



PRESENTATION

2:23 min

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Effective Problem-Solving Instruction, Part 3: Mathematical Notation

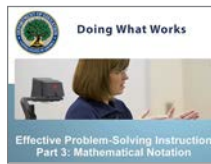
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Topic IMPROVING MATHEMATICAL PROBLEM SOLVING IN GRADES 4 THROUGH 8

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.
 - » While students may be able to solve simple problems intuitively, they will need facility with mathematical notation for more complex problems. Teachers can build up that facility by explicitly linking ideas in word problems to equations.
 - » To provide practice with notation, teachers can provide worked examples with related mathematical equations.
 - » Overall, the goal should be to help students articulate mathematically valid explanations of their reasoning.

Full Transcript



Slide 1: Welcome



Slide 2: Mathematical notation

Mathematical notation helps students organize the information in a problem, articulate mathematics concepts, and think about their options for solving a problem.



Slide 3: Notation for challenging problems

Students may prefer to approach problems intuitively or informally, rather than spend the time to develop an equation. Intuitive approaches may work for simple problems, but notational tools are needed for more complex and challenging problems.

By explicitly linking the ideas in a word problem to an equation, teachers demonstrate how to express problems through mathematical notation, including algebraic notation.



Slide 4: Using worked problems

One way to help students become comfortable with mathematical notation is to provide worked examples of word problems along with related mathematical expressions or equations. A teacher can challenge students to match key information in the problem statement with the related component in the equation.



Slide 5: Opportunity for new concepts

Problem solving provides a teacher with many opportunities to review or explain relevant mathematical concepts and introduce new ways of reasoning.

When preparing problems, teachers should work through several approaches in advance. This will help them anticipate the mathematical concepts students may attempt to use in order to solve a problem.



Slide 6: Mathematically valid explanations

A goal of problem solving is to help students learn to articulate mathematically valid explanations. Teachers may need to support students in organizing their ideas and rewording explanations so they are mathematically correct.

The teacher's probing questions can help students refine their thinking and develop explanations that are logical and can be generalized and applied in other problem situations.



Slide 7: Symbolic notation

Students will need time to become familiar with the abstract symbolic notation of algebra.

Teachers may use arithmetic problems as a first step, drawing on students' prior math experience to frame a solution to a problem before translating the same problem into an equation with variables representing the problem's components.



Slide 8: Learn more

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

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