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COMPLETE

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Page 1: I. Program Overview and Update

**Q1** Department(s) Reviewed:

Biology

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**Q2** Lead Author and Participants: Please list any person who participated in the preparation of this report.

Kathryn Nette (lead)  
Fabienne Bouton, Richard Jimenez, Michelle Garcia, Kim Dudzik, Christina Burnett

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**Q3** Dean/Manager:

Pam Kersey

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**Q4 Program Update:** Please summarize the changes, additions, and achievements that have occurred in your program since your last program review was submitted. To access your 2019 program review, visit the Program Review webpage.

The major changes this year were the addition of a full-time anatomy instructor and the semi-completion of the new Biology lab behind the H building. These additions allowed us to add some additional Bio 131 and Bio 140 classes to the schedule. The new lab behind the H building was "completed" in the last few days before the semester started. There are things that are missing and still need to be finished, but we are running 10 sections of Bio 131 in the new lab, and now have increased to 8 sections of anatomy in the labs in the H building.

Much of the work to support student equity in biology is happening through the HSI-STEM grant. For example, Biology 130 is being redeveloped to be a thematic, project centered course that will have many more active learning projects designed to help engage students in the work. The success rates for this course, which has the greatest enrollment in the department, have ranged from 55-73%, with no obvious pattern to success each semester. We know that there are several obvious issues with this course including 1) that all sections are run with 50 or more students, making it extremely difficult for the instructor to spend quality time with each student in the class 2) all of the faculty teaching the course are part-time, and there is a lot of turnover each semester; we have a very difficult time replacing faculty each semester, and usually end up hiring faculty with little or no teaching experience. Our location in east county works against us, as faculty from UCSD and SDSU find it extremely inconvenient to travel to east county to teach a class, and so typically only stay with us a semester or two before giving up and finding other positions at more centrally located campuses. Thus, most of the faculty teaching this course have less than 4 semesters of teaching experience and 3) students in this class are extremely reluctant to take advantage of the tutoring services that are offered through the college.

We are working to address issues 1 & 3 by embedding learning assistants in some of the Bio 130 classrooms to work with the instructors; our internal data from Fall 2019 has showed that students will seek out more assistance from learning assistants when they know who they are and can talk with them specifically, rather than going to tutoring to a random person that they do not know. In addition, the embedded learning assistants know exactly what is happening in the classroom, and so can be consistent with information that they tell the students in workshops. In Spring 2019, attendance of Bio 130 students at workshops was limited to 2 students out of a total of 107; in Fall 2019, where learning assistants who were embedded in three of the Bio 130 sections, a total of 183 Bio 130 students participated in workshops (versus two out of 107 the prior semester) out of a total of 233 attending. And, of the 183 who attended a workshop, 84.7% of them came from the sections with a learning assistant embedded. We are working to obtain data about the students who attended the workshops to examine the demographics of the students who attended the workshops and whether they had greater success rates than the Bio 130 students as a whole. We are continuing to gather additional data about this system in Spring 2020.

SCI 100 is another course that we continue to develop that supports Biology students. This course which addresses development of basic skills for STEM has been offered 4 semesters now, and students are just now starting to reach the point where they will be completing their programs. We are seeing students who took SCI 100 entering capstone classes, and we are working to start gathering data to determine whether the students who take this class are overall more successful than those who do not. We were prevented from running SCI 100 in Fall 2019 because the enrollment was a little low and despite the fact that running this class is a requirement of the grant for which we receive \$1.2 million per year.

We have received significant data regarding the results of the HSI-STEM grant for the first 2 years. Students who are part of our cohort of students (including all STEM majors) were retained >95% of the time versus approximately 88 % for the comparison group. The cohort students had > 90% success in their courses versus 74% in the comparison group. Fall to Spring persistence was 100% for the cohort group, versus 74% for the comparison group. Cohort students attempted approximately 26% more units than non-cohort, and successfully completed 40% more units than non-cohort students. GPAs for cohort students were approximately 3.05 on average, versus 2.76 for non-cohort. The overall data suggests that the student interventions supported by the grant, including STEM counselors, faculty mentors, SCI-100, a STEM community area, workshops, and other support systems are having a significant difference on the success of those students and could have equally as much difference on our overall student population when scaled up.

Page 2: II. Assessment and Student Achievement

**Q5** 1. Do you have a course Student Learning Outcome (SLO) assessment plan on file with the Student Learning Outcome and Assessment Committee (SLOAC)? If you have not already done so, you can submit your program's assessment plan to SLO Coordinator, Tania Jabour, at [tania.jabour@gccd.edu](mailto:tania.jabour@gccd.edu). **No**

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**Q6** OPTIONAL: You may upload a copy of your SLO assessment plan for SLOAC here. If you have an Excel sheet, please convert to one of the supported files listed below before submission. **Respondent skipped this question**

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**Q7 2.** Please provide an analysis of your Student Learning Outcomes (SLO) findings and what changes, if any, were made as a result.

As in previous years, we continue to have a meeting during staff development week every spring and fall semester to discuss the results of SLO analysis from the previous semester and plan for the upcoming semester. One thing we noticed is that a lot of the data from the last year that was submitted for uploading to Trac Dat is missing and does not appear to have been uploaded and so it appears that we did not do the SLO assessments although we did; It is not clear why this is the case.

#### Bio 122 The Secret Life of Plants

SLO 1 was assessed in Fall 2019 utilizing a Scientific Inquiry Lab that spans a week and a half. This interactive assignment was successful with 29 out of 33 passing (87.9%) the SLO. SLO2 was scheduled to be assessed this semester; however, the assessment and activity requires the plant environmental growth chamber requested so SLO 4 will be assessed instead.

#### Bio 130 General Biology

As a part of our HSI-STEM grant project, we have been reworking the curriculum for Bio 130 bringing it to a more active learning mode that should increase student success. This has been an extensive project that is still in progress and will likely take several more years to complete. As a part of this project, the SLOs for the course were rewritten last year, but after moving forward with the rework of the course, we are not happy with the new SLO's and are in the process of reworking them again. Once that is complete, we will begin another round of assessment.

Looking at the success and retention rates in Bio 130 from the past five years, there has been little change in the overall success rates. There is an equity gap in the success rates of African American and Hispanic students in Bio 130, and we are hoping that the interventions previously described for the course will help to close that gap.

#### Bio 131 General Biology Lab

All of the SLOs in this course have been assessed and the course is scheduled to be reworked as a part of the HSI-STEM grant.

#### Bio 133 Ethnoecology

This course was run as a hybrid course for the first time in Fall 2019. Three SLO out of 9 were assessed. It was determined that five of the SLO (1, 2, 3, 4, and 9) are redundant and should be re-written as one SLO. These were assessed by a multiple part research project over two months. All of the students passed the 5 SLOs. The plan is to rewrite the SLOs to be less cumbersome to assess and eliminate the redundancy. The research project was successful in student learning and this progress and development was tracked over two months.

#### Bio 134 Ethnobotany

All SLO have been assessed previously. No assessment was done Spring 2019. Assessments and evaluation of SLO are scheduled for Spring 2020. Course is only offered in the Spring.

#### Bio 135 Lab in Ethnobotany and Ethnoecology

All SLO have been assessed previously. No assessment was done Spring 2019. Assessments and evaluation of SLO are scheduled for Spring 2020. Course is only offered in the Spring.

#### Bio 140 Human Anatomy

In Fall 2019, 4 sections of Bio 140 were assessed for SLO 1, 2, 5, and 6 using a case study integrating the muscular and nervous systems. Criteria for success was 70% or above of students will be able to pass the SLOs with a grade of C (70%) or higher.

In one section 23 students were assessed, and the success rate was 87%. In the second section, 16 students were assessed and the success rate was 81%. In the third section, 14 students were assessed and the success rate was 92%. In the last section, 18 students were assessed and the success rate was 83%.

This was the first time a case study was used to assess multiple SLOs. This was a great opportunity for students to work in groups of three to discuss and explore the interrelationship between two organ systems (muscular and nervous systems). Students were asked

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to answer six questions in the form of short answers and answers were detailed and thorough. This method of assessment included collaboration, analytical analysis of the case details and writing composition.

SLO 3 was assessed Spring 2019 and all students met the passing criteria.

Plan for Spring 2020 is to assess SLO 4 in four anatomy sections using a similar case study approach but focusing on the cardiovascular system, more specifically Patent Ductus arteriosus (PDA).

### Biology 141 Human Physiology

SLO Review for Bio 141: Human Physiology

All SLO's were assessed by Fall 2018 and all students met the passing criteria.

No assessment needed for Spring 2020.

SLO Review for Bio 141L: Human Physiology Lab

All SLO's were assessed by Fall 2018 and all students met the passing criteria.

No assessment needed for Spring 2020.

### Bio 152 Microbiology

Two SLO's were assessed in Fall 2019; SLO 1 & SLO 3. SLO 1 was assessed via a project that required students to use a variety of methods described in the SLO to identify an unknown organism. After the project was complete, 22 of 23 students were able to successfully meet the SLO. The one student that did not had missed class on many occasions, and did not turn in work even when given opportunities to turn in work late. Consequently, we concluded that the assignments leading to the final assessment were adequate to allow students to meet the outcome.

SLO 3 was designed to have students learn to do research about infectious diseases and to present that information to peers or the general population either as a presentation or poster, two common ways in which information is communicated in STEM. 100% of the students in the course met the SLO at 70% or greater.

Based on the assessment of these SLOs no curriculum changes are planned at this time.

### Bio 230 Cell & Molecular Biology

A new round of assessments were started in Fall 2019. SLO #2 was assessed 81% of students in the class met the 70% criteria for the SLO. This was assessed by looking at the overall lab report grades for the lab exercises. We will continue to work on development of writing and reading skills for students in this class.

### Bio 240 Organismal Biology

An Acid Soils inquiry lab was used to assess SLO1. This was a very successful activity with all of the students passing. However, it was clear that this SLO should be woven into many more assignments throughout the semester.

Other SLO assessments that were to be developed as interactive learning activities are not yet complete. We are waiting on backordered models to develop these activities/labs. The plant environmental chamber that is being requested this year is also critical to the implementation of more active learning activities for students to understand plant life cycles and develop projects based on these cycles. We also need new and updated animal specimens because the ones that we have are so old they are disintegrating. A request for these materials is included in this report. This type of learning unitizing the tools of scientific inquiry will benefit both student engagement and deeper understanding of the material. We are hung up waiting on new updated equipment, specimen and materials.

### Bio 251 Human Dissection

In Spring 2016, SLO's 1, 3, 5, 6, and 7 were assessed and all students met the passing criteria.

In Spring 2017, SLO's 2 and 4 were assessed and all students met the passing criteria.

In Spring 2020, SLO's 1, 3, 5, 6, and 7 will be assessed.

**Q8** 3. Does your department or discipline offer any degrees and/or certificates? **Yes**

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Page 3: II. Assessment and Student Achievement

**Q9** 4. How are you currently assessing your PLOs?

Right now we have stopped assessing them until it is determined how they are going to be rewritten. We are part of the new college-wide program that is looking at the development of PLOs that align with the new ACPs. We continue working with the SLO coordinator and this program to come to a consensus of what the PLOs should look like for Biology in conjunction with the PLOs for the other sciences in the ACPs, particularly chemistry and physics which are courses that are required for our Biology majors. Once the new ACP based system for PLOs is in place, we will look at assessment of them. Regarding the next set of questions in this report, the PLOs that are presently in the catalog do in fact reflect current learning objectives, and we did have the SLOs and PLOs mapped in the past, but with all of the changes that are currently in progress, we will need to update all of the mapping once the new PLOs are completed.

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**Q10** 5. Are your PLOs in the catalog an accurate reflection of the department or discipline's current learning objectives? To access the College Catalog Associate Degree Programs and Certificates section, click here. **Yes**

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**Q11** 6. Are the PLOs mapped onto the course SLOs? If you require assistance, please contact Madison Harding in the IESE Office at madison.harding@gcccd.edu **No**

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Page 4: II. Assessment and Student Achievement

**Q12** Referencing the last 5 years of data, discuss the changes in course success rate since the last program review (annual or comprehensive) report.

Overall, the overall course success rate for biology over the past 5 years has remained relatively flat. There is definitely semester to semester variation in different courses, but looking at averages does not reflect those types of variations. The overall success rate across all of biology has randomly floated between 65%-75%. Some of the smaller classes, such as the Human Dissection and Ethno courses tend to have higher success rates, while the core biology courses which serve a larger and broader population of students have lower success rates. Courses that have multiple prerequisites (Bio 152, Bio 230, Bio 240) and smaller class sizes, have overall have higher success rate, most likely because students in these courses have already made it through a series of difficult prerequisites. Courses that are lab only (Bio 131, Bio 141L) have a higher success rate, but are also smaller classes where students receive more individual attention in contrast to the lecture components which are classes of 50+ students. Since there is no statistical information available, it is difficult to tell whether small percentage differences (1-2%) are statistically significant ( Our external grant evaluators have indicated that they probably are not). Success rates in Bio 130 have remained relatively flat since 2014. The only exception is our Bio 130 summer course where we have been experimenting with active learning and problem/project based curriculum changes. With the same faculty member teaching this section of the course since 2014, we have the ability to actually compare the differences in those classes and remove the differences based on instructor and different curriculum except for that which has been designed in. What we have seen is that by using more active learning, and adding problem based learning, we have seen increases in success over the past 3 years; Success rates over the past 3 years when the new strategies were implemented averaged 81.5% while the three previous years had an average of 65.3%. This shows a greater than 15% increase in students success for those classes. The summer course is run over 6 weeks versus the 17 weeks in the regular semester, and the content covered did not change over the 6 year period. This tells us that it is possible to increase the success rates, but that 1) an active learning strategy, and 2) having an instructor with many years of experience may both result in significant increases in success.

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**Q13** Considering the college's 2024 goal of increasing course success rates to 77%, discuss how your department/discipline will help meet that goal.

In the past 3 years, we have been working toward more active learning based curriculum which national research has shown may have an impact on student success and retention in STEM. It has been very difficult for us to design a valid study of exactly what impacts student success the most because most of our courses are taught by PT faculty who are typically here for 1-2 years at the most before they move on to other districts that pay better and are in more convenient locations. We spend time working with them on active learning strategies, including those like Reading Apprenticeship that will increase the reading and critical thinking skills of students. Bio 130, the course that enrolls the most students every semester (2000-3000 students), is taught by a constantly changing group of PT faculty, most of whom come into the course with no prior teaching experience. It is extremely difficult to find PT faculty, not only at Cuyamaca but in colleges all over the county. So as soon as a PT faculty gains some experience, they are immediately targeted for hiring by other districts. So as we look at the success rates in that course, they tend to be random as there are few faculty (2) who have taught the course more than once or twice.

We are continuing to implement these new strategies across the department. In Bio 130, we are this semester testing an updated curriculum supported by the HSI-STEM grant that will be used in 8 sections of Bio 130. The curriculum contains many active learning components similar or identical to the ones used in the Bio 130 summer sessions the last 3 years that resulted in significant increases in student success. In addition, we will be making significant curriculum changes in Bio 240 as soon as the back ordered materials arrive and if the materials requested this year are funded. Bio 140 (anatomy) is making curriculum changes that are more problem oriented to help better engage students and improve student success.

**Q14** Please describe any equity gaps, in which specific groups (e.g., by gender and ethnicity) have success rates lower than that of the department or discipline overall.

We have the classic equity gaps that the whole college and in fact the nation has; success rates of the African American population in biology is around 56% compared to the college success rate of 61%, and the success rate of Hispanic students in biology is around 63.4% compared to the overall college success rate of 68%. This is a problem nationally, and the recommended ways to close those gaps are the ones that have been described in this document including active learning strategies and support of students.

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**Q15** What department/discipline (or institutional) factors may be contributing to these lower success rates for these groups of students?

The reality is that these lower success rates in STEM are a national problem, not limited to our college or department. Much research has been done by the National Science Foundation and other national STEM organizations that has show that the groups where we have equity gaps are the same ones that are seen nationally. Nationally, there is also a gender gap, with fewer women entering STEM fields, but we do not seem to have that problem at Cuyamaca.

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**Q16** What specific steps will the department of discipline take to address these equity gaps in the 2020/21 academic year?

We will continue working to increase the number of students enrolled in SCI 100 in order to better prepare those students who have weaker skills in reading, writing, and critical thinking. This is going to take the help of our counseling department who will need to direct those students to take the course. Although we have STEM counselors, the majority of STEM students still go to general counseling where they are not necessarily given the most up to date information about our curriculum and courses. The department chair has been working with the counseling department to try to spread the word about these courses and will continue to do so.

We are continuing to work with faculty to develop more active learning strategies for the classroom, while ensuring that the course content still meets articulation standards. This is a significant challenge since the change to active learning strategies often requires more time in in the classroom, and more time for students to do their own reading out of the classroom. Hence. we are continuing our programs for Reading Apprenticeship that occur on a monthly basis and expanding the number of exercises in the classroom that help support reading. We will continue developing our authentic research lab exercises as suggested through national STEM organizations. We are spending more time working with new, inexperienced instructors, and working to provide them a well-established curriculum package (Bio 130, SCI 100) that will support their early teaching with many active teaching and learning strategies. There are also plans to continue to revamp Bio 240 and Bio 140 with new materials and activities that will be focused on active learning strategies.

We also are continuing to build more situations where students can learn more about careers early in their arrival at the college. With the new career center opening soon, we plan to work with the counselors and staff there to further expand the programs that we have developed over the last 3 years as a part of our grant program.

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**Q17** How do these steps inform the long-term department or discipline goals that you are setting in this annual program review?

All of the goals that we have in this annual review are addressing students success and equity.

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**Q18** In what way does your department/discipline work across instruction and student services to advance the college's student success & equity goals?

Because of our HSI-STEM grant, we have two part-time STEM counselors in our area who are in constant contact with many of our STEM students. In addition to individual counseling appointments, these counselors hold many events during the semester to ensure that students are able to complete their programs in a timely manner. Because of these meetings, for example, the counselors have indicated that the HSI-STEM students attain 30% more degrees than the average student at the college. In addition, the biology department chair is the instructional representative on SSLAT, which helps us to maintain contact and bounce ideas of how to better communication between the two groups. Biology has also been represented for all of this student success day programs each year.

**Q19** OPTIONAL: If you would like to attach any charts or additional documentation (aside from the program review report prepared by the IESE Office), please upload it using the button below.

**PR Data Summary 2020 2021.docx (34KB)**

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Page 5: II. Assessment and Student Achievement

**Q20** Do you offer distance education (online) courses? **No**

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**Q21** Are there differences in success rates for distance education (online) versus in-person sections? **Respondent skipped this question**

**Q22** If there are differences in success rates for distance education (online) versus in-person sections, what will the discipline or department do to address these disparities? **Respondent skipped this question**

**Q23** What mechanisms are in place to ensure regular and effective contact within online courses across the discipline or department? **Respondent skipped this question**

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Page 7: III. Previous Goals: Update (If Applicable)

**Q24** Would you like to provide an update for your previous program review goal(s)? **Yes**

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Page 8: III. Previous Goals: Update (If Applicable) continued

**Q25** Previous Goal 1:

Plan for Development of CC Nature Preserve

**Q26** Which College Strategic Goal does this department goal most directly support? **Student Validation and Engagement**

**Q27** Please describe how this goal advances the college strategic goal identified above.

The goal of this activity is to develop a plan for the development of the Cuyamaca Nature Preserve as a teaching and community resource. The development plan has shifted in scope to start with a more obtainable short-term goal. Part of this plan will be for the development of the preserve as an outreach site for utilizing Native American land management techniques to support three courses that are science requirements for the Kumeyaay Studies degree (Bio 133, Bio 134, Bio 135). The goal is to act as a potential gathering site and learning laboratory to study both modern and traditional land management strategies. Biodiversity analyses can be performed and utilized by multiple classes, allowing students to assist in the development of a restoration plan for the restoration and maintenance of the preserve. However, entry points into the preserve are overrun with invasive plants making it difficult for groups to enter. At this point, the preserve needs invasive plant removal that is beyond the scope of volunteer student activity, as has been done and organized by Biology faculty in the past. Without the removal of these invasive species, a more comprehensive plan of preserve development is not possible. The administration has shown some initial interest in fire mitigation by gathering information from biology faculty, meeting with the fire marshal and putting a call out to gather bids aimed to remove large stands of invasive plants in the riparian areas, and to trim and maintain native plants where the preserve meets service roads and buildings. While this is a good start, more work will need to be done in the heart of the preserve, which opens an incredible opportunity for students to assist in the development and implementation of a Cuyamaca College Nature Preserve Restoration and Maintenance Plan. We have had discussions for many years about developing this resource, but the lack of resources prevents moving past discussion phase. At this point development of a plan is not possible without the immediate removal of invasive species. Invasive plants currently dominate the 3-acres of land that were damaged by thirty years of dirt bike jumps on the site, an area beyond the current site being considered by the administration. Vegetation removal and restoration is essential to the well-being of this habitat and requires a commitment from the college. Biology faculty with the help of Grounds staff and student volunteers worked on battling the invasive species for years, but at this point it is out of control and needs proper funding and commitment from the college. After the removal of invasive species, a traditional land management strategy in restoration of the preserve will both strengthen our relationship with the Kumeyaay Community College at Sycuan and provide research opportunities for our students in both Biology and Kumeyaay Studies. In development of the preserve as a learning laboratory and as a resource for the college and community, points that we need to take into consideration include: "Locations of trails and trailheads on the property: For easy access to school and community groups to access the preserve and stay on trails to prevent unintended destruction of the surrounding ecology;" Construction and maintenance of trails: many of the trails are rutted out from soil erosion, making it difficult for people to stay on trails, the local fire department in the past has used the trails for training and keeping local fire fighters interested in the area is a win for us; conversations between biology and athletics faculty have identified the desire for athletics to utilize trails for training and possible future running events " Placement of benches and other movable improvements to provide resting or meditation places for employees or visitors: during a 2016 sabbatical project in the preserve, the faculty member observed students and residents from the condos on the north end sitting the preserve, apparently meditating;" Continuous general maintenance of the preserve: CA Department of Fish and Wildlife has expressed the need for continuous prevention of invasive species spreading; " Signage for the preserve location and trails: During a sabbatical project conducted by a faculty member in 2016, it was apparent through interactions with several people from the community that use the preserve for hiking and biking, that they didn't know the land was part of Cuyamaca College. Signage is important to remind people they are on college property, to communicate tips to respect the preserve by staying on trails and to pick up after their dogs, and to warn of possible rattlesnake encounters; Location of a visitor's center (the A building rooms A109 & A 112) for the preserve: this will provide a centralized self-education center for students, employees, and community members, along with ways to enhance relationships between the college and the local community via the preserve; and ways to integrate the preserve into the curriculum of the college both within science disciplines and outside of science disciplines. This would include staffing with docents

**Q28** Goal Status

**In Progress - will carry this goal forward into next year**

**Q29** Please describe the results or explain the reason for deletion/completion of the goal: **Respondent skipped this question**

**Q30** Do you have another goal to update? **Respondent skipped this question**

Page 10: III. Previous Goals: Update (If Applicable) continued

**Q31** Please describe action steps for the year:

We were unable to move forward on this goal in the past year because the faculty member who wants to do it was elected academic senate president and has not been able to move forward with the work. The intention is to carry this goal forward and work on it once she comes back to the department for the fall. Hence, the goals are the same as they were last year. For the sciences, the preserve is a living laboratory that can be utilized to provide opportunities to our students to do real research projects that will contribute to their knowledge and understanding of scientific endeavors. Research has shown that student engagement in real research projects is one of the best ways of maintaining student persistence and completion. For our Kumeyaay students, while taking care of this land is a responsibility, not taking care of it dishonors their ancestors. What better way to engage a highly underrepresented population in the sciences than for them to utilize both modern and traditional strategies to plan for the proper care and maintenance of the land of their ancestors? Example activities for other science classes, not limited to biology, chemistry, geology, and geography:" Students use GPS to determine the ratio of non- native plant areas to native areas. GPS will calculate size of the area. Area can be compared across years, especially after eradication efforts to assess success of these efforts. Recorded data will be on file to access if and when Department of CA Fish and Wildlife ask about progress of restoration and maintenance. Students learn the use of a common piece of field biology equipment, the GPS, and how to store and analyze data acquired from it." Johnny Appleseed Days: During rainy season, students go out and pull mustard plants, which is relatively easy to do a few days after a rain. Immediately after removing the mustard, students drop native seeds into the hole. The above monitoring system can check success of this activity over time. " Students hike along existing pathways, each taking a different path, while holding the GPS. GPS will track movement patterns, and data can be downloaded to Google Earth. Hiking trails will, therefore, be mapped and can be printed out as a guide to anyone interested in accessing the preserve. Activities for learning ecological principles:" Conduct bimonthly or monthly Cuyamaca Bird Watch days. Students and interested employees will first be introduced to how to use identification guidebooks and apps for smart phones. With binoculars in hand, we identify bird species in the field, and record their location with GPS. Any nests can also be recorded during breeding season. This information can be downloaded to a database that students can later analyze for distribution of species across habitat type and over different seasons. Also, pictures can be taken and loaded to an online Citizen Science site called iNaturalist where biodiversity and differences in species composition can be compared across San Diego County." Student project in the majors biology class Bio 240: students work in groups to collect and/or identify plants, insects, and vertebrates.Using the library resources, they determine how each of these organisms are connected to one another, building an ecological web.Students learn ecological principles on how species are connected to one another, and the importance of biodiversity. The information gathered can be used to further our understanding of the specifics of the natural processes of our preserve." Tree Frog Project Reboot: Students go to riparian area to capture and swab tree frogs, following a detailed protocol. Through either an independent lab project, or a lab conducted in Bio 230, students run material collected on swabs through PCR to determine if our frogs have the deadly chytrid fungus that is causing the demise of numerous frog species around the world. Information can be analyzed and submitted to local frog researchers at the San Diego Natural History Museum and/or the San Diego Zoo's Save the Frog initiative. In addition, it is possible to invite a wide variety of different disciplines on campus to engage in a movement to incorporate natural sciences into their curriculum. Over and over, research has shown that contact with nature can help improve mental health, and stimulate creativity and learning. The incorporation of this unusual and valuable resource into our way of thinking across the college will provide huge benefits to the college community as a whole

**Q32** How will this goal be evaluated?

This goal will be evaluated based upon the completion of the activities listed the the previous section.

**Q33** Do you have another goal to update? **Yes**

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Page 11: III. Previous Goals: Update (If Applicable) continued

**Q34** Previous Goal 2:

Continue to Meet Expectations for HSI-STEM grant

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**Q35** Which College Strategic Goal does this department goal most directly support? **Guided Student Pathways**

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**Q36** Please describe how this goal advances the college strategic goal identified above.

This grant includes Guided Pathways as part of the core work of the grant. We are in year 4 of a 5 year grant. and we are continuing to build the student cohort as much as possible addressing those populations that show equity gaps in our success data. The grant supports continuation of the development of active learning curriculum for gateway courses, additional teaching and learning support for faculty, and additional testing and modification of new curriculum that is being designed to support those students who have success rates that are lower than the department average.

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**Q37** Goal Status **In Progress-will carry this goal forward into next year**

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Page 12: III. Previous Goals: Update (If Applicable) continued

**Q38** Please describe the results or explain the reason for deletion/completion of the goal: **Respondent skipped this question**

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**Q39** Do you have another goal to update? **Respondent skipped this question**

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Page 13: III. Previous Goals: Update (If Applicable) continued

**Q40** Please describe action steps for the year:

- 1) Continuation of the development of active learning curriculum for gateway courses including Bio 130, Bio 131 & SCI 100.
  - 2) Additional teaching and learning support for faculty,
  - 3) additional testing and modification of new curriculum that is being designed to support those students who have success rates that are lower than the department average.
  - 4) development of additional training for faculty
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**Q41** How will this goal be evaluated?

There are extensive evaluation protocols that are part of the grant that must be followed; these data are collated and evaluated by our external evaluation group and then are submitted to the Department of Education in our quarterly and yearly reports.

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**Q42** Do you have another goal to update? **No**

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Page 14: III. Previous Goals: Update (If Applicable) continued

**Q43** Previous Goal 3: **Respondent skipped this question**

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**Q44** Which College Strategic Goal does this department goal most directly support? **Respondent skipped this question**

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**Q45** Please describe how this goal advances the college strategic goal identified above. **Respondent skipped this question**

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**Q46** Goal Status **Respondent skipped this question**

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Page 15: III. Previous Goals: Update (If Applicable) continued

**Q47** Please describe the results or explain the reason for deletion/completion of the goal: **Respondent skipped this question**

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**Q48** Do you have another goal to update? **Respondent skipped this question**

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Page 16: III. Previous Goals: Update (If Applicable) continued

**Q49** Please describe action steps for the year: **Respondent skipped this question**

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**Q50** How will this goal be evaluated? **Respondent skipped this question**

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**Q51** Do you have another goal to update? **Respondent skipped this question**

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Page 17: III. Previous Goals: Update (If Applicable) continued

**Q52** Previous Goal 4: **Respondent skipped this question**

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**Q53** Which College Strategic Goal does this department goal most directly support? **Respondent skipped this question**

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**Q54** Please describe how this goal advances the college strategic goal identified above. **Respondent skipped this question**

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**Q55** Goal Status

Respondent skipped this question

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Page 18: III. Previous Goals: Update (If Applicable) continued

**Q56** Please describe the results or explain the reason for deletion/completion of the goal:

Respondent skipped this question

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**Q57** Do you have another goal to update?

Respondent skipped this question

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Page 19: III. Previous Goals: Update (If Applicable) continued

**Q58** Please describe action steps for the year:

Respondent skipped this question

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**Q59** How will this goal be evaluated?

Respondent skipped this question

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**Q60** Do you have another goal to update?

Respondent skipped this question

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Page 20: III. Previous Goals: Update (If Applicable) continued

**Q61** Previous Goal 5:

Respondent skipped this question

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**Q62** Which College Strategic Goal does this department goal most directly support?

Respondent skipped this question

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**Q63** Please describe how this goal advances the college strategic goal identified above.

Respondent skipped this question

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**Q64** Goal Status

Respondent skipped this question

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Page 21: Copy of page: III. Previous Goals: Update (If Applicable) continued

**Q65** Please describe the results or explain the reason for deletion/completion of the goal:

Respondent skipped this question

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Page 22: Copy of page: III. Previous Goals: Update (If Applicable) continued

**Q66** Please describe action steps for the year:

Respondent skipped this question

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**Q67** How will this goal be evaluated?

Respondent skipped this question

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Page 23: IV. New Goals (If Applicable)

**Q68** Would you like to propose any new goal(s)? **Yes**

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Page 24: IV. New Goals (If Applicable) continued

**Q69** New Goal 1:

Develop new active learning curriculum for Bio 240.

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**Q70** Which College Strategic Goal does this department goal most directly support? **Guided Student Pathways**

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**Q71** Please describe how this goal advances the college strategic goal(s) identified above.

Bio 240 is one of the core biology courses for the Biology transfer pathways to UCSD and SDSU. This course is a challenging one for students, and has traditionally been predominantly a lecture course over the years. Students must pass this course in order to transfer.

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**Q72** Please indicate how this goal was informed by SLO (student learning outcome) assessment results, PLO (program learning outcome) assessment results, student achievement data, or other data:

Currently the evolution and identification of 8 different animal phyla is very difficult for students to understand. This critical need was clear when assessing SLO data. The instructors for this course discussed solutions to this critical need for our students. One of the biggest impediments to the student's understanding is old materials that are impossible to identify. Being able to visually see and compare different animal groups from sponges to sea stars major will give our students the ability to fully understand the concept of descent with modification by seeing the changes in these organs from one species to the next with these preserved specimen.

Microscope slides are also needed, as the stains fade over time. As a number of these slides are 15+ years old, the images are faded or gone and students no longer of the ability to view the organisms or anatomical features of these organisms.

Due to the redevelopment of Bio 240, new materials are needed to support the new, more active activities that are being implemented. Through SLO evaluation, we found students really struggling to understand animal physiology and the different tissues comprising animal organs., A laboratory exercise was developed to allow students to learn the material utilizing a hands-on approach to view and understand the four different types of animal tissues. However, we do not have the materials required to make this lab fully successful. This request is for microscope slides that represent the four tissue types of animals in order to support student success

The SLO data for this course shows that the most successful student outcomes correlate with material that is taught utilizing active learning strategies. This supports the need for continuation and development of innovative active learning strategies to teach the evolution of these organs and organisms within Kingdom Animalia.

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**Q73** Action steps for this year:

1. Obtain specimens necessary to develop and implement the new active learning curriculum.
  2. Complete development of active learning curriculum for the course utilizing the new materials.
  3. Evaluate the student learning using the new curriculum and materials.
-

**Q74** How will this goal be evaluated?

The SLOs for the course will be reevaluated using the new curriculum.

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**Q75** Do you have another new goal?

**Yes**

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Page 25: IV. New Goals (If Applicable) continued

**Q76** New Goal 2:

Develop and implement new active learning botany curriculum for Bio 122, 134, 135 and 240

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**Q77** Which College Strategic Goal does this department goal most directly support?

**Guided Student Pathways**

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**Q78** Please describe how this goal advances the college strategic goal(s) identified above.

Bio 122 is a general education course that can be used to support our students who need a GE biology course to support their GE requirements.

Bio 134 and 135 are part of our Kumeyaay curriculum that supports the equity mindedness has been inclusive in developing curriculum that represents underrepresented student populations. The addition of courses (Bio 133, 134, 135) that represent the local Native American community have helped increase our Native American student population by 100% with an average success rate of 86% over the Fall 2017/Spring 2018 semesters. Developing curriculum that highlights and represents under served communities underlines our commitment to making biology accessible to all students. These courses serve as the science requirement for the Kumeyaay Studies degree. Upon successfully running Bio 135: Ethnobotany |Ethnoecology Lab for the first time in Spring 2018, the first students were able to graduate with their Associates Degree in KumeyaayStudies. In 2019, we piloted one of the science courses (Bio 133) as a hybrid course in order to alleviate transportation challenges that Kumeyaay students face. Offering the course helped to identify some of the issues with offering online courses in this area, and we found that we will need additional equipment to support continuing this in the future.

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**Q79** Please indicate how this goal was informed by SLO (student learning outcome) assessment results, PLO (program learning outcome) assessment results, student achievement data, or other data:

Through evaluating the SLO for these courses, students struggle with understanding the plant anatomy and classification. One of the issues is the lack of supplies available to students. For a class of 32 students, there may be only one microscope slide available. When this happens, students are unable to perform the active learning exercise and struggle to understand the material and meet the SLO. Below is a list of slides that are needed or need to be replaced. These slides will be utilized in Bio 122, Bio 240, Bio 134 and Bio 135.

Another issue students have been facing as witnessed during SLO assessment, is an understanding of plant life cycles. This has been an issue noted in three courses: Bio 240, Bio 122 and Bio 134 and Bio 135. Growing and running experiments on C-ferns, from spores in petri to full sized plants is incredibly successful in assisting in student learning as it provides both an active learning and inquiry based approach to meet the student learning outcomes. The issue to growing these specimen has been that they need to be grown at 80 degrees with a required level of humidity and a constant source of light. Currently, we do not have the equipment to do this properly. An environmental growth chamber with a heating/humidity system is required in order to grow enough of these plants for four courses: Bio 122, 134, 135 and Bio 240.

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**Q80** Action steps for this year:

1. Obtain specimens necessary to develop and implement the new active learning curriculum.
  2. Complete development of active learning curriculum for the course utilizing the new materials.
  3. Evaluate the student learning using the new curriculum and materials.
- 

**Q81** How will this goal be evaluated?

SLOs that support the curriculum to be developed with these materials will be assessed and results will be reported.

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**Q82** Do you have another new goal? **Yes**

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Page 26: IV. New Goals (If Applicable) continued

**Q83** New Goal 3:

Increase and maintain existing support for students in Bio 140, Human Anatomy

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**Q84** Which College Strategic Goal does this department goal most directly support? **Guided Student Pathways**

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**Q85** Please describe how this goal advances the college strategic goal(s) identified above.

Human anatomy is one of the most requested courses in biology. We have added classroom space in order to be able to accommodate more of the students who want the course, but more students mean that we need to provide additional support our commitment to student success and equity. This course is required for most allied health pathways, and without this support students will not be able to transfer into their programs of choice. In addition, in order to support our Human Dissection course, we will need to obtain new cadavers for next year's classes.

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**Q86** Please indicate how this goal was informed by SLO (student learning outcome) assessment results, PLO (program learning outcome) assessment results, student achievement data, or other data:

Human anatomy is one of the most difficult courses that is offered in biology, and the success rates are generally below the overall department success rates. Students initially underestimate the difficulty of the course, and find that they need additional assistance to be successful in the course. Since we have added additional sections of the course, we now have a greater demand for supplemental instruction, and that instruction requires more equipment in order to facilitate the sections. Without the requested materials, many students will not be able to get adequate supplemental instruction and are more likely to not be successful in the course.

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**Q87** Action steps for this year:

Obtain and put into use the materials requested in order to support supplemental instruction.

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**Q88** How will this goal be evaluated?

Evaluate SLOs that are supported by the requested equipment and supplies.

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**Q89** Do you have another new goal? **No**

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Page 27: IV. New Goals (If Applicable) continued

**Q90** New Goal 4: **Respondent skipped this question**

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**Q91** Which College Strategic Goal does this department goal most directly support? **Respondent skipped this question**

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**Q92** Please describe how this goal advances the college strategic goal(s) identified above. **Respondent skipped this question**

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**Q93** Please indicate how this goal was informed by SLO (student learning outcome) assessment results, PLO (program learning outcome) assessment results, student achievement data, or other data: **Respondent skipped this question**

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**Q94** Action steps for this year: **Respondent skipped this question**

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**Q95** How will this goal be evaluated? **Respondent skipped this question**

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Page 28: V. Resources Needed to Fully Achieve Goal(s)

**Q96** Is the program requesting resources this year to achieve this program goal(s)? (Faculty Resource Needs, Classified Staff Resource Needs, Technology Resource Needs, Supplies/Equipment Resource Needs, Facilities Resource Needs or Other Resource Needs) **Yes**

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Page 29: VI. Faculty Resource Needs

**Q97** Are you requesting one or more Faculty Positions to achieve this program goal(s)? **No**

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Page 31: VIII. Classified Staff Resource Needs

**Q98** Are you requesting one or more Classified Positions to achieve this goal? **Yes**

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Page 33: X. Technology Resource Needs

**Q99** Are you requesting technology resources to achieve this goal? **Yes**

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Page 35: XIV. Supplies/Equipment Resource Needs

**Q100** Are you requesting supplies and/or equipment resources to achieve this goal? **Yes**

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Page 37: XVI. Facilities Resource Needs

**Q101** Are you requesting facilities resources to achieve this goal(s)? **Yes**

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Page 39: Final Check

**Q102** Are you ready to submit your program review?If you would like to go back and review a section, select a section a click "Next." **I am ready to submit my program review**

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