

Writing to Develop Sense Making, Reasoning, and Arguments
2018 NCTM, Washington, DC
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Writing makes students' thinking visible. We present four types of writing tasks that have been used to elicit ways students choose to validate conclusions, conduct analysis of incorrect work done by others, use mathematics vocabulary to communicate their understanding of concepts, and reflect on approaches to problems. We connect these tasks to the Standards for Mathematical Practice (CCSS, 2010) and NCTM's (2014) Mathematics Teaching Practices.

For each type of writing task, we will share more than one idea we have used in courses, such as Intermediate Algebra, College Algebra, and Mathematics for Elementary School Teachers. For most tasks, we will share examples of our students' writing on that task.

Our writing tasks emphasize the importance of sense making. They connect to the first three Standards for Mathematical Practice (CCSS, 2010):

- SMP 1: Make sense of problems and persevere in solving them
- SMP 2: Reason abstractly and quantitatively
- SMP 3: Construct viable arguments and critique the reasoning of others

Our writing tasks also connect to three of the Mathematics Teaching Practices (NCTM, 2014):

- Implement tasks that promote reasoning and problem solving
- Pose purposeful questions
- Elicit and use evidence of student thinking

Principles we follow to prepare writing tasks:

- Purposeful choices for prompts
- Balance of open and guided
- Deliberate choice of wording to reduce confusion and lack of focus
- Guidance to students about how to make their thinking clear
- Some information about expectations

We will offer observations about experiences with our students. We will share insights about planning for and successfully implementing writing tasks.

References

- Gay, A. S., & Peterson, I. (2014). Writing to promote and assess conceptual understanding in College Algebra. *PRIMUS: Problems, Resources, and Issues in Mathematics Undergraduate Studies*, 24(7), 637-646.
- NCTM. (2014). *Principles to actions: Ensuring mathematical success for all*. Reston, VA: NCTM.
- National Governors Association Center for Best Practices, Council of Chief State School Officers. (2010). *Common Core State Standards: Mathematics*. Washington, DC: National Governors Association Center for Best Practices, Council of Chief State School Officers.