BASIC PROGRAM INFORMATION

Program Review is about documenting the discussions and plans you have for improving student success in your program and sharing that information with the college community. It is also about linking your plans to decisions about resource allocations. With that in mind, please answer the following questions.

Program/Department Name: Biology

Division Name: Biological and Health Sciences

Please list all team members who participated in this Program Review:

Name	Department	Position
Karen Erickson	Biology	FT Faculty, Department Chair
Sara Cooper Kathleen Duncan Amy Edwards Carolyn Holcroft Martin Melia Lisa Schultheis Gillian Schultz	Biology	FT Faculty
Neha Arora Laura Branagan Erin Kew Leif Pallesen William Webb	Biology	PT Faculty

Number of Full Time Faculty: 8 **Number of Part Time Faculty:** 17 (fall 2106)

Please list all existing Classified positions: *Example: Administrative Assistant I*

FT (100%) Laboratory Technician (currently on medical leave, covered by TEA).
PT (40%) Laboratory Technician (currently TEA, permanent (to 50%) hire in progress).

SECTION 1: PROGRAM REFLECTION

1A. Program Update: Based on the program review data, please tell us how your program did last year. We are particularly interested in your proudest moments or achievements related to student success and outcomes.

In 2015-16, our enrollment was 3877 in 139 sections. In 2014-15, we had 4000 students in 146 sections. This represents a decline of 123 students and 7 sections. Unfortunately, our enrollment continues to decline, with a 4-year drop of 12.0%. This is much higher than that of the college as a whole (down 5.1%) and the division (holding fairly steady at 0.7%). In looking at the data from just last year, our enrollment isn't as drastic a drop ~ the majors (our smallest group of enrolled students) are down just 0.7%, nonmajors classes (our middle enrollment group) are up 0.9%, and our allied health support classes (our largest enrollment group) are down 2.4%. Since our allied health enrollment is the largest of our three "mission" groups, a drop in enrollment here does impact our overall enrollment trends significantly. Anecdotally, the enrollment trends in our allied health support classes does seem to track with economic trends, with a stronger economy resulting in lower enrollments. It would be interesting to see if there are actual data that supports this. Enrollment of students from the African American community continues to decline, aligning with the college trend.

The good news is that our success rates, both for overall and disproportionately impacted student groups (DISGs), are high: 82% total, with 74% for DISGs (college wide is 73%) and 86% for non-DISGs (college wide is 83%). Clearly the goal to raise the success rates for our students in DISGs remains a priority.

Our department continues to strive to improve student sucees through active learning and innovative pedagogy. Faculty in our department regularly expand their pedagogical training. Some examples from this past year include involvement with the Reading Apprenticeship program, attendance at the National Science Teacher's Association meeting, and continuing our involvement with CCB-FEST. Additionally, we continue to support and seek out professional development opportunities, on and off campus, for our full and part-time faculty. Examples of this are expanded, below.

1. Four of our FT faculty members (SC, AE, KE, GS) have participated in Reading Apprenticeship (RA) training (thanks to GS for applying for a STEM grant from WestEd!). During these trainings, we've learned many valuable tools for helping students use texts in a more meaningful way. From AE: "I've begun using some of these strategies in both my Microbiology and General Biology courses and have seen some definite improvement in students' ability to understand complex text; it is fabulous to see the "lightbulb" moments as students realize there are ways decipher text even when it contains unfamiliar words and ideas. I plan to continue to incorporate more of these strategies into my courses going forward." KE and GS have started conversations about how to weave the techniques of RA into the majors series. Faculty from PSME also participated, strengthening our STEM connections on campus. Our 2nd Annual Biology Teaching & Learning Summit included chemistry instructors for the first time ~ something we all appreciated and hope to continue as we plan for our 3rd annual summit.

2. Two of our FT faculty members (AE, KE) attended the National Science Teachers' Association meeting this past March. This conference had innumerable sessions aimed at providing science teachers with learner-centered activities for the lecture and lab classrooms. Many fabulous (and free) resources were brought back and shared with our department and many of our colleagues are now using them as well (HHMI Biointeractive is one example).

3. Many of us (FT and PT faculty) also participated in CCB-FEST activities throughout last year and this continues to be a source of valuable active learning strategies to use in our classrooms. SC and LS are involved in larger CCB-FEST projects: the Fall Program teaching square and a classroom partnership. Many of the faculty in our department HB, SC, KD, AE, KE, BJ, LS) participated in a study that has been submitted to PNAS for publication ("Classroom Sound Can Be Used to Classify Teaching Practices in College Science Courses").

4. Biology department faculty sponsored several campus-wide professional development workshops/activities related to student success. Examples include cultural democracy in the classroom (CH), first day syllabus activities (AE, KE), student-centered syllabi (GS), use of clickers to promote active learning (LS), and efforts to identify affordable options for clickers (LS). The Second Annual Biology Summit this year focuses on Equity and, for the first time, included faculty from the PSME division! One on-going goal we have is to continue to develop this summit and strengthen our ties with our STEM colleagues.

In addition to the above activities, our department faculty are also involved with other programs that impact student success:

1. Three of our FT faculty (AE, CH, GS) are participating in the Stanford PFP (Preparing Future Professors) program as faculty mentors for Stanford graduate students to help them experience the realities of faculty life at the community college. They are also involved in the Stanford DARE program to help Stanford graduate students in underrepresented groups understand what career opportunities exist at the community college.

2. Another of the biology department's achievements in increasing student success was (and is) the use of embedded tutors. Embedded tutors in Fall 2015 Biol10 classes had a significant impact for students who chose to use the service. Course completion rates were higher for sections of Bio 10 offering embedded tutors compared to sections that did not. The majority of students using the service were on financial aid. The students represented a wide variety of majors. (Data from Elaine Kuo). Biol41 also utilizes embedded tutors.

3. One of our PT faculty (LB) is involved with the Summer STEM Internship program, heading into its third year (2017). The primary objective of the program is to connect students with hands-on research experiences by placing them in mentored research environments for 8 to 12 weeks. Studies indicate that hands-on research experience improves retention in STEM fields. The program's target population consists of underrepresented groups in STEM fields, including people of color, low-income, women, and first generation college students. A secondary objective is to promote academic aspirations that extend into the graduate level (MS, MD, PhD, MD-PhD). Each year the program serves approximately 20 students. The program offers opportunities in biology, medicine, biomedical engineering, chemistry, computer science, and STEM-related entrepreneurship. Foothill is partnered with laboratories at UCSF, SJSU, and local biotech and computer science start-up companies. Funded by grants and private donations, internships are paid positions. All interns enroll for internship units. Incoming interns participate in professional training activities on campus prior to fanning out to their respective labs/companies. Throughout the program, interns are mentored by their respective research advisors and a Foothill faculty advisor. Student reports are overwhelmingly positive. Many students express an expanded view of possibilities, including graduate school. Program alumni are tracked via LinkedIn and periodic email correspondence. The majority of alums (2015) transferred to a four-year institution to pursue a STEM major. The 2015 program directly led to a reactivation of the Foothill Neuroscience Club, which continues to thrive. Program leaders intend to submit an NSF REU grant proposal. However, because this program does not match the model of a typical REU grant recipient, future funding is especially uncertain. The program operating budget is roughly $80,000 per year.

What we are most proud of is the fact that our entire department is completely dedicated to student success and is constantly looking for ways to improve our teaching methods in order to improve student outcomes. This manifests itself in many ways from attending a variety of conferences and sharing the techniques we've learned to just daily conversations about which activities have resulted in better outcomes and helping each other incorporate those.

1B. Program Improvement: What areas or activities are you working on this year to improve your program? Please respond to any feedback from the supervising administrator from last year's program review.

Reading Apprenticeship in STEM, as mentioned above, will continue to be fleshed out by the faculty. Since this also included participants from Chemistry and Engineering, our department hopes to continue to strengthen our alliance and build community with faculty in other STEM disciplines.

Vital to student success is increased college support for professional development. The faculty need, and have an interest in, allocating time and space for opportunities (such as our Annual Biology Summit) to talk SLOs, pedagogy, etc… inclusive of our part time faculty and the PSME division. As mentioned in past program reviews, one of our greatest challenges continues to be the logistics around finding a time and venue for all to participate in discussions of pedagogy, student learning outcomes, student success, etc. The recent change in the contract allowing part-time faculty to be compensated for participating in one SLO per year is helpful. However, we know our part-time colleagues teach many of our classes and have valuable contributions to discussions of student learning, so ideally we would like to support their participation beyond just one SLO per year. It would also be very helpful to have time and space to collaborate with our PSME/STEM colleagues regarding matters of pedagogy, learning, and student equity. The department faculty are continually scouring for information leading to potential professional development opportunities ~ OnCourse Workshops are another option for enhancing student success.

We are also very much interested in creating service learning opportunities for our students, as we know this is an effective practice at increasing student success, particularly for disproportionately impacted student groups. The initial challenge is that we don't have background in this area and need assistance to learn how to create service learning opportunities and effectively integrate them into our curriculum. A possible solution is a dedicated flex day to gather, brainstorm, and review our CORs for possible areas of implementation.

While embedded tutors increase student success, many students who need the service do not use it. It is difficult to provide tutoring hours at times that work for all students, especially since the tutors are also students. An alternative approach we are considering is to offer several faculty or tutor staffed workshops throughout the quarter through the STEM Center, each focusing on topics in the targeted class. Allocating points in a course syllabus for attending sessions (e.g. two during the quarter out of several available) would increase student attendance and perhaps increase the likelihood that students who need the help will receive it.

Our Biology program has recently teamed up with the STEM Center to host Wellness Workshops available for all students. These Wellness Workshops will focus not only on academic growth but also on our students mental and physical well-being. We recently held our first workshop that was geared around healthy eating and allowed students to learn how to make quick and easy grocery choices that can benefit their short and long term health.

In fall, 2016, the biology department is offering its first hybrid Natural Sciences/GE class, Biol10. The class is full and has maintained enrollment similar to that of the face-to-face class (61 of 64 max still enrolled in week 8). Perhaps the hybrid model (lectures online, face-to-face labs) is an effective way to maintain success in online courses. It obviously offers more flexibility to students with respect to those who have work and family obligations that make attending a fully F2F class more challenging.

The biology majors are involved in a pilot research project aimed at evaluating program learning outcomes from a disagregated perspective. Although this project is in its infancy, the desire is it will lead to an increase in our majors program success, perhaps even in recruitment and retention.

The Biology AD-T hit a procedural snag this summer but now seems to be on track to be accepted by the State and in place for offering in the very near future. We hope this will increase student recruitment into our majors program, thus boosting enrollment.

The department continues to plan for the use of an outdoor classroom (the "Evolutionary Plant Garden") to be used for both formal and informal educational opportunities. Several classes will use the garden for formal lessons covering the history of life on our planet, major evolutionary events, major extinctions, evolutionary processes, adapation, and ecological change over time (e.g. Bio 10, Bio 9, Bio 1C). We need an outdoor space on campus to introduce students to ecological and evolutionary concepts. Student success increases with kinesthetic learning. Being able to walk through a natural area and discuss the evolution of plant and animal adaptations would greatly increase student understanding and appreciation of basic evolutionary trends. Teaching students the relationships and interdependence found in ecosystems is always challenging, but much less so if you can show students exactly what you're discussing. As an attractive, inviting and accessible path, the garden will also informally educate our entire campus community as well as the visiting public about important evolutionary and ecological processes that shape our planet. The most effective way to get any citizen to appreciate and tend the environment is by providing an environmental location that evokes passion and delight. Furthermore, creating this outdoor class room might provide an excellent opportunity for environmental. Having ecological spaces on campus (native plant garden and evolution garden) is an equity issue, as

transportation to field trip sites is not possible for all students.

1C. Measures of Success: What data or information will you use to measure your success (e.g. student success rates, changes in student or program learning outcomes)?

Many of our efforts can be measured with assessment and reflection on SLOs and enrollment/success data. STEM Workshop success can be measured by student success rates as correlated with the number of sessions attended. Embedded tutor success can continue to be measured comparing success rates of students who access the tutor services compared with those who do not.

1D. EMP Goal: The 2015-2020 Educational Master Plan (EMP) includes the following goal:
"Create a culture of equity that promotes student success, particularly for underserved students."

Based on the program review data, tell us some of the things your program will be doing this year to support this goal. You will be asked to report on any accomplishments on your next comprehensive program review.

Our department plan to create a culture of equity and promoting student success includes:
1. continuing our professional development focus on pedagogical techniques that foster student-centered, active learning, equity and diversity; specifically investigate the opportunity to bring an OnCourse Workshop to campus for faculty across all disciplines (including academic divisions and student support services)
2. promoting collaboration within our department and throughout our campus to build a strong STEM community that supports our STEM students
3. providing opportunities for students to support their learning (embedded tutors, STEM workshops, STEM Center support, review/study sessions)
4. working with the Pass the torch, Puente and Umoja programs to see about expanding their cohort and peer-to peer models for their students who enroll in GE natural science courses as a possible mechanism to improve performance among disproportionately impacted student groups
4. pursuing opportunities to support student success (equity grant for classroom sets of clickers)
5. creating an outdoor classroom (Evolution Garden) that brings opportunities for learning about ecology, evolution, and the environment to campus for all students in all disciplines
6. exploring, perhaps with a flex day, opportunuties to incorporate service-learning into the CORs of our biology classes

SECTION 2: PROGRAM OBJECTIVES & RESOURCE REQUESTS

2A. New Program Objectives: Please list any new objectives (do not list your resource requests).

Program Objective	Implementation Timeline	Progress Measures
Example: Offer 2 New Courses to Meet Demand	*Winter 2016 Term*	*Course Enrollment*

1. Maintain quality of instruction, course offerings, schedule diversity	ongoing	procurement/maintenance of needed supplies, particularly those related to lab activities
2. Increase involvement with PSME Division/STEM Programs/Honors Program	ongoing	
3. Transform pedagogical approaches (more active/problem-based/student-centered learning)	ongoing	procurement and use of needed supplies
4. Develop service-learning/internship/civic engagement opportunities for students	ongoing	
5. Increase enrollment, particularly of DISGs , into Biology	ongoing	
6. Increase success, particularly of DISGs, in Biology	ongoing	
7. Hold Annual Biology Department Summit on Teaching & Learning (3rd Annual)	winter or spring, 2017	faculty participation, pedagogical changes
8. Increase exposure to students in the application of technology and modeling in biology (bioinformatics) using course activities in ecology and evolution. By providing appropriate computers in the classroom, we can make sure that all students have equal access to the required computing power necessary to running the required softward. The software is all open source, so no licenses are required but all students do not have computers that can handle the RAM and hard drive requirements. As we use physical materials and specimens in lab while they are building models of processes and performing data analysis, it is impractical to use exisiting computer rooms on campus.	as soon as possible	improved understanding of the use of statistics, modeling and spatial analysis software in the application of ecology and evolution.

2B. Resource Requests: Using the table below, summarize your program's unfunded resource requests. Refer to the Operations Planning Committee (OPC) website for current guiding principles, rubrics and

resource allocation information.

Resource Request	$	Program Objective (Section 2A)	Type of Resource Request			
			Full-Time Faculty/Staff Position	One-Time B-Budget Augmentation	Ongoing B-Budget Augmentation	Facilities and Equipment
FT Faculty		Supports the following program objective(s): 2A.1 (replacement position for retiring faculty member, Martin Melia)				

Increased B budget	$20,000	Supports the following program objective(s): 2A.1 (assures supplies for laboratory activities, supports replacement of damaged or lost items); 2A.3,7 (supports adjunct involvement in department professional development activities including, but not limited to, the annual department summit)

Outdoor Classroom (Evolution Garden)	$1M	Supports the following program objective(s): 2A.1,2,3,4,6 (this has the potential to impact and support several of the goals of the biology department and to increase student equity and success)
8 laptops @ $500/each with minimum RAM of 512 MB and min hard drive of 5000 MB	$4000	Supports the following program objective(s): 2A.1,3,8 (more powerful computers will allow students to run open source modeling software to perform ecological modeling analysis)

2 Olympus DP22 microscope Cameras	$12,000	Supports the following program objective(s): 2A.1,6 (to show and record microscope images, from dissecting and compound microscopes, and videos onscreen.
Gel Electrophoresis Equipment: 1. 14 power supplies 2. 3 gel electrophoresis units	1.$10,000 2. $2000	Supports the following program objective(s):2 A.1 (replaces broken ones in 5100 ~ serious safety issue)

Professional Development Funds 1. Biology Department Summit 2. Flex Day for Service Learning	1. $2500 2. $2500	Supports the following program objective(s): 2A.1,2,3,4,6, 7 (allows for dedicated time and space to discuss strategies for improving student success, specifically provides stipends for PT faculty)
Microscope Repair Class	$10,000 (unsure of total cost, depending on travel)	Supports the following program objective(s): 2A.1 (training for our lab techs to keep our microscopes in working condition)
Creation of STEM Library in STEM Center (all required textbooks and reference books for us by STEM faculty when helping students)	$2000	Supports the following program objective(s): 2A.2,5

Funding to bring three-day, OnCourse Workshop I to campus (information: http://oncourseworkshop.com/educator-workshops/campus-workshops/signature-workshop-three-day-course-workshop/)	$20,000 (should cover up to 50 attendees)	Supports the following program objective(s): 2A.1,2,3,7, perhaps 4 (conversatios with others in the student services areas, including counseling and psych services, has identified this workshop as an excellent one to increase student success, by offering it on campus, there is a chance for greater participation across divisions and service areas)

2C. Unbudgeted Reassigned Time: Please list and provide rationale for requested reassign time.

The department continues to need a department chair with reassigned time for chair duties. The department is aware the campus is working on a district-wide solution, so this request is made with that understanding.

SECTION 3: LEARNING OUTCOMES ASSESSMENT SUMMARY

3A. Attach 2015-2016 Course-Level Outcomes: Four Column Report for CL-SLO Assessment from TracDat. Please contact the Office of Instruction to assist you with this step if needed.

3B. Attach 2015-2016 Program-Level Outcomes: Four Column Report for PL-SLO Assessment from TracDat. Please contact the Office of Instruction to assist you with this step if needed.

SECTION 4: FEEDBACK AND FOLLOW-UP

This section is for the Dean/Supervising Administrator to provide feedback.

4A. Strengths and successes of the program as evidenced by the data and analysis:

The Biology Department is filled with some of the most gifted faculty in the district. Their enthusiasm and self-directed activities described in the program review reflect their commitment to student success as well as to each other as professional teachers. They are continually evolving, learning, teaching each other, experimenting, sharing and have created a dynamic community of colleagues, not only within the biology department, but in the area of STEM on the larger campus.

4B. Areas of concern, if any:

I have no specific concerns regarding the Biology Department

4C. Recommendations for improvement:

The faculty have articulated their desire to continue to close the achievement gap and their efforts are outlined in this review. They are encouraged to continue on this trajectory of learning, exploring, testing and evaluating new teaching methods and classroom support strategies in their efforts to provide classroom settings in which all student can succeed.

4D. Recommended Next Steps:

XProceed as Planned on Program Review Schedule
Further Review / Out-of-Cycle In-Depth Review

Upon completion of Section 4, the Program Review document should be returned to department faculty/staff for review, then submitted to the Office of Instruction and Institutional Research for public posting. Please refer to the Program Review timeline.

Unit Course Assessment Report - Four Column

Foothill College

Department - Biology (BIOL)

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Department - Biology (BIOL) - BIOL 10 - GENERAL BIOLOGY: BASIC PRINCIPLES - SLO 1 - Scientific Process - Explain the scientific method and demonstrate an ability to use this method of study. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Embedded questions on final and lab quizzes. **Assessment Method Type:** Exam - Course Test/Quiz	12/01/2016 - Median score on lab quizzes was 84%, with only 15% of students receiving a D or F. Median score on first midterm questions was 70% for independent work, and 80% for group work. A disappointing 43% of students received a D or F for independent works, and 33% for group work. The second midterm showed improvement with a median score of 77% for independent work and 91% for group work. Fail rate also improved with 24% for independent work and only 5% for group work. The group projects (experiments designed and completed by student groups) had a median score of 81% with 20% of students receiving a D or F. **Result:** Target Met **Year This Assessment Occurred:** 2015-2016 **Resource Request:** STEM tutors to work with students not passing the midterm or lab quizzes **GE/IL-SLO Reflection:** This SLO requires the use of both critical thinking and computational skills.	12/01/2016 - Develop some STEM center workshops on scientific method. Require students to meet with tutors in the STEM center to analyze their mistakes on lab quizzes and midterms.
Department - Biology (BIOL) - BIOL 10 - GENERAL BIOLOGY: BASIC PRINCIPLES - SLO 2 - Disease Prevention - Describe the risk factors and methods of prevention for cardiovascular disease and cancer. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** List 5 characteristics of cells - first week of quarter. Revise list - end of quarter. **Assessment Method Type:** Essay/Journal **Target for Success:** 85% of the students will show improved use of vocabulary, depth of response in the "after" list when compared with the "before" list.		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	Assessment Method: Embedded questions on final **Assessment Method Type:** Exam - Course Test/Quiz		
Department - Biology (BIOL) - BIOL 12 - HUMAN GENETICS - SLO 1 - Patterns of Inheritance - Demonstrate an ability to use Mendelian principles to predict genetic inheritance. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Embedded exam question **Assessment Method Type:** Exam - Course Test/Quiz	11/30/2016 - On the final exam there were series of inheritance problems including autosomal single trait, sex linked single trait, and autosomal two traits. Average score was 91%, with 92% of students receiving a C or better. 8% of the students received a D or F on this part of the final. **Result:** Target Met **Year This Assessment Occurred:** 2015-2016 **Resource Request:** Stem tutors to work with students not passing the homework assignments. **GE/IL-SLO Reflection:** This slo requires the use of both combination of critical thinking and computational skills.	11/30/2016 - Adding required meetings with tutors in the stem center for students failing the homework or midterm would improve student success with both the homework and exams for this course. In this course homework is optional but highly recommended. It would be helpful to make the assignments required in future offerings of this course.
	Assessment Method: homework assignment.	11/30/2016 - 5 homework assignments given during the quarter to assess this SLO. Median score for each assignment was 86%, 94 %, 88%, 86%, and 85%. 84 % of the students passed the homework with only 16% of the students receiving a grade of D or F on the homework. Failures were primarily due to not completing the assignments. **Result:** Target Met **Year This Assessment Occurred:** 2015-2016 **Resource Request:** Stem tutors to work with students not passing the homework assignments. **GE/IL-SLO Reflection:**	11/30/2016 - In this course homework is optional but highly recommended. It would be helpful to make the assignments required in future offerings of this course. Adding required meetings with tutors in the stem center for students failing the homework would improve student success with both the homework and exams for this course.

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		This slo requires the use of both combination of critical thinking and computational skills.	
Department - Biology (BIOL) - BIOL 12 - HUMAN GENETICS - SLO 2 - DNA Fingerprint - Demonstrate an ability to interpret a DNA fingerprint. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Embedded exam question. **Assessment Method Type:** Exam - Course Test/Quiz		
Department - Biology (BIOL) - BIOL 13 - MARINE BIOLOGY - SLO 1 - Evolution - The student can describe the theory of evolution. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Question embedded in the final exam. **Assessment Method Type:** Exam - Course Test/Quiz		
Department - Biology (BIOL) - BIOL 13 - MARINE BIOLOGY - SLO 2 - Global/Community Conciousness - The student can make well informed decisions as a consumer based on their understanding of sustainable fishing practices and evaluate how their own behavior affects future fish conservation. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Question embedded in exam. **Assessment Method Type:** Exam - Course Test/Quiz **Assessment Method:** Five-week survey/experiment about sustainable fishing practices and overfishing. Required to develop a presentation explaining the concepts of overfishing and evaluating their own behavior. **Assessment Method Type:** Class/Lab Project		
Department - Biology (BIOL) - BIOL 13 - MARINE BIOLOGY - SLO 3 - Scientific Process - The student can understand how to collect scientific data quantitatively and present those data graphically.	**Assessment Method:** Question embedded in final lab assignment. **Assessment Method Type:** Class/Lab Project		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
(Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Students were given five weeks to develop their own survey/experiment about sustainable fishing practices and overfishing. Required to develop a presentation explaining the concepts of overfishing and evaluating their own behavior. **Assessment Method Type:** Class/Lab Project		
Department - Biology (BIOL) - BIOL 14 - HUMAN BIOLOGY - SLO 1 - Evolution - The student will be able to describe the theory of evolution by natural selection and explain how it unifies all living things at least three different levels of the biological hierarchy. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Each lecture exam (there are three total) will have questions asking students to related the unity and diversity of life as explained by evolutionary theory at the levels of the biological hierarchy that are relevant to the information covered on that exam. For example: on the first exam, the students are asked to discuss the how all living things are unified and differentiated at the molecular and cellular levels and how this demonstrates descent with modification by natural selection. Assessment consists of tracking number of points earned out of total possible points (8 pts) for the question. **Assessment Method Type:** Exam - Course Test/Quiz	06/29/2016 - For assessing this SLO, I evaluated the students based on an in class activity and the post lecture Homework and embedded test questions (multiple choice and short answer) In the 64 enrolled Bio 14 students in the assessment based on the Multiple choice questions given as homework,73% scored a perfect score of 10 (100%), 22% scored between 80-90%, and only 3% were below a 80%. In the class, the students were also show a film on evolution from the HHMI website and then were answered questions (worksheet) based on the film they saw. http://www.hhmi.org/biointeractive/making-fittest-evolving-switches-evolving-bodies In the assessment based on this activity, most of the students (about 84%) scored between a 80-90 % Based on these two assessments, I would say that the students had a sound understanding about evolution and even how mutations play a role in the process of evolution. (NG Spring 2016) **Result:** Target Met **Year This Assessment Occurred:** 2015-2016	
Department - Biology (BIOL) - BIOL 14 - HUMAN BIOLOGY - SLO 2 - Scientific	**Assessment Method:** The students will be assessed on each		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Process - The student will be able to evaluate basic scientific research as described in the popular press and explain the study in terms of the scientific method. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	exam with questions related to processing the scientific method. For example, on the first exam, the students are asked to visit the website www.sciencedaily.com or similar reference and to choose a study to evaluate. They are asked to identify the question(s) asked, the hypothesis of the research, the independent, dependent and controlled variables and to discuss whether or not the researchers supported or falsified their hypothesis and to explain their answers. I track the number of correct answers based on points earned (out of 8 points on the first and last exams.) **Assessment Method Type:** Exam - Course Test/Quiz		
	Assessment Method: The students will be assessed on each exam with questions related to processing the scientific method. For example, on the first exam, the students are asked to visit the website www.sciencedaily.com or similar reference and to choose a study to evaluate. They are asked to identify the question(s) asked, the hypothesis of the research, the independent, dependent and controlled variables and to discuss whether or not the researchers supported or falsified their hypothesis and to explain their answers. I track the number of correct answers based on points earned (out of 10 points) **Assessment Method Type:** Exam - Course Test/Quiz		
Department - Biology (BIOL) - BIOL 15 - CALIFORNIA ECOLOGY/NATURAL HISTORY - SLO 1 - Scientific Process - The student will master basic techniques of field biology, including taking field notes, identifying organisms in the field, and using	**Assessment Method:** The student will be required to enter at least 7 entries into a field journal (Modified from John McLaughlin, Western Washington University)	12/02/2016 - Students continue to do well on this project. The majority of students are able to include the required components in their notebooks. **Result:** Target Met	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
survey and sampling techniques. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	Here is the assignment: For an ecologist or field biologist, the field notebook is a record of their observations and the conditions of their study sites. One emphasis of this course is to learn basic field techniques, your field notebooks will be one of your most important tools. You should record all of your observations, hypotheses about natural history patterns, and other ideas related to natural history in your notebooks. Your notebook should contain entries from each field trip in the course, supplemented by natural history observations you make outside of the course. (You might want to carry your notebook with you at all times this quarter. Perhaps you will enjoy natural history so much that this will become a life-long habit). There is a great book about keeping a field journal: Keeping a Nature Journal by Clare Walker Leslie and Charles E. Roth (2000) that might be useful. **Assessment Method Type:** Essay/Journal **Target for Success:** 90% of students should be able to do this with a B or better. **Related Documents:** Rubric/Criteria for Field Notebook Biology 15	**Year This Assessment Occurred:** 2015-2016 **GE/IL-SLO Reflection:** Communication: students write clear and organized field journals with entries for each site. Most include diagrams, data and photos with captions to illustrate their observations. They use appropriate language for describing ecological conditions.	
Department - Biology (BIOL) - BIOL 15 - CALIFORNIA ECOLOGY/NATURAL HISTORY - SLO 2 - Ecological Principles - The student will explain basic principles of organismal, population, community and ecology (Created By Department - Biology (BIOL))	**Assessment Method:** The student will use the information gathered in their field journal to write a natural history report describing the ecology of an ecosystem visited during the course.		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Course-Level SLO Status: Active	Natural History Report #2 Select a distinct ecological community that we have visited in the San Francisco Bay Area. For this assignment please make your observations within the ?interior? of the community (avoid edge habitats). Observe the community and answer the following questions. Feel free to support your written answers with drawings, photographs, or non-living, non-toxic, non-infectious samples. Your report need not exceed 2-3 pages in length (single-spaced). Please list references at the end of your report. **Assessment Method Type:** Case Study/Analysis **Target for Success:** 90% of students will complete the report with a grade of B or higher. **Related Documents:** Rubric/Criteria for Natural History Report 2Biology 15		
Department - Biology (BIOL) - BIOL 17 - BIOTECHNOLOGY & SOCIETY - SLO 1 - Application of Biotechnology - Students can give specific examples of biotechnology-related products or applications. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active			
Department - Biology (BIOL) - BIOL 17 - BIOTECHNOLOGY & SOCIETY - SLO 2 - Personal Relevance of Biotechnology - Students can relate biotechnology-related products or applications to their daily lives (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active			

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Department - Biology (BIOL) - BIOL 17 - BIOTECHNOLOGY & SOCIETY - SLO 3 - Evaluate Biotechnology information - Students can evaluate information about biotechnology-related products or applications. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active			
Department - Biology (BIOL) - BIOL 190X - DIRECTED STUDY - SLO 1 - Demonstrate Understanding - Student can demonstrate an understanding of a major concept discussed in class. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active			
Department - Biology (BIOL) - BIOL 190X - DIRECTED STUDY - SLO 2 - Communication - Student can communicate understanding of a major concept discussed in class. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active			
Department - Biology (BIOL) - BIOL 1A - PRINCIPLES OF CELL BIOLOGY - SLO 1 - Cellular level of life - Students can describe life at the cellular level. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** List 5 characteristics of cells. **Assessment Method Type:** Pre/Post Test **Target for Success:** The post-test answers should demonstrate increased comprehension, as evidenced by use of appropriate (and new) vocabulary and higher-level knowledge. All students should show an improvement.	12/04/2016 - KE: In the academic year, 2015-16, I changed this from "list 5 characteristics of cells" to "write 5-6 sentences defining cells and describing what you already know about life at the cellular level." I also told the students this was not a test and not to worry about "right or wrong" answers. I gave this assignment to each student on the first day of class and then again on the last day (they got their exact same handout returned). On the last day, I asked them to read what they wrote on the first day, make corrections to any errors, and to add to their description. In reviewing these, I was able to see a lot of new vocabulary used, but with the new vocabulary came new	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		misconceptions. I am interested in getting students to learn about their learning, so I might add another component to this on the last day asking for a reflection on this. In general, I think this is a difficult assessment to quantitate, but I do like using the activity to get students geared up for the class and to get them to summarize what they've learned before they move on. **Result:** Target Met **Year This Assessment Occurred:** 2015-2016	
Department - Biology (BIOL) - BIOL 1A - PRINCIPLES OF CELL BIOLOGY - SLO 2 - Compare prokaryotes and eukaryotes - Students can compare and contrast prokaryotic and eukaryotic life. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Compare/contrast questions on the final exam. Questions are not restricted to structures, but include all life processes. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 85% correct.	12/04/2016 - KE: Fall, Winter, Spring quarters 2015-16 Fall: 19 exam questions; 9 missed by more than 25% of the students; 2 missed by 16-24% of the students, 2 missed by 10-15% of the students; 6 missed by less than 10% of the students. Winter: 18 exam questions; 10 missed by more than 25% of the students; 2 missed by 16-24% of the students, 2 missed by 10-15% of the students; 4 missed by less than 10% of the students. Spring: 17 exam questions; 9 missed by more than 25% of the students; 4 missed by 16-24% of the students, 0 missed by 10-15% of the students; 4 missed by less than 10% of the students. I tried something new in winter quarter (and also did it in spring): throughout the quarter I used a Venn diagram (prokaryote vs. eukaryote) with the students, assigning them structures and processes to add after each biological theme. I first had them work in small groups and then we discussed as a whole class. I also told them they were building a study-guide for their final exam. The SLO questions reflected this work. However, compared with fall (when I did not do this), where 58% of the questions were still missed more than 15% of the students; winter and spring averaged higher (72% of the questions were missed by	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		more than 15% of the students). Obviously that tactic didn't work... It would be really useful to know exactly where the students' thinking is on these exam questions ~ I keep trying different techniques to get them to master this, but if I had a better grasp which wrong answers are being selected (rather than just a total count of wrong answers), I might be able to intervene in appropriate ways earlier in the term. **Result:** Target Not Met **Year This Assessment Occurred:** 2015-2016 **Resource Request:** Scantron grader with statistical capability	
Department - Biology (BIOL) - BIOL 1A - PRINCIPLES OF CELL BIOLOGY - SLO 3 - Scientific Process - experiment - Students can pose questions, state hypotheses, and identify variables from any given experiment. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Students are given an abstract or other article summarized from an original research publication. After reading the selection, they will rephrase the question in a "How does ____ affect ____?" format, identify the independent and dependent variables from the question, and state the hypothesis in an "If ... then ..." format. **Assessment Method Type:** Case Study/Analysis **Target for Success:** Average 75% on assignment.	12/04/2016 - KE: Fall 2015: 70% Winter 2016: 72% Spring 2016: 82% Average over 3 quarters: 75% This assignment is typically given very early in the quarter ~ second week, typically. For the rest of the quarter, students are asked to identify variables and phrase their question/hypothesis as instructed for their lab activities. This year, I started to include short readings from scientific resources on each quiz to get them to continually practice with this concept. **Result:** Target Met **Year This Assessment Occurred:** 2015-2016	
Department - Biology (BIOL) - BIOL 1A - PRINCIPLES OF CELL BIOLOGY - SLO 4 - Scientific Process - graphs - Students can graph experimental results. (Created By	**Assessment Method:** Students will make a graph of their experimental data from any appropriate lab activity.	12/04/2016 - KE: Fall 2015: #1 = 85%, #2 = 79%, #3 = 88%; average = 84% Winter 2016: #1 = 89%, #2 = 86%, #3 = 88%;	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method Type:** Class/Lab Project **Target for Success:** Average 80% on assignment.	average = 87.7% Spring 2016: #1 = 89%, #2 = 85%, #3 = 84%; average = 86% Students this year were given specific instructions ("How to Make a Graph" handout) and graph paper to plot their experimental results for 3 different activities. For each activity, students did a portion of the graphing alone, at home, as homework and then completed a final graph with a partner in class. I really loved how this got the students talking about their results and how to display them. I also think it helped the students improve their graphing skills. Students must do graphs by hand in this class. I think when they rely on a computer program to graph for them, they lose the nuanced understanding of what a graph is and what should be part of a graph. I think working together is one tactic that helps many students. **Result:** Target Met **Year This Assessment Occurred:** 2015-2016	
Department - Biology (BIOL) - BIOL 1A - PRINCIPLES OF CELL BIOLOGY - SLO 5 - Scientific Process - conclusion - Students can analyze experimental results to draw a conclusion. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Students will be given a graph or table of experimental results and asked to write a conclusion based on the data. **Assessment Method Type:** Class/Lab Project **Target for Success:** Average 80% on assignment.		
	Assessment Method: Students can distinguish between results and conclusions from their own, or other published, data. **Assessment Method Type:** Class/Lab Project **Target for Success:** Average 80% on assignment.	12/04/2016 - KE: Fall 2015: 37/40 (92.5%) correct Winter 2016: 43/50 (86%) correct Spring 2016: 25/61 (41%) correct Average 3 quarters: 73.1% correct Yikes! This was a reading assignment question on the lab final exam. Same exact question. I have no idea what happened, but this is the first quarter that the lab was not taught by the same instructor.	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		Perhaps there was a different emphasis in each class. The data were not collected for individual sections, so it's impossible to tell if that's the reason, but it is a surprising downturn from the previous two quarters. **Result:** Target Not Met **Year This Assessment Occurred:** 2015-2016	
Department - Biology (BIOL) - BIOL 1B - FORM & FUNCTION IN PLANTS & ANIMALS - SLO 1 - Physiological Processes - The student will compare and contrast the functioning of physiological systems in plants and animals. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** During the quarter students will answer exam questions testing their knowledge of plant (growth, development, reproduction, water and nutrient transport, hormones, responses to external environmental cues) or animal (nervous, muscle contraction, digestive, circulatory, respiratory, excretory, reproduction, development) systems. Questions assessing their ability to compare and contrast animals and plants will appear on a cumulative final exam as multiple choice and/or essay questions. These could include questions addressing the determinate versus indeterminate growth of animals versus plants, differences in development due to cell walls in plants, the role of pressure gradients in both animal and plant transport, and similarities and differences in gametogenesis. Multiple choice questions are typically worth 2-3 points, and essays 5-10 points. **Target for Success:** 80% of students will answer questions correctly (if multiple choice) or receive passing scores (if written responses).	02/03/2016 - Only 44% of the students answered the first comparative question correctly, but 88% answered the second correctly. Students performed significantly better on the short essays comparing and contrasting plant and animal processes. The low score on the 1st multiple choice question is most likely due to insufficient time working with development. I've encountered this problem in past quarters and had hoped to consolidate lectures to allow more time for this topic. Our next step is to reevaluate the COR to see what (if any) topics can be scaled back or covered more appropriately in Bio 1A/1C, allowing us to more adequately cover aspects of development. Submitted by LS. **Result:** Target Not Met **Year This Assessment Occurred:** 2015-2016	
	Assessment Method: On the final exam, students were given this open-ended question:	06/22/2016 - Winter 2016. Students performed very well on this question, averaging 93.6% for the class. Most students had an excellent grasp of	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	Select 3 of the following systems: reproduction, transport of nutrients, defense against pathogens, cells/ tissues/ organ systems/, and sense/ response to environmental changes. For each of the 3 systems, elaborate on similarities and differences between plants and animals, using as much biological detail and terminology as possible within the space provided. (Added by N. Markelz) **Assessment Method Type:** Essay/Journal **Target for Success:** An average score of 80% for this question.	similarities and differences between plants and animals within these two systems, at least as assessed by this question. However, I'm not convinced this is the best way to assess students on their understanding of similarities and differences between plants and animals. The question itself is a bit open-ended, which seems like a good idea initially, but makes assessment a bit tricky and it is difficult to get a true sense of the depth of knowledge. I think this kind of essay question could be improved, and/ or move to a series of multiple choice questions. (Submitted by N. Markelz) **Result:** Target Met **Year This Assessment Occurred:** 2015-2016	
Department - Biology (BIOL) - BIOL 1B - FORM & FUNCTION IN PLANTS & ANIMALS - SLO 2 - Scientific Process - Students will be able to communicate the results of scientific research to an audience of peers. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Students discuss topics to research for a multi-week laboratory experiment. In groups of 3 or 4 students, they decide which specific hypotheses they will test, and then design and carry-out an appropriate experiment. Each group reports their results in a 15 minute oral-presentation following a format typical of scientific meetings. Individuals write papers in the format of a typical scientific paper and submit them for peer-review by their classmates. Using feedback from the peer-review process, group members prepare a written group report graded by the instructor. Points are awarded based on the quality of presentations, participation in the peer-review process, the outcome of the peer-review process, and the quality of the group paper. **Assessment Method Type:** Research Paper	06/22/2016 - Winter 2016. For their Introduction, the class average was 81% with the class averaging 89% on the full individual paper. Their group scores were even higher, with the class averaging 93% for the group presentation and 94% for the group paper. For this quarter students were given several opportunities to look at and read published scientific papers before attempting to write their own. This resulted in improved understanding and slight improvement in scores on their full paper. In future classes, I would like to provide even more good examples of past students' work, as well as more published papers as exemplars, as I think many students just haven't had to do write many scientific papers. Points deducted are often for stylistic issues or lack of references to other research in the field. (Submitted by N. Markelz) **Result:** Target Met **Year This Assessment Occurred:**	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		2015-2016	
	Target for Success: 80% of students receive a passing score on the research paper.		
	Assessment Method: Students discuss topics to research for a multi-week laboratory experiment. In groups of 3 or 4 students, they decide which specific hypotheses they will test, and then design and carry-out an appropriate experiment. Each group reports their results in a 15 minute oral-presentation following a format typical of scientific meetings. Individuals write papers in the format of a typical scientific paper and submit them for peer-review by their classmates. Using feedback from the peer-review process, group members prepare a written group report graded by the instructor. Points are awarded based on the quality of presentations, participation in the peer-review process, the outcome of the peer-review process, and the quality of the group paper. **Assessment Method Type:** Presentation/Performance **Target for Success:** 80% of groups receive passing grades on presentations.		
Department - Biology (BIOL) - BIOL 1C - EVOLUTION, SYSTEMATICS & ECOLOGY - SLO 1 - Ecosystem Processes - Students will be able to describe an ecosystem in terms of the flow of energy and cycling of matter between the abiotic to the biotic components of that ecosystem. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** The student will be asked to choose an ecosystem and describe it for two parameters: energy and matter 1) in terms of the flow of energy from the sun through the trophic levels. A good answer will include a discussion of primary productivity, secondary productivity, the inefficiency of energy transfer through the ecosystem and why the inefficiency limits		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	length of food webs and the population size of the higher trophic levels. 2) In addition the student will discuss at least two biogeochemical cycles between the biotic and abiotic components of the ecosystem. For example, if they choose the nitrogen cycle, they must discuss which members of the ecosystem are responsible for making it biologically available, how it moves into the autotrophs and then into the heterotrophs, the role of the decomposers in cycling and finally why the nitrogen is important for living things and why it is often considered a limiting factor in ecosystems. Other biogeochemical cycles they can choose are the hydrologic cycle, the carbon cycle or the phosphorus cycle. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of students will answer the test question correctly (if multiple choice) and/or will receive a passing score (if a written response).		
	Assessment Method: Depending on the quarter, students are engaged in sampling soil invertebrates from contrasting communities. During lab, the students identify invertebrates from their samples, pool class data, and characterize each community in terms of species richness and diversity using appropriate species diversity indices. Students offer hypotheses to explain observed differences, including hypotheses based on energy input into the system and litter decomposition rates. **Assessment Method Type:** Class/Lab Project **Target for Success:**		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	80% of the lab groups can successfully calculate species richness and diversity and can articulate reasonable hypotheses to explain differences observed in contrasting communities.		
Department - Biology (BIOL) - BIOL 1C - EVOLUTION, SYSTEMATICS & ECOLOGY - SLO 2 - Evolution - Students will explain natural selection of populations under different selective pressures. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Students will conduct an experiment that examines the loss of antibiotic resistance (carried on a plasmid) in environments with or without the antibiotic (which is the selective pressure). The students are required to turn in a written report with their hypotheses, predictions, results and conclusions including a explanation of why adaptations might be favored or selected against under different environmental conditions. **Assessment Method Type:** Essay/Journal **Target for Success:** 80% students receive a passing grade on the written report.		
Department - Biology (BIOL) - BIOL 1C - EVOLUTION, SYSTEMATICS & ECOLOGY - SLO 3 - Phylogeny - Students will explain the phylogenetic relationships of all living things in terms of derived and ancestral traits. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Students will be required to carry out a quarter long project in which they collect representatives of 10-12 phyla profiled in the course. In approximately week 8, the students will bring in their collections for presentation to the class. The class will discuss the different phyla collected and their characteristics. Each student will then pick three organisms from one phylum that were collected by the class and describe the common features of these organisms (body plan, habitat, etc.)as well as the differences between them. Because the students are required to memorize the characteristics of about 35-40 phyla in the course, this		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	exercise will also serve to help them make associations to these groups. **Assessment Method Type:** Class/Lab Project **Target for Success:** 80% of student groups receive a passing grade on the collection. 80% of individual students receive a passing grade on the phylum essay.		
	Assessment Method: Students will carry out two projects that require them to collect, analyze and observe data for cladistic analysis of evolutionary relationships: one using plants and the other using animals. In both cases, students are presented with sets of organisms and specimens and they are required to select characteristics that they think group one set of organisms together relative to the others based upon shared ancestry. They then use software to perform an analysis to see how their data resolve relationships within and between the different groups. In the case of the plants, they also use a molecular analysis to compare and then combine with their morphological/anatomical data to see how new data can change or support hypotheses. Students are finally asked to submit a report that describes their findings. **Assessment Method Type:** Class/Lab Project **Target for Success:** 80% of students should be able to create data matrices, run the analysis and be able to use the appropriate vocabulary to describe the relationships that come out in their cladograms.	12/02/2016 - I started using these two projects in place of the phylum collection to try and better integrate the concepts from the beginning of the course (phylogenetics) with the more descriptive diversity portion of the course. Overall, the students are much more engaged in the projects because they have to figure out the important characteristics for analysis and determine why some they choose are not as valid or useful. They use open source software and databases to obtain molecular data, analyze their data sets and also use computers to carry out the background research necessary to complete the project. **Result:** Target Met **Year This Assessment Occurred:** 2015-2016 **Resource Request:** A set of laptops with a large amount of RAM and internet connectivity would help make sure that all students have equal access to equivalent computing power for running the software and analyses. **GE/IL-SLO Reflection:** These two projects really force the students to display competency in three of the GE/IL SLO areas: Communication: they are adequately able to demonstrate how to apply learned knowledge to new situations, they are able to summarize the findings of their analyses Computation: students could improve in	12/02/2016 - Provide activities/instruction to improve their understanding of the statistical methods used in these analyses.

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		their ability to interpret and understand the statistics used in the project that help them to see the "best" hypothesis (cladogram) to explain their data. We need to work on this. Critical Thinking: students are demonstrating the ability to use analytic and inquiry methods that are appropriate to studying evolution. They are also asked to critique their trees, but there is room for improvement in helping them to better understand the use of the terminology.	
Department - Biology (BIOL) - BIOL 1C - EVOLUTION, SYSTEMATICS & ECOLOGY - Ecological relationships - Students will be able to demonstrate an understanding of the ecological relationships between organisms and their environment. (Created By Department - Biology (BIOL)) **Assessment Cycles:** End of Academic Year **Start Date:** 04/07/2014 **Course-Level SLO Status:** Active	**Assessment Method:** Phenology Project **Assessment Method Type:** Class/Lab Project		
Department - Biology (BIOL) - BIOL 1D - MOLECULAR GENETICS - SLO 1 - Structure and function - Explain the relationship between structure and function as observed in key enzymes used in DNA replication, transcription and translation. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Embedded test question on exam and/or quiz. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of students will be able to correctly answer embedded quiz/exam question(s).	06/26/2016 - 77% of the students demonstrated the ability to understand, and explain the relationship between the structure of cellular macromolecules and their functions within the cell. **Result:** Target Met **Year This Assessment Occurred:** 2015-2016	
Department - Biology (BIOL) - BIOL 1D - MOLECULAR GENETICS - SLO 2 - Scientific Process - Demonstrate an understanding of how experimental evidence is used to draw conclusions regarding the	**Assessment Method:** Embedded test questions, written and/or multiple choice. **Assessment Method Type:** Exam - Course Test/Quiz		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
structure and function of important genetic molecules. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Target for Success:** 80% of students will be able to successfully answer the embedded question(s) on the exam/quiz. **Assessment Method:** Embedded questions on course quizzes and exams. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of students can correctly answer the embedded questions.		
Department - Biology (BIOL) - BIOL 1D - MOLECULAR GENETICS - SLO 3- Examination of Scientific literature - Demonstrate the ability to examine current scientific literature, and draw conclusions based on published current research (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Group activities, individual case study analysis **Assessment Method Type:** Case Study/Analysis **Target for Success:** 80% of students will be able to correctly answer embedded quiz/exam question(s)		
Department - Biology (BIOL) - BIOL 1D - MOLECULAR GENETICS - SLO 4- DNA as molecule of heredity and an instrument of evolution - Demonstrate the ability to understand the link between DNA structure, and it's function as the molecule of heredity, and evolutionary change (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** In Class group activities., Examination **Assessment Method Type:** Case Study/Analysis **Target for Success:** 80% of students will be able to correctly answer embedded quiz/exam question(s)/ perform well on group activities		
Department - Biology (BIOL) - BIOL 23 - INTRODUCTION TO BIOTECHNOLOGY - SLO 1 - Application of Biotechnology - Students can explain what biotechnology is, and how it influences medicine, agriculture, and daily life. (Created By Department - Biotechnology (BTEC))	**Assessment Method:** Students are asked to research and orally present both the positive and negative aspects of a specific, current topic in biotechnology. **Assessment Method Type:** Observation/Critique		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Course-Level SLO Status: Active			
Department - Biology (BIOL) - BIOL 23 - INTRODUCTION TO BIOTECHNOLOGY - SLO 2 - Scientific Process - Students can apply the scientific method to study a question (Created By Department - Biotechnology (BTEC)) **Course-Level SLO Status:** Active	**Assessment Method:** Students are given multiple opportunities throughout the quarter to apply the scientific method, such as simple, student-driven lab experimentation and other inquiry-based biotechnology activities. **Assessment Method Type:** Class/Lab Project **Target for Success:** 85% of the students should show mastery of the concepts of the scientific method by the end of the quarter, as measured by improvement on related assignments.		
Department - Biology (BIOL) - BIOL 40A - HUMAN ANATOMY & PHYSIOLOGY I - SLO #1: Cells - The student can analyze and evaluate the relationship between cell structure and function, and the mechanisms in place to maintain homeostasis at the cellular level. (Created By Department - Biology (BIOL)) **Start Date:** 07/02/2015 **End Date:** 07/01/2017 **Course-Level SLO Status:** Active	**Assessment Method:** Embedded question on an exam (Bio A) **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of the class will correctly answer the question on the exam (Bio 40A)		
Department - Biology (BIOL) - BIOL 40A - HUMAN ANATOMY & PHYSIOLOGY I - SLO #2: Integumentary System - The student can analyze and evaluate the relationship between integumentary system structure and function, and the role of the integumentary system in maintaining homeostasis in the human body. (Created By Department - Biology (BIOL))	**Assessment Method:** Embedded Question on an exam (Bio 40A) **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of the class will correctly answer the question on the exam (Bio 40A)		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Start Date: 07/02/2015 **End Date:** 07/01/2017 **Course-Level SLO Status:** Active			
Department - Biology (BIOL) - BIOL 40A - HUMAN ANATOMY & PHYSIOLOGY I - SLO #3: Skeletal System - The student can analyze and evaluate the relationship between skeletal system structure and function, and the role of the skeletal system in maintaining homeostasis in the human body. (Created By Department - Biology (BIOL)) **Start Date:** 07/02/2015 **End Date:** 07/01/2017 **Course-Level SLO Status:** Active	**Assessment Method:** Embedded question on an exam (Bio 40A) **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of the class will correctly answer the question on the exam (Bio40A)		
Department - Biology (BIOL) - BIOL 40A - HUMAN ANATOMY & PHYSIOLOGY I - SLO #4: Muscular System - The student can analyze and evaluate the relationship between muscular system structure and function, and the role of the muscular system in maintaining homeostasis in the human body. (Created By Department - Biology (BIOL)) **Start Date:** 07/02/2015 **End Date:** 07/01/2017 **Course-Level SLO Status:** Active	**Assessment Method:** Embedded question on an exam (Bio 40A) **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of the class will correctly answer the question on the exam (Bio40A)		
Department - Biology (BIOL) - BIOL 40A - HUMAN ANATOMY & PHYSIOLOGY I - SLO 2 - Structure and function - The student can identify the importance of structure/ function relationship. (Created By	**Assessment Method:** Embedded question on an exam (Bio 40A) **Assessment Method Type:** Exam - Course Test/Quiz		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Department - Biology (BIOL)) **End Date:** 07/01/2015 **Course-Level SLO Status:** Inactive	**Target for Success:** 80% of the class will correctly answer the question on the exam (Bio 40A).		
Department - Biology (BIOL) - BIOL 40A - HUMAN ANATOMY & PHYSIOLOGY I - SLO 1 - Homeostasis - The student can identify how the integumentary and skeletal system contributes to homeostasis (Created By Department - Biology (BIOL)) **End Date:** 07/01/2015 **Course-Level SLO Status:** Inactive	**Assessment Method:** Embedded question on an exam (Bio 40A). **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of the class will correctly answer the question on the exam (Bio 40A).		
Department - Biology (BIOL) - BIOL 40B - HUMAN ANATOMY & PHYSIOLOGY II - SLO #1: Nervous System - The student can analyze and evaluate the relationship between nervous system structure and function, and the role of the nervous system in maintaining homeostasis in the human body. (Created By Department - Biology (BIOL)) **Start Date:** 07/02/2015 **End Date:** 07/01/2017 **Course-Level SLO Status:** Active	**Assessment Method:** Embedded question on an exam (Bio 40B) **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of the class will correctly answer the question on the exam (Bio40B)	06/24/2016 - 82% of class correctly indicated physiologic effects of parasympathetic stimulation. 88-98% of class correctly matched sensory modalities with their receptors. No numerical date for exam 1, but students consistently do not answer the resting membrane potential questions adequately-perhaps because it's asked as a written (short answer). -EK **Result:** Target Met **Year This Assessment Occurred:** 2015-2016	
Department - Biology (BIOL) - BIOL 40B - HUMAN ANATOMY & PHYSIOLOGY II - SLO #2: Cardiovascular System - The student can analyze and evaluate the relationship between cardiovascular system structure and function, and the role of the cardiovascular system in maintaining homeostasis in the human body. (Created By Department - Biology (BIOL)) **Start Date:**	**Assessment Method:** Embedded question on an exam (Bio 40B) **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of the class will correctly answer the question on the exam (Bio40A)		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
07/02/2015 **End Date:** 07/01/2017 **Course-Level SLO Status:** Active			
Department - Biology (BIOL) - BIOL 40B - HUMAN ANATOMY & PHYSIOLOGY II - SLO #3: Respiratory System - The student can analyze and evaluate the relationship between respiratory system structure and function, and the role of the respiratory system in maintaining homeostasis in the human body. (Created By Department - Biology (BIOL)) **Start Date:** 07/02/2015 **End Date:** 07/01/2019 **Course-Level SLO Status:** Active	**Assessment Method:** Embedded question on an exam (Bio 40B) **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of the class will correctly answer the question on the exam (Bio40B)		
Department - Biology (BIOL) - BIOL 40B - HUMAN ANATOMY & PHYSIOLOGY II - SLO 1 - Homeostasis - The student can identify how the nervous system and cardiovascular system contributes to homeostasis. (Created By Department - Biology (BIOL)) **End Date:** 07/01/2015 **Course-Level SLO Status:** Inactive	**Assessment Method:** Embedded question on an exam (Bio 40B). **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of the class will correctly answer the question on the exam (Bio 40B).	06/24/2016 - 70-72% of students correctly indicated compensatory mechanisms for BP changes (target not met) 92% answered correctly regarding erythropoiesis 90% understood physiologic mechanisms affecting cardiac output 88-96% understood respiratory mechanisms/Bohr effect. -EK **Result:** Target Met **Year This Assessment Occurred:** 2015-2016	
Department - Biology (BIOL) - BIOL 40B - HUMAN ANATOMY & PHYSIOLOGY II - SLO 2 - Structure and function - The student can identify the importance of structure/ function relationship. (Created By Department - Biology (BIOL))	**Assessment Method:** Embedded question on an exam (Bio 40B). **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of the class will correctly answer the	06/24/2016 - 98% understood importance of erythrocyte shape & hemoglobin/oxygen binding. 78% correctly recalled the significance of arterial elastic tissue. (target not met) No numerical data, but most students understand the reason for the difference in ventricular	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Start Date: 07/01/2015 **Course-Level SLO Status:** Inactive	question on the exam (Bio 40B).	myocardial thickness & anastomoses.(short answer question). -EK **Result:** Target Met **Year This Assessment Occurred:** 2015-2016	
		06/24/2016 - 74-92% of students correctly identified various functions of brain regions in terms of sensations, ANS control, & motor functions. -EK **Result:** Target Met **Year This Assessment Occurred:** 2015-2016	
Department - Biology (BIOL) - BIOL 40C - HUMAN ANATOMY & PHYSIOLOGY III - SLO 1 - Homeostasis - The student can identify how the urinary system and endocrine system contributes to homeostasis. (Created By Department - Biology (BIOL)) **Start Date:** 03/03/2014 **End Date:** 07/09/2015 **Course-Level SLO Status:** Inactive	**Assessment Method:** Embedded question on an exam (Bio 40C). **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of the class will correctly answer the question on the exam (Bio 40C).		
Department - Biology (BIOL) - BIOL 40C - HUMAN ANATOMY & PHYSIOLOGY III - SLO 2 - Structure and function - The student can identify the importance of structure/ function relationship. (Created By Department - Biology (BIOL)) **End Date:** 07/09/2015 **Course-Level SLO Status:** Inactive	**Assessment Method:** Embedded question on an exam (Bio 40C). **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of the class will correctly answer the question on the exam (Bio 40C).		
Department - Biology (BIOL) - BIOL 40C - HUMAN ANATOMY & PHYSIOLOGY III -			

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
SLO #1: Digestive System - The student can analyze and evaluate the relationship between digestive system structure and function, and the role of the digestive system in maintaining homeostasis in the human body. (Created By Department - Biology (BIOL)) **Start Date:** 07/02/2015 **End Date:** 07/01/2019 **Course-Level SLO Status:** Active	**Assessment Method:** Embedded question on an exam (Bio 40C) **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of the class will correctly answer the question on the exam (Bio40C)	06/24/2016 - 88% correctly indicated how ANS affects GI activity. 84% understood GI motor functions & communications with nervous system. 86% correctly identified colon functions. 70-72% correctly identified small intestine & colon transport/absorption. (target not met) 84-98% identified digestive phases & their stimuli. comprehension of metabolism & metabolic adaptations ranged from 40-92% -EK **Result:** Target Met **Year This Assessment Occurred:** 2015-2016	
		04/01/2016 - Across several exam questions, on average 82% of students were able to identify structure-function relationships (including layers of the GI muscularis, surface area of the GI tract, hepatic portal system). 96% of students correctly identified the role of the digestive system in maintaining homeostasis. (W16-LB) **Result:** Target Met **Year This Assessment Occurred:** 2015-2016	
		03/31/2016 - 92% of the class correctly answered this question concerning the structure function relationship for the digestive system and relationship to homeostasis. J Lopez Bio 40C Fall 2015 **Result:** Target Met **Year This Assessment Occurred:** 2015-2016	
Department - Biology (BIOL) - BIOL 40C - HUMAN ANATOMY & PHYSIOLOGY III - SLO #2: Urinary System - The student can analyze and evaluate the relationship between urinary system structure and	**Assessment Method:** Embedded question on an exam (Bio 40C) **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:**	06/24/2016 - about 72% (ave.) of students correctly answered at least 9 renal physiology/acid -base balance questions. -EK **Result:** Target Not Met	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
function, and the role of the urinary system in maintaining homeostasis in the human body. (Created By Department - Biology (BIOL)) **Start Date:** 07/02/2015 **End Date:** 07/01/2019 **Course-Level SLO Status:** Active	80% of the class will correctly answer the question on the exam (Bio40C)	**Year This Assessment Occurred:** 2015-2016 04/01/2016 - Across several exam questions, on average 83% of students correctly identified how the urinary system contributes to homeostasis (elimination of wastes from blood, regulation of blood volume & osmolarity, regulation of blood ion concentration, blood pH). Only 74% identified that the kidneys contribute to blood pH homeostasis. This may be due to the fact that we spent more time on how the respiratory system and proteins buffer changes in blood pH, and just briefly covered the role of the kidneys. One student purchased a fresh kidney (pig?) from a local grocery store. She video-recorded her dissection and structures were MUCH clearer than in the preserved kidneys we use in class. According to the student, the kidney cost less than one dollar and the store sold them in bulk. (W16-LB) **Result:** Target Met **Year This Assessment Occurred:** 2015-2016 **Resource Request:** Fresh pig kidneys from local grocery store- but get John's input on that 03/31/2016 - 78% of the class correctly analyzed the structure function relationship of the urinary system in maintaining homeostasis. Close to target, but target of 80% not met. I will emphasis aspects of the kidney specifically during lecture and lab especially dissection of kidney. J Lopez Bio 40C Fall 2015 **Result:** Target Not Met **Year This Assessment Occurred:** 2015-2016 **Resource Request:** Human Anatomy Atlas; site license for valuable depiction of stuctures	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		Resource Request: Human Anatomy Atlas; site license for valuable depiction of stuctures **Resource Request:** Human Anatomy Atlas; site license for valuable depiction of stuctures	
Department - Biology (BIOL) - BIOL 40C - HUMAN ANATOMY & PHYSIOLOGY III - SLO #3: Lymphatic System - The student can analyze and evaluate the relationship between lymphatic system structure and function, and the role of the lymphatic system in maintaining homeostasis in the human body. (Created By Department - Biology (BIOL)) **Start Date:** 07/02/2015 **End Date:** 07/01/2019 **Course-Level SLO Status:** Active	**Assessment Method:** Embedded question on an exam (Bio 40C) **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of the class will correctly answer the question on the exam (Bio40C)	06/24/2016 - an average of 87% of students answered at least 5 questions immune function correctly. -EK **Result:** Target Met **Year This Assessment Occurred:** 2015-2016	
		04/01/2016 - 78% of students identified how the lymphatic system contributes to homeostasis by draining excess interstitial fluid. The question involved the disorder elephantitis. (W16-LB) **Result:** Target Not Met **Year This Assessment Occurred:** 2015-2016	
		03/31/2016 - 93% of the class correctly identified the relationship between the lymphatic system structure and function with homeostasis mechanisms. J Lopez Bio 40C Fall 2015 **Result:** Target Met **Year This Assessment Occurred:** 2015-2016	
Department - Biology (BIOL) - BIOL 40C - HUMAN ANATOMY & PHYSIOLOGY III - SLO #4: Endocrine System - The student can analyze and evaluate the relationship between endocrine system structure and function, and the role of the endocrine system in maintaining homeostasis in the	**Assessment Method:** Embedded question on an exam (Bio 40C) **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of the class will correctly answer the question on the exam (Bio40C)	06/24/2016 - an average of 76% of students understood a series of at least 8 questions on hormone interaction & feedback regulation, including specific physiologic examples. -EK **Result:** Target Not Met **Year This Assessment Occurred:**	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
human body. (Created By Department - Biology (BIOL)) **Start Date:** 07/02/2015 **End Date:** 07/01/2019 **Course-Level SLO Status:** Active		2015-2016 04/01/2016 - Across several exam questions, on average 84% of students correctly identified how the endocrine system contributes to homeostasis (communication between systems, growth, development, metabolism). 78% of students correctly identified comparisons and contrasts between the endocrine and nervous system. 82% of students identified the structure-function relationship of the hypophyseal portal system. (W16-LB) **Result:** Target Met **Year This Assessment Occurred:** 2015-2016	
Department - Biology (BIOL) - BIOL 40C - HUMAN ANATOMY & PHYSIOLOGY III - SLO #5: Reproductive System - The student can analyze and evaluate the relationship between reproductive system structure and function, and the role of the reproductive system in maintaining homeostasis in the human body. (Created By Department - Biology (BIOL)) **Start Date:** 07/02/2015 **End Date:** 07/01/2019 **Course-Level SLO Status:** Active	**Assessment Method:** Embedded question on an exam (Bio 40C) **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of the class will correctly answer the question on the exam (Bio40C)	06/24/2016 - an ave. of 80% of the class answered homeostasis questions correctly, mainly addressing hormonal regulation. no numerical data-most students understood the role of the ciliated epithelium in the uterine tubes, role of scrotal muscles, effects of estrogen, and vascular importance of the endometrium (all short answer questions). -EK **Result:** Target Met **Year This Assessment Occurred:** 2015-2016	
Department - Biology (BIOL) - BIOL 41 - MICROBIOLOGY - SLO 1 - Disease Prevention - Students will discuss the role of the health care practitioner in prevention of nosocomial infection (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Written and multiple-choice questions on midterm and final exams **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of students will answer the test questions correctly	11/01/2016 - AE: As Sara indicated in her reflection, students in my Microbiology course are also consistently able to answer the main idea of questions about health care professionals preventing these infections right from the beginning of the quarter. In the analysis of data from the last school year, >95% of my students were able to successfully name 3 strategies (on a written exam) for decreasing these infections on	11/01/2016 - Those of us who teach microbiology will work together to come up with another SLO for Micro that we believe better reflects the needs of the students taking the course.

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		the final exam. The only students who weren't able to, could name 2 clear strategies and a couple left the questions blank. That is true for all 3 quarters that I looked at from the 2015-16 school year. While I will continue to make sure students have exposure to these techniques, the fact that the vast majority are already able to name them before coming into the course makes me agree with Sara (SC) above that this SLO needs to be changed modified. **Result:** Target Met **Year This Assessment Occurred:** 2015-2016	
		10/17/2016 - SC: There are many activities, lessons and questions related to prevention of infection and identification of nosocomial infections throughout the quarter in my class and students are generally quite successful in mastering the topic. For example, at the end of the Spring 2016 quarter, 97.6% of students properly identified a nosocomial infection (assessed via multiple choice exam question) with only one student out of 41 missing the question. Additionally, 95% of students were able to suggest three ways to control such an outbreak (assessed via essay exam question), where 39 students were able to suggest three strategies, one student suggested only two strategies, and another student left the last two pages of his exam blank and therefore suggested no strategies. All of that being said, I assessed the students for prior microbiology knowledge on the first day of the Spring 2016 quarter, before any class lessons on the subject took place. When asked an essay question about how to control an outbreak of an infection as a health care worker, 87.8% (36/41) of students were able to suggest three or more effective strategies for controlling the outbreak, while the remaining 12% (5/41) students were able to suggest two effective strategies. Thus 100% of the	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		students had a grasp on how to control the spread of infection before the class even began. While the time spent on discussions and lessons regarding nosocomial infections in class is valuable, it might be time to consider that, by and large, students have met this SLO before they even begin their microbiology education. **Result:** Target Met **Year This Assessment Occurred:** 2015-2016	
	Assessment Method: Written questions answered during in-class activities **Assessment Method Type:** Essay/Journal **Target for Success:** 100% of students will be able to answer these written activities correctly		
Department - Biology (BIOL) - BIOL 41 - MICROBIOLOGY - SLO 2 - Compare healthy and disease states - Students will compare and contrast the role of normal flora, opportunistic and obligate pathogens in both health and disease states (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Embedded exam questions **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of students will understand		
Department - Biology (BIOL) - BIOL 41 - MICROBIOLOGY - SLO 3 - Treatments for bacterial and viral Pathogens - distinguish between bacterial and viral pathogens in terms of structure and chemotherapeutic interventions. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Embedded exam questions **Assessment Method Type:** Exam - Course Test/Quiz		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Department - Biology (BIOL) - BIOL 45 - INTRODUCTION TO HUMAN NUTRITION - BIO 45 CL-SLO Food Labels - Upon successful completion of the course, students will be able to interpret food labels, explain the rationale for the information, and teach a potential patient how to use the labels to make informed dietary choices. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Exam **Assessment Method Type:** Exam - Course Test/Quiz		
Department - Biology (BIOL) - BIOL 45 - INTRODUCTION TO HUMAN NUTRITION - BIO 45 CL-SLO DGAs - Upon successful completion of the course, students will be able to utilize the dietary Guidelines for Americans to plan a diet for both healthy individuals as well as individuals at increased risk for chronic illnesses such as heart disease and type 2 diabetes. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Students participate in a quarter-long written analysis project in which they analyze their dietary intake (period of five days). Prompts are included asking students to address how modifications/analysis might vary if they had heart disease or diabetes. **Assessment Method Type:** Case Study/Analysis **Target for Success:** More than 85% of students will consistently suggest appropriate modifications.		
	Assessment Method: One of the midterm exams asks several questions requiring the students to recall and apply the DGAs **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** About 85% of students will answer these questions with 90% accuracy.		
Department - Biology (BIOL) - BIOL 45 - INTRODUCTION TO HUMAN NUTRITION - BIO 45 CL-SLO Dietary Analysis & Planning - Upon successful completion of the course, students will be able to utilize dietary analysis software to analyze current dietary intake and subsequently make suggestions	**Assessment Method:** Students participate in a quarter-long written analysis project where they analyze their own five-day intake. Weekly written assignments prompt them to make appropriate suggestions to modify their intake to reduce their risk for diet-related		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
for appropriate dietary modifications, and explain the rationale for these recommendations. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	disease. **Assessment Method Type:** Case Study/Analysis		
Department - Biology (BIOL) - BIOL 54H - HONORS INSTITUTE SEMINAR IN BIOLOGY - SLO 1 - Critical Thinking - The student can critically analyze a topic covered in the course. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Students will write a reflection paper indicating their understanding and biases prior to the course and how those have evolved by the end of the course. **Assessment Method Type:** Essay/Journal **Target for Success:** All students will demonstrate improvement by the end of the course. **Related Documents:** Holcroft Bio 54H Final Reflection Paper Prompts	11/30/2016 - 16 of 18 students did an excellent job on their reflection paper. 1 student did not turn in a paper. 2 students received a D on this assignment; neither of these two students completed the assignment and one student clearly had problems with his English skills. **Result:** Target Met **Year This Assessment Occurred:** 2015-2016 **Resource Request:** Continued use of the TLC. **GE/IL-SLO Reflection:** This slo requires communication and critical thinking skills.	12/01/2016 - Improve coordination with the TLC to aid students that need to improve their writing skills.
Department - Biology (BIOL) - BIOL 54H - HONORS INSTITUTE SEMINAR IN BIOLOGY - SLO 2 - Communication - The student can use new vocabulary relevant to topic covered in the course. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Students will be given weekly vocabulary lists pertinent to the assigned readings and course topic. Questions on the readings/vocabulary will measure understanding. **Assessment Method Type:** Discussion/Participation **Related Documents:** Holcroft Diabetes Pre Class Homework	12/01/2016 - Median score for the class was 93%. One student received a D (5% of class). One student received an F, due to nonattendance. **Result:** Target Met **Year This Assessment Occurred:** 2015-2016 **GE/IL-SLO Reflection:** This SLO requires both verbal and written communication skills.	
	Assessment Method: Short (three to five) question clicker quiz given at the very beginning of each class. Questions test understanding of basic biology concepts relevant to the discussion topic that week.		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	Assessment Method Type: Pre/Post Test		
Department - Biology (BIOL) - BIOL 54H - HONORS INSTITUTE SEMINAR IN BIOLOGY - SLO 3 - Information Literacy - The student can identify and critically evaluate appropriate sources of information. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Final reflection paper will include a component asking students to find and evaluate information from 1) a website and 2) a publication. **Assessment Method Type:** Essay/Journal	12/01/2016 - Median score for this portion of the paper was 80%, with only one student failing. **Result:** Target Met **Year This Assessment Occurred:** 2015-2016 **Resource Request:** None **GE/IL-SLO Reflection:** This SLO assesses communication and critical thinking skills	
Department - Biology (BIOL) - BIOL 58 - FUNDAMENTALS OF PHARMACOLOGY - SLO 1 - Physiological Processes - The student will be able to describe the basic functions and mechanism of action of drugs and the physiologic responses of various body systems (Created By Department - Biology (BIOL)) **Start Date:** 04/08/2012 **End Date:** 06/28/2012 **Course-Level SLO Status:** Active	**Assessment Method:** Midterm #1 100 points Midterm #2 100 points Final Exam 200 points Top 50 Drugs 100 points _____ TOTAL POINTS 500 points **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of students will score 70% or better		
Department - Biology (BIOL) - BIOL 58 - FUNDAMENTALS OF PHARMACOLOGY - SLO 2 - Drug interactions - The student will be able to list the side effects, desirable and undesirable actions and the appropriate remedies of drug interaction. (Created By Department - Biology (BIOL)) **Start Date:** 04/08/2012 **End Date:**	**Assessment Method:** Midterm #1 100 points Midterm #2 100 points Final Exam 200 points Top 50 Drugs 100 points _____ TOTAL POINTS 500 points **Assessment Method Type:**		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
06/28/2012 **Course-Level SLO Status:** Active	Exam - Course Test/Quiz **Target for Success:** 80% of the students will receive a 70% or higher on all methods of assessment		
Department - Biology (BIOL) - BIOL 8 - BASIC NUTRITION - BIO 8 CL-SLO Food Labels - Upon successful completion of Bio 8, students will be able to interpret food labels and use them to make informed dietary choices. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Short answer exam questions **Assessment Method Type:** Exam - Course Test/Quiz		
	Assessment Method: Students examined food labels in class and worked in pairs to address a series of prompts about interpreting the information. **Assessment Method Type:** Case Study/Analysis **Target for Success:** 90% of students will demonstrate at least minimum competence in evaluating a food label.		
Department - Biology (BIOL) - BIOL 8 - BASIC NUTRITION - BIO 8 CL-SLO DGAs - Upon successful completion of Bio 8, students will be able to utilize the Dietary Guidelines for Americans to plan a diet for themselves and their family. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Students complete a self-dietary analysis using a four-day food diary and analyze their intake as it compares to the recommendations in the DGAs. Their analysis is written as a formal report. **Assessment Method Type:** Case Study/Analysis	06/22/2016 - 28 students completed several smaller reports using different areas of the DGA recommendations, protein, carbs, lipids, etc, and showed that they comprehended these guidelines, and were able to apply them to their diet. of these, 27 of 28 provided an overall summary of their knowledge that demonstrated they understand how to plan a good diet for themselves, and most discussed ways that these guidelines change for children, athletes and older adults. The one student that did not fully demonstrate this knowledge did not complete the assignment as directed, so I was unable to assess their overall learning in this area, though from the previous reports, they were able to read and apply the guidelines to individual aspects of diet. RB **Result:** Target Met **Year This Assessment Occurred:** 2015-2016	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Department - Biology (BIOL) - BIOL 8 - BASIC NUTRITION - BIO 8 CL-SLO Dietary Analysis & Planning - Upon successful completion of Bio 8, students will be able to analyze their current dietary intake and use this information to make suggestions for appropriate dietary modifications. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Students complete a self-dietary analysis and make written recommendations for appropriate dietary modifications. **Assessment Method Type:** Case Study/Analysis		
Department - Biology (BIOL) - BIOL 9 - ENVIRONMENTAL BIOLOGY - SLO 1 - Global/Community Conciousness - Student will evaluate environmental issues and describe possible solutions at both the local and global level (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Advocacy Campaign Assignment. I have found that one of the biggest obstacles to change is that generally people are uninformed about how their behavior affects the environment. I would like each person (or you may work in groups of two to three) to come up with an advocacy campaign that ties together the environmental consequences of human actions at both the local and global levels Criteria for picking topic include: you feel passionate about the topic, you want to learn more about it, and you want to share that knowledge with others. Your grade will be based upon three things: 1. Research on your topic: (worth 50% of your grade) ? Notes from your research ? info and facts in your words or properly cited. This will be research you have completed on the topic from the internet, books etc? Your textbook website has long lists of resources related to each chapter so you might find some resources there. (30 pts) ? Research could also include interview with a person of authority (a scientist working on		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	the problem, a local farmer etc?), or volunteering (for example if you wanted to talk about invasive species you could volunteer for a day on a restoration project). ? A summary (one page is fine) on gathered info and your interview ? tie your research together. This can be a bulleted list that is to help you focus your advocacy campaign (10 pts) ? One paragraph summary on how this info relates to you, your family, and/or society. If working in a group, each person should turn this in separately (10 pts) ? A presentation for the class (25 points) ? The presentation should overview your topic. This should be a 5-10 minute PowerPoint presentation. You should see me for help if you are unfamiliar with PowerPoint. I will post a list of helpful PowerPoint tips on the ETUDES website. 2. A method for sharing your advocacy campaign with the campus. (25 points) ? Possible methods of sharing include posters, a YouTube video, create a website or other methods of getting information out to the public . **Assessment Method Type:** Presentation/Performance		
Department - Biology (BIOL) - BIOL 9 - ENVIRONMENTAL BIOLOGY - SLO 2 - Ecosystem Processes - The student will be able to explain and provide examples of the movement of energy and matter through ecosystems and discuss human impacts that disrupt these processes. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Student will be given two to three exam questions in which they distinguish between the flow of energy and the cycling of matter (biogeochemical cycles). Students must also evaluate human impacts and disruptions of these processes and describe possible solutions. **Assessment Method Type:** Exam - Course Test/Quiz		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	Assessment Method: Students create pathways maps to tie together the movement of energy and nitrogen from the atmosphere, through the food chain into the soil. They are required to identify positive and negative feedbacks in the system. Each group is given a set of 16 terms that they have to use to create pathways to relate the terms to each other. They then must peer-evaluate the maps of the other groups and identify pathways that are unclear. To evaluate their understanding, students are asked to describe three pathways they learned a a reflection and given a pathway on a quiz to describe related terms and processes. They are also asked to identify where human activity might lead to disruption of the processes. **Assessment Method Type:** Class/Lab Project **Target for Success:** 100% of the students can identify and accurately describe at least one pathway. 80% can identify and accurately describe at least two pathways	07/02/2016 - I tried this project in the Fall and Winter quarters without success. Students could generally understand some aspects of the relationships between the terms, but were unable to accurately describe how the feedbacks occurred between them. **Result:** Target Not Met **Year This Assessment Occurred:** 2015-2016 **Resource Request:** None **Resource Request:** None **GE/IL-SLO Reflection:** Critical Thinking - students were only able to demonstrate an understanding of what individual terms meant, but were unable to relate them and organize them appropriately. **GE/IL-SLO Reflection:** Critical Thinking - students were only able to demonstrate an understanding of what individual terms meant, but were unable to relate them and organize them appropriately.	07/02/2016 - I either need to scrap this assignment/activity or figure out a way to better scaffold it.
Department - Biology (BIOL) - BIOL 9 - ENVIRONMENTAL BIOLOGY - SLO 3 - Global/Community Conciousness - Student will evaluate their personal impact on the earth. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Student will be required to carry out a three day project in which they track all of their resource use (energy, material goods, food etc...). On the first day, they will be required to simply record all of the energy and matter that they use. On the second day, they will be required to reduce their resource use by 50%. By the third day, they will be required to reduce their impact by 100%. Students will be graded upon the quality of their reporting (with full recognition that 100% is probably impossible to obtain) and their self		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	reflection of their impacts and their discussion evaluating wants and needs and how their lifestyle reflects wants and needs. **Assessment Method Type:** Class/Lab Project		
Department - Biology (BIOL) - BIOL 9L - ENVIRONMENTAL BIOLOGY LABORATORY - SLO 1 - Scientific Process - Students will be able to apply the scientific process to evaluating environmental issues. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Students will design a research project on a local environmental issue related to a threatened or endangered species. They will be required to research causes and conflicts related to the listing of the species and then to report out to the other students in the class. At the end of the quarter, students have a mini conference to decide which of the researched species can be "funded. Essentially they have to act as experts and be prepared to argue for their own species in a time of limited budget and management resource availability. Criteria considered include species biology and population dynamics, effects on human/economic factors, feasibility of mitigating causes of loss. The students are each then required to write a short opinion on which three species should be saved and why based upon what they heard in the mini -conference. **Assessment Method Type:** Case Study/Analysis **Target for Success:** 90% of the students should be able to think and adequately argue with reasons why their three choices are the best in times of limited resources for mitigation.		
Department - Biology (BIOL) - BIOL 9L - ENVIRONMENTAL BIOLOGY LABORATORY - SLO 2 - Scientific Process - Students will demonstrate proficiency in	**Assessment Method:** Over the course, students will be taught standard environmental sampling techniques for water quality and biodiversity		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
research and sampling techniques to evaluate a local ecosystem and impacts upon that ecosystem. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	assessment. They will be required to apply these techniques in their research projects due at the end of the course. **Assessment Method Type:** Class/Lab Project **Target for Success:** 100% of the students should be able to adequately use basic instruments for testing environmental samples.		

Unit Assessment Report - Four Column

Foothill College

Program (BHS-BIOL) - Biological Sciences AS

Mission Statement: A. Prepare students for a successful career in the biological sciences, including students planning to transfer to a four-year school.
B. Prepare students to be savvy consumers of scientific information, and provide a general education in the life sciences.
C. Provide students with the background knowledge and critical thinking skills required to understand important issues such as environmental science, climate change, evolution, disease prevention and basic nutrition.
D. Support programs in allied health by providing an education in biological principles including anatomy, physiology, microbiology, nutrition and pharmacology.

Primary Core Mission: Workforce

Secondary Core Mission: Transfer

PL-SLOs	Means of Assessment & Target / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Program (BHS-BIOL) - Biological Sciences AS - 1 - Upon successful completion of the Biology majors sequence, students can/will be able to use the scientific method to formulate questions, design experiments to test hypotheses, interpret experimental results to draw conclusions, communicate results both orally and in writing, and critically evaluate the use of the scientific method from published sources. **Year PL-SLO implemented:** End of Quarter **SLO Status:** Active	**Assessment Method:** In Biology 1A, students will design and conduct an experiment in groups culminating in a written abstract. **Assessment Method Type:** Class/Lab Project **Target:** Students can properly phrase a question and a hypothesis, identify necessary experimental controls, depict experimental results in graphical format, and draw a conclusion supported by results.	12/04/2016 - KE: Students this year were asked to design and conduct two different experiments. In each experiment, students worked in groups on the design, data collection, results, and analysis. Abstracts were written to model those submitted with a scientific research paper. In general, students are pretty good at identifying their experimental variables and stating their hypothesis in writing. Their graphs (results) and conclusion for this assignment vary widely, depending on whether or not the experiment gave any usable data. I'm thinking one way to improve this assignment and to give everyone a chance at analyzing useful data, is to have instructors guide the students more in the planning stages. **Result:** Target Met **Year This Assessment Occurred:** 2015-2016	
	Assessment Method: In Biology 1A, students will design and conduct an experiment in groups	03/16/2012 - In phrasing a question, students were able to correctly identify the variables (independent vs. dependent) 89% of the time.	05/25/2012 - As students in Biol1A are just starting their scientific educational careers, it is reasonable

PL-SLOs	Means of Assessment & Target / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	culminating in a poster presentation. **Assessment Method Type:** Class/Lab Project **Target:** Students can properly phrase a question and a hypothesis, identify necessary experimental controls, depict experimental results in graphical format, and draw a conclusion supported by results.	Students correctly identified necessary controls 60% of the time. Students drew conclusions based on results 66% of the time. **Result:** Target Met **Year This Assessment Occurred:** 2011-2012	to expect that not all students will fully grasp each component of the scientific method. Throughout the quarter, students are given the opportunity to "practice" identifying and stating each component in their weekly experiments. Students are also given quiz and exam questions that test their ability to identify and state the different steps to the scientific method. By far, the most difficulty comes in distinguishing a result from a conclusion and in identifying an important control. As students progress through the biology program, they should improve in these areas. I don't think any extra resources are necessary, but more time spent on task.
	Assessment Method: In Biology 1B, students will work in small groups to design and conduct an experiment on selected aspects of plant growth and present their results in oral and/or written form. **Assessment Method Type:** Class/Lab Project	02/03/2016 - From year to year, students consistently perform well on this assignment. Scores consistently improve from the initial stages of the project (writing introductions) to the final stages (complete paper), and are consistently high for the oral presentations. Adding a guided reading of a published peer-reviewed paper appears to have helped the students understand the format of a paper and, especially, the importance of proper citations. A difficulty we repeatedly encounter is that students have trouble identifying appropriate papers in their literature searches, perhaps because of the large number of papers available in electronic databases combined with the high technical detail most contain. A possible solution is to provide a set of relevant published papers from which the students choose, putting a greater emphasis on properly applying the content of a paper to one's own research and	

PL-SLOs	Means of Assessment & Target / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		less emphasis on the literature search itself. **Result:** Target Met **Year This Assessment Occurred:** 2015-2016 **Resource Request:** A set of binders to store selected papers in the lab (alternatively, we could make pdf files available on the class website).	
	Assessment Method: In Biology 1C, students will conduct an experiment in natural selection and present their findings in a written paper. **Assessment Method Type:** Class/Lab Project **Target:** We expect students should have mastery of the process by the end of the course Biology Majors series.	01/20/2016 - Students generally do well in this assignment. It is structured to guide them through the process of experimental design, hypotheses and predictions. The final report is written in a scientific paper format which includes an introduction, methods, results and conclusions. There does seem to be some confusion with their understanding of how to write methods sections (which has been tied to the way they are taught to report in their chemistry classes) and also in confusing results with discussion and conclusions. **Result:** Target Met **Year This Assessment Occurred:** 2014-2015 **Resource Request:** None **GE/IL-SLO Reflection:** This outcome helps the student practice their critical thinking skills in executing and interpreting results of a antibiotic resistance experiment. In addition, the students practice communication in the form a written report. They use appropriate language for the discipline (Biology).	01/20/2016 - While students have done well in this experiment, the faculty that teach the majors would like to see more realistic, quarter long experimental/scientific process practice going forward and will be implementing different strategies to assess this PlSLO. We will be changing our assessment plan accordingly.
		06/14/2012 - Overall the students did fairly well in demonstrating their understanding of the scientific process and communicating results. While all students passed the assignment, there were a few areas which could use improvement including understanding how to communicate methods and	06/14/2012 - As approximately 30% of the students did not correctly state the hypothesis, I will have to make sure that I double check them at the start of the experiment to make sure that they really

PL-SLOs	Means of Assessment & Target / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		results in a clear manner and how to state hypotheses clearly. **Result:** Target Met **Year This Assessment Occurred:** 2011-2012 **GE/IL-SLO Reflection:** This particular activity in Bio 1C speaks mostly to the Communication and Creative/Analytical thinking IL-SLOs. Students generally did well, but about 40% of the papers had confusing introductions and conclusions which confounded grading a bit. It is hard to tell if this was because students did not bother doing drafts (not required) before submission. I am considering also having anonymous peer review of papers before they are turned into me, using my rubric to see if that improves overall quality of the papers.	understand what they are doing. A common mistake was to state the null hypothesis without also stating what was expected to change as a result of the experimental procedure. This led them to conclude that their hypothesis was correct (which the data bore out) but often resulted in poor explanations of the experimental results. Also about 95% of the students wrote lengthy overly descriptive explanations of how they conducted the experiments that were in the style of a lab manual description. I may try to provide a couple of simple scientific papers for them to review so that they can see how methods and results should be written. I am considering also having peer review of papers before they are turned into me, using my rubric to see if that improves overall quality of the papers.
	Assessment Method: In Bio 1C Students engage in a project to observe phenology for ten weeks in an assigned species. As part of the project, they write a short research paper on their species, perform observations 2X week and then use their data to compare against past years. They are asked to hypothesize how their particular species might be affected by climate change and how they can test that on campus. **Assessment Method Type:** Class/Lab Project **Target:** 90% can correctly understand how to carry	12/02/2016 - Students are generally good at obtaining and finding peer-reviewed data and writing their background reports. I have included a visit with the librarian about how to do research and find peer-reviewed papers and that has improved the quality of the research. Students generally do a good job with the data collection and entry but have a hard time with the analysis and interpretation. Part of the problem lies in the software that we are using, but part of it is also in helping them to better understand what the data indicates. I think the students also have a hard time understanding the bigger picture and how their data fits in. I also think this project could be	

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	out background research using peer-reviewed papers. 100% complete their observations and data entry 90% can carry out a summary analysis of their data and how it compares over time to past observations and across other variables such as latitude and location.	improved by having them required to include a few observations outside of just the "required" ones, such as photos, interactions with other organisms observed, weather, etc... **Result:** Target Met **Year This Assessment Occurred:** 2015-2016 **Resource Request:** Laptops for the Bio 1C room with adequate RAM to be able to effectively use software for analysis. **GE/IL-SLO Reflection:** Students are required to communicate using both written and oral skills (they have a short oral summary of their findings at the end of the project). Overall, students are able to do this well. Students are required to use a specific software program to analyze trends in their data. The project will be improved with the addition of more data (the data set grows every year) and the addition of some statistical analyses to better help them understand how the process works. I would like the students to also make a stronger connection to the global consciousness SLO, in that they should understand the signature they see in their assigned species is supporting data for the impacts of global climate change.	
Program (BHS-BIOL) - Biological Sciences AS - 2 - Upon successful completion of the biology program, students will be able to apply evolutionary theory at the molecular, cellular, organismal and population levels to explain the unity and diversity of life. **Year PL-SLO implemented:** End of Quarter	**Assessment Method:** Students will be given a list of questions at the beginning of Biology 1A related to evolutionary theory at different levels of the biological hierarchy. The questions will be mapped to each of the three courses (as to where the basic information will be covered). At the end of Biology 1C, students will be	01/20/2016 - Students excel on this outcome. By the end of Biology 1C, the students have a very good understanding of the application of evolutionary theory to all levels of the biological hierarchy. Due to changes in the teaching of Biology 1C, students are explicitly exposed to more material that helps them to compare molecular and organismal data and observations	

PL-SLOs	Means of Assessment & Target / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
SLO Status: Active	tested on those questions and are expected to show mastery. **Assessment Method Type:** Exam - Course Test/Quiz **Related Documents:** List of Assessment questions on evolution	to understand the big picture of the relatedness of life. Because we have implemented these changes in the course level to bring in and remind the students of the application of the material from Biology 1A and Biology 1B in Biology 1C, by the time they have their final exam questions, they are well prepared and answer the questions well (on a scale of 1-5, 1 lowest and 5 highest, the average assessment finding is a 4). **Result:** Target Met **Year This Assessment Occurred:** 2014-2015 **Resource Request:** None **GE/IL-SLO Reflection:** This PL-SLO directly meets the criteria for critical thinking as the students are required to apply the information from all three courses to develop a comprehensive understanding and ability to explain the unity and diversity of life and how different lines of evidence all generally support the theory of evolution.	