



## 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.

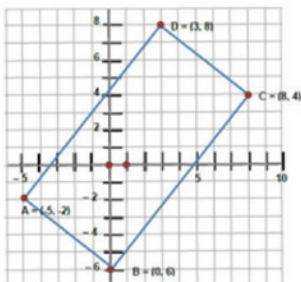


### How do we use it?

**If you are new to providing wait time, try this:** Once you have some information about your students' thinking, you can ask questions like **“What would happen if...”** or **“How can you prove...”** to explore the concepts more deeply and move beyond their current understanding.

This challenges students to reflect on their reasoning and make progress towards the learning goals of the lesson. Always remember that after stating your advancing move you should walk away and give students time to think and work on the challenge you have posed.

### An Example of Advancing Student Thinking in Action



**Scenario:** Imagine students are working on a task using the image to the left. It states “Investigate the slopes of each of the sides of the rectangle ABCD. What do you notice? Explain.”

**Teacher:** What do you notice about the slopes?

**Student 1:** It's a rectangle so opposite sides would be parallel.

**Student 2:** If they're parallel, they'll have the same slope.

**Teacher:** Interesting... **see if you can either prove or disprove that they have the same slopes.** (Teacher walks away to check in with a different group.)

**Teacher:** Hi, tell me what you are all discussing.

**Student 3:** We did the slopes on all of the sides and the sides across from each other have the same slope.

**Teacher:** That is interesting. **Will that always be true for every rectangle we put on the plane? See if you can come up with an argument for why it will or will not always be true.**



### Things to Remember

- This move can often follow “Encouraging In-Progress Thinking” to move students towards the mathematical goal of the lesson.
- Allowing students to engage in productive struggle as they advance their thinking will ensure they produce their own mathematical ideas.
- Advancing student thinking moves can be used to differentiate for students at varying levels of understanding.



### Questions to Consider with Colleagues

- 1 What are some of the challenges you face when posing advancing questions? How might you and your students overcome these?
- 2 How do you encourage students to look for extensions once they have an initial idea?
- 3 How do you see Orienting Students to Another's Reasoning relating to the Standards for Mathematical Practice? Consider SMP 1, 3, and 6 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](https://nc2ml.org/high-school-teachers)) for the most up to date resources.

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