

Why Mathematical Discourse Matters

And How It Can Help Your Students!

Why Is Mathematical Discourse Important?

It helps students...

- **Reflect** on their own understanding
- **Make sense of and critique** others' ideas
- **Link prior knowledge** to current understanding
- Deepen and **extend conceptual knowledge**
- Build mathematical **confidence**
- Stay **engaged, focused, and motivated**

It helps teachers...

- **Evaluate** what students understand and their misconceptions
- **Be aware of gaps** in students' knowledge
- **Guide** students to discuss concepts more precisely
- **Monitor** math language development

How Do You Nurture a Discourse-Rich Classroom?

- Students and teachers **acknowledge and discuss errors** and the reasons behind them, in addition to correct answers and strategies.
- Students **questions each other** and explain their reasoning using mathematical language.

- Students **reach and justify conclusions** based on their own mathematical knowledge, without relying on the authority of teachers.
- Students engage in **productive struggle** with appropriate scaffolds for support.

What Does Mathematical Discourse Look Like?

Teacher

In a fraction, what does the denominator—the bottom number—tell us?

Julie

The total number of parts or sections.

[to the class] Using thumbs up or thumbs down, show us if you agree with Julie. [after observing the responses] Some of you disagree. Would someone explain why? Okay, James, please explain.

James

She said the denominator tells the total number of parts, but all the parts have to be the same size.

Thank you, James. Can someone else say that differently?

Nicole

They have to be the same.

Can you say that again using some of the math words we've been learning?

Nicole

The bottom number, I mean, the denominator, tells us the total number of equal-sized parts.

Thank you, Nicole.

What Do Teachers and Students Do During Math Discourse?

Teachers:

- **Engage students in purposeful sharing of mathematical ideas**, reasoning, and approaches, using varied representations.
- **Select and sequence student approaches** for whole-class analysis and discussion.
- **Facilitate discourse among students** by having them decide if an answer or strategy is correct or incorrect.
- **Ensure progress toward mathematical goals** by making explicit connections to student approaches and reasoning.

Students:

- **Present and explain ideas** to one another during conversations in pairs, in small groups, or as part of the whole-class.
- **Listen carefully to and critique the reasoning of peers**, using examples to support or refute arguments.
- **Seek to understand the approaches used by peers** by asking questions and trying out others' strategies.
- **Identify how different approaches to solving a task** are the same or different.

6 Strategies to Try Now

- 1 **Establish a rule** such as "Ask three before you ask me" to encourage students to seek assistance from peers before asking the teacher.
- 2 **Allow students to work independently and in pairs** before they share with the group.
- 3 **Use questions and prompts such as:**
 - Tell your partner what you think the answer is and why.
 - Can someone say that differently?
 - Who has another way to solve this?
 - How is your solution the same? How is it different?
 - Is there a way to show that visually?

- 4 **Remind students frequently that errors are expected and natural.** Encourage students to question the thinking of others.
- 5 **Use collaborative strategies to prepare students for whole-class discussions**, such as think-pair-share.
- 6 **Use a variety of strategies to engage all students in whole class discussion, such as:**
 - **Thumbs up/thumbs down:** You pose a question and ask students to respond, using thumbs up to represent one choice and thumbs down to represent the other.
 - **Response sticks:** Teachers write each student's name on a popsicle stick, place the sticks in a container, and randomly select a stick to choose a student to participate in the discussion.
 - **Classroom response systems or other digital tools.**

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