**Overall Concept and Activities**

The **Molecular Science Project** is one of the five NSF systemic-reform initiatives. We have developed computer assisted and web-based instructional materials for lower-division chemistry courses. These materials are framed around two kinds of learning units: Explorations and Calibrated Peer Review™ (CPR) assignments. Although there is a logical progression of learning from Exploration to a CPR, the units stand alone. Instructors can select several (or all) units under any topic to supplement traditional instruction or use as the sole source of instruction.

Our goals: Integrate telecommunications and technology into instructional processes so that students can
- explore data
- visualize molecular models
- collaborate
- write about chemistry
- learn at their own pace to a mastery level
- take responsibility for their own learning

Explorations are available for use at the Molecular Science website:

http://www.molsci.ucla.edu/

Calibrated Peer Review™ is an Web-based instructional tool that enables students to learn by writing about important topics in a course. Instructors may either author their own CPR assignments or choose from an assignment library. Once assignments are authored or chosen from the library, CPR empowers an instructor to give frequent writing assignments without increasing grading workload. Regular use of CPR assignments teaches students to articulate ideas coherently and to critically evaluate both their peers’ and their own work.

**Strategy**

The Molecular Science approach is to develop:
- Facilities to implement web-based instruction
- Curricular materials congruent with web-based instruction
- Instructional processes that capitalize computer strengths
- Teaching styles that are adaptable to computer-enhanced classrooms
- A move from a lecture-based to a student-centered format

The units can be used as “in-class” activities in computer-equipped classrooms or as “out-of-class” homework assignments. The materials involve peer collaboration, writing, critical thinking, and tutorials with visualizations of molecules, processes, and systems.

**Supporting Data**

- Confidence and ability to review peer work increases with multiple CPR assignment use, across all students.
- A 10% or greater increase in learning for a specific topic
• 125 institutions (University, 4 year, 2 year, K-12) are using CPR nationwide
• More than 225 faculty have been trained to use CPR