

Introducing Cooperative Learning Activities into a large section of General Chemistry

In the Fall of 1997, Prof. Jacobs developed a new General Chemistry sequence for students identified as being 'at-risk' for performing poorly in General Chemistry. In the alternative course, students are taught the same material as those enrolled in the traditional General Chemistry course; however, at-risk students now engage in cooperative learning activities within the formal course structure. Specifically, students pair-off to answer concept questions in lecture, and they attend mandatory recitation sections in which they cooperatively solve problems in small groups. Active learning, concept integration, creative problem solving, individual accountability, and frequent feedback are central goals in the new course design. A detailed comparison of the two course structures is outlined below:

Characteristic	Traditional Section	Alternative Section
Population	250 students per section Target Math SAT > 630	250 students per section Target Math SAT ≤ 630
Textbook	"Chemistry: The Central Science" by Brown, LeMay, and Bursten (7 th Edition, Prentice Hall)	SAME
Chapters Covered	1-11,13-17, 19-20	SAME
Lecture	3 hours per week. Mostly Powerpoint Presentation w/ demonstrations	3 hours per week. Mix of Powerpoint Presentation, Demonstrations, Concept questions for pairs of students to discuss, and interactive problem solving on overhead projector
Labs	2 1/2 hours per week	SAME (intermixed labs)
Recitation Sections	NONE required. Instructor offers weekly session to answers students' questions and work through sample problems. < 10% attendance.	Mandatory. 1 hour per week. 20 students/section. Small groups (4 students/group) solve challenging problems cooperatively. > 95% attendance
Homework	30 problems are assigned per week. Homework is NOT collected.	10 problems are assigned per week. Homework is collected and graded.

On-Line Quizzes	NONE	Students answer a series of WWW-delivered questions after each chapter.
Exams	(4) 1-hour Midterms (1) 2-hour Final <u>Test Format</u> 50% Multiple Choice 50% Free Response	Exams are taken simultaneously with Traditional Section. SAME Format. Most Multiple Choice questions are COMMON to both sections.
Student Accountability / Feedback	Tests occur once every 3-4 weeks.	Each week student receives graded homework, graded group problem set, graded on-line quiz, and multiple in-class concept questions. Tests occur once every 3-4 weeks.
Personal Contact	Optional visits to faculty office hours	Instructor or teaching assistant knows each student by name. Student receives a phone call when their performance drops.