

LINKING PROBLEM SOLVING AND THE STANDARDS FOR MATHEMATICAL PRACTICE

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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. Revisions are encouraged as second drafts 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

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* (not the solutions themselves) 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 orally 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 asks herself:

- ♦ Did my students understand the problem?
- ♦ What solution strategies were used? What does that tell me 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.

