

What is Teaching Through Problem Solving?

A Teaching Through Problem-Solving Lesson includes these four basic experiences for students, as highlighted in the table below.

What Students Do	What Teacher Does
1. Grasp and become interested in the problem posed by the teacher; consider what knowledge may be useful (brief)	Poses a problem that students do not yet know how to solve, in a way that interests students and encourages them to consider their related knowledge
2. Independent problem-solving. Students bring their own prior knowledge to bear, and try to develop ways to solve the problem. There may be input from classmates after a few minutes of independent work, but students are individually exerting effort to come up with a solution approach. Students are not simply following the teacher's solution example. (10-20 min)	Circulates and records individual student solution approaches, in order to plan for student presentation and discussion. Notices students who are "stuck" and intervenes in ways that still allow them to do the important mathematical thinking.
3. Presentation and discussion. Several students present and explain solution methods; all students actively make sense of the solutions and draw out key mathematical points (orchestrated by teacher's neriage "kneading" or "polishing") (15-30 min)	Selects several students to present and explain their work on the blackboard, attending to sequence, in order to support development of the important mathematical understanding(s). (Incorrect approaches are sometimes included in the presentations.) Asks questions that spark discussion about the mathematical thinking and reasoning, such as "Do you agree with this method?" "What is the same and different about Sam's and Marika's solutions?" "What are the good points and difficulties of each of solution method?" Teacher's questions provide a model for development of students' questioning and verification.
4. Summary/Consolidation of Knowledge (brief)	Teacher draws on student thinking to summarize (usually on blackboard) what has been learned. Students use blackboard writing and math journals to organize, reflect on and consolidate their thinking. Class often ends with a journal writing prompt like "What I learned today."