**What do chemists do? Engaging first-year majors with career and research examples from Chemistry and Biochemistry**

**Introduction**

A new two-semester General Chemistry course sequence was created for Chemistry and Biochemistry majors. CHEM 1251 ran for the first time in Fall 2009, with Dr. Cech at the helm (and with 90 students). In Spring 2010, Dr. Feldheim taught about 60 students in CHEM 1271.

Dr. Cech crafted “Career Scenarios” to frame each major concept area. These scenarios also made their way into clicker questions, recitation materials, and a few exam questions. In addition, Dr. Cech used current research to illustrate concepts and to frame example problems in class.

CHEM 1251, Fall 2009

- Dr. Cech crafted “Career Scenarios” to frame each major concept area. These scenarios also made their way into clicker questions, recitation materials, and a few exam questions.

CHEM 1271, Spring 2010

- Dr. Feldheim used current research and real-world examples to frame each concept area, and to weave big ideas through the course. He also posted “Hot Topics” on CULearn every 2 - 3 weeks.

**Multiple faculty within the department provided input on the major goals for creating these courses. These include:**

- **Provide an opportunity to build community among chemistry and biochemistry majors,** and among students and faculty.
- **Emphasize and develop student excitement towards career opportunities in chemistry and biochemistry.**
- **In lab, develop investigation skills, lab techniques, and research-like thinking and skills.**
- **Might be an opportunity to go a little deeper into a few key areas that better prepares majors for future chemistry and biochemistry courses.**

**Transition Metals**

- Transition Metal Chemistry in Context
- Magnetic resonance imaging allows shift to be imaged. A “contrast agent” is required to make tissue windows show up more clearly.

**Catalysis**

- How can the reaction between transition metals happen at all?
- Magnetism in Drug Design

**Kinetics**

- Why is this important? Drugs can be designed to bind to their targets more tightly by lowering K<sub>G</sub>.
- Drug design: tubes vs. locks

**To what extent have we met our goals?**

**Indicator #1:**

**IF** we are motivating students to pursue careers in chemistry and biochemistry, **THEN** we should be retaining majors in these courses. The Fall 2009 data show quite a few students choosing to change their major. This may not be too surprising, given that they are first-semester Freshmen and are starting to realize what it really means to be a major. Many students who change from biochemistry to biology cite math requirements for biochemistry as a reason. In Spring, students are still changing majors, but the population seems to have stabilized, and we have much better retention. We need to compare these data to retention data from previous years (prior to these changes in major). The Fall 2009 data show quite a few students choosing to change their major. This may not be too surprising, given that they are first-semester Freshmen and are starting to realize what it really means to be a major. Many students who change from biochemistry to biology cite math requirements for biochemistry as a reason. In Spring, students are still changing majors, but the population seems to have stabilized, and we have much better retention. We need to compare these data to retention data from previous years (prior to these changes in major).

**Indicator #2:**

**IF** these scenarios are interesting and motivating, **THEN** students should report an increase in interest. In both semesters, 75 - 80% of students report maintaining high interest or increased interest in chemistry. When asked their reasons, common responses include “seeing research applications in class” and “initial learning leads to increased confidence, which leads to increased motivation.”

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