

PROBLEM SOLVING STRATEGIES

- ⇒ Use Objects / Act it Out
- ⇒ Draw a Picture
- ⇒ Look for a Pattern
- ⇒ Guess and Check
- ⇒ Use Logical Reasoning
- ⇒ Make an Organized List
- ⇒ Make a Table
- ⇒ Solve a Simpler Problem
- ⇒ Work Backward

As you and your students engage in problem solving investigations throughout the year, please be sure to actively refer to and use these strategies. It is important that students develop and use a variety of solution strategies. Different strategies are useful for different types of problems and students themselves have different styles for solving problems. Be sure to have students explain their own use of a strategy to their classmates – they often learn more from each other than from us.

Problem solving is the most important strand in mathematics – it is where everything else is put to use, in math curriculums and in real life! Last, but not least, it is assessed on the CMT Strand 25 and the CAPT.


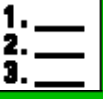


Math Strategies

The NCTM Curriculum and Evaluation Standards for School Mathematics recommends that math programs "include numerous and varied experiences with problem solving as a method of inquiry and application"

When solving math problems, it is recommended that a four-step method be used:

- Understand the problem by finding out what the problem means and what question you must answer to solve it
- Plan / Choose a strategy that will help you solve the problem
- Solve it to work through the problem using the strategy or more than one strategy
- Look back to reread the problem and check the solution to see that it meets the conditions stated in the problem and that it answers the question.

Ten strategies are listed on this table. The explanation to the right of each graphic tells what the strategy means.

	When making a series of computations, you can start with data presented at the end of the problem and end with data presented at the beginning of the problem. This is called the <i>Work Backwards</i> strategy.
	When making an <i>Organized List</i> you can organize your thinking about a problem. Recording your work in list form allows you to review that you have done and identify important steps that you need to do to complete solving the problem. This strategy provides a systematic way to record computations made with given data.
	The <i>Guess and Check</i> strategy is helpful when a problem presents large numbers or many pieces of data, or when the problem requires finding one solution to many possible solutions. This strategy involves guessing the answer, testing to see if it is correct, and making another guess if the answer is not correct.
	<i>Making It Simpler</i> is useful when solving a complex problem because it allows you to reduce large numbers to small numbers, or reducing the number of items given in a problem. Sometimes a simpler representation will show a pattern which can help solve a problem.



It is often helpful to *Use Objects or Act Out* a problem. This allows you to use visual images of the data in the problem and the solution process. Dramatizations or moving around objects can help you remember the process you use and you may be able to use it again for solving other similar problems.



Making a picture or diagram to solve problems can help you understand and manipulate data. *Draw a Picture Strategy* is especially useful with problems that involve mapping, geometry and graphing.



Use or Make a Table is a strategy that uses an orderly arrangement of data, such as numbers, that helps you keep track of data, spot missing data, and identify data that is asked for in the problem.



Use or Look for a Pattern strategy involves identifying a pattern and predicting what will come next and what will happen again and again in the same way. Making a number table often reveals a pattern.



Logical Reasoning is really used in all the problem solving strategies. However, when answering conditional problems such as "if" and "then" type of problems you can display your data in a chart or matrix. This strategy requires formal logical reasoning.



The **Brainstorm** strategy is often used when all else fails! Brainstorming means looking at a problem in new and inventive ways. Use your imagine, be creative, and by all means, be flexible in your thinking! Eventually the lightbulb will go on and you will find a solution!

[Math Resources webpage](#) --

<http://www.fcps.k12.va.us/DeerParkES/kids/diane/Math/tenstrat.htm>

The strategies listed in the chart were based on those listed in [Creative Publications'](#) (1987) *The Problem Solver 4*. The Four-step process and further explanations of the ten strategies can also be found on [MathCounts](#). The graphics and the table on this webpage were created by Diane Painter, curator for Deer Park ES.