

Support Productive Struggle in Learning Mathematics

Effective teaching of mathematics consistently provides students, individually and collectively, with opportunities and supports to engage in productive struggle as they grapple with mathematical ideas and relationships.

NCTM (2014, p. 48)

Am I **asking questions** to help students work through areas of struggle and make their thinking visible?

Am I **providing encouragement** that prompts students to reflect on their strategies?

Am I **giving adequate time** for students to explore individually and with peers without intervening?

Am I **acknowledging student contributions** by valuing mistakes, methods, and explanations?

Adapted from Huinker & Bill (2017, p. 231)

As a teacher I...

- anticipate challenges students may face and be ready to support them in a way that keeps them thinking.
- give students ample time to work through challenges.
- create a culture where mistakes are normalized.
- foster open conversations about struggles and model strategies to get “un-stuck”, such as asking questions, working a similar but simpler problem, or choosing a helpful representation.
- value the process of reasoning and explaining thinking.
- encourage students to embrace the mindset that learning is an ongoing process of growth and improvement.

Adapted from NCTM (2014, p. 52)

so that my students...

- embrace mistakes and/or false starts as part of doing mathematics, but sticking with a problem leads to breakthroughs and new understandings.
- feel empowered to tinker and explore, even when a solution path isn’t clear.
- keep trying, understanding that it is OK to ask questions or say “I don’t know what to do next,” but it is not OK to give up.
- help one another without telling the answer or showing how to solve the problem.
- recognize their own mathematical growth and how things that were previously confusing are now easily understood.

