language). • Provide feedback that move ELLs toward language development.

Purpose	Management	Opportunities for ENL & Math Teachers to Collaborate
Summary		
Editing draft increases understanding of grade-level mathematics.	Whole-class discussion and direct instruction https://vimeo.com/277467482/8e154460a6	• Students draft summary in journals; teacher leads discussion of summary of mathematics learned. Use examples from student work and talk during lesson. • Extend language used during lesson to more precise and correct academic language and mathematical representations. Students revise summaries based on discussion. Encourage reading the summaries of others to get good ideas and language. • Make explicit connections to the learning intentions. • Highlight language development. • Attend to the impact on student learning based on a criteria for success. • Emphasize major points to be learned.
Apply Learning		
Apply target mathematics for related problems.	Solo-partner, peer tutoring, homework	**Before the lesson**: • Make selection of 2 to 3 problems for homework together. **During the lesson**: • Go over first problem for language challenges; match partners to optimize embedded peer tutoring and language development. • Encourage ELLs to collaborate with English-proficient students.

Appendix C

Exercise – Reflection questions to foster the collaboration of the integrated ENL model
Commissioner's Regulation Part 154 http://www.nysed.gov/common/nysed/files/programs/bilingual-ed/part154qa_06_08_15.pdf
These questions are intended for team of school professional learning communities (PLC) to work toward improving the collaboration between the ENL and content (math) teacher.

A. First, answer these questions individually.

B. Then, compare your responses to find common grounds with other members of your team.

C. Together, view the available videos clips.

D. Compare and contrast your responses with the answers provided in the video clips.

Questions:

1. What is agency in the math classroom? **https://vimeo.com/272638159/a394764a8d**	**2.** Why is academic language important for ELLs? **https://vimeo.com/272642348/124ef2c946**
3. Why is language production of particular importance in the math classroom? **https://vimeo.com/272640001/db0c4f309f**	**4.** How can we promote mathematical discourse? **https://vimeo.com/272647256/97f39a64dd**
5. Why is trust important for teachers' collaboration? **https://vimeo.com/272622164/c22752f979**	**6.** What are some first steps that teachers who are working together in the integrated model can implement? **https://vimeo.com/276917977/9e3bb41ca8**

7. What can the ENL and math teacher do to deepen their work in the integrated model?
https://vimeo.com/276925172/9ece135b62

8. What should the ENL and math teachers keep in mind when planning and implementing the Japanese lesson model?
https://vimeo.com/276913446/0797c52fce

9. How would you describe the relationship between "gaps" in prior knowledge and ELL students getting the math "wrong"?
https://vimeo.com/276927331/c7b533a601
https://vimeo.com/275345528/d23a4016bf

10. What are the most common language genres in mathematics? How do they differ from other disciplines?
https://vimeo.com/277123921/5e14c9544d

11. How can Writing in Journals help build knowledge?
https://vimeo.com/275344456/a1a83ca25d

12. What is the role of errors in learning mathematics?

Jack Dieckmann:
https://vimeo.com/272652231/0bdb10293d

Phil Daro:
https://vimeo.com/275345528/d23a4016bf

13. What are some things you would consider in selecting academic vocabulary?
https://vimeo.com/272655961/fa5b89a639

14. What are some things to consider when planning appropriate scaffolds?
https://vimeo.com/272650630/879fd1c9cd

Appendix D

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Appendix E

List of Videos (listed in the order they appear throughout the document)

As a matter of convenience, this appendix has all the videos embedded throughout the document into one single place. To access them, you will need to download a **QR code reader** to your smartphone or tablet with a camera. We recommend that you download a QR code reader app that is made specifically for our phone or tablet brand.

Video Name, Link and QR Code

A message from Jack Dieckmann: **https://vimeo.com/272643845/14a0050aa0**	A message from Phil Daro **https://vimeo.com/276912258/0c290b309e**
Pay attention to mathematical language forms: Genres **https://vimeo.com/277123921/5e14c9544d**	Convince yourself, convince a friend, convince a skeptic. **https://vimeo.com/275342920/13eefaa8e0**
Teaching the Genres of Mathematics: Teachers' Ideas **https://vimeo.com/276971411/ba1ca16e19**	Formative Assessment **https://vimeo.com/272619001/d4d0b7f1dd**
I believe in you! **https://vimeo.com/275339815/ddad3ad711**	Academic vocabulary **https://vimeo.com/272655961/fa5b89a639**

Avoid GPSing **https://vimeo.com/277336244/d81a08dbcc**	The Three Reads Routine **https://vimeo.com/276929668/98aceb6260**
Jack Dieckmann, The Role of Errors **https://vimeo.com/272652231/0bdb10293d**	Phil Daro, Learning from Errors **https://vimeo.com/275345528/d23a4016bf**
Using journals in math **https://vimeo.com/277133350/93ddb370ca**	Draft and revision **https://vimeo.com/275341975/dbe3942d4d**
The Three Reads Routine **https://vimeo.com/276929668/98aceb6260**	Phil Daro modeling the opening **https://vimeo.com/275346372/e06904b4b3**
Phil Daro modeling work time **https://vimeo.com/275346775/e840bcc783**	Phil Daro – Make sure scaffolds are appropriate **https://vimeo.com/275348340/2d0bd2287e**

Phil Daro models "Explain to the class" **https://vimeo.com/275349254/903bef3ca8**	Phil Daro – Whole-class discussion and direct instruction **https://vimeo.com/277467482/8e154460a6**
The role of revising in learning **https://vimeo.com/275341975/dbe3942d4d**	Modeling attitudes toward the learning of mathematics **https://vimeo.com/275343842/6e1f05e3a0**

Department of Education

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Additional Considerations for Supporting ELs

Engagement: ELs learn best when they are actively engaged in the learning process. This can be accomplished by activating interest in the content and/or the teacher and by making sure they feel comfortable participating.

- *Interest:*
  - Build in opportunities for students to informally connect with you and one another, perhaps at the beginning or end of class.
  - Get to know student interests and adapt content to include those topics.
  - Offer students choice in assignments when possible.
    - Allow students to submit written or audio responses to assignments.
    - Provide choice in topic or how they engage with the topic.
  - Take "brain breaks" periodically with movement or brain games.
- *Participation:*
  - Assign students partners or small groups to increase speaking opportunities. Group students strategically by language level or content knowledge (sometimes heterogeneously, sometimes homogeneously). Regroup regularly.
  - When in small groups, assign roles to individual students and rotate these roles.
  - Invest students in the content by stating a clear purpose at the beginning of the lesson.
  - "Warm call" students by telling them that you will be calling on them to respond.
  - Give students the opportunity to share with a peer/the teacher or write prior to sharing out whole group (think-pair-share, numbered heads together, talking chips, etc)

Access: It is important to continue using the established curriculum, adapting for remote learning and language needs where possible/necessary. Scaffolds and feedback are methods to maintain rigor while still providing access points to instruction.

- *Scaffolding:*
  - Provide sentence frames and/or stems for responses.
  - "Chunk" content of classes and/or texts: stop frequently and provide opportunities for students to engage with the content (e.g., by answering a question about the content or summarizing it).
    - Indicate specific parts of the text that you want students to re-read for important information.
  - Provide graphic organizers and model their use.
  - Provide templates for writing and model their use.
  - Use closed-captioning for videos.
  - Include information that uses all modalities—written, auditory, and visual--so that students see it in multiple ways.
  - Use leveled texts where appropriate.

- Pre-teach vocabulary by providing students with a visual vocabulary list prior to a lesson.
- For students who are literate in their home language, provide pre-readings in that language to build schema.
- Chart key evidence/ideas throughout the lesson.
- Teach note-taking skills.

- *Feedback and reflection:*
  - Provide specific feedback (both positive and areas for growth) for both academic work and behavior.
  - Check in with students regularly.
  - Provide self-reflection and self-evaluation opportunities.
  - Provide rubrics and exemplars.

Technology: Technology can provide us with easy ways to adapt content to the needs of our students. However, it is also important that we recognize that not all students have access to technology at home, and we must provide content that can be adapted/offered to students that does not require it.

- *Advocacy:*
  - Explore opportunities with the school and community partnerships to expand technology access for families who need it.
  - Contact local news channels to see if they are willing to stream at home learning during "off peak hours".
- *Skill-building:*
  - Suggest free keyboarding sites to improve students' skills.
  - Provide access to online math or reading programs.
- *Online/at home learning:*
  - Provide a mixture of synchronous and asynchronous learning opportunities. Emerging ELs may need more synchronous support.
  - Create short videos of yourself explaining content or giving directions. Include closed captioning when possible.
  - Prioritize use of familiar online resources first before adding new tools.
    - If you incorporate new online resources, include a video of yourself showing how to access and use them.
    - Explore digital components that are included in your existing curriculum resources to support learning.
  - Consider how lessons may be adapted and offered in packet form for students who lack reliable technology access.
  - Incorporate opportunities for home-based learning using commonly found household items. For example:
    - Watch a television show and write a brief summary or identify new words learned.
    - Measure, describe, and compare items found around the house.

Student and family connections: Family and guardian engagement can increase the likelihood that students will be able to fully access and engage with schoolwork. Keep in mind the cultural norms that may exist for your MLLs, and be respectful of those when engaging with families and guardians.

- *Scheduling:*

- Create a schedule for regular individual conversations with students.
- Create office hours where you (or a bilingual staff member) will be available.
- Provide an overview of the learning activities scheduled for the week, allowing flexibility for family schedules and responsibilities. Maintain consistency.
- Provide students and families with one location to access everything they need: schedules, lessons, and resources needed. Ensure that it is able to be accessed via mobile device.

- *Relationship building:*
  - Connect regularly with families, preferably with phone calls or video conferencing. Use technology translation only as a backup when personal connection isn't possible.
  - Encourage families to continue use of the home language, enriching with literacy activities when possible.