Infusing Critical Thinking into the STEM First Year Experience

Carmen Works and Jeremy Qualls
Sonoma State University
Thinking Like a Scientist: A Freshmen Year Experience for Chemistry and Biochemistry Majors

• Immerse all first year Chemistry and Biochemistry students in the culture of the Chemistry Department at SSU by creating a learning community through linked courses, faculty collaboration and peer mentors

• Teach students to think critically about science using the scientific method and case studies

• Retain a diverse group of first year students at SSU by providing all of them with the tools they need to be successful scholars
## Course Work

<table>
<thead>
<tr>
<th>Fall</th>
<th>Spring</th>
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<tbody>
<tr>
<td>General Analytical Chemistry I (5 units lab and lecture) GE area B1</td>
<td>General Analytical Chemistry II (5 units lab and lecture) GE area B3 and lab</td>
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<tr>
<td>Thinking Like a Scientist A (2 units)</td>
<td>Thinking Like a Scientist B (2 units) GE area A3</td>
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<tr>
<td>Math (4 units) GE area B4</td>
<td>Math (4 units)</td>
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<tr>
<td>Chemistry Department Seminar or GE</td>
<td>GE</td>
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Example of a Case Study

Zombie Attack! An Introduction to Quantitative Modeling

Question 1: In your own words, summarize the process of transition from Susceptible to Zombie and then to Dead.
Link to General Analytical Chemistry

- Kinetics
- Mechanism
- Differential equations
- Rates vs rate constants
- Models

\[ E + S \underset{k_1}{\overset{k_2}{\rightleftharpoons}} ES \rightarrow E + P \]
Science 120: A freshman year experience for STEM

- Common General Education Courses
  - Critical Thinking (A3) 4-units
  - Intro Biology (B2) 3-units
  - Precalculus (B4) 4-units
  - Science Lab 1-Unit

- Transition Elements

- Service Learning
  - Preserve
  - Partner

SCIENCE 120
“Sustainability in my World”
12 Units
Critical Thinking Integration

• Philosophy Prof. on the Team (John Sullins)
• Integrated in the context of math and biology
• Development/testing of questions and hypotheses
• Defense of individual research projects
• Group critique
• Peer Mentor facilitation

2. Logic Made Easy by Deborah Bennett ISBN: 0-393-32692-6