

LINKING PROBLEM SOLVING AND THE STANDARDS FOR MATHEMATICAL PRACTICE

rsilbey@hotmail.com ♦ www.robysilbey.com

Speak, Write, Reflect, Revise describes a problem solving process in which teachers *facilitate* students' learning through the Standards for Mathematical Practice. Students use precise terms and clear statements to verbally articulate the meaning of a problem and possible solution pathways. After solving and writing a draft to justify their solution strategies and reasoning, students share their responses. Second drafts with revisions are completed. Using *Speak, Write, Reflect, Revise*; your students will *live* the Mathematical Practices in a risk-free environment as they learn independence, interdependence, self-reliance, and resourcefulness.

The Process must involve and engage every student in the class. Therefore, problems should be constructed so that the solution can be obtained using a variety of pathways, both sophisticated and simple. Below is a summary of the *Speak, Write, Reflect, Revise* process:

1. A problem is presented to the class. Students think independently about how they would solve the problem *without solving it*.
2. Students verbally exchange solution *strategies* in small groups.
3. The entire class reconvenes to discuss and compare solution strategies. Embedded in discussions are appropriate math vocabulary and sense-making justifications.
4. Students solve the problem independently. Using a rubric as a guide, students write a paragraph describing their solution strategies and justifying their answers.
5. One or two volunteers, selected by the teacher for the clarity and quality of their responses, read their first drafts to the class. The teacher carefully chooses volunteers whose papers need only minor edits in order to be an outstanding, full-credit response.
6. Using the rubric as a guide, students score their classmates' responses. Through a class discussion, students collaborate to upgrade the responses to full-credit anchor papers. This third discussion about the original problem solidifies conceptual understanding for the majority of students.
7. All students reflect on the discussions and anchor papers as they write a second draft.

Teacher Reflection Students' work is complete, but the reflection process is just beginning for the teacher. Once teachers read students' papers, she takes time to *think about* students' responses. She ponders:

- Did my students understand the problem?
- What solution strategies were used? What does that reveal about students' conceptual understanding?
- What terminology did students use? What terms did they neglect to use?
- Did the explanatory paragraph clearly articulate the process and rationale for the solution?

The answers to these questions inform and drive instruction, both in the Standards for Mathematical Practice *and* the Content Standards for the coming days and weeks.

Common Core Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

