Note To Instructors

Over the past two decades, as *pre*-collegiate math textbooks moved toward theory and away from math computation, students have arrived in our classes increasingly less prepared to solve calculations in the physical sciences.

In retirement after 30 years of teaching, I have been working on an experiment to increase the limited class time available to instructors to teach chemistry (as opposed to math) by offering students lessons in chemistry calculation fundamentals to be completed before lecture.

The lessons are self-paced tutorials. For students with background in a topic, the lessons are a quick review. In areas where there are gaps in knowledge, the lessons teach the topic. By reviewing these fundamentals before lecture, students prepare for higher level instruction.

During 2007-08, these tutorials have been either assigned or recommended to students in first-year chemistry at over 50 colleges and universities, including Brown, Illinois, Oklahoma State, Rowan, Tennessee, Texas A&M, and Wyoming.

In some cases, the ChemReview tutorials were recommended as a web resource for students seeking additional help. Other instructors assigned the lessons as an experiment in preparation for lecture. Among those instructors, the consensus was that "on tests, most B's moved to A's, most C's to B's, and most D's to C's (but not much changed in F/W's)."

Those results may represent progress in gaining more majors in chemistry and the sciences.

By assigning the tutorials as preparation for lecture, instructors reported that they gained additional time in lecture for advanced topics, in-class problem solving, and demonstrations.

For the tutorials to work as class preparation, a short announced quiz is administered at the start of a topic. Draft quizzes on the tutorials in an MSWord format are available by email on request.

The current tutorials come with caveats.

- The lessons are focused on *calculations*. They are not intended as a complete course in chemistry.
- Modules on K_{sp}, electrochemistry, and thermodynamics are currently being tested and are scheduled to be in print in October.
- The "self-learning" tutorial format is paper intensive.
- The lessons continue to be revised based on evaluation by instructors.

If you have interest in experimenting with the tutorials as a resource for students or as preparatory assignments, all lessons may be printed by students -- or printed for class use by instructors -- from the website at *no* cost. Permission to copy is posted on the website.

For more extensive use, a three volume professional paperback version of the tutorials is available as *Calculations in Chemistry*. For quantities of 10 or more, the cost of the workbook is $15 each per volume plus shipping (a no-profit price). Order information is on the website.

Instructors using the lessons are encouraged to evaluate their impact on achievement and to recommend improvements.

Our nation needs more majors in science, math, and engineering. Chemistry is the gateway to these rewarding careers. I hope that these lessons may assist in your important work.

Sincerely,

-- E. A. Nelson

Please contact EANelson@ChemReview.Net if you have questions or suggestions.