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.

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 Amy Edwards Carolyn Holcroft Joanne Lopez Martin Melia Gillian Schultz Lisa Schultheis	Biology	FT Faculty
John Atkins	Biology	FT Staff
Dadbeh Rouhbakhsh, Jeffrey Tsao	Biology	PT Faculty

Number of Full Time Faculty: 9 **Number of Part Time Faculty:** 19

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

FT (100%) Laboratory Technician. Part-time position (40%) resignation in November, 2015.

List all programs covered by this review and indicate the program type:

Biology ☐ Certificate ☒ AA / AS ☒ AD-T ☒ Pathway

SECTION 1: PROGRAM DATA & ENROLLMENT

1A. Transcriptable Program Data: Data will be posted on Institutional Research's website for all measures except non-transcriptable completion. You must manually copy data in the boxes below for every degree or certificate of achievement covered by this program review.

Transcriptable Program	2012-2013	2013-2014	2014-2015
Biological Sciences, A.S.	5	9	15

1B. Non-Transcriptable Program Data: Please provide any non-transcriptable completion data you have available. Institutional Research does not track this data; you are responsible for tracking this data.

Non-Transcriptable Program	2012-2013	2013-2014	2014-2015
N/A			

Please provide the rationale for offering a non-transcriptable program and share the most recent program completion data available.

N/A

1C. Department Level Data:

	2012-2013	2013-2014	2014-2015
Enrollment	4,405	4,464	4,000
Productivity	608	588	510
Course Success	78%	80%	79%
Full-Time Load (FTEF)	6.9	6.6	7.9
Part-Time Load (FTEF)	8.9	10.4	10.0

1D. Enrollment Trend:
Program Enrollment (Over Past 3 Years): ☐ Increase ☐ Steady/No Change ☒ Decrease

1E. Course Success Trends: Please describe course success trends for the following student groups and compare the program-level data with the college-level data.

	Program-Level Trend			College-Level Comparison		
	Increase	Steady/No Change	Decrease	Above	At Level	Below
African American	☐	☐	☒	☐	☒	☐
Asian	☐	☒	☐	☒	☐	☐
Filipino	☒	☐	☐	☒	☐	☐
Latino/a	☐	☒	☐	☐	☐	☒
Native American	☒	☐	☐	☒	☐	☐
Pacific Islander	☒	☐	☐	☒	☐	☐
White	☒	☐	☐	☒	☐	☐
Decline to State	☐	☒	☐	☐	☐	☒

1F. Course Success Demographics: Please compare the program-level course success rate data for the following student groups with the college-level data.

Male:	☐ Above Level	☒ At Level	☐ Below Level
Female:	☐ Above Level	☒ At Level	☐ Below Level
<25 Years Old:	☐ Above Level	☒ At Level	☐ Below Level
>25 Years Old:	☒ Above Level	☐ At Level	☐ Below Level

1G. Equity: One of the goals of the College's Student Equity plan is to close the performance gap for disproportionately impacted students, including African-American, Hispanic/Latino, and Filipinos/Pacific Islanders. If the course success rates for these students (or other groups not listed above, such as foster youth, veterans, and students with disabilities) is below that of the College, what is your program doing to address this?

African American students make up 3% of our enrollment, Filipino students are 10% of enrollment, and Latino students make up 21% of our enrollment in biology. This is similar to overall enrollment at the college for African American students and Latino students (5% and 22%, respectively) but we're slightly higher than the college enrollment for Filipino students (5%). Most student groups (exceptions being the Latino/a and the younger demographic) are succeeding at, or slightly above the College level. Targeted groups are at 70% success (vs. 72% for the College) and non-targeted groups are at 84% (vs. 82% for the College). We are constantly trying new things to increase student success. For example, in the past year, we have continued to staff and promote the STEM Center (including holding a tutor session in Spanish), and held a Biology Department Summit on Teaching & Learning. We are hopeful that these efforts will

increase success for all of our students.

In response to our program review and equity data last year, we wrote an equity grant to place embedded tutors in select biology classes. Using the 80% index, we identified Biol41 and Biol10 as the courses with the most disproportionate impact to our targeted student groups. We have asked for data on the student success rates in courses with embedded tutors and will reflect on that information when we receive it (likely winter quarter).

The department continues to emphasize active learning and hands-on projects (through our ongoing collaboration with CCB FEST). Our students participated in two internship opportunities: the Alliance for Innovation (NSF Grant) and the Summer STEM Internship Program at UCSF. Faculty regularly seek professional development opportunities emphasizing student equity, recruitment, and retention in the STEM fields.

Although African American students comprise only 3% of our biology enrollment, they succeed in our courses at lower rates than other student groups. This presents an opportunity, as the number of students is not huge so it may therefore be a bit easier to raise success rates for those students through targeted interventions. Ideas include utilizing the new early alert and intervention program, and continuing to prioritize attendance at professional development events to help us better understand how we can help African American students in our classrooms. Following such PD events we would request time and monetary support for part-time participation to meet as a department and reflect on ways we could apply what we learned. We will also request data disaggregated by course so we might identify which biology courses seem to have more African American student enrollment and/or lower success rates for our African American students, to identify any particular courses to focus on in the immediate future.

1H. Course Enrollment: If there are particular courses that are not getting sufficient enrollment, are regularly cancelled due to low enrollment, or are not scheduled, discuss how your program is addressing this.

Enrollment in the Biology Program is down 10% from last year (compared with a 2% increase college-wide). This decrease in enrollment was experienced all across the curriculum (roughly 18% decline in majors courses, 5% decline in GE courses, 12% decline in allied health support courses). The cause of this trend is not readily apparent to the department. In response to lower enrollments, course sections have been cut (which will account for some of the decrease, as fewer sections, even when those sections are not full, will result in an enrollment decline). All courses in the biology program are regularly scheduled in any given academic year. The scheduling process focuses on ensuring a diversity of offerings (GE/majors/allied health), times of day (day/evening), and format (face-to-face/hybrid/online). Unfortunately, the impact of offering a diverse schedule has not been to increase enrollment.

1I. Productivity: Although the college productivity goal is **535**, there are many factors that affect productivity (i.e. seat count / facilities / accreditation restrictions).

Program Productivity Trend: ☐ Increase ☐ Steady/No Change ☒ Decrease
Program Productivity (Compared to College): ☐ Above Goal ☐ At Goal ☒ Below Goal

Please discuss what factors may be affecting your program's productivity.

The Biology Department productivity declined (as expected) when the load factors for lab classes were

adjusted to the same as the load factors for equivalent lecture hours. This load factor change, which came about after extensive negotiations with the Faculty Association and the District, affects all courses with lab components (essentially all of the Biology Department offerings) and went into effect in the fall, 2014. Another factor influencing productivity is the attrition in enrollment for courses in sequence (Biol1ABC and Biol40ABC). The department must offer sections of the entire sequence, despite loss of enrollment, so students can complete the series.

If your program's productivity is below that of the College, please discuss your program objectives aimed at addressing this.

Due to the restricted size of laboratory classes, it is unlikely the Biology Department productivity will rebound to pre load-adjustment levels. If demand warrants, lecture-only course offerings can be increased.

SECTION 2: COURSE COMPLETION & PROGRAM IMPROVEMENT

2A. Institutional Standard: This represents the lowest course completion (success) rate deemed acceptable by the College's accrediting body (ACCJC). The institutional standard is **55%**.

Program Level Course Completion:	☒ Above Standard	☐ At Standard	☐ Below Standard
Targeted Student Course Completion:	☒ Above Standard	☐ At Standard	☐ Below Standard
Online Student Course Completion:	☒ Above Standard	☐ At Standard	☐ Below Standard
In-Person/Hybrid Course Completion:	☒ Above Standard	☐ At Standard	☐ Below Standard

2B. Institutional Effectiveness (IEPI) Goal: This represents an aspirational goal for course completion (success) rates; all programs should strive to reach/surpass this goal. The IEPI goal is **71%**.

Program Level Course Completion:	☒ Above Goal	☐ At Goal	☐ Below Goal
Targeted Student Course Completion:	☐ Above Goal	☒ At Goal	☐ Below Goal
Online Student Course Completion:	☒ Above Goal	☐ At Goal	☐ Below Goal
In-Person/Hybrid Course Completion:	☒ Above Goal	☐ At Goal	☐ Below Goal

Please comment on your program's efforts to continually improve course completion (success) rates, especially for students with basic skills needs.

Some of our recent strategies, also mentioned above, include regular staffing/promotion of the STEM Center, increased reliance on active learning, embedded tutors.

If your program's course completion (success) rates are below the institutional standard (see above), please discuss your program objectives aimed at addressing this.

N/A

2C. Faculty Discussion: Does meaningful dialogue currently take place in shaping, evaluating, and assessing your program's Student Learning Outcomes (SLOs)? ☒ Yes ☐ No

Does meaningful dialogue currently take place around equity and course success rates? ☒ Yes ☐ No

If yes, in what venues do these discussions take place? (Check all that apply)

☒ Department Meetings ☒ Opening Day ☒ Online Discussions ☒ Other: We regularly gather informally to share ideas with each other. Our department is open and sharing.

If no, please discuss what is missing and/or the obstacles to ensuring meaningful dialogue takes place.

This is one of the Biology Department's strengths and we are very proud of our commitment to our students and our colleagues. We care very much that students succeed and are willing to examine trends, discuss trials and triumphs, try new approaches, and evaluate successes and failures. Instructors teaching the same course(s) typically meet to discuss their SLO assessment data, reflections, and share ideas for increasing student achievement of our SLOs for that course. The most difficult part of this process is finding time for everyone to participate. The newly implemented policy allowing part-time faculty to be paid for their participation in the SLO process will help us make our efforts to dialog about our SLOs even more robust.

2D. Course-Level: How has assessment and reflection of course-level Student Learning Outcomes (CL-SLOs) and course completion data led to course-level changes?

Course level changes regularly occur after assessment and reflection. Individual course assignments (lab activities, lecture activities, written reflections, assessments, etc…) are regularly reviewed and improved upon (or attempted to be!) by the department faculty. Appropriateness of the SLOs themselves are also reviewed regularly.
Some recent examples of course-level changes based on SLO discussions include:
1. Majors course-level changes: Changes to meiosis covered in the 1A majors course based on discussions with 1B/1C instructors; changes to research paper assignment in Biol1B (dedicated lab day, guided reading assignment, and review of a published paper).
2. Changes to Biol10 SLOs: removing SLO about cardiovascular disease and cancer and adding two new SLOs on evolution/natural selection and the role of human activities in environmental problems.

If your program's CL-SLOs are not being met, please indicate your program objectives aimed at addressing this.

CL-SLOs are generally met. Again, objectives to improve student success in the CL-SLOs include regular staffing/promoting of the STEM center, increased reliance on active-learning, and embedded tutors.

2E. Program-Level: How has assessment and reflection of program-level Student Learning Outcomes (PL-SLOs) led to certificate/degree program changes and/or improvements?

Faculty involved in assessing the PL-SLOs (majors level courses are those assessed for PL-SLOs) regularly communicate to ensure a quality degree program. The majority of our biology majors are transfer students, not intending on receiving an A.S., Biology degree. We have just completed the paperwork for the AD-T, Biology and are hopeful this will increase degree completion for our transfer students. Student interest in the AD-T appears to be high.

What is being done at the program-level to assist students in achieving degree/certificate completion and/or transferring to a four-year institution?

The biology department completed and submitted paperwork for the AD-T, Biology. Pending approval, this will offer an alternative to the A.S., Biology degree for students wishing to transfer to the 4-year system. Once the AD-T, Biology is approved, the department plans to work closely with counselors and the PSME Division (for scheduling of math, physics, and chemistry requirements) to ensure students can progress through the requirements for the AD-T in a timely manner.

If your department has a Workforce/CTE program, please complete Section 2F.
If your department does not have a Workforce/CTE program, please skip to Section 3.

2F. Workforce/CTE Programs: Refer to the program review website for labor market data.

What is the regional three-year projected occupational growth for your program?

What is being done at the program-level to assist students with job placement and workforce preparedness?

If your program has other program-level outcomes assessments (beyond SLOs and labor market data), discuss how that information has been used to make program changes and/or improvements.

SECTION 3: SUMMARY OF PROGRAM OBJECTIVES & RESOURCE REQUESTS

3A. Past Program Objectives: Please list program objectives (not resource requests) from past program reviews and provide an update by checking the appropriate status box.

Complete AD-T/Biology, Address faculty workload issue	Year: 2014	☒ Completed	☐ Ongoing	☐ No Longer a Goal
Design majors capstone course, interdisciplinary courses	Year: 2014	☐ Completed	☐ Ongoing	☒ No Longer a Goal
Increase involvement with PSME Division/STEM Programs, Honors Program	Year: 2014	☐ Completed	☒ Ongoing	☐ No Longer a Goal
Maintain course offerings, scheduling diversity, quality of instruction	Year: 2014	☐ Completed	☒ Ongoing	☐ No Longer a Goal
Build a community of biology learners, transform pedagogical approaches (more active, problem-based, student-focused learning)	Year: 2014	☐ Completed	☒ Ongoing	☐ No Longer a Goal
Develop service learning, internship, and other such opportunities for students	Year: 2014	☐ Completed	☒ Ongoing	☐ No Longer a Goal
Increase enrollment and success of targeted groups into the Biology Program	Year: 2014	☐ Completed	☒ Ongoing	☐ No Longer a Goal

Please comment on any challenges or obstacles with ongoing past objectives.

The main challenge with the ongoing objectives is evaluating the effectiveness of solutions and initiatives meant to "complete" the objective (some objectives, by their nature, will always be ongoing). As we modify and (attempt to) make improvements to our curriculum, program, offerings, etc…, in the hopes of achieving these goals, it takes time to see if anything is making an impact. We must be patient and vigilant.

Please provide rationale behind any objectives that are no longer a priority for the program.

New course design has been put on hold for the time being. The capstone course idea is not supported

by the strict guidelines for the AD-T and the interdisciplinary courses have been written, but are not being scheduled, amid concerns for impacts on our already declining enrollment.

3B. New Program Objectives: Please list all new program objectives discussed in Sections 1-2; do not list resource requests in this section.

Program Objective	Implementation Timeline	Progress Measures
Example: Offer 2 New Courses to Meet Demand	*Winter 2016 Term*	*Course Enrollment*
Recruit students into AD-T, Biology pathway	upon approval of AD-T, Biology (expected this academic year)	number of degrees awarded
Hold Annual Biology Department Summit on Teaching & Learning (second annual)	Winter Quarter	faculty participation, pedagogical changes

3C. EMP Goals. Please refer to the Educational Master Planning (EMP) website for more information. Indicate which EMP goals are supported by your program objectives (Check all that apply).

☒ Create a culture of equity that promotes student success, particularly for underserved students.
☒ Strengthen a sense of community and commitment to the College's mission; expand participation from all constituencies in shared governance.
☒ Recognize and support a campus culture that values ongoing improvement and stewardship of resources.

3D. 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. Be sure to mention the resource request in your narrative above when discussing your program so the request can be fully vetted.

Resource Request	$	Program Objective (Section 3B)	Type of Resource Request			
			Full-Time Faculty/Staff Position	One-Time B-Budget Augmentation	Ongoing B-Budget Augmentation	Facilities and Equipment
1. FT Faculty		Replacement position for retiring faculty member (Joanne Lopez). Supports department ability to maintain course offerings, scheduling diversity, and quality of instruction.				
2. FT lab tech for		Ongoing	☒	☐	☐	☐

5100		request from previous years: primarily in support of maintaining quality of instruction.				
Increased B-budget	$20,000	Supports quality of instruction (assures ongoing supplies for laboratory activities and supports replacement of damaged or lost items); promotes transformation of pedagogical methods by supporting adjunct involvement in department activities (such as annual department summit);	☐	☐	☒	☐
Outdoor Classroom	$1M	Ongoing request from previous years: supports quality of instruction; the department	☐	☐	☐	☒

		has put together a slideshow outlining this project and has submitted it for the opportunity to raise outside funding				
5100 lab: shaking water bath, -20o freezer, -80o freezer, refrigerator, microscope cabinet		Supports quality of instruction	☐	☐	☐	☒
8700 lab: deli case freezer	$8000	Supports quality of instruction	☐	☐	☐	☒
A&P Models	$20,000 for classroom set	Supports quality of instruction	☐	☐	☐	☒
Skulls, Skeletons, Teeth	$750	Supports quality of instruction	☐	☐	☐	☒
Field Binoculars	$1500	Supports quality of instruction	☐	☐	☐	☒
Replacement Electrophoresis Equipment	$7000	Supports quality of instruction	☐	☐	☐	☒
Classroom Clickers	$1500 per class set of 32	Supports quality of instruction; Transforms Pedagogical Approaches; the department is planning on applying for an equity grant to	☐	☐	☐	☒

		purchase these

3E. Unbudgeted Reassigned Time: Please list and provide rationale for requested reassign time.

Reassigned time for department chair duties: ongoing request from previous years. Although the college is defining the duties of department chair for all departments and working with the FA to assign compensation in a fair and uniform manner, the department wishes to express, again, the need for reassigned time (rather than a stipend) to promote the work of the deparment beyond that which will be in the described duties (currently assisting the dean in scheduling, adjunct faculty hiring/evaluation, and Program Review/SLO coordination). Many of the goals of the department (increasing involvement with PSME, Honors Program, developing internships and service-learning opportunities) require time and coordination that is most appropriately delegated to a department chair. We are requesting 25% release time.

3F. Please review the resource requests that were granted over the last three years and provide evidence that the resource allocations supported your objectives and led to student success.

1) 2014-15. First Annual Biology Department Teaching and Learning Summit: We were granted money to have a Biology Teaching summit that included compensation for Part-time faculty. As more than 20 members of the department participated, this resource helped improve communication between part-time and full-time faculty as well as allowed us to learn about novel teaching strategies successfully used by our colleagues. We have asked this be an annual event and that compensation to part-timers be part of our B-budget augmentation.

2) 2014-2015. Microscopes: 16 dissecting and 33 compound light microscopes have been ordered (Fall 2015). When they arrive they will improve the quality of teaching in the third part of the major's series, where there has not been even enough working microscopes for half the students in the course. Also, the purchase of new dissecting scopes will free up some of the older scopes to be used in courses (such as Biology 9L, 10 14 and 1B) which have not had access to dissecting scopes in the past due to the limited supply.

3) 2014-2015. Models and Slides: Lottery money was used for the purchase of additional models and slides for A&P, Biol1B, and Biol1C. In addition to helping the department replace models and slides that are broken, these funds have allowed us to increase the availability of study materials for students at the STEM tutoring center and to improve the quality of materials used in laboratory instruction (for example, the articulating skulls in Bio 40A). The purchase of new skulls and skeletons is fundamental to increasing the inquiry based labs now being implemented in Bio 1C. This will continue to be an ongoing need, as models and slides will regularly break and need replacing. Also, as new and improved models become available, the department will want to update the current inventory.

4) 2013-2014. Full time Faculty - Microbiology. Sara Cooper started in 2014 and she has been a great asset to our department, collaboratively working with other faculty to improve our Microbiology courses and also generally collaborating to increase active learning used by all of our faculty.

5) 2012- 2014. Environmental tools. We have purchased two game cameras (still need to be set up for environmental monitoring) as well as 8 environmental chemistry meters that can be used to improve the application of scientific methods in Biology 9L, 15 and 1C. In addition, in selecting the models, we found that they can also be used in other applications such as oxygen production measurements, and will also be useful in Biology 1A, 13 and Bio 10. We also purchased 16 pairs of new binoculars, which are

basic tools used in field biology and they have greatly improved the observational capacity of students in both Bio 9L, 1C and 13. The purchase of another 16-32 will ensure each student doing field work will have his/her own pair of binoculars. In addition, this will compensate for the inevitable loss and breakage.

SECTION 4: PROGRAM SUMMARY

4A. Prior Feedback: Address the concerns or recommendations made in prior program review cycles, including any feedback from the Dean/VP, Program Review Committee (PRC), etc.

Concern/Recommendation	Comments
Enrollment concerns (general decrease and targeted students)	Recent approaches to increase enrollment are: online component to Biol10 in development (this academic year); AD-T, Biology pending approval.
Targeted student success rates	The department shares this concern with the campus, in general. Several approaches to increase success have been implemented (STEM Center, embedded tutors) and data on impacts will be evaluated when available.

4B. Summary: What else would you like to highlight about your program (e.g. innovative initiatives, collaborations, community service/outreach projects, etc.)?

The Foothill Biology program has a strong foundation in its excellent curriculum for both majors and non-majors. Our faculty - both full and part time - are committed to student success and consistently engage in professional development to learn about and implement effective classroom practices. We appreciate opportunities to meet to collaborate and reflect on our teaching successes and challenges. As a department, we are committed to continually improve true student learning and success. Towards that end, 6 of our 9 FT faculty members and many of our part-time faculty have gone through an intensive week-long summer institute through the CCB-FEST. This program is aimed at improving success especially for underrepresented groups and using active learning techniques, which the research shows increases student success across the board. This collaboration is ongoing; there are many facets to the program including collaboration with instructors and graduate students who want to teach from SFSU as well as collaboration with instructors from other CC campuses around the Bay Area. Last year, several department faculty participated in a CCB-FEST project titled "Talk Matters and Changing Minds," the latest in a long chain of opportunities offered through CCB-FEST and aimed at increasing student success.

We are also an extremely cohesive department that prides itself not only on discussing items like SLOs and CORs, but also consistently sharing strategies and new activities to use in the classroom.

Foothill Biology and Horticulture staff collaborated with DeAnza in their Sustainability Across the Curriculum initiative, and developed modules for the Campus as Living Lab Workshops. We developed modules during the 2013-2014 academic year, and are using them in our classes now.

Foothill College Global Medical/Dental Brigades club completed its fourth annual volunteer trip to Honduras and the department is working with another group of students for this summer's fifth trip. We recently received a grant from West-Ed to participate in trainings in Reading Apprenticeship in STEM fields across the curriculum (STEM only). We have both full-time and part-time faculty members who

will participate in this year-long training process.

Several of our faculty are serving as Faculty Mentors. Carolyn Holcroft and Gillian Schultz are working with two Stanford graduate students in Biology. These students will shadow their mentors in winter quarter to understand how to develop curricula, teach effectively at the community college and the service side of faculty responsibilities. Karen Erickson is serving as a mentor to a student in the NSF/SLI Scholar STEM Mentoring Program. Laura Branagan is working to place students into position supported by the Alliance for Innovation NSF Grants.

SECTION 5: LEARNING OUTCOMES ASSESSMENT SUMMARY

5A. Attach 2014-2015 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.

5B. Attach 2014-2015 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 6: FEEDBACK AND FOLLOW-UP

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

6A. Strengths and successes of the program as evidenced by the data and analysis:

The Biology faculty are excellent teachers and dedicated mentors for our biology students, our part time faculty and aspiring teachers. The thoughtful reflection provided in this program review is evidence of their commitment to equity, continuous improvement thru thoughtful review and lifelong learning as professional educators.

The Department has been quick to respond to requests from the administration to encourage student participate in the STEM Center (previously known as the PSME Center), to develop an online GE Biology course and to develop a Biology ADT. The Biology faculty rotate the responsibility for oversight of the joint Medical/Dental Brigade taking students to Honduras for the last 4 years to provide health care to rural villagers. This is a huge responsibility and time commitment and provides our students with experiences outside the classroom, exposes them to the medical profession and enriches the college life experience.

As a group, the department is very collegial. They share best practices and rotate the role and responsibilities of the department chair. They are incredibly supportive of new and long term part time instructors and readily participate in teaching evaluations when requested. They are continually looking for ways to innovate and enhance student learning and are committed to student success for all of our students regardless of ethnicities.

6B. Areas of concern, if any:

There are two main areas of concerns which this program review does an excellent job of discussing. Student success has not improved in our targeted populations over many years and enrolment in Biology has declined in the last year for reasons that are not clear.

6C. Recommendations for improvement:

There has been little improvement in student success in our targeted populations over many years. The department has highlighted their plans to address this in the coming year. The department is encouraged to prioritize these efforts and measure their effectiveness.

The development of an online GE Biology class may increase enrolment. The development of the ADT in Biology may also help. The department is encouraged to talk to marketing about highlighting certain classes that may have strong appeal and also consider developing other online biology classes that might enhance enrolment. Furthermore, there may be additional curriculum that could be developed that would be of interest to non Biology majors.

6D. Recommended Next Steps:

☒ Proceed as Planned on Program Review Schedule
☐ Further Review / Out-of-Cycle In-Depth Review

This section is for the Vice President/President to provide feedback.

6E. Strengths and successes of the program as evidenced by the data and analysis:

The Biology Program does an outstanding job of serving students in both transfer-track degree programs and the many outstanding biological and health science career programs we have at Foothill College. The department faculty have been leaders in creating and assessing SLOs for its courses and it is clear collegial conversation and dialogue is going on regarding ways to improve learning. The program holds regular department meetings where issues regarding student success and curriculum are discussed, and faculty take the time to share ideas on teaching strategies and innovations with each other. The Biology Teaching and Learning Summit is a strong example of this. Department activities involve adjunct faculty and it is clear there is strong participation among adjunct in areas such as SLO assessments. Outside of the classroom, the program has been active in the community and recently participated in two "Medical Brigades" serving disadvantaged populations in Ecuador and Vietnam.

6F. Areas of concern, if any:

The recent enrollment decline discussed in this program review is most likely due to an overall decline in the division among some of the career programs. Further evaluation of this is necessary to determine if it is an anomaly. The entire Division of Biological and Health Sciences is down in Academic Year 15-16 approximately 11% and this will impact the number of students going into Biology. The development of additional online courses could help this decline and open up new populations of students.
The lower success rates for targeted populations and lower percentage of enrollment among targeted populations is an ongoing issue that the program is working on new ideas to address. I encourage the Department to take advantage of available equity funds and other resources to look at ways to attract and retain students from targeted populations.

6G. Recommendations for improvement:

No major recommendations for improvement. Continued excellence in the are of SLO assessment, mentoring and inclusion of part-time faculty, and continued work to address the achievement gap for targeted populations.

6H. Recommended Next Steps:

☒ Proceed as Planned on Program Review Schedule

☐ Further Review / Out-of-Cycle In-Depth Review

Upon completion of Section 6, 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		
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.		
	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		
	Assessment Method: homework assignment.		
Department - Biology (BIOL) - BIOL 12 - HUMAN GENETICS - SLO 2 - DNA Fingerprint - Demonstrate an ability to	**Assessment Method:** Embedded exam question. **Assessment Method Type:**		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
interpret a DNA fingerprint. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	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. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Question embedded in final lab assignment. **Assessment Method Type:** Class/Lab Project **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:**		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	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		
Department - Biology (BIOL) - BIOL 14 - HUMAN BIOLOGY - SLO 2 - Scientific 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	**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 8 points on the first and last exams.) **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: 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	10/06/2015 - The students had several opportunities to practice applying the scientific method to research articles and graphs over the quarter. For the final exam, I provided a synopsis of a current research project. Students were asked to provide independent/ dependent variables, controlled variables, and control group. They were then asked to determine if the data supported or refuted the scientists' hypothesis. Out of the 45 students, 24 earned a perfect or near-perfect score. 8% (4/45) of the less-than-perfect scores were due to inversion of the independent/dependent variables. About 25% (10/45) had some issues with providing a proper control group for the listed experiment, either partially or completely off-base. The remaining 7/25 had multiple problems. NM S14 **Result:** Target Met **Year This Assessment Occurred:** 2014-2015	
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 survey and sampling techniques. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** The student will be required to enter at least 7 entries into a field journal (Modified from John McLaughlin, Western Washington University) 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	12/10/2015 - The students who try do fairly well on this. I took them out on the first day of class to do a practice run and have them share what they observed, instead of just waiting for them to do it on the 4th week during the first field trip. I did stop at multiple specific points on field trips to force them to do the observations, but at times, the spots I picked were not the best in terms of logistics. **Result:** Target Met **Year This Assessment Occurred:** 2014-2015 **Resource Request:** None **Resource Request:** None	12/10/2015 - I will try to have the students do more practice runs with grading in the run up to starting the actual field notebook. I will assign them to do this both in a guided manner (in class) and as HW (at home in a park or their yards) to get them practiced in observation skills. I will also be putting more forward thought into specific sites within our field trips for them to do the observations and making checklists so that they do not get so caught up in writing down complicated names but rather making the observations at a point in time.

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	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	**Resource Request:** None **GE/IL-SLO Reflection:** The students are practicing reflective writing and critical thinking in their notebooks. **GE/IL-SLO Reflection:** The students are practicing cirit	
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)) **Course-Level SLO Status:** Active	**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. 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	12/10/2015 - Again the students tend to fairly well on this assignment as the expectations are spelled out fairly clearly. What I am not seeing as fully is them making the deeper critical thinking connections between major ecological concepts and their observations. **Result:** Target Not Met **Year This Assessment Occurred:** 2014-2015 **Resource Request:** None. **GE/IL-SLO Reflection:** The students are not making the critical thinking links as clearly as I would like. **GE/IL-SLO Reflection:** The students are not making the critical thinking links as clearly as I would like.	12/10/2015 - I am going to spread the ecological concepts out over the quarter in terms of using videos with worksheets and short readings related to those concepts instead of massive front-loaded lectures at the start of the quarter. I will use the practice runs of the field notebook in the first few weeks to short additional assignments that ask the students to tie their observations to a specific concept.

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	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			
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			

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
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.		
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.	09/24/2015 - Fall, Winter, Spring quarters 2014-15 Fall: 13 exam questions, 7 missed more than 25% of the time; 1 missed 16-24% of the time, 2 missed 10-15% of the time; 3 missed less than 10% of the time. Winter: 19 exam questions, 5 missed more than 25% of the time; 5 missed 16-24% of the time, 5 missed 10-15% of the time; 4 missed less than 10% of the time. Spring: 19 exam questions, 7 missed more than 25% of the time; 4 missed 16-24% of the time, 2 missed 10-15% of the time; 6 missed less than 10% of the time. The trend is still that 50-60% of the questions are	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		being missed by more than 15% of the class, but this is an improvement over previous years. I have brought a lot more active learning into my lecture and have also introduced clickers to keep the students learning and incorporating the material throughout the quarter. **Result:** Target Not Met **Year This Assessment Occurred:** 2014-2015	
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.	09/24/2015 - Fall 2014: 81% Winter: 69% Spring: 55% Average over 3 quarters: 68% Wow ~ this is unexpected. Students normally do fairly well on this assignment, but the trend here is worse than in previous years. I haven't really changed much in terms of what I do to introduce the Scientific Method, which article I select, or when in the quarter (during the first few weeks), I assign this. I will keep an eye on this over the next quarters and see if something needs to be done differently. **Result:** Target Not Met **Year This Assessment Occurred:** 2014-2015	
Department - Biology (BIOL) - BIOL 1A - PRINCIPLES OF CELL BIOLOGY - SLO 4 - Scientific Process - graphs - Students can graph experimental results. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Students will make a graph of their experimental data from any appropriate lab activity. **Assessment Method Type:** Class/Lab Project **Target for Success:** Average 80% on assignment.	09/24/2015 - Three main graphing exercises were assigned over the quarter. In the first, the class worked together on preparing the graph (so there was a lot of hands-on instruction). In the other two, the graphs were done as homework. Students were provided the "How to Make a Graph Handout" for all three graphs. Fall: 81% - 74% - 88% (average = 81%), general trend is improvement (2nd-3rd) Winter: 88% - 61% - 73% (average = 74%),	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		general trend is improvement (2nd-3rd) Spring: 90% - 62% - 57% (average = 70%), general trend is downward (2nd-3rd) It is expected that the first graphs will be well-done, since there is ample time to make improvements to them before submitting them (students can work together and with instructor consultation), and it is hoped that students take what they learn from graph 1 and, along with the "How to Make a Graph" handout, they will repeat this good work, on their own. Generally, students improve from graph #2 to graph #3 (both of these are on their own graphs), but spring quarter was different. To analyze graphing skills in a bit more detail, in winter I also looked at EXACTLY where students were missing points on their graphs. The data for that showed that, out of 42 students, 19% did not turn in the graph (!) and of the 34 graphs that were graded, 50% were perfect (no errors). The number one most common mistake was not labeling, or including units, on the axes. Most mistakes by the last graph are really lazy ones (labels missing, titles incorrect) ~ rather than not understanding (line and calculation errors). If students would just use the "How to Make a Graph" handout as a checklist (as I've asked them to do), I think their graphs grades by graph #3 would all be perfect. **Result:** Target Not Met **Year This Assessment Occurred:** 2014-2015	
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:**	**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.		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Active	**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.		
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).	01/20/2015 - In Fall 2014, 83% of the responses to the 1st question were correct, and 77% were correct for the 2nd question. In my last assessment I thought an end of quarter review of plant/animal comparisons would help solidify the material (perhaps with a carousel graffiti activity). I always run out of time at the end of the quarter to implement this. Consolidating some of my lectures early in the quarter could help make the time for a more effective synthesis period at the end of the quarter. (Submitted by Schultheis) **Result:** Target Not Met **Year This Assessment Occurred:** 2014-2015	
Department - Biology (BIOL) - BIOL 1B - FORM & FUNCTION IN PLANTS & ANIMALS - SLO 2 - Scientific Process -	**Assessment Method:** Students discuss topics to research for a multi-week laboratory	09/28/2015 - Spring 2015. As in past years, students show consistent improvement through the quarter when preparing papers or components	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
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	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 **Target for Success:** 80% of students receive a passing score on the research paper.	of papers. This quarter the averages were 79% on the paper introduction, 88% on the full individual paper, and 95% on the group paper. The introductions received higher scores than in past quarters. Examining a published paper as an example may have helped, but I would like to see if students in future quarters also have improved scores. (Submitted by Schultheis) **Result:** Target Met **Year This Assessment Occurred:** 2014-2015	
	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		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	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 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	04/10/2015 - Winter 2015. I did a pre- and post-assessment of students, before and after lab activities focused on the carbon cycle. All of the students had a reasonably good understanding of the roles photosynthesis and respiration play in the carbon cycle, even before we discussed them. Very few of them (only 21%) identified other important processes relevant to the carbon cycle. In the post-assessment, 94% of the students were able to identify additional processes and reservoirs in the carbon cycle. The students grasp the concept of a biogeochemical cycle, but as a class we don't delve into the details. **Result:** Target Met **Year This Assessment Occurred:** 2014-2015	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	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:** 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.		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
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 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.	04/10/2015 - Winter 2015. This quarter I attempted having students bring samples to lab throughout the quarter rather than having an end-of-quarter project. The downside to this approach is that students don't have enough familiarity with the major phyla to make good identifications. I found that they were much more careful and thorough in the original version for this project. I plan to return to the original version next time I teach the class, or will find a way to combine to the two approaches. **Result:** Target Not Met **Year This Assessment Occurred:** 2014-2015	
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		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
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).		
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 structure and function of important genetic molecules. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	**Assessment Method:** Embedded test questions, written and/or multiple choice. **Assessment Method Type:** Exam - Course Test/Quiz **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 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)) **Course-Level SLO Status:** Active	**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		
Department - Biology (BIOL) - BIOL 23 - INTRODUCTION TO BIOTECHNOLOGY - SLO 2 - Scientific Process - Students can	**Assessment Method:** Students are given multiple opportunities throughout the quarter to apply the scientific		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
apply the scientific method to study a question (Created By Department - Biotechnology (BTEC)) **Course-Level SLO Status:** Active	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 - 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).	04/20/2015 - For the question on homeostasis for the integumentary system 92% of the class were able to successfully answer this exam question on how the integumentary system contributes to homeostasis. [Bio 40A, Winter 2015, Lopez/ YR 14-15] **Result:** Target Met **Year This Assessment Occurred:** 2014-2015 **Resource Request:** Although target meet this topic would benefti from histology slides for skin tissue to request for labs and STEM center	
		01/21/2015 - For the questions on homeostasis for both the skeletal system and the integumentary system the class exceeded the goal of 80%. For the skeletal system 90% of the class was able to identify how this system contributes to homeostasis. For the integumentary system 97% of the class was able to identify how this system contributes to hemeostasis of the human body. MM-BIO40A-F14 **Result:** Target Met **Year This Assessment Occurred:** 2014-2015	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
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 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).	04/20/2015 - How changes in structure and function of bone tissue contributes to the disease state of osteoporosis was a question that was successfully answered by 78% of students. Results are just slightly under the target set at 80%. [Bio 40A, Winter 2015, Lopez: YR 2014-2015] **Result:** Target Not Met **Year This Assessment Occurred:** 2014-2015 **Resource Request:** One possible resource request would be histology slide showing osteoporosis or poster describing disease may be helpful for discussion in lab	
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			
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			

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
integumentary 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			
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			
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			
Department - Biology (BIOL) - BIOL 40B - HUMAN ANATOMY & PHYSIOLOGY II -	**Assessment Method:** Embedded question on an exam (Bio 40B).	04/09/2015 - For both systems the class was able to correctly identify how each system contributed	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
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 Type:** Exam - Course Test/Quiz **Target for Success:** 80% of the class will correctly answer the question on the exam (Bio 40B).	to homeostasis by a margin of 85%. (MM W15) **Result:** Target Met **Year This Assessment Occurred:** 2014-2015	
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)) **Start 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).	04/09/2015 - The class was able to correctly identify the importance of the structure/function relationship by a margin of 82%. MM W15 **Result:** Target Met **Year This Assessment Occurred:** 2014-2015	
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			
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			

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
cardiovascular 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			
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			
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).	10/12/2015 - 84% of the students were able to identify how the urinary system and the endocrine contribute to homeostasis (MM SP15 40C) **Result:** Target Met **Year This Assessment Occurred:** 2014-2015	
Department - Biology (BIOL) - BIOL 40C - HUMAN ANATOMY & PHYSIOLOGY III - SLO 2 - Structure and function - The student can identify the importance of structure/	**Assessment Method:** Embedded question on an exam (Bio 40C). **Assessment Method Type:** Exam - Course Test/Quiz	10/12/2015 - 87% of the students were able to identify how form and function are related and the importance of this relationship. (MM SP15 40C) **Result:**	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
function relationship. (Created By Department - Biology (BIOL)) **End Date:** 07/09/2015 **Course-Level SLO Status:** Inactive	**Target for Success:** 80% of the class will correctly answer the question on the exam (Bio 40C).	Target Met **Year This Assessment Occurred:** 2014-2015	
Department - Biology (BIOL) - BIOL 40C - HUMAN ANATOMY & PHYSIOLOGY III - 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			
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 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			
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			

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
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			
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 human body. (Created By Department - Biology (BIOL)) **Start Date:** 07/02/2015 **End Date:** 07/01/2019 **Course-Level SLO Status:** Active			
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			
Department - Biology (BIOL) - BIOL 41 - MICROBIOLOGY - SLO 1 - Disease	**Assessment Method:** Written and multiple-choice questions on		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
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	midterm and final exams **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of students will answer the test questions correctly		
	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 of Bacterial and viral infections - 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	10/19/2015 - SEC: Understanding the similarities and differences between prokaryotic pathogens, eukaryotic pathogens and viruses is one of the main ideas of microbiology as it informs our understanding of how pathogens work, how to control them in the environment, and how to treat them when they cause disease. This concept is assessed in many different ways throughout the quarter, including in-class discussions and activities (drawings, Venn diagrams, bluebook questions), homework assignments (cell structure and function, eukaryotic pathogens, viruses), lab assignments and post-lab questions (gram staining lab, eukaryotic pathogens lab), and exam questions. On the final exam, students are asked to compare and contrast between the structure,	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		genetics and treatment of Rhinovirus (ssRNA virus), Toxoplasma gondii (protozoa) and E. coli (bacteria). Of the 41 students taking the final exam in Spring 2015, 87.8% (36 students) earned 80% or more of the points on this exam question and all but one student earned at least 50% of the points. This demonstrated that most students were able to explain the similarities and differences between bacterial, viral and eukaryotic pathogens in terms of structure, genetics and treatment targets. A very common and very hard to change misconception amongst students is that antibiotics are effective at treating both bacterial and viral infections. One of the questions I ask my students as they walk in the door on the first day is "Antibiotics are most likely to be effective in the treatment of infections caused by (choose all that apply): bacteria, viruses, parasitic worms, lice and ticks, or prions." For the Spring 2015 class, 50% of students answered this question correctly at the beginning of the quarter with the most common misconception being that antibiotics effectively treat viruses. By the end of the quarter, when asked that same question again, 90% of students knew that viruses could not be treated with antibiotics. I will continue to emphasize the importance of the similarities and differences of these three classes of pathogens and the impact on drug development and treatment with my students through a wide variety of activities and assessments. **Result:** Target Met **Year This Assessment Occurred:** 2014-2015	
		09/23/2015 - AE: In my Micro course, I do many assessments to be sure the students truly understand the important differences between these types of microbes and how they are treated if you become infected. These include in class and HW activities in which they practice the	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		material multiple times throughout the course. At the end of the course, I ask a written question on the final for which they must draw a bacterium, virus and yeast cell and compare/contrast their structures and functions. Of the 36 students who took the final, 58% got the question at least 80% correct. Since it is a written question, there is partial credit. These students have a firm grasp of the differences between the 3 groups. 25% of the class earned between 50-79% of the points for this question; these students had at least some of the big picture components of the differences, but often were unable to discuss the similarities with as much clarity. Lastly, 17% of the class earned less than 50% of the points on this question. These data indicate that I should spend even more time with the compare/contrast activities I do in class- I've used Venn diagrams as well as multiple drawings, but plan to increase the time I spend reinforcing these ideas. As for the part of the SLO that addresses medications used to treat infections of these microbes, I asked a group of 9 multiple-choice questions on the final exam related to structures targeted in various groups of microbes. Overall, 72% of the questions were answered correctly. There were 2 questions in the group that more students missed (14, 16 missed of 36) that brought the % down quite drastically. I have already spent time rewording those questions to make sure they are really clear and I also plan to review the concepts in those questions more thoroughly with my students in future quarters. Since I am shooting for 80% of students to come away with the concepts addressed by this SLO, unfortunately that target wasn't met for my course in Spring of 2015. Hopefully, with the steps discussed above, the Fall 2015 class will meet the 80% goal. **Result:** Target Not Met **Year This Assessment Occurred:** 2014-2015	

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	**Assessment Method:** Students participate in a quarter-long written analysis project where they analyze their		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
- Upon successful completion of the course, students will be able to utilize dietary analysis software to analyze current dietary intake and subsequently make suggestions for appropriate dietary modifications, and explain the rationale for these recommendations. (Created By Department - Biology (BIOL)) **Course-Level SLO Status:** Active	own five-day intake. Weekly written assignments prompt them to make appropriate suggestions to modify their intake to reduce their risk for diet-related 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		
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		
	Assessment Method: Short (three to five) question clicker quiz given at the very beginning of each class. Questions test understanding of basic		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	biology concepts relevant to the discussion topic that week. **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		
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:** 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 the students will receive a 70% or		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	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.	08/01/2015 - Data was collected over three quarters, a total of 85 students participated in both an in-class activity centered around reading nutrition labels and a short in class quiz over the material, given in the following class meeting. Of 85, 81 students demonstrated the ability to interpret labels, were able to do calculations based on the information and apply it to specific situations and make decisions. 4 students had difficulty completing all the calculations as requested by the assignment, but were able to make informed choices after help was given. 95% grasped the concept after the initial activity, and after reviewing the quiz questions in small groups the other 5% were also competent in this area. **Result:** Target Met **Year This Assessment Occurred:** 2014-2015	
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		
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	**Assessment Method:** Students complete a self-dietary analysis and make written recommendations for		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
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	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 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	12/10/2015 - The students did an excellent job. While they need some better presentation skills, the fine-tuning I have done with the assignment to improve the collection and development of the presentations, their actual presentations could improve. An interesting theme this time is that the students really really made connections to their own behaviors and several of the students found deeply personal connections to the topic they researched and presented. **Result:** Target Met **Year This Assessment Occurred:** 2014-2015 **Resource Request:** None **Resource Request:** None **GE/IL-SLO Reflection:** Communication: Students do a great job communicating information to the class. Because I have structured the project so that they students have to plan very clearly what they want to share, (they have to take all of their research, done using an annotated bibliography and boil it down to 1-2 pages of major points) they are able to limit themselves to the points they feel are most important.	12/10/2015 - To continue the improvement of the presentations, I will restructure the assignment slightly to have the students really, more strongly take a position and argue for it, rather than just presenting information. I I would also require a preview of their presentations a week ahead of time with additional points provided if they "fix" the issues with their presentations.

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	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		
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:**	**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		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Active	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 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.	12/10/2015 - The students continue to do very well on this project. They generally provide great arguments for why they chose the species they did. **Result:** Target Met **Year This Assessment Occurred:** 2014-2015 **Resource Request:** None **GE/IL-SLO Reflection:** Communication- Students have to communicate in three ways for this assignment - one is to present a written report to their colleagues (the other students) and a verbal version of the major threats and solutions and finally their last written argument as to which of the 18 species best deserve funding. Critical Thinking- Students do critically apply and construct arguments to defend their choices. I really like this assignment.	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Department - Biology (BIOL) - BIOL 9L - ENVIRONMENTAL BIOLOGY LABORATORY - SLO 2 - Scientific Process - Students will demonstrate proficiency in 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 Method:** Over the course, students will be taught standard environmental sampling techniques for water quality and biodiversity 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 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.	03/16/2012 - In phrasing a question, students were able to correctly identify the variables (independent vs. dependent) 89% of the time. 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	05/25/2012 - As students in Biol1A are just starting their scientific educational careers, it is reasonable 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 design and conduct an experiment on plant nutrition and		

PL-SLOs	Means of Assessment & Target / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	orally present their results. **Assessment Method Type:** Class/Lab Project		
	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 results in a clear manner and how to state hypotheses clearly. **Result:** Target Met **Year This Assessment Occurred:** 2011-2012	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 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

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		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.	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.
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 **SLO Status:** Active	**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 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	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 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	

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		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.	