BIOL 4480 Marine Ecology

- explore relationships of marine animals
- understand organismal form, function, ecology
- engage in discussions about the impact of humans
- explore the multi-dimensional challenges
- synthesize alternative solutions to the challenges
- effectively communicate the complex conservation strategies
Student Learning Outcomes

1. Demonstrate the ability to increase critical thinking skills (Application)
2. Identify the limitations of one’s own hypotheses, interpretations, or positions. (Analysis)
3. Integrate information/data to solve a problem. (Synthesis)
5. Criticize the appropriateness of procedures for investigating a question of causation. (Evaluation)
7. Validate evidence and identify both reasonable and inappropriate conclusions. (Evaluation)
11. Develop and justify one’s own hypotheses, interpretations, or positions. (Synthesis)
Incorporating Critical Thinking Activities

- Each week focused on a different student learning outcome (SLO)
- Critical thinking activity (CTA) chosen to match SLO with the lecture topic
- Evaluation of the CTA was rubric based – 20 point maximum
  - Level 1 – Weak – 0-14 points
  - Level 2 – Unacceptable – 15-17 points
  - Level 3 – Acceptable – 18-19 points
  - Level 4 – Strong – 20 points
Student Learning Outcomes

SLO Type
• Application
• Analysis

Class Activity
• CCTST pre / post examination
• Multiply hypothesis testing (Excel)
• Random draw debate (articles)
• Group discussion
## Application & Analysis

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Student Learning Outcomes

**SLO Type**
- Evaluation
- Synthesis

**Class Activity**
- Critical movie review (Chasing Coral)
- Us vs. them debate (climate change)
- Persuasive essay
- Calculation and analysis (Excel)
- Marine spatial management plan
Evaluation & Synthesis
Course Self Assessment

• explore relationships of marine animals
• understand organismal form, function, ecology
• engage in discussions about the impact of humans
• explore the multi-dimensional challenges
• synthesize alternative solutions to the challenges
• effectively communicate the complex conservation strategies

• Good – 2
• Very good – 3
• Excellent – 4
• Very good – 3
• Good – 2
• Very good - 3
California Critical Thinking Skills Test

CCTST Question Types

Analysis  Inference  Evaluation  Induction  Deduction  Overall

CCTST Difference (scores +/-.95%CI)
California Critical Thinking Skills Test

Gain (percentile) vs. Initial CCTST score for different groups:
- Regular
- Creative inquiry
- Grad students
Student Evaluations - Strengths

• I liked having the critical thinking activities. They helped me grow and better understand the material.

• I really enjoyed the critical thinking exercises and class discussions. They brought up issues that are both culturally important and complicated. I felt discussions focused on the most important current issues facing marine ecology and conservation.

• Notes and scientific paper reading were very helpful, as were other activities we conducted in class. Though I understand its purpose, the Critical Thinking Skills test was a little frustrating, specifically because this is the fourth time I have taken it and I seem to receive approximately the same score every time. Perhaps considering another method of analyzing critical thinking skills could be helpful.
Student Evaluations - Weaknesses

• A lot of the time, I am unsure what exactly will be on the test and the tests seem to be a little more about critical thinking which is hard. Also the debates cause people to be impolite at times to other students, but that's life.

• units cover a lot of material so sometimes its difficult to pick out the most important parts

• The grading for the class participation activities could be a little skewed. It didn't always make sense to base grades off of the number of comments made during class.
Final Thoughts