



We ALL speak math

Advancing Student Thinking

What is it?

Asking questions that move students beyond their current thinking by pressing them to extend what they know to a new situation. It is the question you pose right before you walk away.

Why do we use it?

Advancing questions (or statements) are intended to support students in moving forward in solving the task beyond their current work and thinking or to explore the underlying mathematics more deeply. These questions move students toward the targeted goal of the lesson. Furthermore, posing questions that require thinking helps to develop positive math identities and agency by positioning students as thinkers and doers of mathematics.

When Advancing Student Thinking...

Teachers are...

- planning advancing questions based on their anticipations of student thinking
- asking students to add on to each other's ideas
- posing a question or challenge and walking away, leaving students to figure out how to proceed
- careful not to take over and funnel student thinking

Students are...

- explaining, elaborating, and reflecting on their own and other's thinking
- reflecting on and justifying their reasoning, not simply providing answers
- learning to ask questions of each other
- developing a positive math identity

What would happen if...?

Will that always work? Why or why not?

How could you prove or disprove what they are saying?

Can you find some more solutions to see if that is the best solution or not?

Can we verify...?



Discourse Move: Advancing Student Thinking



To facilitate problem solving and empower students, teachers resist imposing strategies and instead support their students in finding their own.



Support for Administrators

NC Professional Teaching Standards

Advancing Student Thinking aligns to Standard 3 and Standard 4.

- 3b.** Teachers bring a richness and depth of understanding to their classrooms.
- 4b.** Teachers engage students in the learning process.
- 4g.** Teachers help students articulate thoughts and ideas clearly and effectively.

NC Portrait of a Graduate

Advancing Student Thinking aligns to the Adaptability and Learner's Mindset competencies.

- Demonstrate agility in thought processes and problem-solving.
- Embrace curiosity to experience new ideas and persist through challenges.

Standards of Mathematical Practice (SMP)

Mathematically proficient students...

Make sense of problems and persevere in solving them.

Explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends.

Construct viable arguments and critique the reasoning of others.

Compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is.

Model with mathematics.

Apply the mathematics they know to solve problems arising in everyday life, society, and the workplace; they are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later.



When working with a teacher, here are some questions to help coach the teacher to implement the discourse move of Advancing Student Thinking in their classroom.

Clarifying Questions...

- How do you bring a richness and depth of understanding to your classroom as a teacher?
- How do you actively involve students in activities, discussions, and projects that promote critical thinking, problem-solving, and deeper understanding of mathematics?
- How do you support students in making sense of problems and persevering in solving them?



Digging Deeper for Discourse

- How do you ensure that you have a strong grasp of the subject matter you are teaching in order to facilitate meaningful learning experiences for your students?
- How do you encourage students to approach challenges with curiosity, embrace new ideas, and persist through difficulties?
- How do you encourage students to compare the effectiveness of different arguments, distinguish between correct and flawed logic or reasoning, and explain any flaws they identify?

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.

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