

Rationales for a New Approach to Lab

In our new curriculum we have separated the lab from the course, in which it was previously included. Often the labs were used as "proof of principle" in which students were to gain a more active and deeper understanding of course material through the lab experience. Although this approach to lab may increase students' understanding of concepts, there are compelling reasons to try a different approach:

- Problem-solving Approach. We have revised the pedagogical focus of lab from "illustrating classroom concepts" to "solving scientific problems". The lab is the best place to develop these skills and should be used that way as the emphasis shifts to learning of technical skills and data analysis skills essential for any science student.
- Increase critical thinking skills in students. Laboratory allows an obvious forum to present each student with a *unique* set of challenges. By overcoming these challenges, the students learn and grow individually or in teamwork. At the same time, this approach deters copying the work of other students, whether it is the lab work itself or the reports.
- Increase technical skill level of students. By shifting focus to more problem-solving and techniques practice, our graduates should become more competitive in clinical and industrial settings and graduate schools.
- Increase laboratory efficiency. By filtering out purely illustrative labs, in which students do not develop new skills, we can deliver a greater range of laboratory experiences in fewer lab courses.
- Increase course flexibility. We no longer need to have every class tied to a lab, so every innovation in course offerings does not have to be supported by a whole new lab curriculum.
- Increase student options. Some programs want their students to take a chemistry class but do not need a lab.
- Be greener. If there are fewer students taking the class without a lab, we produce less chemical waste.
- Be thrifter. If there are fewer students taking the class without a lab, we save resources.
- Reflect Student Strengths/Weaknesses. Employers and graduate schools can see separate grades. Separation of the lab and lecture grades will more accurately reflect the strengths and weaknesses of a given student with respect to lab skills vs. theoretical understanding.
- Increase scheduling flexibility. This approach will increase flexibility of order of classes and labs. The curricular design allows students to take the introductory course, Structure, with Purification I Lab and then go into Reactivity 1 and Purification 2 Lab. Alternatively, they could go into Analytical with Measurement Lab, or another route.
- Student Appeal Students will be more satisfied if we make the workload match the credit load.

