

and encourage individual students to discover which solution is clearest for them. Generally, it is better to avoid long explanations of different solutions to the same problem.

Other teacher actions during review include: relating the solution or its strategy to a problem the students solved earlier, presenting a clever solution that was not mentioned, directing attention to important information in the problem statement that students underlined and used in the solution or to information that was not important to the solution, or directing attention to another problem-solving situation. A different problem-solving situation might involve application of similar strategies or solution methods, exploring or extending the mathematical concept in a problem, or writing a related problem or an entirely new problem.

Student Participation

Teachers who implement the *Problemoids* program should encourage maximum participation from students. Students benefit from the program through active participation. Evidence of participation may take the usual forms of oral participation: discussing problems and solutions with teachers, another student, a small group of students, or the whole class. Also, it may take the form of a great deal of scribbling in the student book, excitement about a problem, increased interest in the program and/or mathematics, student-created or introduced problems, reluctance to stop working on a problem, eagerness to see newly posted solutions, etc. In any case, the teacher, through expertise in teaching and personal acquaintance with the students, has a number of techniques to motivate and evaluate student participation.

Direct students to maintain a record of their work. A record of problems and solutions serves several purposes. When solving a problem, students may find solutions to previous problems helpful. If students do not complete a solution in one working period, they have a fixed workspace to help them organize the solution and recall what they attempted in their previous work. The student book provides space for work on each problem. If students do not work in student books, they should maintain their work in individual notebooks.

Student Evaluation

The emphasis of the program should be on the goals established by the instructional staff. Attempts to evaluate progress toward process and attitudinal goals and problem-solving performance are limited by the nature of the associated behaviors and by present-day methods of evaluation. Students tend to make progress in problem solving over an extended period of time. For this reason an annual evaluation may be more appropriate than short-term evaluations.

Useful forms of evaluation include an analysis of students' solutions to problems and observations of students' behaviors associated with problem solving. A method of scoring written solutions to problems which places much greater emphasis on the process of solving the problem than on getting the correct answer follows below. Each problem has a value of 10 points.

Understands the Problem

- 4 Shows complete understanding of the problem
- 3-1 Interprets part(s) of the problem correctly
- 0 Completely misinterprets the problem or no work shown

Applying A Strategy

- 4 Applies one or more strategies to produce a correct solution
(Minor copying or arithmetic errors may be allowed.)
- 3-1 Applies one or more strategies and makes progress toward a correct solution
- 0 Shows no work or work is unrelated to a correct solution