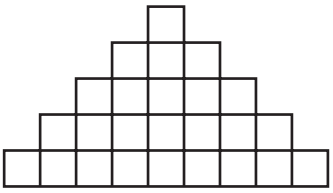
Problem Solving

What is problem solving?

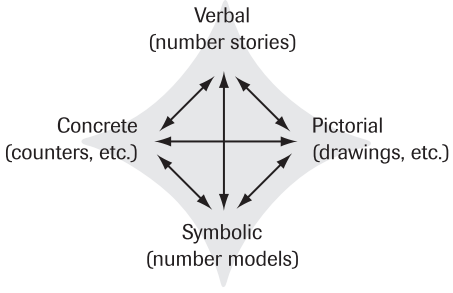
In *Everyday Mathematics*, problem solving means much more than doing calculations and finding answers to printed "word problems." While the idea of problem solving does include number stories (word problems), it also includes working with problems for which the solution methods are not known in advance. Think of it this way: a problem is not a genuine problem if the problem solver knows exactly what to do right away!

Here are two examples of mathematical problems.

- *A store sells a certain brand of cereal in two sizes: a 10-ounce box that costs $2.50 and a 15-ounce box that costs $3.60. Which box is the better buy? Why?*
- *This is an up-and-down staircase that is 5 steps tall. How many squares are needed for an up-and-down staircase that is 10 steps tall?*



Different students might use different approaches to solve the problems above. For the staircase problem, for example, students might use blocks, make a drawing, look for and describe a pattern, or write a number model to come up with an answer. *Everyday Mathematics* focuses on four basic ways of looking at, or representing, problems: concrete, verbal, pictorial, and symbolic.



The program aims to not only develop students' comfort and skill with all the representations, but also to develop their abilities to translate between the representations. Symbolic representations (including number models with variables) and pictorial representations with graphs become increasingly important in Grades 4–6.

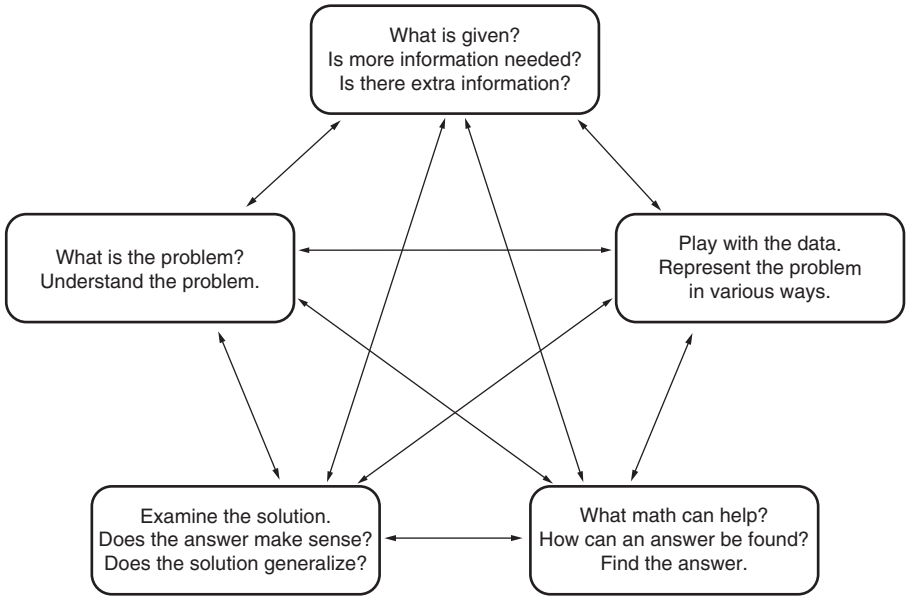
Why is problem solving important?

Learning to solve problems is the principal reason for studying mathematics. When students are able to use their skills and understanding to solve real world problems, they begin to see mathematics as something meaningful, useful, and even exciting.

Furthermore, the demands for mathematics competence and problem-solving ability are continually increasing in our world. Desirable careers require people to work collaboratively and apply their knowledge to unfamiliar, complex situations. *Everyday Mathematics* prepares students for the future by involving them in problem-solving situations that develop their skills in group interaction, communication, and the use of mathematical tools.

How is problem solving taught?

Problem solving is a complex process. This diagram shows how people often think about problem solving with everyday situations.



Students develop the skills needed to navigate among the different parts of the problem-solving process through the following kinds of activities.

- **practicing specific parts of the process separately:** Students practice many specific skills that are useful in solving problems, such as counting, measuring, calculating, estimating, looking up information, and so forth.
- **creating and solving number stories:** Students work with real, age-appropriate problems that involve numbers and a question. They gradually progress from learning to make up their own number stories to writing number models that use variables to fit their stories.
- **sharing strategies and solutions:** Students develop the ability to think, strategize, and use common sense by discussing both their correct and incorrect problem-solving strategies with the teacher and classmates.