



## SLO Assessment Cycle for BIOL 11

Human Biology SLO Modified: [04/15/2011]

### Jeff Schinske's Team Members:

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**Additional Team members not on list/notes about team:**

**Additional Notes:**

### Outcomes:

**Outcome 1: Statement** Modified: [04/15/2011]

Investigate the forms and functions of selected human organ systems from the molecular/cellular level to homeostasis at the organismal level.

### Assessment Cycle Records:

**Outcome 1: Assessment Planning** Modified: [04/15/2011]

**Assessment Strategy Used:**

Quarter: Winter 2011

Assessors: Jeff Schinske

Assessment Tools: Exams • Papers/Essays

Sections being assessed: 03, 04D

**Outcome 1: Reflect & Enhance** Modified: [04/15/2011]

**Number of people involved in Phase III:** 10

**Changes:**

Based on last year's reflection and enhancement work, the Bio 11 instructors collaboratively edited the course SLO's to make them more representative of course content. Those new SLO's were put into use in 2010-2011.

**Methods:**

I used pre/post essay questions in an online survey environment (SurveyMonkey). Students completed the survey in the first week of class, and again in the last week of class. The essay prompt began with a challenge statement as follows: Do you agree or disagree with the following statement? "Your NERVES and your GLANDS serve a very similar purpose in your body." Please explain your opinion of the statement. This was chosen, since the nervous and endocrine systems were subjects of substantial discussion in class.

**Summary:**

Initial student ideas were not scientifically supported and exhibited a multitude of misconceptions about the cells and physiology of these organ systems. An example response was "I do not recall what either parts of the body do, but I disagree because they have different names, which mean they serve different functions." Another pre-class quote was "Your nerves are in your nervous system pertaining to your sense. Your glands are in a totally different part like hair glands." Post-class responses were significantly more scientifically supported across the board. For example "Nerves are useful in more direct "messaging", whereas glands/hormones are better used for "mass messaging". Nerves use neurons and neurotransmitters whereas glands use hormones and the circulatory system." On average, post-class scores were 137% higher than pre-class scores (using my grading rubric). At the same time, most responses were relatively brief compared to essay questions we complete in class. That limited the depth of inferences I could draw about student progress. The changes I observed, though, were very pleasing and encouraging.

**Enhancement (Part I):**

The main way I plan to change is to frame the surveys differently in the future. I was very pleased with the changes I saw in student thinking in terms of the level of biological complexity, but I would have liked even more detail. I think the lack of detail compared to in class essay questions related to the online environment. In the future, I will give students a word count suggestion and will indicate that their responses will be somewhat more strictly graded (not just done for data collection purposes).

**Enhancement (Part II):**

Resources most helpful as related to this outcome would be

- 1) additional laboratory materials resources. There are a number of labs that help to directly demonstrate to students the cellular and molecular physiology of these organ systems. However, those activities require materials resources to implement.
- 2) additional online data collection and analysis tools. I found the online survey to be a nice way to collect pre/post data, but more complex tools and features would be even more helpful.
- 3) related to the above, students would benefit from additional areas for biology-specific support in technology, tutoring, and studying. The Science Resource Center (Building SC3) is a critical resource in this area, and needs additional funding and support.

**Outcome 2: Statement** Modified: [04/15/2011]

OLD/DELETED OUTCOME: Distinguish the characteristics of life.

**General Notes for Outcome 2**

THIS SLO HAS BEEN DELETED AND IS NO LONGER IN USE. Based on the initial round of assessment and reflection, we eliminated this SLO as too narrow for the course.

**Outcome 2: Assessment Planning** Modified: [04/15/2011]**Assessment Strategy Used:**

Quarter: Fall 2010

Assessors: Jeff Schinske

Assessment Tools: Papers/Essays

Sections being assessed: 01, 02

**Outcome 2: Reflect & Enhance** Modified: [06/04/2010]

**Number of people involved in Phase III:** 6

**Changes:****Methods:**

I asked students the exact same essay question on the very first day of class and the very last day of class (final exam). I scored both sets of questions using same rubric and looked for shifts in student scores. The essay question asked students to explain why a flag waving in the wind cannot be considered "living" based on the common characteristics of life.

**Summary:**

The average score for students' initial responses was a 13% and the average score of students' final exam responses was a 73%. Initially, students self-reported numerous misconceptions about what all living things have (ex. all living things think, breathe, have faces, have emotions, etc.). Final exam responses showed much more biologically appropriate answers about the features of living things (ex. made of organic molecules, metabolize, respond and grow at a cellular level, etc.). Since the characteristics of life are covered in the first week of class, it was impressive that students apparently not only learned the information, but retained it for 11 weeks until the final exam. While this is satisfactory and exciting to see, it would be nice to increase the final exam scores even more.

**Enhancement (Part I):**

I will use the misconceptions from the pre-assessment to guide my teaching in the future. I will take student quotes from those papers and challenge my future students to evaluate them, specifically looking for exceptions where life is clearly present without those characteristics. Most strikingly, the SLO itself seems too narrowly constructed. Since the topic of the SLO is really only specifically covered in the first week of class, it would be nice to switch out this outcome for a more-broad and overarching course goal.

**Enhancement (Part II):**

I will need to work with other Bio 11 instructors to change this SLO and make it more suitable for the course. That will require departmental or division meeting time that might need to be accommodated administratively.

**Outcome 3: Statement** Modified: [04/15/2011]

Use scientific reasoning to evaluate the biological principles underlying current human health dilemmas, such as the causes of disease, use of biotechnologies, management of epidemics and public health, ecological/environmental health, and social health inequities.

**Outcome 3: Assessment Planning** Modified: [04/15/2011]**Assessment Strategy Used:**

Quarter: Winter 2011

Assessors: Jeff Schinske

Assessment Tools: Exams

Sections being assessed: 03, 04D

**Outcome 3: Reflect & Enhance** Modified: [04/15/2011]

**Number of people involved in Phase III: 10****Changes:**

Based on last year's reflection and enhancement work, the Bio 11 instructors collaboratively edited the course SLO's to make them more representative of course content. Those new SLO's were put into use in 2010-2011.

**Methods:**

I used pre/post essay questions in an online survey environment (SurveyMonkey). Students completed the survey in the first week of class, and again in the last week of class. The essay prompt began with a challenge statement as follows: Using your current ideas (no right or wrong answer), do you agree or disagree with the following statement? "There are NOT currently any DNA technologies that treat human diseases, but researchers hope to discover some in the future." This was chosen, because it elicits student responses about a topic of importance in current events and with societal/ethical contexts.

**Summary:**

After applying my grading rubric, the majority of students received 0 points for their pre-class responses. Students exhibited a variety of confusions and a general lack of complex understanding about DNA and DNA technologies as applied to human health. Some example pre-class quotes are "DNA is a complicated aspect of a human body." and "There are some DNA technologies but i don't know for what diseases." The after class responses were, as a whole, far more specific and scientifically supported. Students not only recognized that some DNA technologies exist and have been in use for years, they cited specific examples of technologies and sometimes described how those technologies are done. Some example post-class quote excerpts are "Their are DNA technologies used in medicine like gene therapy, where we use viruses to splice healthy genes into the DNA of patients with a chromosomal abnormality." and "There many different types of DNA technologies that treat human disease that we are currently using or researching such as Gene Therapy, stem cell, and Oocyte Nuclear Transfer." The average student score (according to grading rubric) raised by over 200% pre-class to post-class (students more than tripling their pre-class scores). At the same time, the essay responses were quite a bit shorter than I typically see when I ask in-class essay questions.

**Enhancement (Part I):**

The main way I plan to change is to frame the surveys differently in the future. I was very pleased with the changes I saw in student thinking in terms of the level of biological complexity, but I would have liked even more detail. I think the lack of detail compared to in class essay questions related to the online environment. In the future, I will give students a word count suggestion and will indicate that their responses will be somewhat more strictly graded (not just done for data collection purposes).

**Enhancement (Part II):**

Resources most helpful as related to this outcome would be  
1) additional online data collection and analysis tools. I found the online survey to be a nice way to collect pre/post data, but more complex tools and features would be even more helpful.  
2) related to the above, students would benefit from additional areas for biology-specific support in technology, tutoring, and studying. The Science Resource Center (Building SC3) is a critical resource in this area, and needs additional funding and support.

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[ Number of Outcomes for BIOL 11: 3 ]