Problem Solving

Developing multiple skills in problem solving enriches the learner's ability to manage complex tasks and higher levels of learning. By providing opportunities for students to practice many different approaches to solving problems, the teacher empowers the student with an important life skill.

Exemplary Descriptors for Problem Solving

The teacher implements activities that teach and reinforce three or more of the following problem-solving types:

1. Abstraction
2. Categorization
3. Drawing Conclusions/Justifying Solutions
4. Predicting Outcomes
5. Observing and Experimenting
6. Improving Solutions
7. Identifying Relevant/Irrelevant Information
8. Generating Ideas
9. Creating and Designing

Descriptor 1: Abstraction

Abstraction is the process of leaving out of consideration one or more properties of a complex object so as to attend to others. For example, when the mind considers the form of a tree by itself or the color of the leaves as separate from their size or figure, the act is called abstraction. Abstraction is also applied when students take the key components or ideas occurring across given examples and use that idea to solve a new problem.

Descriptor 2: Categorization

Students analyze information, classify it, and sort it into meaningful categories.

Descriptor 3: Drawing Conclusions/Justifying Solutions

Students draw conclusions based on data presented to them in many forms, viewpoints, perspectives, and quality. De Bono (1994) states that there are three levels of conclusions at which the mind can arrive:

- A specific answer, idea, or opinion;

- A full harvesting of all that has been achieved, including, for example, a listing of ideas considered; and
- An objective look at the "thinking" that has been used.

Children analyze several possible solutions, select the best solution, and justify why that solution is best and why other solutions are less adequate.

Descriptor 4: Predicting Outcomes
Students make predictions, and then test the validity of those predictions.

Descriptor 5: Observing and Experimenting
Children observe, record, code, and measure. Children develop hypotheses, gather instruments, then collect and analyze data.

Descriptor 6: Improving Solutions
Children are given a solution to a problem, and asked to suggest methods for improving it.

Descriptor 7: Identifying Relevant/Irrelevant Information
Students are given relevant and irrelevant information needed to solve a problem. They identify relevant information and use that information to solve a problem.

Descriptor 8: Generating Ideas
Children are given ill-defined problems and taught to look for analogies, to brainstorm, to generate idea lists, to create representations, and to come up with viable solutions.

Descriptor 9: Creating and Designing
Children are asked to create or design a product, an experiment, or a problem for another student to solve or evaluate (e.g. video, cartoon strip, presentation, software application, etc.).