

Mind-tricks for Mastery: Redesigning an Organic Chemistry Course by Focusing on Productive Persistence

(a Non-Technology-Based CSU-CRT project)

Laurie Starkey
lstarkey@cpp.edu



Course Redesign Goals

The goal of the redesign was to reduce the D/F/W rate in CHM 201 by improving students' attitudes about Organic Chemistry and incorporating modules on learning theory to improve student persistence. Interventions included lessons on growth mindset and metacognition, formation of study groups, keeping reflective journals and using exam wrappers.

Organic Learning Communities (OLC)

Incentives were given for students to form study groups outside of class, and structured activities were provided for the OLCs on a weekly basis. Each week, students met with their group and wrote a Bb journal entry about the meeting. At the end of the quarter, students reflected on their OLC experience.

- I found that I was **more willing to ask questions** and be unsure about topics in my study group than I was with asking during class or even going to office hours (i'm just that type of person).
- A study group ended up being **extremely helpful** because even if not one of us understood something, we all **felt a bit less overwhelmed** since we knew that **we were not alone**.
- We actually **suffered together** which was okay because that **boosted our confidence** towards this class.
- I have never been a part of a study group before! I **really enjoyed it**.
- Also we were able to **help one another understand difficult topics** because we could **look at the problems from multiple perspectives** rather than relying solely on our own perspective.
- I think the fact that **we did become friends** was also a positive because it can be very difficult to make friends at a school that uses the quarter schedule.
- This **created a level of support** that reduced stress in other areas and **allowed me to focus more on my coursework**.

Learning-Focused Syllabus

To foster a supportive and inclusive environment, I redesigned my syllabus to be learning-focused. The syllabus was distributed on the first day of class and a Kahoot! Quiz was used in the next class meeting to bring attention to important course information.

CALIFORNIA STATE POLYTECHNIC UNIVERSITY, POMONA
Elements of Organic Chemistry, CHM 201 – Course Syllabus – Spring 2017
Lectures: Tu/Th 1:00-2:15 pm Room 15-1807 Section 01, CRN 32255
Instructor: Dr. Laurie S. Starkey Room 411-428 Phone: (909) 869-3670
Homepage: <http://www.cpp.edu/~lstarkey>
e-mail: lstarkey@cpp.edu (don't get lost: include "CHM 201" in Subject!)

Office Hours: Bldg. 4, Room 1-428 – on ground floor (not basement), across the hall from the General Chemistry stockroom, Tue/Thu 10:45-11:45 am & 2:30-3:30 pm (or by appointment)

What will you learn in this course?

Organic chemistry is a fascinating subject! As humans, we interact with carbon-containing (organic) compounds all day every day... did you know that nearly everything you eat, taste and smell is an organic molecule? Other examples of organic compounds and materials include the vitamins and pharmaceuticals that **keep us healthy**, the **personal care products that keep us looking good and feeling clean**, the **plastics that surround us**, and the **fuels that power our cars and airplanes**.

How will you learn about Organic Chemistry?

I have designed this course around your learning, and I will do everything I can to help you succeed! If you share in the commitment to doing well in this class, then you have to commit to the first four items on the following "To Do List." If you want to earn an A or B in the course, the last two can further help you achieve your goal, especially the OLC. I offer a small amount of extra credit as incentive for these last two items because students have reported that they were very helpful and I want to encourage you to try them. However, I recognize that Sapling incurs an extra cost and that some students would be miserable in a study group, so these are not mandatory and you are free to opt out.

Work Required to Pass CHM 201:

- **Class Lectures** – I will provide handouts of partial/skeleton notes for each chapter and we will work through these during lecture. I will provide many opportunities during lecture for problem-solving and self-assessment (such as working through examples and using "clicker" questions), so come ready to be engaged every day!
- **Read the Book & Work on Textbook Problems** – Here is where you should be spending the majority of your time outside of class, ideally 1-2 hours every day! This is a relatively fast-paced class so working on it a little bit every day means you won't fall behind – trying to " cram" study and memorize material is NOT a successful strategy for organic chemistry! Working textbook

Reaching your Maximum Potential:

- **Organic Learning Community (OLC)** – Research shows that students who work with other students can achieve more and earn higher grades. To encourage student-to-student teaching and learning, I will offer +2 points extra credit on the final exam to students who join a study group that meets weekly for at least one hour (OLC details are provided on the next page).
- **Online Homework (Sapling)** – I will provide a problem set for each chapter in Sapling and students who complete the assignments (with 65% or higher score) before each midterm will earn +1-2 points extra credit on the exam. Each online homework assignment is a combination of multiple-choice and drawing problems. Multiple attempts are allowed with no penalty, and it offers the benefit of providing instant feedback.

How will I help you learn?

I recognize that Organic Chemistry sometimes has a scary reputation as a "weed-out" course, but I promise that we are capable of meeting, and even mastering, the challenge ahead. We are about to embark on a journey together, and I am fully committed to your success! As I guide your learning, I will wear many hats: organized lecturer, demanding coach, enthusiastic cheerleader, wise elder, patient tutor, career counselor and well-prepared SIBern. I invite you to visit office hours where we can discuss lecture notes, textbook problems, homework assignments, midterm results, strategies for studying, and even extracurricular activities. I serve as Advisor to three student clubs: chemistry, pre-dental and pre-vet. I extend beyond teaching more

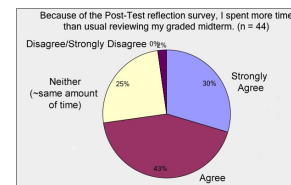
What happens if life gets complicated?

There are many excellent resources available at Cal Poly Pomona if you need help: Disability Resource Center (DRC), Counseling Center, Learning Resource Center (LRC), Veteran's Resource Center, Women's Resource Center, Pride Center, Cultural Centers, etc. If for some reason you are unable to complete the course, come see me to discuss withdrawing (W) or possibly taking an Incomplete grade.

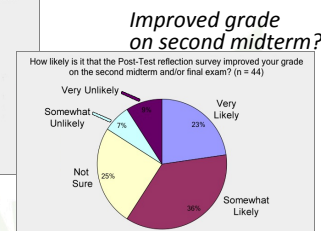
Exam "Wrappers"

A reflective "exam wrapper" exercise was given after the first midterm. Extra credit added to score: +2 for survey and another +2 points for exam corrections. The exam wrapper questions focused on three areas:

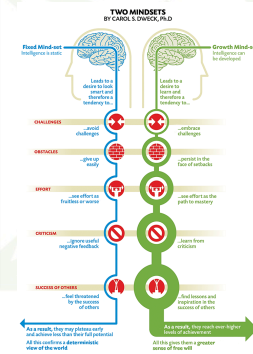
- How did I prepare for this exam?
- What kinds of mistakes did I make?
- What will I do differently next time?



Spent more time reviewing graded midterm?



Growth Mindset Activities



We watched short videos in class, students were given articles to read, and journal prompts were provided to encourage a focus on values, persistence and inclusivity.

References
goo.gl/36Iz1V

