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Education Through Integration™

Mathematics Problem Solving Strategies

I. GUESS, CHECK, AND REVISE

Guessing and checking is helpful when a problem presents large numbers or many pieces of data, or when the problem asks students to find one solution but not all possible solutions to a problem. When students use this strategy, they guess the answer, test to see if it is correct and if it is incorrect they make another guess using what they learned from the first guess. In this way, they gradually come closer and closer to a solution by making increasingly more reasonable guesses. Students can also use this strategy to get started, and may then find another strategy which can be used.

II. DRAW A PICTURE

For some students, it may be helpful to use an available picture or make a picture or diagram when trying to solve a problem. The representation need not be well drawn. It is most important that they help students understand and manipulate the data in the problem.

III. ACT IT OUT OR USE OBJECTS

Some students may find it helpful to act out a problem or to move objects around while they are trying to solve a problem. This allows them to develop visual images of both the data in the problem and the solution process. By taking an active role in finding the solution, students are more likely to remember the process they used and be able to use it again for solving similar problems.

IV. MAKE AND USE AN ORGANIZED LIST, TABLE, CHART OR GRAPH

Making an organized list, table, chart or graph helps students organize their thinking about a problem. Recording work in an organized manner makes it easy to review what has been done. Students keep track of data, spot missing data, and identify important steps that must yet be completed. It provides a systematic way of recording computations. Patterns often become obvious when data is organized. This strategy is often used in conjunction with other strategies.

V. LOOK FOR A PATTERN

A pattern is a regular, systematic repetition. A pattern may be numerical, visual, or behavioral. By identifying the pattern, students can predict what will "come next" and what will happen again and again in the same way. Sometimes students can solve a problem by recognizing a pattern, but often they will have to extend a pattern to find a solution. Making a number table often reveals patterns, and for this reason is frequently used in conjunction with looking for patterns.

VI. USE LOGICAL REASONING

Logical reasoning is really used for all problem solving. However, there are types of problems that include or imply various conditional statements such as, "if.. then," or "if.. then.. else," or "if something is not true, then..." The data given in the problems can often be displayed in a chart or matrix. This kind of problem requires formal logical reasoning as a student works his or her way through the statements given in the problem.

VII. WORK BACKWARD

To solve certain problems, students must make a series of computations, starting with data presented at the end of the problem and ending with data presented at the beginning of the problem.

VIII. SOLVE A SIMPLER OR A SIMILAR PROBLEM

Making a problem simpler may mean reducing large numbers to small numbers, or reducing the number of items given in a problem. The simpler representation of the problem may suggest what operation or process can be used to solve the more complex problem.

Reference: http://www.pasd.wednet.edu/school/mathWASL/8des.htm