

# Supplemental Material

*CBE—Life Sciences Education*

Owens *et al.*



The Science Education  
Partnership & Assessment Lab  
San Francisco State University

# HHMI Biology FEST Winter Institute

## Monday, January 13, 2014

### Participant Agenda

#### Day 1: Introduction to Scientific Teaching

#### Today's Learning Outcomes...

- Get to know your 2014 HHMI Biology FEST Winter Institute colleagues!
- Distinguish the components of Scientific Teaching through a shared classroom experience.
- Discuss the relationship between innovative teaching and the biological basis for learning.
- Apply principles of Backwards Design to individual class contexts.
- Investigate the Vision and Change Core Competencies.

<b>9:00-10:05</b>	<b>Introductions: Getting to Know You...</b>
<b>10:05-10:15</b>	<b>Reflection: A Time to Reflect on Your Own...</b>
<b>10:15-10:25</b>	<b>Big Idea: HHMI Biology FEST Overview and Scientific Teaching Framework</b>
★ 10 min - Bathroom Break ★	
<b>10:35-11:35</b>	<b>Activity: Scientific Teaching – A Common Experience</b>
<b>11:35-11:45</b>	<b>Big Idea: Focusing on a Single Course &amp; Thinking about Spring...</b>
<b>11:45-12:45</b>	<b>LUNCH</b>
<b>12:45-1:00</b>	<b>Activity: Keeping Your Eye on the Big Picture</b>
<b>1:00-1:20</b>	<b>Activity: What We Want Students to Be Able to Do at the End of the Course</b>
<b>1:20-1:40</b>	<b>Big Idea: Evidence on How People Learn</b>
<b>1:40-1:55</b>	<b>Discussion: On Content Coverage and Prioritizing Student Learning Outcomes</b>
<b>1:55-2:35</b>	<b>Activity: Using Backwards Design to Prioritize What to Teach</b>
★ 10 min - Bathroom and Snack Break ★	
<b>2:45-3:15</b>	<b>Activity: Scientific Teaching as a National Movement: Exploring Vision &amp; Change</b>
<b>3:15-3:30</b>	<b>Big Idea: Spring Action Plans &amp; Friday Poster Session</b>
<b>3:30-3:50</b>	<b>Activity: Begin Spring Action Plans</b>
<b>3:50-4:00</b>	<b>Closing &amp; Reflection</b>

→ **HOMEWORK:** Bring assessments/exams/quizzes tomorrow!

→ **RESOURCE READINGS:** 1) Understanding by Design (Intro & Ch. 1) by Wiggins and McTighe, 2) Scientific Teaching in Practice by Miller et. al, 3) Putting the Horse Back in Front of the Cart by Allen and Tanner, 4) Vision and Change booklet by NSF and AAAS.



The Science Education  
Partnership & Assessment Lab  
San Francisco State University

# HHMI Biology FEST Winter Institute

## Tuesday, January 14, 2014

### Participant Agenda

#### Day 2: Assessment

#### Today's Learning Outcomes...

- Construct a common understanding of “assessment” and its role in learning.
- Compare and contrast different forms of assessment tools for uncovering student ideas.
- Examine Bloom’s Taxonomy as a tool for evaluating and modifying assessments.
- Compile a bank of student misconceptions that could serve as the basis for assessment prompts.
- Apply Bloom’s Taxonomy and misconceptions work to individual class contexts.

<b>9:00-9:15</b>	<b>Welcome and Reflections from Day 1</b>
<b>9:15-9:45</b>	<b>Activity: The Purpose of Assessment and the Role of Questions</b>
<b>9:45-10:30</b>	<b>Activity: Assessment A-Go-Go, Part I</b>
☼ <i>5 min - Bathroom Break</i> ☼	
<b>10:35-11:30</b>	<b>Activity and Discussion: Assessment A-Go-Go, Part II</b>
<b>11:30-12:00</b>	<b>Activity: Exploring Bloom’s Taxonomy</b>
<b>12:00-1:00</b>	<b>LUNCH</b>
<b>1:00-1:40</b>	<b>Activity: Analyzing Our Exams/Quizzes Using Bloom’s Taxonomy</b>
<b>1:40-2:10</b>	<b>Big Idea and Movie: Uncovering Student Misconceptions</b>
☼ <i>10 min - Bathroom and Snack Break</i> ☼	
<b>2:20-3:10</b>	<b>Activity: Misconceptions Research</b>
<b>3:10-3:45</b>	<b>Activity: Continuation of Spring Action Plans</b>
<b>3:45-4:00</b>	<b>Closing &amp; Reflection</b>

→ **HOMEWORK:** Read Stalking the Second Tier intro chapter

→ **RESOURCE READINGS:** 1) Biology in Bloom by Crowe et. al., 2) Application of Bloom’s Taxonomy Debunks “MCAT Myth” by Zheng et. al., 3) Scientific Teaching (Ch. 3) by Handelsman et. al., 4) Understanding the Wrong Answer by Tanner and Allen, 5) Taming the Testing/Grading Cycle in Lecture Classes Centered Around Open-Ended Assessment by Schinske.



The Science Education  
Partnership & Assessment Lab  
San Francisco State University

# HHMI Biology FEST Winter Institute

## Wednesday, January 15, 2014

### Participant Agenda

#### Day 3: Equity & Diversity

#### Today's Learning Outcomes...

- Explore how issues of equity and diversity affect student learning.
- Experience how unstructured classroom environments can work against inclusiveness, fairness, and equity.
- Discuss recent research on stereotype threat and unconscious bias in science.
- Self assess current awareness of and use of common equitable teaching strategies.
- Evaluate concrete strategies for facilitating group work.
- Investigate group behaviors that can influence inclusiveness, fairness, equity.

**9:00-9:15**                      **Welcome and Reflections from Day 2**

**9:15-10:25**                    **Activity: Building Mobiles**

★ *10 min - Bathroom Break* ★

**10:35-11:00**                 **Small Group Discussion: Talking About Leaving**

**11:00-11:20**                 **Rock Stars of Science**

**11:20-12:35**                 **Stereotype Threat Jigsaw**

**12:35-1:35**                    **LUNCH**

**1:35-2:00**                    **Activity: Exploring 20 Simple Classroom Equity Strategies**

**2:00-2:25**                    **Self-Assessment: What Equity Strategies Are You Using?**

★ *10 min - Bathroom and Snack Break* ★

**2:35-2:45**                    **Self Assessment: Reflecting on Group Work...**

**2:45-3:00**                    **Big Idea: Explicit Group Work Strategies**

**3:00-3:25**                    **Activity: Identifying and Managing Group Dynamics**

**3:25-3:45**                    **Activity: Continuation of Spring Action Plans**

**3:45-4:00**                    **Closing & Reflection**

→ **HOMEWORK:** reading on 5E Model by Bybee

→ **RESOURCE READINGS:** 1) Scientific Teaching (Ch. 4) by Handelsman et. al., 2) Cultural Competence in the College Biology Classroom by Tanner and Allen, 3) Katayoun Chamany People & History of Biology article, 4) Increased Structure and Active Learning Reduce the Achievement Gap in Introductory Biology by Haak, et. al.



The Science Education  
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San Francisco State University

# HHMI Biology FEST Winter Institute

## Thursday, January 16, 2014

### Participant Agenda

#### Day 4: Active Learning

#### Today's Learning Outcomes...

- Construct a common understanding of “active learning.”
- Experience and evaluate different amounts of time required for integrating active learning into a lecture.
- Compare and contrast approaches to promoting active learning outside of class.
- Use the 5E model to analyze and modify a class session, identifying opportunities for active learning.
- Applying active learning strategies to individual class contexts.
- Reflect on how the HHMI Biology FEST Winter Institute is and is not likely to influence our classes this spring.

<b>9:00-9:15</b>	<b>Welcome and Reflections from Day 3</b>
<b>9:15-9:30</b>	<b>Brainstorm and Video: What Can Active Learning Look Like in a Lecture?</b>
<b>9:30-10:30</b>	<b>Activity: Active Learning in 1, 5, 10, and 20 Minutes During a Lecture</b>
✪ <i>10 min - Bathroom Break</i> ✪	
<b>10:40-11:30</b>	<b>Activity: Promoting Active Learning Outside of Class</b>
<b>11:30-12:00</b>	<b>Discussion: Integrating Active Learning in Your Own Context</b>
<b>12:00-1:00</b>	<b>LUNCH</b>
<b>1:00-1:20</b>	<b>Activity: How to Thoughtfully Integrate Active Learning</b>
<b>1:20-1:35</b>	<b>Mini-Lecture: The 5 E's</b>
<b>1:35-1:55</b>	<b>Activity: Assigning E's to an Individual Class Session</b>
<b>1:55-2:20</b>	<b>Discussion: Strategies for Using the 5E Model to Iteratively Change</b>
<b>2:20-2:40</b>	<b>Activity: Tweak Your Lesson!</b>
✪ <i>10 min - Bathroom and Snack Break</i> ✪	
<b>2:50-3:35</b>	<b>Carousel Graffiti: What Will You Use in Your Classroom?</b>
<b>3:35-3:50</b>	<b>Activity: Continuation of Spring Action Plans</b>
<b>3:50-4:00</b>	<b>Closing &amp; Reflection</b>

→ **Homework:** Think about what you will propose to do in Spring and describe on your poster...

→ **RESOURCE READINGS:** 1) Active Learning chapter from Scientific Teaching, 2) Su et al Science article, 3) How People Learn by Donovan, and 4) Infusing Active Learning into Large Classrooms



The Science Education  
Partnership & Assessment Lab  
San Francisco State University

# HHMI Biology FEST Summer Institute

## Friday, January 17, 2014

### Participant Agenda

#### Day 5: Looking Forward to Spring...

#### Today's Learning Outcomes...

- Defend or refute common conceptions of the applicability of Scientific Teaching to undergraduate biology classes.
- Develop potential solutions to anticipated barriers we might encounter in applying Scientific Teaching to our classes.
- Compose a plan for implementing small changes in our classes this spring based on Scientific Teaching.
- Set expectations for spring semester activities and create individual plans within spring working groups.

**9:00-9:15**                      **Welcome and Reflections from Day 4**

**9:15-10:00**                    **Activity: Evaluating Statements About Scientific Teaching**

★ *10 min - Bathroom Break* ★

**10:10-11:00**                **Discussion: What are the Hurdles to and the Resources for Making Things Happen?**

**11:00-11:45**                **Poster Creation**

**11:45-12:15**                **LUNCH**

**12:15-1:15**                 **Poster Session**

**1:15-1:30**                    **Celebration & Closing**

**1:30-1:45**                    **Final Reflection**

**1:45-2:00**                    **Final Announcements**

★ *15 min - Bathroom and Snack Break* ★

**2:15-4:00**                    **Activity: Launching Teaching Squares!**

→ **RESOURCE READINGS:** Innovations in Undergraduate Biology and Why We Need Them by Bill Wood.

## Informed Consent Letter

Dear Colleague,

You are being asked to participate in a research study conducted by a postdocs, Gloriana Trujillo, Ph.D. and Shannon Seidel, Ph.D. of the Science Education Partnership and Assessment Laboratory (SEPAL), here at San Francisco State University (SFSU).

You are being invited to participate in this study because you are a faculty at SFSU who is currently (Spring 2014) teaching at least one course offered by the Biology Department. Your participation in this study is voluntary.

### PURPOSE OF THIS STUDY

The purpose of this study is to investigate the perceptions of SFSU faculty and students of their experiences in biology courses this semester.

### PROCEDURES

You will be asked to complete a 10 minute online survey about your experiences in your Spring 2014 biology courses. If you are teaching more than one course, you will be asked to answer the survey separately for EACH COURSE. At the end of the survey, there will be a short demographics questionnaire. Your responses will remain completely confidential.

If you volunteer to participate in this study, you will complete the survey in a secure website. You will be giving us permission to read, analyze and report data from your confidential responses to the survey.

### POTENTIAL RISKS

The primary risk is the potential loss of privacy, as demographic information and your insights about your perceptions of your courses will be collected. To mitigate this risk, we will keep the survey data strictly confidential. Original survey responses only be known to Gloriana Trujillo, Ph.D. or Shannon Seidel, Ph.D. and all personal indicator information will be removed before any analysis is done. All data will be collected using a password protected survey system (SurveyMonkey.com).

### POTENTIAL BENEFITS TO YOU AND/OR SOCIETY

There are no direct benefits to you by participating in this study. However, participating in this research study may provide insights into student perceptions of your classroom environment. In addition, access to the aggregate data collected in this study will be useful in guiding all faculty participating in the upcoming HHMI Biology FEST Summer Institute toward making improvements in the classroom experiences of their students.

### PAYMENT FOR PARTICIPATION

You will be offered a \$20 gift card from your choice of one of the three following businesses: Amazon.com, Peet's Coffee and Target. In order to receive your gift card, you will be asked to provide your name and email address. This information will NOT be associated with your survey responses. You will receive one gift card per course if you complete the survey multiple times for different biology courses you are teaching in Spring 2014.

### CONFIDENTIALITY AND ANONYMITY

Your identity will be kept strictly confidential during the entire research process, and the survey data itself will be collected anonymously. Department administrators and HHMI grant co-PI's Kimberly Tanner, Ph.D. and Carmen Domingo, Ph.D. will not have access to any data with personal identifiers. If you choose to share your name and email to receive your gift card, this information will be separated from your survey responses. Anonymous data or findings from this study might be included in various publications and presentations, but only as a group.

### PARTICIPATION AND WITHDRAWAL

You can choose whether to participate and you may withdraw from this study at any time. Choosing not to participate or choosing to withdraw at any point will mean that your responses will not be included in data analysis or reporting for research purposes.

### IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the study, please feel free to contact Gloriana Trujillo, Ph.D. [REDACTED], Shannon Seidel, Ph.D. [REDACTED], or their research advisor, Kimberly Tanner, Ph.D. [REDACTED]

**RIGHTS OF RESEARCH PARTICIPANTS**

If you have questions or concerns regarding the manner in which this study is conducted, you may contact Human and Animal Protections at [REDACTED] or [REDACTED]

Thank you in advance for your participation!

Gloriana Trujillo, Ph.D.  
Postdoctoral Research Fellow  
SEPAL

Shannon Seidel, Ph.D.  
Postdoctoral Research Fellow  
SEPAL

This study has been reviewed and approved by the SFSU Committee for the Protection of Human Subjects, Protocol Number: X13-29R1; Approval Date: April 22, 2014 Expedited; Expiration Date: This approval expires on April 30, 2015.

\* Please respond to the following first person statement. NOTE: Your decision whether or not to take part in this research will have no influence on your present or future status at San Francisco State University.

"I have read the procedures described above. By checking "Agree" below, I am electronically signing this document and consenting to participate in this study."

- Agree
- Disagree

If you would like a copy of your electronically signed Informed Consent Letter, please email Shannon Seidel, Ph.D. at [REDACTED]



## Introduction to the Survey

Over the next few pages, you will be asked questions about your experiences in your biology course(s) at SFSU this semester. You will first be asked to identify the course and the course section that you will be sharing your impressions on. Please limit your answers on this survey to your experiences in that specific course.

If you are teaching more than one course, you will be given the opportunity to retake this survey for those additional courses.

Thank you in advance for your honest and complete answers to the following questions. All responses will be kept strictly confidential.

\* Please select ONE biology class you are currently teaching. All of your answers to the survey should refer SOLELY to this class. If you are teaching more than one biology class you will be asked to take this survey again later.

- |  |  |
|--|--|
| <input type="radio"/> BIOL 100 - Human Biology                                       | <input type="radio"/> BIOL 586 - Marine Ecology Laboratory                                   |
| <input type="radio"/> BIOL 101 - Human Biology Laboratory                            | <input type="radio"/> BIOL 600 - Animal Behavior   |
| <input type="radio"/> BIOL 150 - The World of Plants                                 | <input type="radio"/> BIOL 612 - Human Physiology  |
| <input type="radio"/> BIOL 160 - Marine Biology                                      | <input type="radio"/> BIOL 613 - Human Physiology Laboratory                                 |
| <input type="radio"/> BIOL 170 - Animal Diversity                                    | <input type="radio"/> BIOL 616 - Cardiorespiratory Physiology                                |
| <input type="radio"/> BIOL 176 - Science and Politics of Stem Cell Biology           | <input type="radio"/> BIOL 617 - Environmental Physiology                                    |
| <input type="radio"/> BIOL 210 - General Microbiology and Public Health              | <input type="radio"/> BIOL 618 - Biology of Aging  |
| <input type="radio"/> BIOL 211 - General Microbiology and Public Health Laboratory   | <input type="radio"/> BIOL 623 - Pharmacology  |
| <input type="radio"/> BIOL 212 - Principles of Human Physiology                      | <input type="radio"/> BIOL 625 - Hematology  |
| <input type="radio"/> BIOL 213 - Principles of Human Physiology Laboratory           | <input type="radio"/> BIOL 627 - Biophysics  |
| <input type="radio"/> BIOL 220 - Principles of Human Anatomy                         | <input type="radio"/> BIOL 631 GW - Animal Physiology Laboratory - GVAR                      |
| <input type="radio"/> BIOL 230 - Introductory Biology I                              | <input type="radio"/> BIOL 638 - Bioinformatics and Genome Annotation                        |
| <input type="radio"/> BIOL 240 - Introductory Biology II                             | <input type="radio"/> BIOL 640 - Cellular Neuroscience                                       |
| <input type="radio"/> BIOL 310 - Biology for Today's World                           | <input type="radio"/> BIOL 642 - Neural Systems Physiology                                   |
| <input type="radio"/> BIOL 313 - Principles of Ecology                               | <input type="radio"/> BIOL 694 - Cooperative Internship in Biology                           |
| <input type="radio"/> BIOL 317 - Ecology of California                               | <input type="radio"/> BIOL 702 - Biology of the Algae  |
| <input type="radio"/> BIOL 318 - Our Endangered Planet                               | <input type="radio"/> BIOL 710 - Advanced Biometry   |
| <input type="radio"/> BIOL 322 - Human Sexuality: Integrative Science                | <input type="radio"/> BIOL 711 - Immunoassays  |
| <input type="radio"/> BIOL 326 - Disease!  | <input type="radio"/> BIOL 716 - Skills for Scientific Proposal Writing                      |
| <input type="radio"/> BIOL 327 - AIDS: Biology of the Modern Epidemic                | <input type="radio"/> BIOL 723 - Pharmacology  |
| <input type="radio"/> BIOL 328 - Human Anatomy                                       | <input type="radio"/> BIOL 731 - Animal Physiology Laboratory                                |
| <input type="radio"/> BIOL 330 - Human Sexuality                                     | <input type="radio"/> BIOL 738 - Bioinformatics and Genome Annotation                        |
| <input type="radio"/> BIOL 337 - Evolution   | <input type="radio"/> BIOL 760 - Cancer Biology  |
| <input type="radio"/> BIOL 350 - Cell Biology  | <input type="radio"/> BIOL 773 - Advances in Biomedical Microbiology: Molecular Microbiology |
| <input type="radio"/> BIOL 351 GW - Experiments in Cell and Molecular Biology - GVAR | <input type="radio"/> BIOL 782 - Developmental Biology                                       |
|  | <input type="radio"/> BIOL 784 - Cell Culture and Stem Cell Techniques                       |



Read each of the statements below and indicate if you agree, disagree or are not sure.

Your answers should be specific to the course you just selected.

IN THIS COURSE ...

	Agree	Disagree	Not Sure
the instructor spends most of the class time lecturing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
the instructor encourages student discussion.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
students sometimes work with one or more partners during class time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
the instructor tries to learn all of the students' names.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
the instructor has favorite students.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
the instructor regularly includes examples from everyday life during class.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
homework assignments consist mostly of textbook reading.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
the instructor spends most of the class time standing in front of the students.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
the instructor collects information about what students think in ways other than quizzes and exams.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
exams focus on testing students' ability to memorize facts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
the instructor mixes short lectures with activities throughout the lesson.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
student grades are based primarily on a set number of exams.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
the instructor asks for student feedback about the class throughout the semester.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
students typically sit quietly and do not speak to their classmates or their instructor.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
the instructor explains to students why they are being asked to do things in class.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
the instructor regularly answers his/her own questions right after asking them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
students are asked to share their ideas out loud in class.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Does the class you are teaching contain a "lecture portion?"

Yes

No

In the "lecture portion" of your course, please estimate the percentage of class-time spent on student activities, questions, and discussion.

Percent of class-time



## Requesting Permission to Survey Your Students...

Do we have your permission to administer this survey to your students so that we can get data about their perceptions of this course?

NOTE: All data would be kept confidential and we would share the aggregate findings with you. Eventually, anonymous findings from this study might be included in various publications and presentations.

Yes

No



## Demographics Questions

Which of the following best describes your general research area? (check all that apply)

- Botany
- Cell & Molecular Biology
- Ecology
- Marine Biology
- microbiology
- Physiology
- Zoology
- Clinical Science
- Other (please specify)

As an undergraduate student, my field of study was...

As a doctoral student, my field of study was...

I most closely identify as...

- Male
- Female
- Decline to State
- Other (please specify)

I most closely identify as... (choose all that apply)

- African American
- Asian
- Filipino/Pacific Islander
- Latino / Chicano
- Native American
- White
- Decline to State
- Other (please specify)

## To Receive Your Gift Card

So that we can both provide you with feedback from your specific students and give you the gift card of your choice please enter your name and email address below.

This personal information will in NO WAY be affiliated with your responses to the previous questions on this survey.

**Name:**

**Email Address:**

Please select which gift card you would prefer:

- Peet's Coffee
- Amazon
- Target

Are you teaching multiple biology courses?

**IF YOU ARE TEACHING MORE THAN ONE COURSE IN SPRING 2014, READ ON!**

**We ask that you complete the survey for all the courses you are teaching in Spring 2014. If you do so, YOU WILL RECEIVE A \$20 gift card FOR EACH COURSE!**

**PLEASE PASTE THE LINK INTO A NEW BROWSER WINDOW to complete the survey for another of your Spring 2014 Courses.**

\*\*\*\*\*



\*\*\*\*\*

Thank you for your time and thoughtfulness in responding to this survey of Faculty Perceptions of College Biology Classrooms!

If you have any concerns about this survey or suggestions for its improvement, please contact:

Gloriana Trujillo, Ph.D.  
Postdoctoral Fellow, SEPAL



Shannon Seidel, Ph.D.  
Postdoctoral Fellow, SEPAL



## 1. Informed Consent Letter

Dear Student,

You are being asked to participate in a research study conducted by postdoctoral research fellows, Gloriana Trujillo, Ph.D. and Shannon Seidel, Ph.D. of the Science Education Partnership and Assessment Laboratory (SEPAL), at San Francisco State University (SFSU).

You were invited to participate in this study because you are a student at SFSU who is currently (Spring 2014) taking at least one course offered by the Biology Department. Your participation in this study is voluntary.

### PURPOSE OF THIS STUDY

The purpose of this study is to investigate the perceptions of SFSU students of their experiences in their biology courses.

### PROCEDURES

You will be asked to complete a 10 minute online survey about your experiences in your Spring 2014 biology courses. If you are taking more than one course, you will be asked to answer the survey separately for each course. At the end of the survey, there will be a short demographics questionnaire. Your responses will remain completely confidential.

If you volunteer to participate in this study, you will complete the survey in a secure website. You will be giving us permission to read, analyze and report data from your confidential responses to the survey.

### POTENTIAL RISKS

The primary risk is the potential loss of privacy, as demographic information and your insights about your perceptions of your courses will be collected. To mitigate this risk, we will keep the survey data strictly confidential. Original survey responses will only be accessed by Shannon Seidel, Ph.D. and Gloriana Trujillo, Ph.D., and all personal indicator information will be removed before any analysis is done. All data will be collected using a password protected survey system (SurveyMonkey.com).

### POTENTIAL BENEFITS TO YOU AND/OR SOCIETY

There are no direct benefits to participants. However, participation will allow you to share your perceptions of your biology courses and reported results may have the potential to improve classroom experiences for SFSU students in Biology classrooms.

### PAYMENT FOR PARTICIPATION

Each student who responds to the survey will be given the chance to enter into a raffle drawing with over 30 prizes. Students who are enrolled in multiple biology courses may take the survey for each course and receive an entry for each course survey for courses for which their enrollment can be verified.

Raffle prizes include:

- An iPad mini
- One of five \$50 Amazon gift cards
- One of twenty five \$10 Peet's gift cards.

If you would like to enter the raffle, you will be asked to submit your name and email at the end of the survey, so we can contact you if you win. This information will NOT be associated with your survey responses.

### CONFIDENTIALITY AND ANONYMITY

Your identity will be kept strictly confidential during the entire research process, and the survey data itself will be collected anonymously. If you choose to share your name and email to enter the raffle, this information will be separated from your survey responses. Anonymous data or findings from this study might be included in various publications and presentations, but only as a group.

No individual student responses will be shared with your instructor. Grouped (confidential) responses will only be shared after grades have been submitted. Furthermore, your responses and participation will have no influence on your grade in any of your courses.

**PARTICIPATION AND WITHDRAWAL**

You can choose whether to participate and you may withdraw from this study at any time. Choosing not to participate or choosing to withdraws at any point will mean that your responses will not be included in data analysis or reporting for research purposes.

**IDENTIFICATION OF INVESTIGATORS**

If you have any questions or concerns about the study, please feel free to contact Gloriana Trujillo, Ph.D. [REDACTED], Shannon Seidel, Ph.D. [REDACTED], or their research advisor, Kimberly Tanner, Ph.D. [REDACTED].

**RIGHTS OF RESEARCH PARTICIPANTS**

If you have questions or concerns regarding the manner in which this study is conducted, you may contact Human and Animal Protections at [REDACTED] or [REDACTED].

Thank you in advance for your participation!

Gloriana Trujillo, Ph.D.  
Postdoctoral Research Fellow  
SEPAL

Shannon Seidel, Ph.D.  
Postdoctoral Research Fellow  
SEPAL

This study has been reviewed and approved by the SFSU Committee for the Protection of Human Subjects, Protocol Number: X13-29R1; Approval Date: April 22, 2014 Expedited; Expiration Date: This approval expires on April 30, 2015.

\* Please respond to the following first person statement. NOTE: Your decision whether or not to take part in this research will have no influence on your present or future status at San Francisco State University.

"I have read the procedures described above. By checking "Agree" below, I am electronically signing this document and consenting to participate in this study"

- Agree
- Disagree

If you would like a copy of your electronically signed Informed Consent Letter, please email Shannon Seidel, Ph.D. at [REDACTED].

## 2. Introduction to the Survey

Over the next few pages, you will be asked questions about your experiences in your biology course(s) at SFSU this semester. You will first be asked to identify the course, your instructor(s) name(s), and the course section that you will be sharing your impressions on. Please limit your answers on this survey to your experiences in that specific course.

If you are taking more than one course, you will be given the opportunity to re-take this survey for those additional courses.

Thank you in advance for your honest and complete answers to the following questions. All responses will be kept strictly confidential.



## 3.

\* Please select ONE biology course you are currently taking. All of your answers to the survey should refer SOLELY to this class. If you are taking more than one biology class you will be asked to take this survey again.

- |  |  |
|--|--|
| <input type="radio"/> BIOL 100 - Human Biology                                       | <input type="radio"/> BIOL 586 - Marine Ecology Laboratory                                   |
| <input type="radio"/> BIOL 101 - Human Biology Laboratory                            | <input type="radio"/> BIOL 600 - Animal Behavior   |
| <input type="radio"/> BIOL 150 - The World of Plants                                 | <input type="radio"/> BIOL 612 - Human Physiology  |
| <input type="radio"/> BIOL 160 - Marine Biology                                      | <input type="radio"/> BIOL 613 - Human Physiology Laboratory                                 |
| <input type="radio"/> BIOL 170 - Animal Diversity                                    | <input type="radio"/> BIOL 616 - Cardiorespiratory Physiology                                |
| <input type="radio"/> BIOL 176 - Science and Politics of Stem Cell Biology           | <input type="radio"/> BIOL 617 - Environmental Physiology                                    |
| <input type="radio"/> BIOL 210 - General Microbiology and Public Health              | <input type="radio"/> BIOL 618 - Biology of Aging  |
| <input type="radio"/> BIOL 211 - General Microbiology and Public Health Laboratory   | <input type="radio"/> BIOL 623 - Pharmacology  |
| <input type="radio"/> BIOL 212 - Principles of Human Physiology                      | <input type="radio"/> BIOL 625 - Hematology  |
| <input type="radio"/> BIOL 213 - Principles of Human Physiology Laboratory           | <input type="radio"/> BIOL 627 - Biophysics  |
| <input type="radio"/> BIOL 220 - Principles of Human Anatomy                         | <input type="radio"/> BIOL 631 GW - Animal Physiology Laboratory - GWAR                      |
| <input type="radio"/> BIOL 230 - Introductory Biology I                              | <input type="radio"/> BIOL 638 - Bioinformatics and Genome Annotation                        |
| <input type="radio"/> BIOL 240 - Introductory Biology II                             | <input type="radio"/> BIOL 640 - Cellular Neuroscience                                       |
| <input type="radio"/> BIOL 310 - Biology for Today's World                           | <input type="radio"/> BIOL 642 - Neural Systems Physiology                                   |
| <input type="radio"/> BIOL 313 - Principles of Ecology                               | <input type="radio"/> BIOL 694 - Cooperative Internship in Biology                           |
| <input type="radio"/> BIOL 317 - Ecology of California                               | <input type="radio"/> BIOL 702 - Biology of the Algae  |
| <input type="radio"/> BIOL 318 - Our Endangered Planet                               | <input type="radio"/> BIOL 710 - Advanced Biometry   |
| <input type="radio"/> BIOL 322 - Human Sexuality: Integrative Science                | <input type="radio"/> BIOL 711 - Immunoassays  |
| <input type="radio"/> BIOL 326 - Disease!  | <input type="radio"/> BIOL 716 - Skills for Scientific Proposal Writing                      |
| <input type="radio"/> BIOL 327 - AIDS: Biology of the Modern Epidemic                | <input type="radio"/> BIOL 723 - Pharmacology  |
| <input type="radio"/> BIOL 328 - Human Anatomy                                       | <input type="radio"/> BIOL 731 - Animal Physiology Laboratory                                |
| <input type="radio"/> BIOL 330 - Human Sexuality                                     | <input type="radio"/> BIOL 738 - Bioinformatics and Genome Annotation                        |
| <input type="radio"/> BIOL 337 - Evolution   | <input type="radio"/> BIOL 760 - Cancer Biology  |
| <input type="radio"/> BIOL 350 - Cell Biology  | <input type="radio"/> BIOL 773 - Advances in Biomedical Microbiology: Molecular Microbiology |
| <input type="radio"/> BIOL 351 GW - Experiments in Cell and Molecular Biology - GWAR | <input type="radio"/> BIOL 782 - Developmental Biology                                       |

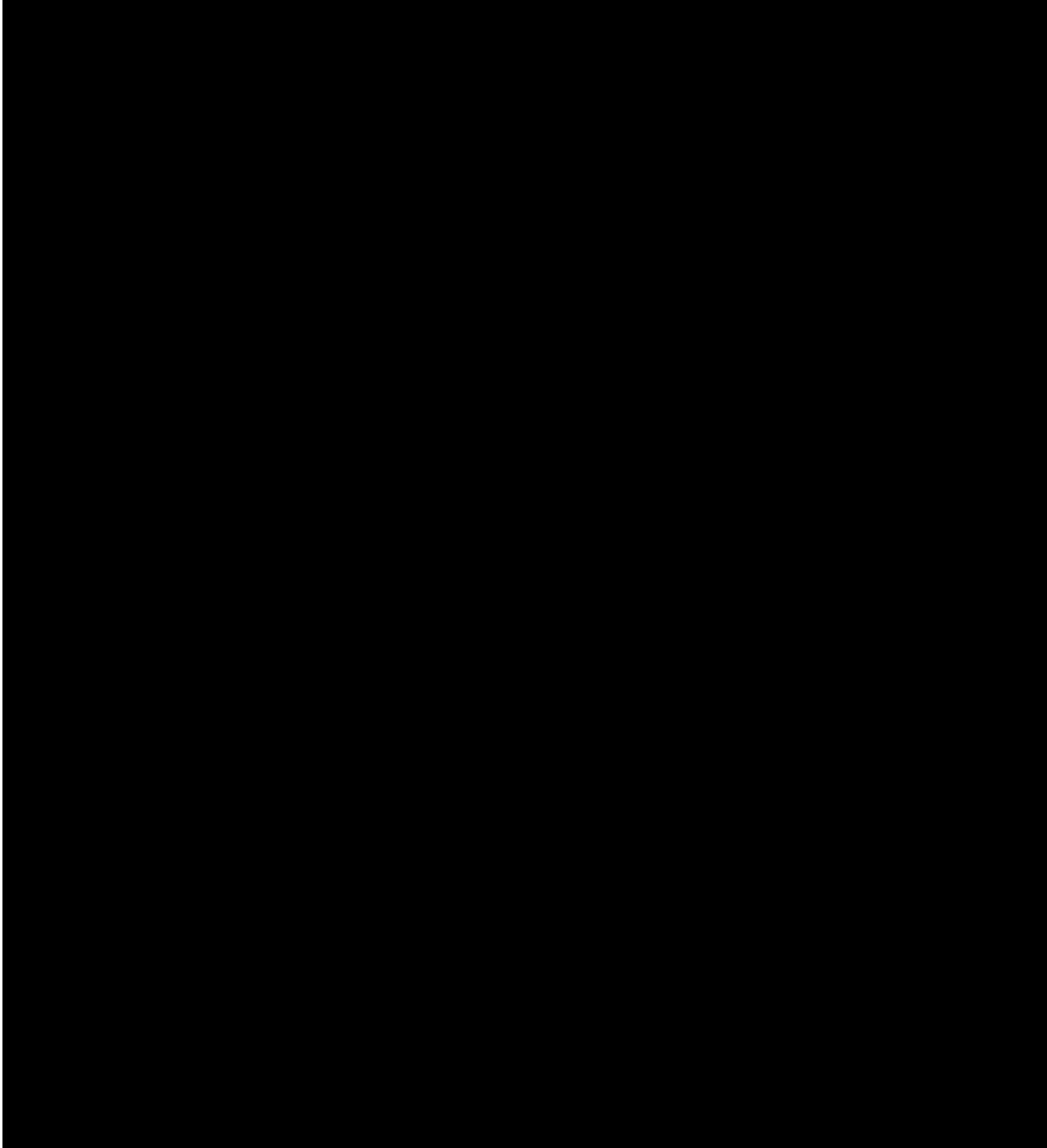
- |   |  |
|---|--|
| <input type="radio"/> BIOL 355 - Genetics   | <input type="radio"/> BIOL 784 - Cell Culture and Stem Cell Techniques                               |
| <input type="radio"/> BIOL 356 - Honors Genetics                                    | <input type="radio"/> BIOL 793 - Reproductive Technologies   |
| <input type="radio"/> BIOL 357 - Molecular Genetics                                 | <input type="radio"/> BIOL 814 - Plant Taxonomy  |
| <input type="radio"/> BIOL 380 - Evolutionary Developmental Biology                 | <input type="radio"/> BIOL 821 - Fire Ecology  |
| <input type="radio"/> BIOL 382 - Developmental Biology                              | <input type="radio"/> BIOL 840 - Community Ecology   |
| <input type="radio"/> BIOL 401 - General Microbiology                               | <input type="radio"/> BIOL 861 - Biology of the Cell Cycle   |
| <input type="radio"/> BIOL 402 - General Microbiology Laboratory                    | <input type="radio"/> BIOL 861 - Gene Expression   |
| <input type="radio"/> BIOL 425 - Emerging Diseases                                  | <input type="radio"/> BIOL 861 - Genetic Systems: Forms and Consequences                             |
| <input type="radio"/> BIOL 435 - Immunology   | <input type="radio"/> BIOL 861 - Topics in Development   |
| <input type="radio"/> BIOL 442 - Microbial Physiology                               | <input type="radio"/> BIOL 862 - Fungal Symbioses  |
| <input type="radio"/> BIOL 446 - Microbial Genomics                                 | <input type="radio"/> BIOL 862 - Nextgen Sequencing Approaches in Ecology, Systematics and Evolution |
| <input type="radio"/> BIOL 458 - Biometry   | <input type="radio"/> BIOL 862 - Current Topics in Ecology   |
| <input type="radio"/> BIOL 475 - Herpetology  | <input type="radio"/> BIOL 863 - Plankton Ecology  |
| <input type="radio"/> BIOL 478 - Ornithology  | <input type="radio"/> BIOL 871 - Colloquium in Microbiology, Cell and Molecular Biology              |
| <input type="radio"/> BIOL 482 - Ecology  | <input type="radio"/> BIOL 872 - Colloquium in Ecology, Evolution, and Conservation                  |
| <input type="radio"/> BIOL 502 - Biology of the Algae                               | <input type="radio"/> BIOL 881 - Current Research Topics in Biology                                  |
| <input type="radio"/> BIOL 514 - Plant Taxonomy                                     | <input type="radio"/> BIOL 883 - Current RTC Research  |
| <input type="radio"/> BIOL 534 - Wetland Ecology                                    | <input type="radio"/> SCI 750 - Scientific Teaching for Scientists                                   |
| <input type="radio"/> BIOL 572 - Colloquium in Ecology, Evolution, and Conservation | <input type="radio"/> Other (Please specify in the box below)  |

Other (please specify)

\* What SECTION of the course are you in?

- 01  02  03  04  05  06  07  08  09  10  11  12  13  14  15
- 16  17  18  19  20

\* Which of the following faculty teach the course you are sharing your impressions of? Please, choose ALL that apply.



4.

Read each of the statements below and indicate if you agree, disagree or are not sure.

Your answers should be specific to the course and instructor(s) you just selected.

IN THIS COURSE ...

	Agree	Disagree	Not Sure
the instructor spends most of the class time lecturing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
the instructor encourages student discussion.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
students sometimes work with one or more partners during class time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
the instructor tries to learn all of the students' names.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
the instructor has favorite students.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
the instructor regularly includes examples from everyday life during class.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
homework assignments consist mostly of textbook reading.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
the instructor spends most of the class time standing in front of the students.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
the instructor collects information about what students think in ways other than quizzes and exams.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
exams focus on testing students' ability to memorize facts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
the instructor mixes short lectures with activities throughout the lesson.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
student grades are based primarily on a set number of exams.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
the instructor asks for student feedback about the class throughout the semester.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
students typically sit quietly and do not speak to their classmates or their instructor.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
the instructor explains to students why they are being asked to do things in class.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
the instructor regularly answers his/her own questions right after asking them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
students are asked to share their ideas out loud in class.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5.

Does the class you are taking contain a "lecture portion?"

Yes

No



## 7. Demographics Questions

What is your CURRENT educational status?

- Undergraduate Student
- Post-bachelors Student
- Graduate Student
- College of Extended Learning student
- Other (please specify)

What is your CURRENT class standing?

- Freshman
- Sophomore
- Junior
- Senior

Is your degree program in the Biology Department?

- Yes  No

Are you a transfer student?

- Yes  No

Anticipated Semester and Year of Graduation

	Semester	Year
Expected Graduation Date	<input type="text"/>	<input type="text"/>

I most closely identify as ...

- Male
- Female
- Decline to State
- Other (please specify)

I most closely identify as (choose all that apply)

- African American
- Asian
- Filipino/Pacific Islander
- Latino / Chicano
- Native American
- White
- Decline to State
- Other (please specify)



## 8. If you would like to be entered in the raffle...

If you would like to be entered in the raffle, please enter your name and email address below.

This personal information will in NO WAY be affiliated with your responses to the previous questions on this survey.

**Name:**

**Email Address:**

9. Are you taking multiple biology courses?

**Are you taking more than one biology course in Spring 2014?**

**If so, we request that you answer this survey again for each remaining course. If you do so, you will have an additional raffle entry. To do this, please paste the link below into a new browser window.**

\*\*\*\*\*



\*\*\*\*\*

**Note: Multiple entries FOR THE SAME COURSE will NOT result in multiple raffle entries. In addition, entries for courses which you are not enrolled in will also NOT result in raffle entries.**

10.

Thank you for your time and thoughtfulness in responding to this survey on the experiences of SFSU faculty and students in Biology courses.

If you have any concerns about this survey or suggestions for its improvement, please contact

Gloriana Trujillo, Ph.D.  
Postdoctoral Fellow, SEPAL

[REDACTED]

Shannon Seidel, Ph.D.  
Postdoctoral Fellow, SEPAL

[REDACTED]

**Dear HHMI Biology FEST colleague,**

**You are being asked to participate in a short, 5-question survey about your motivations for participation in HHMI Biology FEST: Faculty Explorations in Scientific Teaching. It should only take 5-10 minutes to complete.**

**All data will be collected using a password protected survey system (SurveyMonkey.com). Your name will not be associated with your individual responses. Your identity will be kept strictly confidential during the entire research process. Department administrators and HHMI grant co-PI's Kimberly Tanner, Ph.D. and Carmen Domingo, Ph.D. will not have access to any data with personal identifiers.**

**If you have any questions or concerns about the study, please feel free to contact Melinda Owens, Ph.D. [REDACTED], Colin Harrison, Ph.D. [REDACTED], Kimberly Tanner, Ph.D. [REDACTED], or Carmen Domingo, Ph.D. [REDACTED].**

**Thank you in advance for your participation!**

**The HHMI Biology FEST team**

\* Please select the choice that best describes your participation in the HHMI Biology FEST program.

**ONLY** the HHMI Biology FEST Scientific Teaching Institute (1 week workshop on Scientific Teaching) (Note for SM4: This choice takes respondent to pg. 4.)

**BOTH** the HHMI Biology FEST Scientific Teaching Institute **AND** one or more of the following activities: (Note for SM4: This choice takes respondent to pg. 3.)

- Teaching Square (Regular meetings with other HHMI Biology FEST instructors on teaching)
- Classroom Partnership (Teaching collaboration with a master's student or postdoc)
- Changing Minds/ Talk Matters (Classroom evidence collection and classroom audio recording)

## Your reasons for participating in HHMI Biology FEST

What were the primary reasons you **INITIALLY** decided to participate in HHMI Biology FEST? Please use complete sentences to list up to 2 reasons.

Reason 1:

Reason 2:

What are the primary reasons you have **CONTINUED** to participate in HHMI Biology FEST? Please use complete sentences to list up to 2 reasons.

Reason 1:

Reason 2:

What could inspire you to participate in HHMI Biology FEST activities again in the future? Please use complete sentences to list up to 2 reasons.

Reason 1:

Reason 2:

## Your reasons for participating in HHMI Biology FEST

What were the primary reasons you **INITIALLY** decided to participate in HHMI Biology FEST? Please use complete sentences to list up to 2 reasons.

Reason 1:

Reason 2:

What could inspire you to participate in HHMI Biology FEST again? Please use complete sentences to list up to 2 reasons.

Reason 1:

Reason 2:

## Your perception of HHMI Biology FEST's impact on you

For each statement, fill in the blank with the choice that best matches your opinion.

**As a result of my participation in HHMI Biology FEST, I feel that...**

	Increased	Decreased	Not changed
... my willingness to take risks with my teaching has _____ .	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... my interactions with departmental colleagues around teaching have _____ .	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... my willingness to reflect on and make changes in my teaching has _____ .	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... my willingness to be an ambassador for teaching with other scientists has _____ .	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

For each statement, fill in the blank with the choice that best matches your opinion.

**As a result of my participation in HHMI Biology FEST, I feel that...**

	Strongly positively	Positively	Negatively	Strongly negatively	Not applicable
... my teaching has been _____ affected.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... my relationships with departmental colleagues have been _____ affected.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... my confidence in my teaching has been _____ affected.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... my sense of belonging in my department has been _____ affected.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... my career has been _____ affected.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... my research has been _____ affected.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Is there anything else you'd like to share with us?

Thank you for your time and thoughtfulness in responding to this survey!

If you have any questions or concerns about this survey, please contact Melinda Owens, Colin Harrison, Kimberly Tanner, or Carmen Domingo.

The HHMI Biology FEST team