

Discourse Moves for Fostering Confident Math Learners

We ALL speak math

North Carolina Collaborative for Mathematics Learning

Assessing Student Thinking

What is it?

Following up with an individual student's solution, strategy, or question to have the student elaborate on their ideas.

Why do we use it?

Posing assessing questions not only provides an opportunity to check for understanding, but can also encourage students to communicate their ideas using mathematical language and sets the stage for moving the mathematics forward. Assessing can be in the form of a genuine question, or it could be for the benefit of the other students in the class. Furthermore, posing questions that require thinking helps to develop positive math identities and agency by positioning students as thinkers and doers of mathematics.

When Assessing Student Thinking...

Teachers are...

- planning questions based on their anticipation of student thinking
- asking questions that require explanation and justification
- asking questions that make the math more visible and accessible for student examination and discussion
- carefully listening to show students their thinking is valued and makes sense

Students are...

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- thinking carefully about how to present their responses clearly without rushing to respond
- reflecting on and justifying their reasoning, not simply providing answers
- learning to ask questions of each other
- developing a positive math identity





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Discourse Move: Assessing Student Thinking



In a collaborative, confidence-building learning environment, teachers work to understand their students' thinking.



How do we use it?

If you are new to assessing student thinking, try this: Students are used to only sharing their answers. Asking questions like **"Why does that work?"**, **"How do you know that?"**, **"How do you know your answer is correct?"**, or **"Why did you cross that out?"** encourages students to explain their thinking beyond sharing the answer and gives you important information about their thinking.



An Example of Assessing Student Thinking in Action

Scenario: Imagine students have been asked to consider all of the possible coffee orders at Dunkin Donuts. There are 4 sizes, 7 dairy

options, 5 flavor options, and two sweetener options.



Teacher: Hi [student name]. Can you tell me about this representation you are creating?

Student: Well, I started to try to write every combo out but then decided it needed to be more organized so I am trying to make a tree diagram.

Teacher: I really like that you are thinking about how organizing the data is going to be helpful. **Why did you draw this the way you did?**

Student: Well...with so many options I knew there would be a lot of branches so I turned the paper this way to make more space. I started with the sweetener because there are only 2 options, so I'll have 2 trees. Then I did the sizes, then I'm going to add the flavors, then dairy.

Teacher: Why did you cross that out? (Pointing to "450" written at the bottom of the page)

Student: That is what we guessed it would be, but I don't think that is right because there are 7 dairy options and 450 can't be divided by 7.

Teacher: Interesting. I'll let you keep working on your tree diagram. I'm curious. **Do you have any ideas about how you'll know if the number you get is correct?**



Things to Remember

All student ideas are valid and our questions can assess and clarify their thinking.

- Anticipating student responses during planning will help you be prepared to pose questions to assess student thinking through discussion.
- Support your multilingual learners and exceptional students by posing assessing questions that allow students to respond in a variety of ways – e.g., speaking, drawing, using gestures, using technology tools.



Questions to Consider with Colleagues

When monitoring students, what aspects of their work do you pay attention to when

trying to understand their thinking?

- 2 How might asking students' assessing questions while they are working on a task help you decide how to best support them moving forward?
- How do you see Assessing Student
 Thinking relating to the Standards of
 Mathematical Practice? Consider SMP 1, 3,
 and 5 specifically.

Note: This resource is being co-designed by the NC math education community. We welcome feedback to inform its refinement at https://forms.gle/8PBWGsvqJQzcdtCF8 Check the website (nc2ml.org/high-school-teachers) for the most up to date resources. North Carolina Collaborative for Mathematics Learning | Discourse Moves | Last Updated: August 24, 2023 | www.nc2ml.org