



## PRESENTATION

2:18 min

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## Effective Problem-Solving Instruction, Part 2: Multiple Strategies

February 2012

**Topic** IMPROVING MATHEMATICAL PROBLEM SOLVING IN GRADES 4 THROUGH 8

**Practice** PROBLEM-SOLVING INSTRUCTION

- Highlights**
- » Teachers can use specific strategies during problem-solving instruction to build students' understanding of core mathematics concepts and skills. The three important strategies that apply at all grade levels and in all areas of mathematics are: use of visual representations, encouragement of multiple approaches to solving problems, and linking mathematical and algebraic notation to intuitive approaches.
  - » When teachers explicitly teach that there is more than one way to solve a problem, students learn to be more flexible in their thinking and efficient in choosing solutions. This includes demonstrating routinely two or more ways to approach a problem and comparing the problem-solving approaches as well as analyzing solutions for efficiency.
  - » Overall, the goal should be to help students articulate mathematically valid explanations of their reasoning.

## Full Transcript



### Slide 1: Welcome



### Slide 2: Multiple approaches

Researchers recommend that students be taught explicitly that problems can be solved in more than one way.

Students who practice multiple strategies and share their solutions become more flexible and efficient in problem solving, and are more likely to see options when approaching a problem.

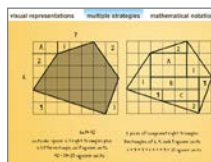


### Slide 3: Demonstrating solutions

Teachers should routinely demonstrate two or more ways to solve a problem.

Looking at worked examples with multiple solutions side by side gives students practice comparing similarities and differences in the strategies, which can help strengthen analytical thinking.

Students also benefit by being expected to use multiple methods to solve problems themselves.



### Slide 4: Ease and efficiency

As students get used to using multiple approaches, teachers should talk through the reasons why one solution might be favored over another. This will help students understand that strategies should be chosen based on ease and efficiency.

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It can also be helpful for a teacher to demonstrate approaches to problems that are not successful and discuss why they seem like they would work, but why they don't.



### Slide 5: Culture of problem solving

When teachers routinely focus on students' thinking and reasoning, and not merely on the mechanics of a particular solution, students begin to expect that there will be multiple ways to approach any problem and that for some problems there will be more than one solution.

Comparing different strategies does take time, as students need to comprehend each approach before contrasting it with others.

When deciding which students will share their solutions with the whole class, it is best to choose three or four students who have used different approaches to the problem.

Dividing the class into small peer groups that compare solutions and explain their approaches to each other can help students who are reluctant to discuss their reasoning in front of the whole class. As students observe each other's reasoning and solutions, they more clearly understand that there are multiple ways to approach problems and they can begin to analyze those approaches for efficiency.



### Slide 6: Learn more

To learn more about Effective Problem-Solving Instruction, please see the other videos on Visual Representations and Mathematical Notation in this series.

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