MATHEMATICAL DISCOURSE GUIDE

Oral and Written Discourse in the Magma Math Classroom

This guide shows how to use Magma Math to build mathematical discourse into your daily instruction. Every feature described here is available in every assignment, for every student. Translation, text-to-speech, voice recording, the Student Canvas, and manipulatives are not separate accommodations for emergent bilingual students. They are the default tools your students use to solve, explain, and discuss mathematics. The strategies in this guide show you how to use what is already built into the platform to develop academic vocabulary, increase comprehension, build background knowledge, and make cross-linguistic connections.

This guide is organized into two parts: oral discourse and written discourse. Each part addresses four areas aligned to the ELPS framework and is designed to be used alongside every Magma Math assignment as embedded instructional guidance. The routines described here are not add-ons. They describe how to use what is already built into every lesson to develop academic vocabulary, increase comprehension, build background knowledge, and make cross-linguistic connections. For ELPS alignment across all four language domains and proficiency-level-specific scaffolds, see the **Academic Language Proficiency Guide.**

PART 1: ORAL DISCOURSE

Developing Academic Vocabulary Through Oral Discourse

Academic vocabulary develops when students use mathematical terms in context, not when they memorize definitions. In Magma Math, the pathway to vocabulary runs through solving, recording, and discussing.

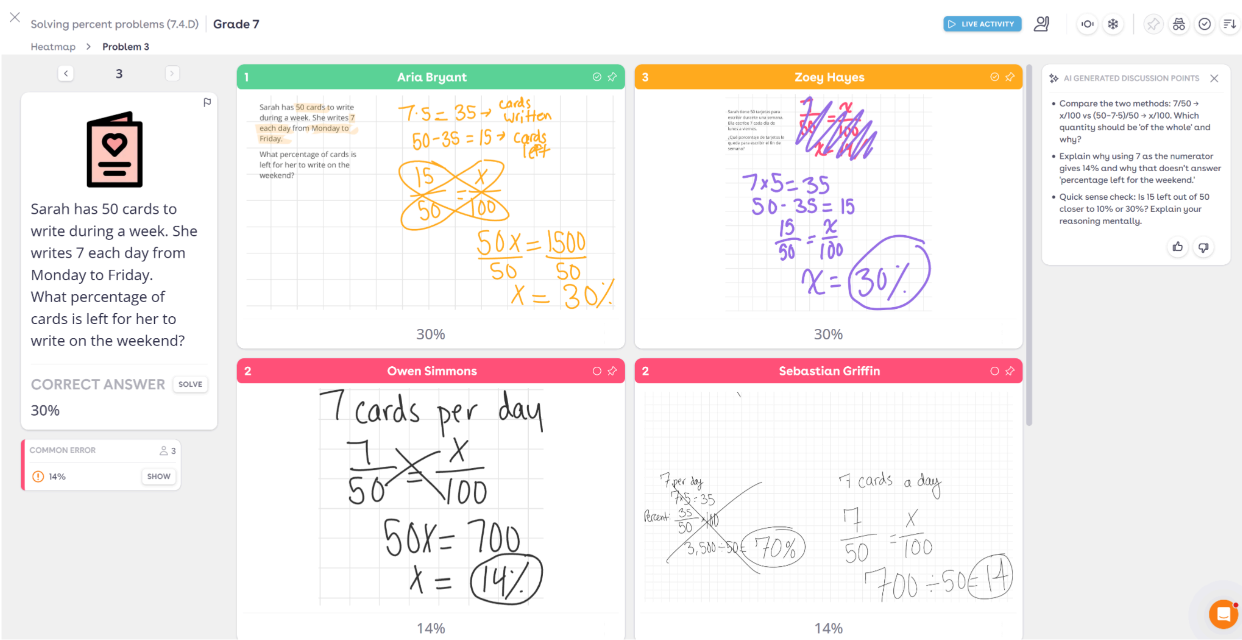
Before the problem: pre-teaching key terms

Each Magma Math assignment identifies the four highest-leverage mathematical vocabulary terms for that lesson, each with three contextual examples. Before students begin solving, use this vocabulary feature as the anchor for a brief pre-teaching routine. Display each term and read it aloud, asking students to repeat it. Show the three examples and ask students what they notice across all three: 'What is the same in each of these? What does that tell us about what this word means?' For emergent bilingual students at Pre-Production and Beginning levels, pair this with the translation toggle to show the term in the student's home language alongside English, and point out cognates explicitly where they exist: equation/ecuación, fraction/fracción, vertex/vértice. This routine takes two to three minutes and ensures that when students encounter these terms in problem text, hints, or peer discussion, they are not meeting the language for the first time.

The routine: Students solve on the Student Canvas, using drawings, equations, and manipulatives to show their thinking. After solving, each student records a voice explanation of their approach. This is the first opportunity to practice saying mathematical terms aloud. A student who drags fraction bars on the canvas to compare two fractions now has to say the words: numerator, denominator, equivalent. The voice recording captures this language and makes it reviewable.

Next, the teacher selects student work to display using **Teacher Playback**. The student whose work is shown explains their thinking to the class. The teacher facilitates: "You said you made them equal. What is the mathematical term for what you did?" This is where everyday language becomes academic language. The teacher pushes for precision: not "the top number" but "the numerator." Not "I split it" but "I partitioned the whole into equal parts."

Discussion Points, generated by Lava AI, provide follow-up questions that scaffold from accessible language toward precise mathematical vocabulary. The teacher uses these to keep the conversation moving and ensure that key terms surface naturally through discussion rather than through direct instruction alone.



Teacher Playback with Discussion Points prompting students to name strategies using academic vocabulary

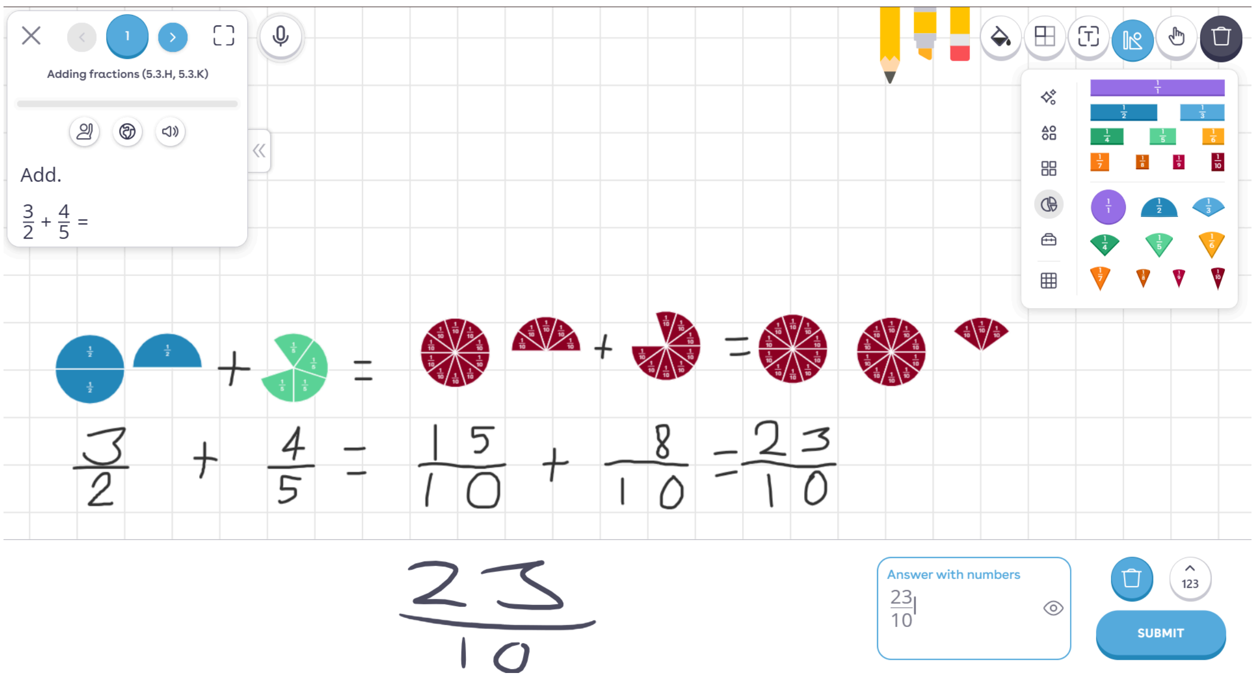
Increasing Comprehension Through Oral Discourse

Comprehension deepens when students explain their reasoning and hear how others approached the same problem. The tools in Magma Math make this possible even when students are still developing English proficiency.

Before discussion: Students access the problem through **text-to-speech** in their preferred language and the **translation toggle**, which shows the problem in both the home language and English. These tools remove the barrier to understanding the task so that students arrive at the conversation ready to talk about the mathematics, not stuck on decoding the language.

During solving: Students build their solution using **manipulatives and visual representations** on the canvas. Dragging fraction bars, drawing area models, and labeling diagrams are all forms of meaning-making. A student who constructs a visual model understands the problem in a way that is deeper than reading alone can provide.

During discussion: The teacher pairs students to explain their approach to a partner. One student points to their canvas and walks through each step. The partner asks clarifying questions: "Why did you split it into fourths?" "How did you know those were equivalent?" These exchanges force both students to articulate their understanding and fill in gaps. The teacher then brings selected solutions forward using **Teacher Playback** and facilitates whole-class discussion, asking the class to compare two different approaches and explain which one they find clearest.



Student canvas with manipulatives, handwritten work, and answer entry used together to solve a fraction addition problem.

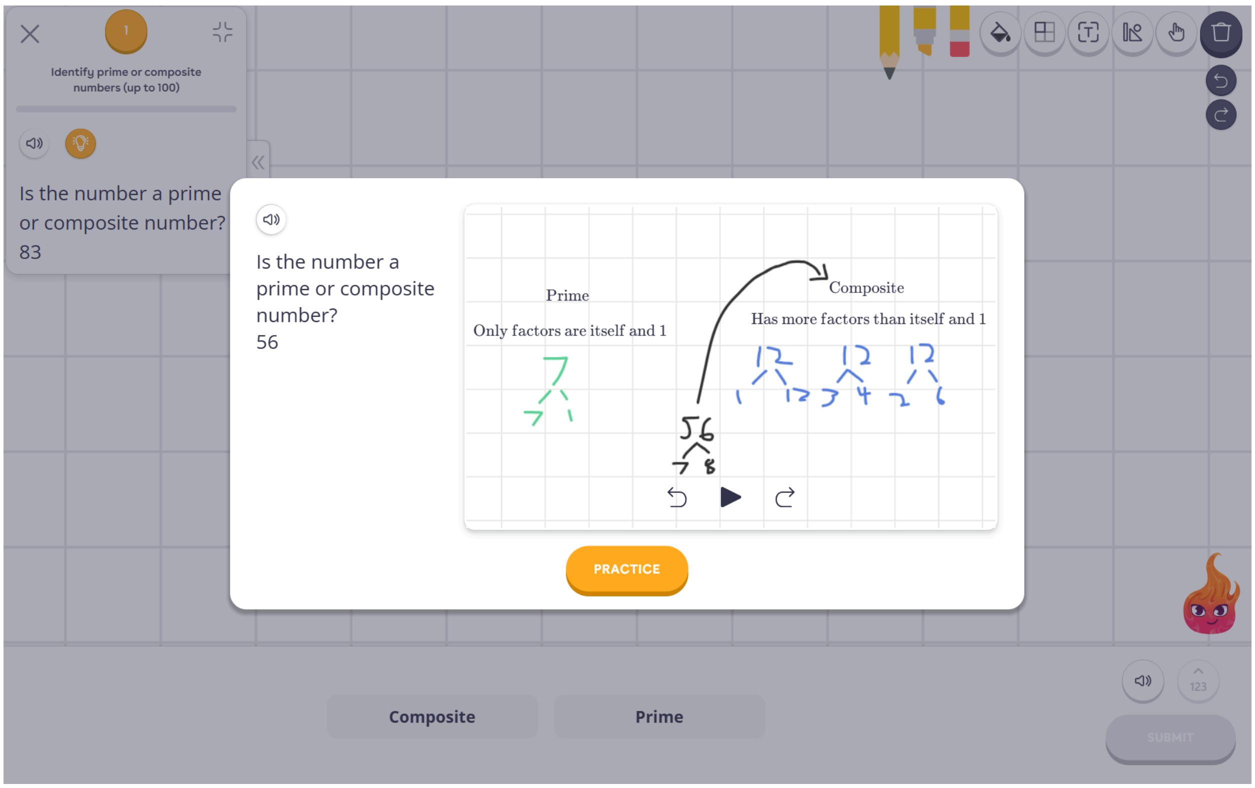
Building Background Knowledge Through Oral Discourse

Background knowledge is what students already know that helps them make sense of new concepts. A student who understands equal sharing from everyday life has background knowledge for division. A student who learned area in a previous grade has background knowledge for volume. The goal is to activate and connect this prior understanding before students encounter new or more demanding mathematics.

Practice Mode videos build background knowledge before students attempt problems. These are visual, step-by-step demonstrations that show how a concept works. Because they are visually based rather than text-heavy, they are accessible across language proficiency levels. After watching, the teacher can ask: "What did you notice? What looked familiar? What connects to something we have already learned?" This discussion activates prior knowledge and gives students language for the new concept.

Mild problems serve the same function. By starting a lesson with problems that activate earlier understanding, the teacher gives the whole class a shared entry point. The teacher uses **Teacher Playback** on a Mild solution first, leading a brief discussion: "What strategy did this student use? Where have we seen this before?" Students make oral connections between what is familiar and what is new.

Playback lets the teacher replay a student's solution step by step, showing how their thinking evolved. This is especially powerful for building background knowledge because the teacher can pause at key moments and ask: "What did they draw here? How does this connect to what we worked on last week?" The visual record of student thinking becomes a tool for oral reflection.



Practice Mode video demonstrating a step-by-step walkthrough of a concept before the student attempts the problem.

Partner talk and small-group discussion are where oral comprehension deepens. Magma Math supports these structures through the Student Canvas and the teacher's ability to pin and display selected student work for the class, but the teacher must set up the interaction explicitly.

For partner talk: after students solve independently on the canvas, pair students and give each a role. The first student points to their canvas and walks through their solution using a sentence stem: 'I solved this by ___. First I ___, then I ___.' The second student listens and then asks a clarifying question: 'Why did you ___?' or 'How did you know ___?' Switch roles. This structure gives both students a speaking and a listening turn and creates the restating and clarifying exchanges the ELPS speaking domain expects.

For small-group discourse: use the teacher's ability to pin and project a student's canvas work to focus the group's attention on a specific solution or representation. Assign a discussion prompt from the AI-generated Discussion Points. Ask each student to respond using a sentence stem before open discussion begins: 'I agree/disagree because ___.' or 'I would have solved it differently by ___ because ___.' This keeps all students accountable to producing academic language, not just listening to whoever speaks first.

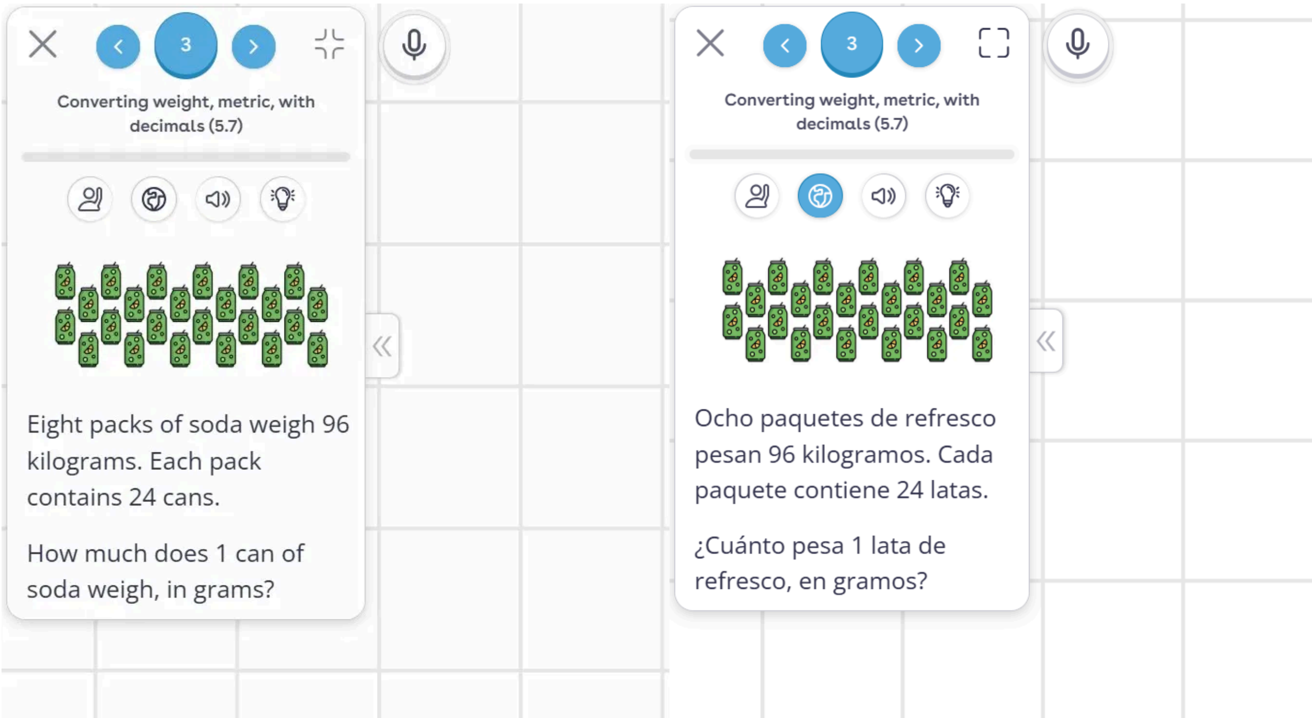
Making Cross-Linguistic Connections Through Oral Discourse

Emergent bilingual students bring a powerful resource to the mathematics classroom: they know mathematical ideas in more than one language. Cross-linguistic connections help students see that mathematical vocabulary is not isolated to English and that their home language is an asset.

The translation toggle shows the same problem in the student’s home language and in English, side by side. The teacher can display this for the whole class and ask: "Look at the problem in English and in Spanish. What words do you recognize in both? What sounds similar?" Students identify cognates aloud: equation/ecuacion, variable/variable, fraction/fraccion, proportional/proporcional. This is an oral discourse activity that builds vocabulary in both languages simultaneously.

Text-to-speech lets students hear the problem read aloud in their home language, then in English. Hearing the same mathematical terms in both languages reinforces the connection. The teacher creates space for partner talk where students discuss how they say the same mathematical idea in different languages and notice where the terms overlap.

When the teacher models these connections explicitly, naming a cognate or showing translation side by side during a whole-class discussion, the message is clear: your home language is a legitimate and valuable tool for learning mathematics.



Translation toggle showing the same math problem displayed in English and Spanish side by side

PART 2: WRITTEN DISCOURSE

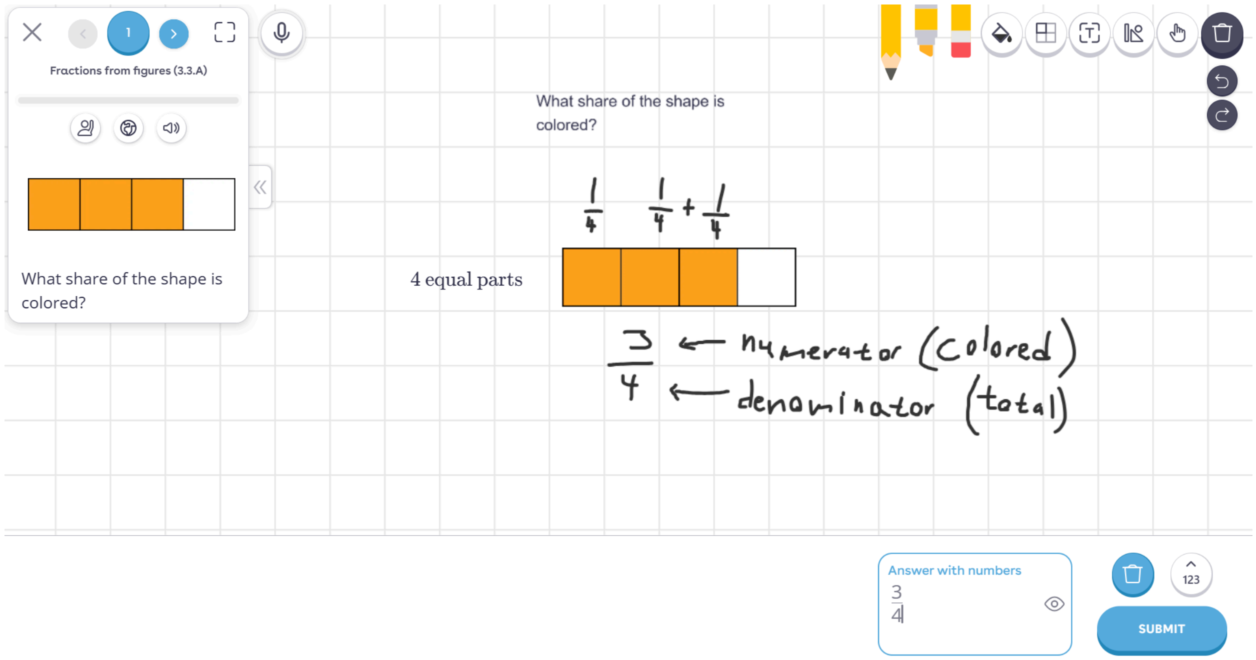
Developing Academic Vocabulary Through Written Discourse

Written vocabulary develops when students use mathematical terms in their own explanations, not when they copy definitions. The Student Canvas is where this happens.

When students solve on the canvas, they label their drawings and models with mathematical terms. A student solving a fraction comparison labels the parts: "numerator," "denominator," "equivalent fraction." A student modeling area writes "length," "width," "square units." This labeling is written academic vocabulary in context.

The **difficulty tiers** (Mild, Medium, Spicy) scaffold the vocabulary demand naturally. Mild problems require students to identify and name. Medium problems require students to explain and compare, using terms like "represent," "equivalent," and "relationship." Spicy problems require students to analyze, evaluate, and justify, using language like "therefore," "because," and "this proves that." The progression builds written academic vocabulary incrementally.

Voice recording with transcription bridges oral and written vocabulary. A student who can say "I decomposed the fraction" but struggles to write it can record their explanation and see it transcribed. This captures academic vocabulary in written form and helps students see their own mathematical language on the page.



Student canvas showing academic vocabulary in written annotations

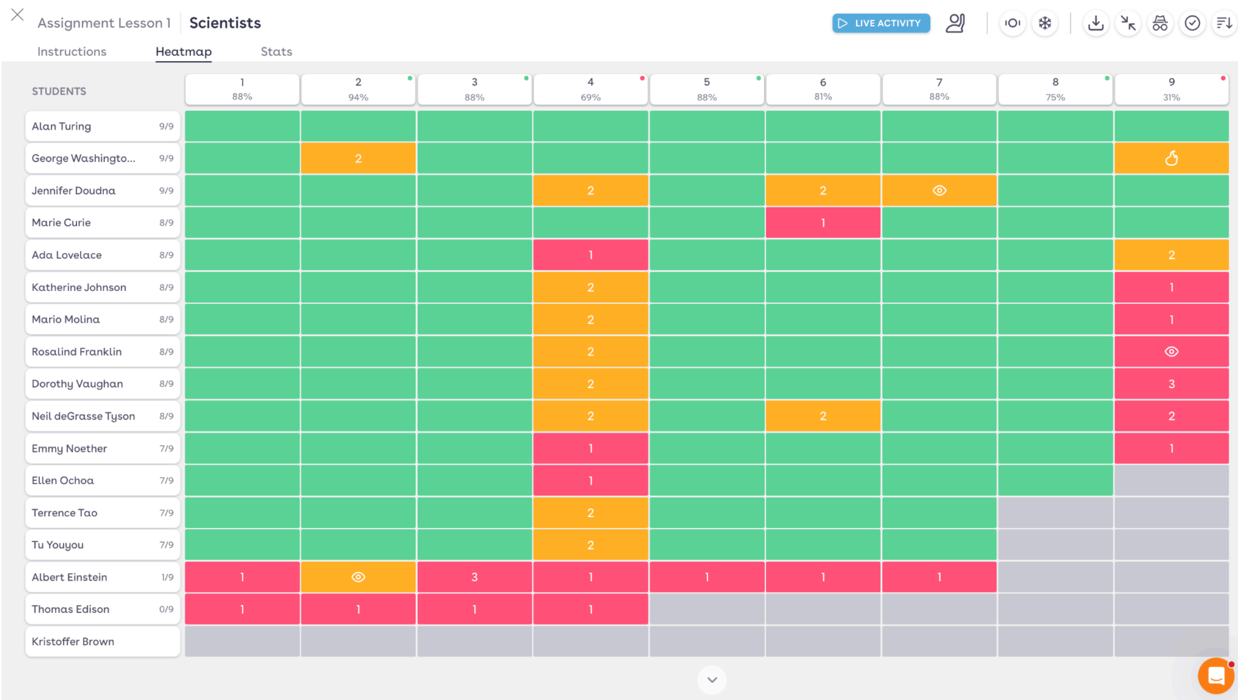
Increasing Comprehension Through Written Discourse

Writing about mathematical thinking forces students to organize their reasoning. When a student has to write "First I... then I... because..." they process the mathematics more deeply than when they only compute an answer.

On the **Student Canvas**, students write alongside their visual work. They annotate each step: why they chose a particular model, what the result means, how they checked their answer. These written annotations create a record of mathematical thinking that the teacher can review.

In the discourse session, the teacher uses **Teacher Playback** to display two students' written solutions. The class reads both and compares: "Student A drew a number line and wrote that they counted by halves. Student B used an area model and wrote about equal parts. How are these the same? How are they different?" Reading and comparing peer work is a written comprehension activity. Students learn to read mathematical explanations critically and build understanding from multiple perspectives.

The **Heatmap** gives the teacher a visual overview of written comprehension across the entire class. Green means the student demonstrated understanding. Orange and red signal gaps. The teacher uses this data to decide which student work to bring forward for discussion and which students need follow-up.



Heatmap, showing class-wide patterns as students work on problems

Building Background Knowledge Through Written Discourse

Background knowledge is built through writing when students make explicit connections between what they already know and what they are learning. The canvas and the difficulty progression both support this.

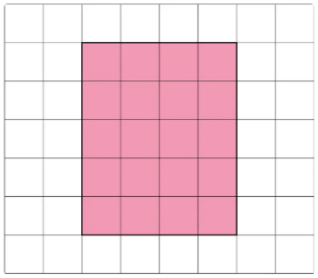
Practice Mode videos provide visual, step-by-step demonstrations that build foundational understanding before students write. Because these videos are visually based, they are accessible across all language proficiency levels. After watching, students solve on the canvas and write explanations that reference what they just learned. The video gives them the background knowledge; the writing makes them process it.

The **progressive difficulty structure** (Mild to Medium to Spicy) ensures that students' written work builds on prior understanding. Mild problems activate what students already know. Medium problems ask students to apply that knowledge in new contexts and write about what changed. Spicy problems ask students to synthesize multiple ideas and justify their reasoning in writing. Each level builds on the written record of the previous one.

The canvas itself creates a **running record** of student thinking across problems. As students work through a set of problems, their annotations accumulate. The teacher can use **Playback** to review how a student's written reasoning developed over a sequence of problems, identifying where background knowledge was activated and where new understanding was built.

☐ Mild

1. How many small squares make up the pink rectangle?



☐ Medium

25. The rectangle shown is made up of unit squares.

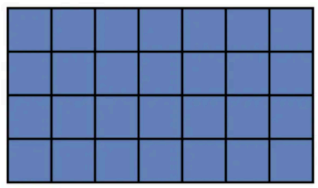
Which equation can be used to calculate the area, *A*, of the rectangle?

A. $A = 8 \times 4$

B. $A = 4 + 7$

C. $A = 7 \times 4$

D. $A = 8 \times 5$



☐ Spicy

76. Darius had yarn that can make a tablecloth with an area of 32 square feet.

The tablecloth he knitted has a length that is twice as long as the width, and both the length and width are whole numbers.

Which two of the following can be either the length or the width?

Mild, medium, and spicy problems showing an increase in linguistic complexity

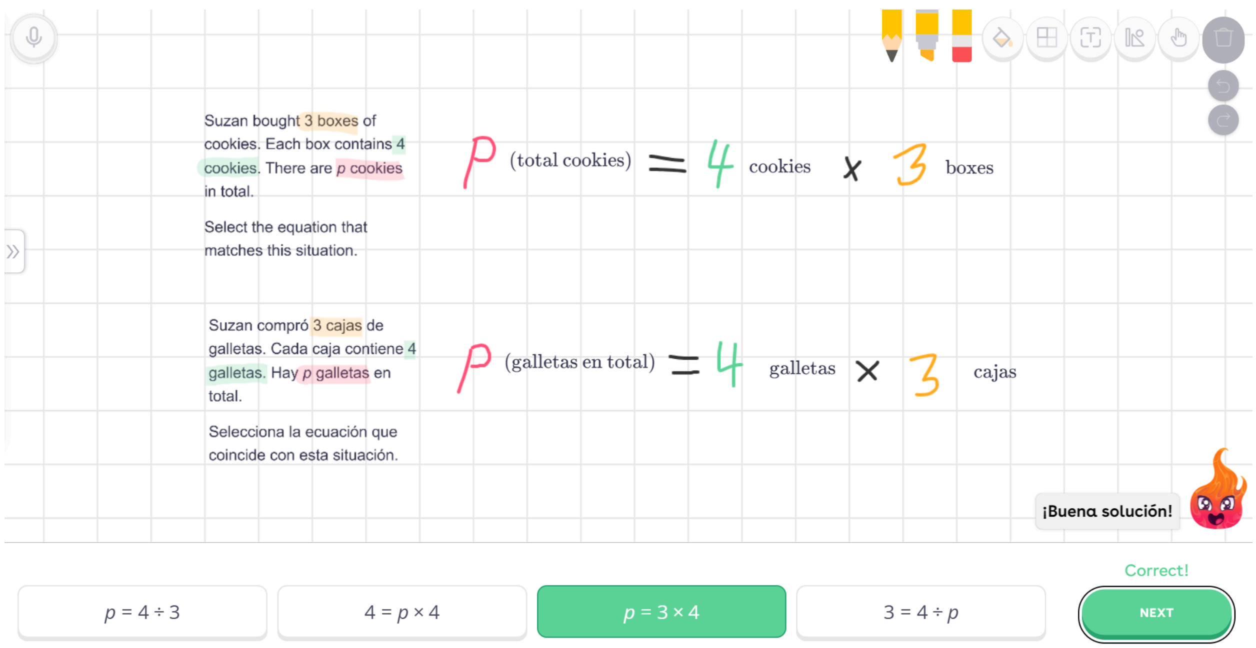
Making Cross-Linguistic Connections Through Written Discourse

Emergent bilingual students strengthen their mathematical writing when they can draw on both languages. Magma Math supports this by making the full translation available while students write.

Students can **toggle between languages** while working on the canvas. A student reading the problem in Spanish can write their explanation in English, switching back to the Spanish version whenever they need to confirm meaning. This is not a workaround. It is how bilingual mathematical thinkers work: moving between languages to construct meaning. When the teacher displays student work that includes bilingual writing, the message is clear: mathematical expression exists across languages, and using both is a strength.

On the canvas, students can write annotations using the **translation feature.** A student might label a diagram with terms in both languages: 'numerator / numerador,' 'equivalent / equivalente.' These annotations show cross-linguistic awareness and reinforce vocabulary in both languages simultaneously.

You can ask the class to notice where terms are similar across languages and where they differ, turning one student's written work into a cross-linguistic learning moment for the whole class.



Two versions of the same problem side by side, one in English and one in Spanish, with student annotations in both languages

Discourse as a Daily Practice

The strategies in this guide are not add-ons to your math instruction. They describe what happens in every Magma Math lesson when you use the platform as designed. Students solve on the canvas, show their thinking with drawings and manipulatives, record their explanations, read problems in their home language, and discuss strategies as a class. Every one of these moments is a discourse opportunity.

For emergent bilingual students, these embedded tools mean that language support is not a separate layer turned on for specific students. It is the way the platform works. Translation, text-to-speech, voice recording, and visual representations are available to every student on every problem. The teacher's role is to use the routines described here to turn these tools into rich oral and written discourse that builds academic vocabulary, deepens comprehension, activates background knowledge, and makes cross-linguistic connections part of daily mathematics instruction.