

English Language Development Strategies in Mathematics

- 1. Grouping Structures.** It is important for teachers to incorporate different grouping structures in the classroom. Possible grouping structures include partners, triads, and small groups of 4-5 students. The choice of structure will depend upon the purpose of the lesson/activity. Partners can be very powerful when students are involved in problem-solving. Think-pair-share is a simple structure for students to learn and practice. Each student thinks individually about the problem or question. This think time allows students an opportunity to gather their thoughts so they can contribute to a later conversation with ideas or questions. After think time, students pair with a peer to discuss their ideas and reconcile their understandings. Using this structure allows teachers to pair students of different language development levels to work together on a common task and work toward achieving specific language objectives. Small groups can accomplish the same language goals of reading, writing, listening, and speaking by working together on tasks. Students can be assigned various roles of facilitator, recorder, or reporter.
- 2. Understanding the Problem/Reading the Story.** Students should be encouraged to think of word problems as short stories. Thus, they can apply the same reading strategies they use for making meaning from other texts. Engaging students in asking questions and discussing the word problems is very beneficial for English Language Learners (ELLs). Pertinent questions would be: What do I know for sure? What do I want to know or do? Are there any special conditions I need to consider? Another important step is to encourage students to make connections to prior experience, to the world, and to their important mathematical ideas. After the students have made sense of the problem, they must plan how to solve it. Guiding students to consider different representations (manipulative, pictures, graphs, written language, symbols, tables, equations, action movement, oral language, or mental images of real world situations) will be especially beneficial for ELLs (Hyde, 2006).
- 3. Writing Problems.** Giving students opportunities to write their own problems, specifically word problems, will support numerous writing skills. When students engage in writing problems, they demonstrate their understanding of the mathematics but also their understanding of sentence structure, vocabulary, grammar, and punctuation. Writing problems demands clear, concise, and complete ideas. After writing problems, their peers should read them to make sure they are complete and make sense. Students can then revise their problems based on that feedback.
- 4. Deciphering the Language of Mathematics.** Language can be confusing because some words are used in both everyday English and mathematics (square, similar, range). Also, certain terms learned together can be challenging (equation and expression, hundreds and hundredths, intersect and intercept). One strategy to use with students is a partnering activity where students study the terms and uncover the differences between them. They focus on these differences and create a poster, skit, web page, or other product that highlights what each term means and how the terms are different. Some type of visual artifact may be posted on a word wall for future reference (Hunsader, Kersaint, Richards, Rubenstein, and Thompson, 2008).

5. **Use of Graphic Organizers.** Graphic organizers are an instructional tool that visually organize information so that it can be understood, remembered, and applied. These organizers aid students in reading comprehension, writing, and oral conversation. In mathematics, concepts webs, charts, KWL charts, Venn diagrams, and the Frayer Model are particularly useful. Graphic organizers allow students to make sense of the important ideas of mathematics. Students make connections between existing knowledge and new concepts to be learned. They are able to organize information obtained from written or oral texts, develop and practice reading strategies, increase retention, activate schema as a pre-reading or pre-listening activity, and organize ideas for writing or discussion. Multiple Representations Charts support students in vocabulary and language development. These charts help students develop conceptual understanding through writing by giving them an opportunity to explain and make connections among vocabulary symbols, concepts, and procedures (Hunsader, Kersaint, Richards, Rubenstein, and Thompson, 2008).

Mathematical Example	Real-Life Example
Visual Example	Explanation in Words

6. **Word Walls.** Word walls come in many different formats. Classroom word walls are developed by identifying the important vocabulary, making strips with the vocabulary words listed, posting these strips on the wall, and referring to these posted words when the terms are introduced. For ELLs, adding a visual to these strips is important. Students can create individual word walls in their notebooks. Using the Frayer Model as a graphic organizer in the individual word walls may help with consistency from student to student.

Definition (in own words)	Characteristics
WORD	
Examples	Non-Examples

7. **Modeling of Think Alouds.** Teachers should use the strategy of thinking aloud as they read through a problem so students can experience the thought processes. After the teacher models it several times, students can practice a think aloud with a partner. Students will be supported not only in the problem-solving process but also in the ability to express themselves.

8. **Learning Journals.** Learning logs can be beneficial in helping students to explain their thinking, use new mathematical vocabulary, and demonstrate their learning. ELLs may need some scaffolding by providing them with writing frames to assist them with organization. When introducing any new tool, it is important for the teacher to model its use. If students have difficulty organizing their thoughts before writing, the teacher can initiate a talk time first. Sometimes if students discuss what they want to write first, they are more confident and successful in transferring their thoughts to paper.
9. **Academic Language Scaffolding.** Language Scaffolding is a step-by-step process of building student's ability to complete tasks on their own. Students identify mathematics vocabulary by participating in an introductory activity. Scaffolding consists of several strategies used in conjunction to "shelter" curriculum content for ELLs. These strategies include modeling the use of academic or technical language; contextualizing academic or technical language through the use of visuals, gestures, graphic organizers, and demonstrations; and using hands-on learning activities that involve the use of academic or technical language.
10. **Directed Reading-Thinking Activity.** This activity engages students in the processes of reading and is applicable when reading a mathematics textbook. Students take a quick look at the titles, captions, charts, pictures, or graphs in the lesson. Students predict what they think the main ideas of the lesson will be. Then students read the text of the lesson to determine how accurate their predictions were. This strategy enables students to get personally involved with the text and gives them a purpose for reading.