Enhancing Problem Solving Skills in an Intro Chemistry Course  
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**Problem:** After exams students complain, “The exam was nothing like the practice problems.” That is because they focus on memorization rather than understanding. The aim of this lesson is to improve problem solving skills by writing a plan out in words.

**Two Assessments:** After I modeled the 5 step process with particular emphasis on writing a plan for an example problem, they were given a similar problem and asked to write out a plan in words. They were not asked to solve the problem, simply to write a plan. After the first data collection, problem solving through writing the plan was emphasized in the next 3-4 classes and a new multi-step problem was assigned.

![Bar chart showing increase in percentage of class able to write plans](image)

**Results.** There was a large increase from the first to last lesson in the number of students who could successfully write a plan for a chemistry problem in words. 70% of students could translate the chemistry problem into something they understood and develop an approach for solving it. The process of writing a plan in words was concluded to be effective in helping students to solve a multi-step chemistry problem successfully, because 81% of the responses in the “Words” category were correct.

As a result of the first assessment, during the next class period I pointed out pitfalls and misconceptions that were commonly occurring. Through further lessons and practice over the course of several lectures, the number of students who could effectively write a plan and solve a multi-step chemistry problem correctly increased dramatically.