

Dear Associate Dean Kumar,

Please find below the summaries provided by Profs. Povinelli, Fredericq and Birdsong for BIOL 121 in Fall 2017.

Best regards,  
Phyllis Griffard

Daniel Povinelli

**\*Goal(s) and Objectives\*** (What did you plan to do? What did you expect the Gen Ed students to be able to do?) **Pursuant to the goals and objectives, I designed three in class and out class assignments designed have the Gen Ed students think through problems that involved materials they had learned in class in a novel way. I presented them with some of these facts and asked which of several inferences were valid. One involved the role of deforestation and the explosion of termite populations and the production of methane gas. I expected the students to be able to draw a connection between what they knew about methanogens and widespread deforestation to estimate the impact of CH<sub>4</sub> in the atmosphere. Other critical thinking exercises were interspersed in class through direct questioning until the students came up with correct ways of framing the right questions to ask in order to be able to justify a scientific claim.**

**\*Measures and Criterion\*** (How did you plan to assess and measure the success of the objectives?) **I measured their ability to do so by having them turn in written assignments that I could easily score for whether the logical inference had been drawn. I also measured the success by flash polls to determine if they were making the critical inferences on topical matters related to genetic engineering, bioengineering, and carbon fixation in the context of climate change. I have also given a 3-page assignment to have student use scientific sources to evaluate a critical issue. This is due with their final exam.**

**\*Findings\*** (How did you do? Were the objectives met? What results were gathered?) **I did very well, thank you for asking. Yes, the objectives were met. I scored each assignment on a scale of 0 to 3 and the mean for the first assignment was a 2.6 and for the second assignment it was a 2.3. There was a bimodal distribution on both assignments. The flash polls added another dimension which allowed student who made the incorrect inference to immediately get feedback through in class discussion about why an inference either was or was not justified.**

**\*Improvement Narrative\*** (What did you learn? What do you plan to improve going forward?) **I learned that my teaching methods are effective in**

**allowing many students to piece together how separate facts they were learning interact to allow a new, valid conclusion to be drawn. In the future I intend to build new assignments that focuses more specifically on the limits and dangers of scientific knowledge.**

Suzanne Fredericq

This is what my Biol. 2017 achieved. This paragraph was included in the Fall 2017 syllabus.

"Learning outcomes: Students will be able to explain: the properties of living things; the chemistry of life; the different levels of life; how evolution affects our daily life; an appreciation of the unity and diversity of the Tree of Life; the different human body systems; how organisms interact with their environment. Each of these concepts will be placed in the context of everyday's life."

**Note: A total 232 students registered for the class.**

The number of students who provided answers to the 6 essay-type assignments to be completed either at the end of the lecture or at home were as follows:

- 1) **12 September:** 156/232
- 2) **28 September:** 165/232
- 3) **12 October 2017:** 184/232
- 4) **19 October:** 77/232
- 5) **2 November:** 108/232
- 6) **16 November:** 166/232

*\*Measures and Criterion\* (How did you plan to assess and measure the success of the objectives?)*

The following concept questions were asked for extra points at the end of 6 class sessions for extra points. The success of the objectives was assessed based on the quality of the students' essay-type answers.

**1) 12 September 2017**

Objective: Comprehension of "Energy and Life" (Chapter 3)

10 points

-What are the scenarios that might make it easier or harder for a substance to get into a cell?

-What are 3 structures unique to plant cells and explain why they're useful to plants and not to animals

**2) 28 September 2017**

Objective: Comprehension of "DNA: the Molecule of Life" (Chapter 6)

10 points

-Why might cancer be hard to treat?

-Explain why sexually producing organisms need both haploid and diploid cells?

### **3) 12 October 2017**

Objective: Comprehension of “Darwinian Evolution” (Chapter 7)

10 points

-Would the concept of Evolution be the same today if Charles Darwin had not lived?

### **4) 19 October 2017**

Objective: Comprehension of “DNA: the Molecule of Life” (back to Chapter 6)

5 points

-Would you get a personal DNA test if you could? Why or why not?

-Would you get a personal DNA test before you had a baby? Why or why not?

### **5) 2 November 2017**

Objective: Comprehension of “Darwinian Evolution” (Back to Chapter 7)

5 points

-Do we have bacterial genes in our cells? Explain in light of endosymbiosis. How do you expect the living world would be if endosymbiosis had not occurred?

### **6) 16 November 2017**

Objective: Comprehension of “Biodiversity” (Chapters 8-10)

10 points

-Find an article in the New York Times that deals with Ocean Acidification and Climate Change and explain why the topic is so relevant today and why you find it interesting or not. Cite the correct article.

*\*Findings\* (How did you do? Were the objectives met? What results were gathered?).*

The objectives were met for the most part met and based on the quality of the students' essay-type answers.

The results were gathered based on 6 assignments and the grades were posted on Moodle - see grade distribution of the extra point assignments in the accompanying pdf file. The names of the 232 students were deleted. An empty space means that the student did not complete the assignment. I gave full credit for the first assignment on Sept. 12 to everyone who provided the requested assignment in order to encourage future essays.

In addition, throughout each class, I kept asking general questions back-and-forth, and kept repeating concepts that were not clear *at nauseam*, until the students “got it”. If students were in back of the class, they shouted their answer. It thought it was a very dynamic way of teaching.

I did not mention ahead of time when I would provide the assignments. If a take-home assignment was required for the next class I would mention it at the end of the class when it was announced, not on Moodle. All answers were essay-type. The students had to provide me a hard copy of the assignment (not through Moodle or email).

Heather Birdsong

**\*Goal(s) and Objectives\* (What did you plan to do? What did you expect the Gen Ed students to be able to do?)** I gave 3 projects to my non majors Biological Principles class over the course of the semester, and I am repeating those projects this semester to get a larger sample size in my data. My plan was to devise assessments that would ask them to think more deeply about biology and relate it to their daily lives. In project 1 I gave them a scientific journal article to read as well as an article from a popular newspaper's website that summarized the results of that same study, but also sensationalized and misrepresented them to get reader's attention. The students had to answer questions about how the article presented the results of the study and whether they thought the newspaper spun the results. Finally, I asked them how they felt that the need to get clicks affects how websites present scientific information. The goal was to see if they could interpret scientific results and to get them to think more carefully about the things they read online. I expected them to be able to get the broad idea of the study's purpose and results and to put it into a larger context.

In project 2 I gave them 2 articles from a popular science magazine that reviewed studies working to cure two genetic disorders with different types of gene therapy. I had them answer questions about the disorders, how they have been treated in the past, what successes and side effects were found, and what new treatments are emerging. Then I asked them to answer, understanding the risks involved in both gene therapies, whether they would be willing to undergo such treatments, and if they would subject their own child to them. The goal was to see if they now had a working understanding of gene therapy (we had just covered it in class), to get them to think about how such research can be important in their own lives, and to think about positive and negative effects of gene therapy on human health. I expected them to be able to understand the finer points of the review articles and put themselves into these situations to really think through all the possible consequences.

The final project I gave them was a bonus project at the end of the semester related to ecology. I had them read an article in a science magazine and watch a video about the changes in the Yellowstone National Park ecosystem that occurred when wolves were reintroduced. They had to answer questions about the state of the park before wolf reintroduction and how those keystone species changed the entire food web of that ecosystem, increasing overall species diversity, ecosystem health, and even the hydrology of the park, once they came back. Then I gave them a hypothetical island ecosystem and explained how all the species on it interact with one another. I then asked if the apex predator of that ecosystem was hunted to extinction how that would affect the other species there and the non-living components of the ecosystem, and what they might do

to stabilize the ecosystem. The goal was to see how well they understood species interactions and to get them to apply that understanding to an imaginary scenario. I expected them to understand the complex interactions of the Yellowstone National Park ecosystem and to extrapolate that information to hypothetical environments.

**\*Measures and Criterion\* (How did you plan to assess and measure the success of the objectives?)** For all 3 projects I assessed and measured success based on the accuracy of their answers to questions about the content of the articles with point values attached to each question. For those questions that asked for opinions about relating the material to themselves I gave credit for well thought out responses, not right or wrong.

**\*Findings\* (How did you do? Were the objectives met? What results were gathered?)** I gathered grades for all three, 10 points possible for projects 1 and 2, and 20 possible for project 3.

#### Project 1

Grade breakdown	Percent students score
100-90%	43.1%
89-70%	52.1%
69-60%	4.7%
59-0%	8.5%

#### Project 2

Grade breakdown	Percent students score
100-90%	77.8%
89-70%	9.1%
69-60%	0.4%
59-0%	12.6%

#### Project 3

Grade breakdown	Percent students score
100-90%	72.9%
89-70%	24.3%
69-60%	0.0%
59-0%	2.8%

**\*Improvement Narrative\* (What did you learn? What do you plan to improve going forward?)** It looks like students performed much better on projects 2 and 3. I changed my questions and grading scale slightly for this semester, so it will

be interesting to compare results, but for now I think the most important thing I have learned is that students who are not biology majors are capable of understanding these complex concepts well and applying them to their lives. However, there is a definite lack in the ability to understand and interpret primary sources of scientific data. I think the next time I give the same type of assignment as project 1 I will try to find a study that is a bit less technical and detailed than the one they read, and perhaps spend more time in class explaining how to interpret data.