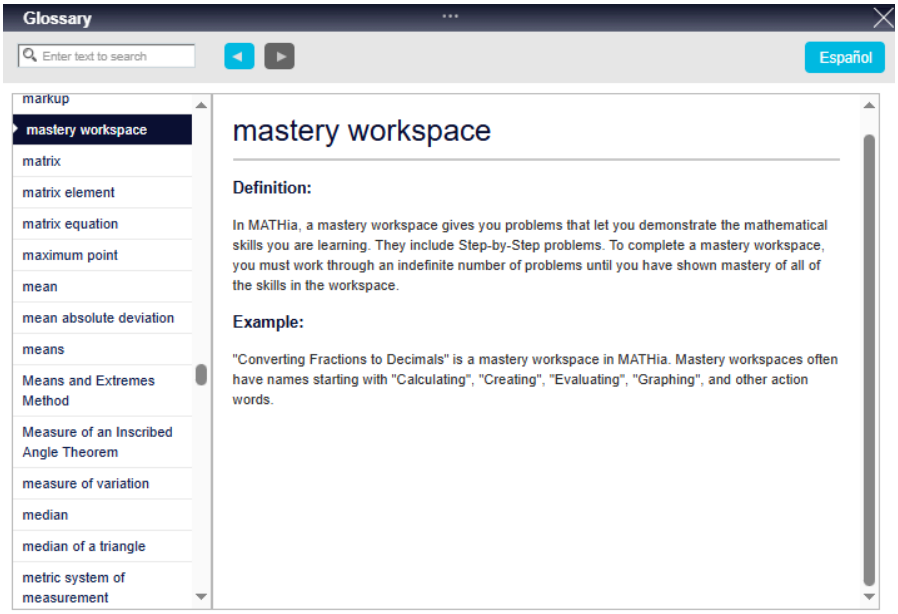
CARNEGIE LEARNING

Making Sense of Mathematics

Connecting Discourse, Vocabulary, and Representations in Carnegie Learning Supplemental Math

Carnegie Learning's Texas Supplemental Math helps students make sense of mathematics by integrating meaningful discourse, precise academic vocabulary, and multiple mathematical representations. MATHstream engages students in interactive, adaptive video lessons that emphasize discourse and collaboration, prompting them to articulate reasoning, reflect on peer strategies, and connect concepts to real-world contexts. Meanwhile, MATHia personalizes practice through interactive tools, animations, worked examples, and multi-level hints that support exploration of multiple representations—visual, numerical, algebraic, and verbal—helping students make meaningful connections across ideas. Both platforms embed academic vocabulary development by encouraging students to use precise mathematical language, reflect in writing, and draw from integrated glossaries and context-based problems. This shared focus on discourse, representations, and vocabulary ensures that students practice procedures and communicate their mathematical thinking, internalize key terms, and develop transferable problem-solving skills.



Developing and Using Academic Mathematical Language

MATHia and MATHstream foster active learning, collaborative discourse, and reflection, which naturally promote vocabulary development. To support students' use of academic mathematical vocabulary in both MATHia and MATHstream, educators should purposefully embed opportunities for students to encounter, apply, and refine precise mathematical language in authentic contexts.

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Teachers can begin by explicitly modeling correct usage of academic terms during instruction, connecting multiple representations—visual, algebraic, numerical, and verbal—to reinforce conceptual understanding and highlight the meaning and utility of each term. They should consistently refer students to the Academic Glossary in software, and set clear expectations for using complete sentences when answering questions, explaining reasoning, and justifying solutions.

In peer and whole-class discussions, teachers should structure tasks so students must articulate their thinking, analyze others' strategies, and explain the reasoning behind correct and incorrect responses. Facilitation techniques include revoicing student ideas in formal terminology, asking clarifying questions, and prompting students to restate peers' responses in accurate math language. In MATHia, animations, multi-level hints, and step-by-step examples offer opportunities for students to hear and read target vocabulary in context. At the same time, Explore Tools, Classification Tools, and Worked Examples provide interactive practice to reinforce these terms in varied problem-solving scenarios.

Anticipating a variety of student answers, both correct and incorrect, is essential for educators. For example, when students conflate "slope" with "y-intercept," teachers can guide them to compare multiple representations to clarify the distinct roles of each parameter. Similarly, when a learner misinterprets a transformation description, the teacher might use dynamic graphing tools in MATHia to visually demonstrate the correct movement and contrast it with the error. Exemplar responses should model precise vocabulary use and connect mathematical concepts to real-world applications. At the same time, redirection should focus on diagnosing the misconception and providing targeted prompts that lead students to self-correct. Over time, repeated cycles of modeling, peer discussion, feedback, and self-assessment, built into both MATHia's adaptive pathways and MATHstream's interactive videos, help students internalize academic mathematical vocabulary as a natural part of their problem-solving process.

Facilitating Mathematical Discourse and Responding to Thinking

Mathematical discourse remains an essential part of MATHia and MATHstream, even when students work individually. Those in the same workspace receive similar, but not identical, problems, encouraging student-to-student discussions about strategies rather than just sharing answers. With LiveLab, you can monitor progress and initiate conversations that deepen student understanding. Self-help tools further support learning by modeling productive self-talk, guiding students in developing the internal dialogue needed for mathematical reasoning.

MATHia and MATHstream help students recognize that there are often multiple valid ways to solve problems, while requiring them to make sense of mathematics through active engagement. Streams and workspaces present tasks in multiple representations, verbal, algebraic, graphical, and numerical, and prompt learners to solve problems using different strategies, compare approaches, and justify their reasoning. For example, Grade 6 students may solve equivalent ratio problems using double number lines, tables, or graphs; Grade 7 students might approach percent change with proportions and then equations; Grade 8 students explore transformations through coordinate rules, geometric reasoning, and visual tools; Algebra I students compare factoring, completing the square, and the quadratic formula; and Geometry students determine triangle congruence using SSS, SAS, ASA, or AAS, defending their choice of theorem.

Both platforms ensure that students have multiple opportunities to do, write about, and discuss mathematics with peers and educators. Collaborative classroom tasks, reflection prompts, and “Who’s Correct?” analyses encourage students to explain their thinking, critique others’ reasoning, and build on one another’s ideas. Embedded supports in MATHia, such as multi-level hints, exploratory tools, and step-by-step guidance, allow learners to explore alternative solution paths while still meeting the same learning goals. Real-world contexts and structured discourse foster deep understanding, helping students see mathematics not as a single set of steps to memorize, but as a flexible, creative process where diverse methods can be compared, refined, and applied.

Supports for emergent bilingual students include MATHstream Spanish closed captioning with English audio, Spanish audio, text, and closed-captioning in MATHia, and the Academic Glossary, which helps them build background knowledge, increase comprehension, and make cross-linguistic connections.

Making Sense Through Multiple Representations

MATHia and MATHstream help educators create learning environments where students actively share and reflect on their problem-solving approaches. Both programs provide multiple points of entry for each task—through varied contexts, representations, and strategies—so that students can engage in ways that match their current understanding.

For educators, MATHia provides real-time reports and progress data that reveal how students approach problems, where misconceptions emerge, and which strategies they apply. This actionable insight allows teachers to ask targeted follow-up questions, prompt students to reconsider their reasoning, and connect their method to broader mathematical principles.

MATHstream extends this support by modeling high-quality questioning and feedback strategies in its interactive video lessons. These videos demonstrate how to sequence questions to elicit student thinking, validate partially correct reasoning, and guide students toward more precise or generalized strategies. Educators see examples of how to prompt for justification, encourage comparison of multiple approaches, and leverage student responses, both correct and incorrect, as opportunities for deeper discussion.

Together, MATHia and MATHstream provide not just rich student tasks, but also the professional guidance and embedded prompts educators need to foster mathematical discourse, address misconceptions in the moment, and help students become confident, reflective problem solvers. MATHia and MATHstream foster a classroom environment where doing, discussing, and writing about math are part of daily practice. Students share and evaluate reasoning, respond to peer ideas, and refine their approaches.