#28

COMPLETE

Collector:	Email Invitation 1 (Email)
Started:	Saturday, February 09, 2019 9:07:05 PM
Last Modified:	Tuesday, February 12, 2019 8:48:43 AM
Time Spent:	Over a day
First Name:	Kathryn
Last Name:	Nette
Email:	Kathryn.Nette@gcccd.edu
Custom Data:	Biological Sciences
IP Address:	8.45.29.73

Page 1: I. Program Overview and Update

Q1 Department(s) Reviewed:

Biological Sciences

Q2 Lead Author and Collaborators:

Michelle Garcia, Kathryn Nette, Fabienne Bouton, Kim Dudzik

Q3 Dean:

Pam Kersey

Q4 Program Update (Required): Please summarize the changes, additions, and achievements have occurred in your program since the last program review. To access last year's program review, visit the IPRPC Intranet Page, accessible here.

As of Fall 2018, data from institutional research indicates that we have 149 Biology: Pre Allied Health majors declared (2.4% of the college population of declared majors), and 422 Biology majors (6.9%). These numbers indicate that we continue to maintain a healthy program in terms of overall numbers at the college.

Much of the work this year for the Biology discipline has been focused on goals of the Title III HSI-STEM grant and in updating and redesigning SLO's to make assessment a more valuable process for improvement. Course maps are developed and in use for Biology, although we are finding that the regular updates necessary to keep these maps current is challenging since Assist.org is not currently up to date and the new improved version is not yet functional. Increasing numbers of students are receiving support from the grant supported STEM counselors and faculty mentors and student peer mentors who provide social, personal and academic support. The initial feedback from students in the program has been very positive with many of the students indicating that they might not have continued at the college without program support.

Participation in SCI 100 (Success in STEM) increased last year, and we continue to modify the program based on student success and feedback. We received approval for Area E transfer credit at the CSU's this past year. This year we are starting to work on developing an OER version of the course that will include both the student manual and an instructor's manual for the course. The reading, writing and study skills introduced in this class are now being followed through in development of new curriculum for Bio 130 and Bio 230, and Bio 140, with an ultimate goal of threading training for these skills throughout most Biology courses.

Revision of the gateway courses Bio 130 & 131 continues. The course is being redeveloped to be project based rather than the traditional content based organization, with the goal of helping students to understand that information in biology is not used in silos, but must be integrated in many ways to solve problems. This is turning out to be a very challenging undertaking, as materials to organize a course in this fashion are not available, and we need to build all of the materials ourselves. We are planning to use predominately OER materials to support this course, although there will be some very current, high-quality, low cost content that we will have to have students purchase. In addition, the goal of this revamp is to build in the assessments that will be necessary to support SLO's so that all SLO's will automatically be assessed each semester through the various assignments that are developed to support each project.

We are currently in process of hiring one additional faculty for Biology. Although we have several areas within the discipline that are unsupported by full-time faculty (Bio 130/131 for example, is completely taught by part-time faculty), we have had to focus this year on finding an additional anatomy instructor. For the first time ever, we were forced to cancel a full section in anatomy because we were unable to hire a part-time instructor to teach the course. This is a county-wide issue, with most colleges including Grossmont having the same issue. Cuyamaca has additional challenges in that 1) it is located in east-county, and faculty who are in San Diego proper complain that it takes too long to get to us and 2) our PT faculty pay scale is still low compared to other colleges and potential faculty will take jobs at colleges that are most convenient and pay best. Not surprising.

Many of the department's core courses went through updates in the past year, and in most cases SLO's were completely revamped with the hope that the new SLO's will help us gain information that is more useful. We are currently building an updated plan for assessment of these new SLO's.

The new lab classrooms that are being funded by the HSI-STEM grant are behind schedule due to construction issues. The Biology and Chemistry labs that were due to be completed for use in Fall 2019 will not be done in time to be used in Fall 2019; it is most likely the case that they will be done in the middle of the Fall 2019 semester, and if everything is in place at that time, we will move one class into the building to test out everything. We still have substantial waitlists for Bio 140 (anatomy) every semester, and until this construction is completed we will not be able to address this issue.

The remodel of classroom F606 to an active learning classroom design was completed the week before staff development this semester. The room is being used at this point, although there is still more training and development work necessary to get all of the functionality in place for the new technology that is in the room. However, those faculty currently using the room have indicated that they absolutely love it and that just the layout of the room alone is far more functional than the previous old-style design. Students are able to work together in a much more effective manner than was possible in the past. The room is currently being shared by Bio 130, Bio 230 and Chem 141 classes.

Page 2: IIB. Student and Program Learning Outcomes

Q5 Do you have an assessment plan on file with SLOAC? If you have not already done so, you can submit your program's assessment plan to SLO Coordinator, Tania Jabour, at tania.jabour@gcccd.edu.	**No**

Q6 Please provide an analysis of your student learning outcomes (SLO) findings and what changes, if any, were made as a result.

SLO assessment planning and evaluation occurs every before every semester during staff development week with both part and full time faculty, as stated in previous reports. These meetings have been utilized to address possible issues in both the instructional aspect of courses and the relevance of the course outlines and SLOs. Due to these meetings and evaluating the SLO data that has been collected, there have been a multiple rewrites to course outlines and SLOs. The department has been both evaluating the assessments in terms of their merit and the usefulness of the SLOs themselves. Current courses have SLO assessment plans in place and are linking these SLO to PLO assessment. Below are some examples of how SLO evaluations have been used to increase student success in both a non-major (Bio 130)and major courses (Bio 240 & Bio 230).

In Bio 130, part-time and full time faculty get together and look at the data every semester during staff development week, as mentioned above. Over the years, the large number of SLOs for this course has been seen as both cumbersome and difficult to assess. Also, the data has shown that our students are not meeting the SLOs effectively in all sections being taught. It was also noted that key concepts were not hitting our target success rates and this may be affecting the low success rates in Bio 140 (See Question 2 under Student Achievement section). With this in mind, both the structure and methodology of the course is currently in the process of redevelopment through the Title III HSI STEM grant. The course SLO were rewritten Fall 2018 with a new mindset to teaching this course. Bio 130 is being redeveloped to increase both student engagement and success by creating a curriculum based on active learning strategies. These new SLOs were evaluated by faculty within the context of previous SLO evaluations. Utilizing previous data, the biology faculty determined that one of the SLO needed to be rewritten for more effective assessment and evaluation. Also, evaluation assignments were discussed and two instructors will be incorporating a new modular based active learning style into their curriculum utilizing the newly remodeled classroom in F606 this Spring 2019. These instructors will be assessing several of the new SLOs and comparing their success rates to the success rates of faculty who are utilizing more traditional methodologies of teaching. This data will help guide the future direction of this course and help us to determine the most effective strategies to increase our student success rates.

In Bio 240, biology faculty have discussed the low success rates for years and determined that there were several key steps that needed to be taken to increase student success. One issue was clear within the SLOs themselves. There were over 20 SLOs. As biology faculty discussed the inefficiency of assessing this many SLO, the discussion also arose as to the goals of the course, and if these were meeting the needs of the students. The SLOs were rewritten to be both more manageable and meaningful. The pedagogical methodology was also assessed within these conversations. Coursework has been redeveloped over the past five years to coincide with these discussions to include more case studies and active learning strategies. Projects and case studies are being utilized to more meaningfully evaluate the success of our students. New SLOs were approved Fall 2018, and three were assessed last semester and three will be assessed Spring 2019. Data has shown that the most successful student outcomes correlate with material that was taught utilizing active learning strategies. With this in mind, the need for vertebrate evolutionary models and portable white boards was clear (please see Supplies/Resources Needs section). Utilizing the data from SLO evaluations and the discussions that followed have seen an increase in student success in this course from 58% in Fall 2013 to 88% in Spring 2018. Further implementation of active learning and project-based activities are planned to keep improving student success and engagement.

For Bio 230, SLO analysis has shown that student reading and writing and lack of study skills is a key problem with success in the course. There are multiple lab projects in this course that require the students to read scientific materials and to write in a way that allows them to convey the meaning of data. Despite having constructed detailed rubrics for the students in the past 2 years, and having them write and submit multiple rough drafts of reports, the overall writing skills have not seen significant improvement as demonstrated by an inability to write analytically about data. The class average on lab reports was 63% in Fall 2018 which resulted in lower overall course grades. Consequently, we are currently developing additional reading and writing interventions that will hopefully have increased impact on the success of these students. We are also working on development of improved study skills for students in this course.

Q7 Review your PLOs. Are the listed PLOs an accurate reflection of the program's current learning objectives? **No**

Q8 Are the PLOs mapped onto the course SLOs? **Yes**

Q9 Discuss your assessment plan for the PLOs.

Discipline/Program: Biology AST & Biology
Upon examining the Biology PLOs, they accurately reflect the outcomes of courses within the discipline; however, there is major aspect of student learning missing from the PLO. Biology PLOs do not reflect what students need to have learned across all of the required disciplines, such as math, physics and chemistry. The PLOs do not address expected outcomes for required courses that fall outside of the discipline. In addition, the PLOs really do not address the necessity of learning to operate as a member of a cross-functional team. Since pathways are driven by a goal to achieve career success, these components all seem to be necessary to give students a clear introduction to workplace expectations.

Discussions during staff development included looking at math, physics and chemistry courses that serve biology students and making sure that the content engages and relates to the field of biology. We are planning on working together within the department to develop these methodologies to link all the required coursework to the PLOs.

Discipline/Program: Biology Pre Allied Health
Most of the PLOs apply strictly to the anatomy and physiology aspects of this program. The PLOs are being rewritten to ensure that they reflect the outcomes that are necessary for student success within the health field and that these outcomes are being met and assessed within the required courses. Similar to biology, the pathways in the allied health fields should be driven by a goal to achieve career success, and operation of cross functional teams, and an ability to understand and apply knowledge, skills and abilities from multiple disciplines is also important to the success of these students.

Page 3: IIB. Student Achievement

Q10 How has the program's success rate changed over the past year?

Overall, the program's success rate has increased slightly in both retention and student success rates. From Fall 2013 to Spring 2018, retention rates have risen 2% and success rates have risen 4% (See Chart 1 and 1C). However, there is a great deal of variability in the success rates from semester to semester as can be seen in Chart 1C.
Most courses have seen an increase in both retention rates and student success (Chart 2). Courses with lower than average success rates will be discussed in question 2.

Q11 The College has set a 2024 goal of reaching a 77% course success rate (students passing with a grade of A, B, C, or P out of those enrolled at census) for the College as a whole. Consider how your will program help the College reach its long-term goal of increasing the course success rate to 77%. This is intended to provide a goal for improvement only; programs will not be penalized for not meeting the goal. What is your program's one-year goal for success rate across all courses in the program?

70%
This is a stretch target for some classes (Bio 130, Bio 140) and and an easier target for others. The extreme variability in success rates across different courses makes it difficult to find an equitable target across all courses, some of which are far more difficult than others and some of which contain the greatest number of students in the discipline.

The Biology Program achieved an average success rate of 74% over all courses in Spring 2018. 77% of the biology courses achieved over the college's set goal for 2024 (Chart 2). The three courses with lower success rates than the college goal were Bio 130: General Biology, Bio 140: Anatomy, and Bio 230: Cellular, Molecular and Evolutionary Biology. If looking strictly at Fall 2014 to Spring 2018, Bio 130 and Bio 230 have seen slight increases in student success over the past 5 years whereas Bio 140 has seen a decline in student success (Chart 2B). However, once again, there is a lot of variability from semester to semester, and looking at a single semester does not necessarily give a complete picture of what is happening in a particular course or across the discipline. Success rates in these courses ranged from 54-68% in Bio 130, from 67-83% in Bio 230, and 58-74% in Bio 140. And these courses have the greatest number of students enrolled for the discipline and so are likely to have the greatest impact on department averages. In SP18, Bio 130 had 38% of the discipline enrollment, Bio 140 had 14% of the enrollment, while Bio 230 had slightly over 3% of the total enrollment. Even in Bio 240, which had an 88% success rate in Spring 2018, the prior Spring 2017 the same course had a success rate of 57%.
Currently, Bio 130 curriculum is being revamped through the Department of Education funded HSI STEM grant. Several sections of Bio 130 are running Spring 2019 in a new state-of the-art smart classroom including Promethean smart boards, modular classroom design, and student laptops. This new classroom set-up complements the development of project-based curriculum to increase active learning and student engagement. These new advances in the classroom and newly developed curricula are targeted to increase both student success and retention rates for this course. Sections of the new course design are scheduled to be piloted during the summer 2019 semester.
The course with the largest gap to meeting the college goal set for 2024 is Bio 140: Anatomy. Multiple discussions have been made between full time and part time faculty regarding the lack of preparedness of students entering into Bio 140 as a major issue with student success in the course. Bio 130, as the prerequisite course for Bio 140, has been looked at in terms of its efficacy in preparing students for the rigor of Bio 140. Bio 130's current redevelopment should help increase student preparedness for Bio 140; however, with the general nature of the required course content for Bio 130, there are gaps in student knowledge that need to be addressed. A new course has been proposed by Anatomy faculty to bridge this gap. It is a course to be taken concurrently with Anatomy to address student needs while they are taking the class. This type of course is challenging to implement without finding a way to force students to take it. One option would be to have some of the anatomy sections linked to this success course, while others are not. A study of success rates in the different sections could be done to determine the effectiveness of the additional course. Further discussions of the design and delivery of this course are scheduled to happen this year. Another issue is both a shortage of Anatomy instructors and classroom space. For Spring 2019, a full Bio 140 course was canceled because there was not an instructor to teach the class. We are dealing with that situation by 1) adding new classrooms and 2) hiring a new anatomy instructor.
Bio 230 has highly variable success rates ranging from 67% to 83% with an overall average of 73% over the past five years. SLO analysis in the class clearly shows that the poor writing and reading skills of the students in this class are clearly impacting their success. This class is beginning to be revamped to address the weaknesses in these skills as a part of the HSI-STEM grant.

Q12 Which specific groups (by gender and ethnicity) have success rates lower than that of the program overall?

There is very little difference between females and males, with males slightly below the average. However, the average is 71% and males are just below at 70.36% and females slightly above at 71.12%. Data was averaged over Fall 2017 and Spring 2018 (Chart 3B). A similar pattern was seen with very little difference between genders for both retention and success rates. There does not appear to be equity gaps between gender over the past five years (Chart 3C).

Lower rates than the average student success rates are clearly seen in two ethnicities, African Americans/Non-white and Hispanics with 22% and 8% below the discipline average in Fall 2017/Spring 2018, respectively (Chart 3).

Q13 What program (or institutional) factors may be contributing to these lower rates of success for these groups of students?

These lower rates are a common issue nationwide, which can be exacerbated in a STEM program. Other factors not able to be determined from the data for Cuyamaca College, but systemic issues that African-American and Hispanic students face include being a first generation college student, of a low income household and adjusting to a college life that is overwhelmingly not similar in ethnicity. These issues are being addressed by providing support systems to our students such as a STEM center that creates a sense of place and belonging, STEM counselors, faculty and student mentors, and success in STEM workshops and activities.

Q14 What specific steps will the program take to address these equity gaps in the 2019/20 academic year?

Research shows that the interventions and support systems that are part of a guided pathways approach should have an impact on equity and overall student success. The work that is being done with the Title III HSI-STEM grant is all designed to address these issues by developing a guided pathways approach and providing multiple support systems and student intervention points.

Biology has strived to be equity focused in our plans and actions. To start, available professional development was utilized to allow for faculty to become aware of better strategies to promote the success of all of our students. Multiple full-time faculty have taken the CORA teaching men of color course to help better serve student needs. Strategies learned from this course are discussed and promoted during staff development department meetings so that all Biology faculty are strongly encouraged to participate in fostering an equity minded campus culture in and outside of our classrooms.

In addition, a number of the discipline's faculty have received some level of training in Reading Apprenticeship (RA) techniques. This program has been shown to result in increases in student success, and is considered to be an excellent intervention for improvement of equity. One faculty member has been trained as an RA facilitator and in the next year will begin to provide broader RA interventions to the Science & Engineering department.

Through the grant, faculty and student peer mentors have been providing support to both validate our student's experiences and struggles while also providing mindful guidance. This program is aimed to assist those students that are generally underrepresented and underserved in our academic institutions. Counselors specifically for STEM majors have been providing guidance in the H-building allowing for clear communication between counselors, students and professors. Communication between all three groups will continue to strengthen the support students are receiving.
Over the past two years, we have developed interventions that help students develop a sense of self and STEM identity among our STEM students. During the Fall 2017, we piloted the first SCI 100 (Success in STEM) course with a small group of students who are part of our initial cohort of students for the grant. As discussed in a previous report, this course is designed to give entry-level students a STEM oriented background in the reading, writing and study skills necessary for success in STEM. The second pilot semester took place in Spring 2018 with updated content based upon results from the first semester. In 2019, we are planning to offer multiple sections of this course and have the curriculum completed and available to be utilized by more instructors.

Another aspect of equity mindedness has been 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 underserved 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 Kumeyaay Studies. In 2019, we plan to pilot one of the science courses (Bio 133) as a hybrid course in order to alleviate transportation challenges that Kumeyaay students face. Offering the course partially online will increase student access for Native American students who are unable to get transport off of their reservation. A hybrid biology course that meets transfer requirements will also serve other students with transportation challenges.

Q15 How do these activities align with the goals set forth in your last comprehensive program review?

This is not a comprehensive program review; this is an annual program review.
These activities are in direct alignment with the implementation of guided pathways for Biology and Biology Pre-Allied Health majors by providing the support systems that are necessary for student success. Support from STEM counselors and faculty mentors directly impact our at-risk students providing them with social, personal and academic support. We have begun to receive preliminary data from our evaluators that indicates that our HSI-STEM interventions are having an impact on student retention and success. And, equity-minded student success is promoted through our goal of developing growth mindset curriculum in a project-based framework in courses such as SCI 100 (Success in STEM), Bio 130 and Bio 230 and Bio 240.

Q16 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. You can upload PDF, Word, and image files.

Charts for Program Review final.pdf (412KB)

Page 4: Distance Education

Q17 Does your program offer any courses via distance education (online)?	**No**

Page 5: Distance Education Course Success

Q18 Are there differences in success rates for distance education (online) versus in-person sections?	**Respondent skipped this question**
Q19 If there are differences in success rates for distance education (online) versus in person sections, what will the program do to address these disparities?	**Respondent skipped this question**

Page 6: IV. Previous Goals: Update (If Applicable)

Q20 Would you like to provide an update for your previous program review goal(s)?	**Yes**

Page 7: Previous Goal 1

Q21 Previous Goal 1:

Veterans Biotech Training Certificate

Q22 Link to College Strategic Goal(s):	**Guided Student Pathways**
Q23 Goal Status	Deleted - Please explain below:: Although we believe that this is still a great idea, with the significant delays in construction that we have had in building the additional labs, we are putting this idea on hold for now. As far as we can tell the need is still there, and once the construction is finished and we have had the time to move in and reorganize the discipline classes/and classrooms, then we can come back to this idea, probably in PR next year. We simply don't have the space right now.

Q24 How was the goal evaluated? If the goal is "in progress," how will it be evaluated?	**Respondent skipped this question**
Q25 Please provide the rationale for this goal:	**Respondent skipped this question**
Q26 Please provide the goal action steps for the year (previously "Activities"):	**Respondent skipped this question**
Q27 Do you have another goal to update?	**Yes**

Page 8: Previous Goal 2

Q28 Previous Goal 2:

Plan for CC Nature Preserve

Q29 Link to College Strategic Goal(s):	**Guided Student Pathways** , **Student Validation and Engagement** , **Organizational Health**
Q30 Goal Status	**In Progress**
Q31 How was the goal evaluated? If the goal is "in progress," how will it be evaluated?	**Respondent skipped this question**

Q32 Please provide the rationale for this goal:

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.

Q33 Please provide the goal action steps for the year (previously "Activities"):

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 spaces 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.

Q34 Do you have another goal to update? **Yes**

Page 9: Previous Goal 3

Q35 Previous Goal 3:

Continue to meet Title III HSI-STEM Goals

Q36 Link to College Strategic Goal(s):

Guided Student Pathways ,

Student Validation and Engagement ,

Organizational Health

Q37 Goal Status

In Progress

Q38 How was the goal evaluated? If the goal is "in progress," how will it be evaluated?

This goal will be evaluated in accordance with the strict guidelines set in the HSI-STEM grant using our external evaluators. Each component has a specific means of evaluation.

Q39 Please provide the rationale for this goal:

. Continuance of this goal covers most of the major aspects of where biology is going for the next three years. We are at the forefront of the Guided Pathways program at the college, and will continue to move forward and grow the STEM student cohort and apply Pathways strategies to the biology discipline activities.

Q40 Please provide the goal action steps for the year (previously "Activities"):

Major steps for Biology this year include:
1) Continue development of active learning curriculum, in particular for gateway classes such as Bio 130/131.
2) Develop additional training for biology faculty such as a Reading Apprenticeship LCOP so that instructors have the understanding of how to include RA techniques into their classroom.
3) Expand the data collection and applications of the Drop Rate Improvement program across biology courses and sections.
4) Expand RA and study skills into other courses such as Bio 230.

Q41 Do you have another goal to update?

No

Page 10: Previous Goal 4

Q42 Previous Goal 4:

Respondent skipped this question

Q43 Link to College Strategic Goal(s):

Respondent skipped this question

Q44 Goal Status

Respondent skipped this question

Q45 How was the goal evaluated? If the goal is "in progress," how will it be evaluated?	**Respondent skipped this question**
Q46 Please provide the rationale for this goal:	**Respondent skipped this question**
Q47 Please provide the goal action steps for the year (previously "Activities"):	**Respondent skipped this question**

Page 11: V. New Goals (If Applicable)

Q48 Would you like to propose any new goal(s)?	**Yes**

Page 12: New Goal 1

Q49 New Goal 1:

Expand the ability of instructors to use active learning techniques across the discipline in order to increase student success, retention and equity. (This is a Science & Engineering Department-wide goal, not just for Biology).

Q50 Link to College Strategic Goal(s):	**Guided Student Pathways**

Q51 Please provide the rationale for this goal:

Much broad-based research in STEM (and other disciplines) has shown that active-learning is the most effective type of learning for students. A meta-analysis of 225 research papers and published in the Proceedings of the National Academy of Sciences (PNAS) in 2014, provided documentation that "active learning leads to increased performance that would raise average grades by half a letter grade, and that failure rates under traditional lecturing increase by 55% over the rates observed under active learning." https://www.pnas.org/content/pnas/111/23/8410.full.pdf. Unfortunately, the majority of classrooms at Cuyamaca are set up to support old-style "lecture" based instruction, rather than active learning. Although some see the use of "clicker" style delivery systems within programs such as PowerPoint as adequate for active learning, the active learning process requires much more student interaction than that provide by a simple clicker-type system.

The HSI-STEM grant provided funding to set up a single active learning classroom to support working being done for the grant. A room was set up that provided furniture that allows students to work in groups of 2-8 students, and also provided technology that facilities interactions among students. Instructors are very happy with the classroom, even though we are currently still getting all of the technology operational since the room was not completed on the planned schedule. However, it is already apparent that the new room layout has many advantages over its previous one where there was little ability for students to interact, and little ability for the instructor to move around the room to interact with the students. Many instructors are already asking for the ability to teach in this room, and it has already become obvious that we are only going to be able to put a small fraction of the number of classes we have in biology and chemistry into that room. Knowing that the research shows the benefit of active learning, and having been told by administrators at Cuyamaca that is will likely be many years before the F building is rebuilt, it is time that we start to modify at least some of the classrooms to an active learning mode.

We are suggesting that F408 be modified. As it is, this room is an absolutely terrible learning environment. Students constantly complain about the desks, not being able to see things written on the board, and there is a complete inability for the instructor to walk around the room, and to have students do any group work. This would increase our ability to move to active learning based curriculum and would be expected to have a significant increase on student success in STEM.

Should we end up with a new building anytime soon, all of this furniture and equipment could easily be removed and reinstalled in the new building.

The estimated cost to refurbish this room would be:
2 Promethean Smart Boards = $16,000
Tables and chairs to set up the room for an estimated 52 students including instructor's station = $37,115.52
Assembly & delivery = $4500.00
Additional white boards for the room: $3500
Total: $61,115.52
Plus miscellaneous costs for cleaning up the room.

Q52 Please provide the goal action steps for the year (previously "Activities"):

" Obtain permission to revamp F408 as an active learning classroom
" Set up plan to determine and install new Smart Classroom layout for F408 to be converted to an active-learning mode, including new furniture, smart boards (2) and additional white boards to be set up around the room.
" Determine cost of wiring and other ancillary costs to set up the room.
" Purchase furniture and equipment
" Set up room.

Q53 How will the goal be evaluated?

We will look at the use of this newly remodeled classroom from the perspective of whether or not we see in increase in success rates for the students who take classes in this room. We will add this evaluation to the evaluations being done for F606 as a part of the HSI-STEM grant to examine the differences in student success and equity based on active learning.

Q54 Do you have another new goal?	**No**

Page 13: New Goal 2

Q55 New Goal 2:	**Respondent skipped this question**
Q56 Link to College Strategic Goal(s):	**Student Validation and Engagement**
Q57 Please provide the rationale for this goal:	**Respondent skipped this question**
Q58 Please provide the goal action steps for the year (previously "Activities"):	**Respondent skipped this question**
Q59 How will the goal be evaluated?	**Respondent skipped this question**
Q60 Do you have another new goal?	**No**

Page 14: New Goal 3

Q61 New Goal 3:	**Respondent skipped this question**
Q62 Link to College Strategic Goal(s):	**Respondent skipped this question**
Q63 Please provide the rationale for this goal:	**Respondent skipped this question**
Q64 Please provide the goal action steps for the year (previously "Activities"):	**Respondent skipped this question**
Q65 How will the goal be evaluated?	**Respondent skipped this question**
Q66 Do you have another new goal?	**Respondent skipped this question**

Page 15: New Goal 4

Q67 New Goal 4:	**Respondent skipped this question**
Q68 Link to College Strategic Goal(s):	**Respondent skipped this question**
Q69 Please provide the rationale for this goal:	**Respondent skipped this question**
Q70 Please provide the goal action steps for the year (previously "Activities"):	**Respondent skipped this question**
Q71 How will the goal be evaluated?	**Respondent skipped this question**

Page 16: VI. Resources Needed to Fully Achieve Goal(s)

Q72 Is the program requesting resources this year to achieve this goal?	**Yes**

Page 17: V. Faculty Resource Needs

Q73 Are you requesting one or more faculty positions to achieve this goal?	**No**

Page 18: Faculty Position Request(s)

Q74 Please remember to complete the Faculty Position Request Form (accessible here, under Staffing Request Information) for this position that you are requesting and upload it using the button below.The Faculty Position Request Form (In Word) can be located here (under Staffing Request Information).Brief Description of the Position Requested:	**Respondent skipped this question**
Q75 Faculty Position Request 1 - Related Program Goal(s):	**Respondent skipped this question**
Q76 Faculty Position Request Upload 1: Please upload the completed faculty request form for the above position using the button below. You can access the Word version of the Faculty Position Request Form here (under Staffing Request Information).	**Respondent skipped this question**

Q77 Faculty Position Request 2 (if applicable): Please remember to complete the Faculty Position Request Form (accessible here, under Staffing Request Information) for this position that you are requesting and upload it using the button below.The Faculty Position Request Form (In Word) can be located here (under Staffing Request Information).Brief Description of Position Requested:

Respondent skipped this question

Q78 Faculty Position Request 2 - Related Program Goal(s):

Respondent skipped this question

Q79 Faculty Position Request Upload 2: Please upload the completed faculty request form for the above position using the button below. You can access the Word version of the Faculty Position Request Form here.

Respondent skipped this question

Page 19: VI. Classified Staff Resource Needs

Q80 Are you requesting one or more classified positions to achieve this goal?

Yes

Page 20: Classified Staff Position Request(s)

Q81 Classified Staff Position Request 1: Please remember to complete the Classified Staff Position Request Form (accessible here, under Staffing Request Information) for this position you are requesting.Brief Description of Position Requested:

This is a request for a Biology Technician II who will support the new labs for Biology and Chemistry that are part of the HSI-STEM grant This request details the reasons why an additional technician is needed to bring these classrooms on board. This position was highly ranked last year, but was not hired. In order to make the labs operational for the Spring 20 semester, we must have this position hired by the middle of Summer 2019.

Q82 Classified Staff Position 1 Related Program Goal(s):

This request is to ensure we meet our Title III HSI-STEM project goals which call for us to provide sufficient classroom space to allow students to achieve their pathway goals in a timely manner.

Q83 Classified Staff Position 1 Request Upload: Please upload a completed Classified Position Request Form for this request using the button below. You can access the Word version of the Classified Position Request Form here.

2018-19 Classified Position Request Bio:Chem.pdf (65.5KB)

Q84 ***OPTIONAL*** Please use the button below to upload the position classification description (obtained from HR).

Science Lab Technician II job description.pdf (73.2KB)

Q85 Classified Staff Position Request 2: Please remember to complete the Classified Staff Position Request Form (accessible here, under Staffing Request Information) for each position you are requesting.Brief Description of Position Requested:	**Respondent skipped this question**
Q86 Classified Staff Position 2 Related Program Goal(s):	**Respondent skipped this question**
Q87 Classified Staff Position Request 2 Upload: Please upload a completed Classified Position Request Form for this request using the button below. You can access the Word version of the Classified Position Request Form here (under Staffing Request Information).	**Respondent skipped this question**
Q88 ***OPTIONAL*** Please use the button below to upload the position classification description (obtained from HR).	**Respondent skipped this question**

Page 21: VII. Technology Resource Needs

Q89 Are you requesting technology resources to achieve this goal?	**Yes**

Page 22: Technology Request(s)

Q90 Technology Request 1: Please remember to complete a Technology Request Form for each request you are submitting. You can access the online Technology Request Form here: Technology Request Form

Description:	**Expand the ability of instructors to use active learning techniques across the discipline in order to increase student success, retention and equity. (This is a Science & Engineering Department-wide goal, not just for Biology).**
One time or On-going	**One time**
Amount Requested $	**$16,696**
Related Program Review Goal(s):	**Expand the ability of instructors to use active learning techniques across the discipline in order to increase student success, retention and equity. (This is a Science & Engineering Department-wide goal, not just for Biology). Much broad-based research in STEM (and other disciplines) has shown that active-learning is the**

most effective type of learning for students. A meta-analysis of 225 research papers and published in the Proceedings of the National Academy of Sciences (PNAS) in 2014, provided documentation that "active learning leads to increased performance that would raise average grades by half a letter grade, and that failure rates under traditional lecturing increase by 55% over the rates observed under active learning." https://www.pnas.org/content/pnas/111/23/8410.full.pdf. Unfortunately, the majority of classrooms at Cuyamaca are set up to support old-style "lecture" based instruction, rather than active learning. Although some see the use of "clicker" style delivery systems within programs such as PowerPoint as adequate for active learning, the active learning process requires much more student interaction than that provide by a simple clicker-type system. The HSI-STEM grant provided funding to set up a single active learning classroom to support working being done for the grant. A room was set up that provided furniture that allows students to work in groups of 2-8 students, and also provided technology that facilities interactions among students. Instructors are very happy with the classroom, even though we are currently still getting all of the technology operational since the room was not completed on the planned schedule. However, it is already apparent that the new room layout has many advantages over its previous one where there was little ability for students to interact, and little ability for the instructor to move around the room to interact with the students. Many instructors are already asking for the ability to teach in this room, and it has already become obvious that we are only going to be able to put a small fraction of the number of classes we have in biology and chemistry into that room. Knowing that the research shows the benefit of active learning, and having been told by administrators at Cuyamaca that is will likely be many years before the F building is rebuilt, it is time that we start to modify at least some of the classrooms to an active learning mode. We are suggesting that F408 be modified. As it is, this room is an absolutely terrible learning environment. Students constantly complain about the desks, not being able to see things written on the board, and there is a complete inability for the instructor to walk around the room, and to have students do any group work. This would increase our ability to move to active learning based curriculum and would be expected to have a significant increase on student success in STEM.

Q91 Technology Request 2: Please remember to complete a Technology Request Form for each request you are submitting. You can access the online Technology Request Form here: Technology Request Form	**Respondent skipped this question**

Page 23: VIII. Perkins and Strong Workforce Resource Needs

Q92 Are you requesting Perkins and/or Strong Workforce resources to achieve this goal?	**No**

Page 24: Perkins Request and Strong Workforce

Q93 Perkins Request and Strong Workforce 1: Please remember to complete the Perkins Request Form and submit it via the annual Perkins/Strong Workforce request process/cycle.	**Respondent skipped this question**
Q94 Perkins Request and Strong Workforce 2: Please remember to complete the Perkins Request Form and submit it via the annual Perkins/Strong Workforce request process/cycle.	**Respondent skipped this question**

Page 25: IX. Supplies/Equipment Resource Needs

Q95 Are you requesting supplies and/or equipment resources to achieve this goal?	**Yes**

Page 26: Supplies/Equipment Request(s)

Q96 Supplies/Equipment Request 1: In the boxes below please provide information on your request. Supplies/Equipment requests will be considered on a one-time funding basis.

Description:	**Augmentation to Supplies for Biology Labs**
Amount Requested $:	**11,800**

Related Program Review Goal(s):	**This is funding to provide adequate supplies to operate the biology labs. Over the past three years the number of biology sections per semester has been increasing by 15% per year, but the baseline department budget has remained the same. Increased numbers of sections require the purchase of additional supplies. In addition, we have added more complex curriculum to courses like Bio 230 which is more costly than previous curriculum for the course. We have twice the number of sections of Bio 240 every semester (one section to two so we have two additional sections per year. We have added the lab course for ethnoecology/ethnobotany. The number of anatomy courses increased without additional funding. We have added additional Bio 130 sections for HSHMC. And supply costs are rising every year. Over the past three years the number of biology sections per semester has been increasing by 15% per year, but the baseline department budget has remained the same. Increased numbers of sections require the purchase of additional supplies. In addition, we have added more complex curriculum to courses like Bio 230 which is more costly than previous curriculum for the course. We have twice the number of sections of Bio 240 every semester (one section to two so we have two additional sections per year. We have added the lab course for ethnoecology/ethnobotany. The number of anatomy courses increased without additional funding. We have added additional Bio 130 sections for HSHMC. And supply costs are rising every year. Over the past four years the number of biology sections per semester has been increasing by 15% per year, but the baseline department budget has remained the same. Increased numbers of sections require the purchase of additional supplies. In addition, we have added more complex curriculum to courses like Bio 230 which is more costly than previous curriculum for the course. We have twice the number of sections of Bio 240 every semester (one section to two so we have two additional sections per year. We have added the lab course for ethnoecology/ethnobotany. The number of anatomy courses increased without additional funding. We have added additional Bio 130 sections for HSHMC. And supply costs are rising every year. We anticipate adding two additional anatomy sections once the new labs are done and need additional funding for supplies.**
Q97 Supplies/Equipment Documentation 1: Please upload any supplies/equipment quotes or additional documentation for this request.	**Respondent skipped this question**

Q98 Supplies/Equipment Request 2: In the boxes below please provide information on your request. Supplies/Equipment requests will be considered on a one-time funding basis.

Description:	**a. Description -models requested for project-based case studies in vertebrate organ system evolution for Bio 240 1) Vertebrate animal model set of 7 individual heart models for comparative anatomy studies allowing students to compare and contrast the structure and function of the 2-, 3-, and 4-chambered heart while studying the evolution of the circulatory system. 2) Vertebrate animal model set of of 8 vertebrate brain models for comparative anatomy studies allowing students to compare homologous structures across species to relate form and function to the evolution and complexity of the vertebrate brain to compare different species such as comparing the brain of a lamprey, to a trout to a dog. 3) Hydra model -enlarged model can enable students to view both cellular and tissue-level structures to enable students to better understand the Cnidarian body plan, which is a struggle since these organisms are incredibly small and structures that are taught in lecture are unable to be seen without the aid of a model. 4) Dissected sea star model -this model is critical for the course as specimen to dissect are no longer available due to the wasting disease that has struck and decimated the sea star populations in the Pacific Ocean. Students still need to learn their anatomy, and these specimens are no longer available.**
Amount Requested $:	**$4854.00**
Related Program Review Goal(s):	**These animal models are to address the issues that arose from evaluating SLO data for this course. These models will be utilized to develop project-based learning exercises to increase student success in the vertebrate physiology component of this course (see Question 2 under Student Assessment).**

Q99 Supplies/Equipment Documentation 2 : Please upload any supplies/equipment quotes or additional documentation for this request.

Respondent skipped this question

Page 27: X. Facilities Resource Needs

Q100 Are you requesting facilities resources to achieve this goal?

Yes

Page 28: Facilities Request

Q101 Facilities Request 1: Please provide the information below and remember to complete a Facilities Request Form accessible here: Facilities Request Form

Description:	**Expand the ability of instructors to use active learning techniques across the discipline in order to increase student success, retention and equity. (This is a Science & Engineering Department-wide goal, not just for Biology).**
Amount Requested $:	**61155.22**
Related Program Review Goal(s):	**Much broad-based research in STEM (and other disciplines) has shown that active-learning is the most effective type of learning for students. A meta-analysis of 225 research papers and published in the Proceedings of the National Academy of Sciences (PNAS) in 2014, provided documentation that "active learning leads to increased performance that would raise average grades by half a letter grade, and that failure rates under traditional lecturing increase by 55% over the rates observed under active learning." https://www.pnas.org/content/pnas/111/23/8410.full.pdf. Unfortunately, the majority of classrooms at Cuyamaca are set up to support old-style "lecture" based instruction, rather than active learning. Although some see the use of "clicker" style delivery systems within programs such as PowerPoint as adequate for active learning, the active learning process requires much more student interaction than that provide by a simple clicker-type system. The HSI-STEM grant provided funding to set up a single active learning classroom to support working being done for the grant. A room was set up that provided furniture that allows students to work in groups of 2-8 students, and also provided technology that facilities interactions among students. Instructors are very happy with the classroom, even though we are currently still getting all of the technology operational since the room was not completed on the planned schedule. However, it is already apparent that the new room layout has many advantages over its previous one where there was little ability for students to interact, and little ability for the instructor to move around the room to interact with the students. Many instructors are already asking for the ability to teach in this room, and it has already become obvious that we are only going to be able to put a small fraction of the number of classes we have in biology and chemistry into that room. Knowing that the research shows the benefit of active learning, and having been told by administrators at Cuyamaca that is will likely be many years before the F building is rebuilt, it is time that we start to modify at least some of the classrooms to an**

	active learning mode. We are suggesting that F408 be modified. As it is, this room is an absolutely terrible learning environment. Students constantly complain about the desks, not being able to see things written on the board, and there is a complete inability for the instructor to walk around the room, and to have students do any group work. This would increase our ability to move to active learning based curriculum and would be expected to have a significant increase on student success in STEM. Should we end up with a new building anytime soon, all of this furniture and equipment could easily be removed and reinstalled in the new building. The estimated cost to refurbish this room would be: 2 Promethean Smart Boards = $16,000 Tables and chairs to set up the room for 52 students including instructor's station = $37,115.52 Assembly & delivery = $4500.00 Additional white boards for the room: $3500 Total: $61,115.52 Plus miscellaneous costs for cleaning up the room. 4. Action Steps (Previously "Activities"): " Obtain permission to revamp F408 as an active learning classroom " Set up plan to determine and install new Smart Classroom layout for F408 to be converted to an active-learning mode, including new furniture, smart boards (2) and additional white boards to be set up around the room. " Determine cost of wiring and other ancillary costs to set up the room. " Purchase furniture and equipment " Set up room. 5. Evaluation Plan: We will look at the use of this newly remodeled classroom from the perspective of whether or not we see in increase in success rates for the students who take classes in this room. We will add this evaluation to the evaluations being done for F606 as a part of the HSI-STEM grant to examine the differences in student success and equity based on active learning.

Q102 Facilities Request 2: Please provide the information below and remember to complete a Facilities Request Form, accessible here:Facilities Request Form	**Respondent skipped this question**

Page 29: XI. Professional Development Resource Needs

Q103 Are you requesting professional development resources to achieve this goal?	**No**

Page 30: Professional Development Request

Q104 Professional Development Request 1: Please provide the information identified below and follow the process for requesting professional development funds, outlined here.	**Respondent skipped this question**
Q105 Professional Development Request 2: Please provide the information identified below and follow the process for requesting professional development funds, outlined here.	**Respondent skipped this question**

Page 31: XII. Other Resource Needs

Q106 Are you requesting any other resources to achieve this goal?	**Yes**

Page 32: Other Resource Requests

Q107 Other Resource Requests 1: Other resource requests will be considered on a one-time funding basis. Please fill in the information below.

Description:	**a. Description -8 Portable white board flip chart easel board for biology classrooms (H221 and H222) 8 boards at 105.99 each**
Amount Requested $:	**847.92**
Related Program Review Goal(s):	**These boards will allow for active learning activities to take place in classrooms that have limited white board space. Eight boards will allow students to work in groups of 4 to solve problems and complete activities. Currently, large pieces of white paper are taped to the wall, which is costly and wasteful. These types of activities have been shown with SLO data to be effective learning tools for students. With portable dry erase boards; these types of activities can also be implemented in Bio 122, Bio 133, Bio 134 and Bio 135 to assist in meeting our goals in increasing student success.**

Q108 Other Resource Requests 2: Other resource requests will be considered on a one-time funding basis. Please fill in the information below.

Description:	**Printer repairs and Maintenance**
Amount Requested $:	**$800**
Related Program Review Goal(s):	**Last year we were able to get most of the printers in our department cleaned and repaired for less than the cost of purchasing one new printer. We have over 25 printers. It seems that is less costly to keep as many printers as possible working as long as possible rather than buying new ones. Regular maintenance should help to extend the longevity of this equipment.**

Page 33

Q109 Are you ready to submit your program review? If you click "No," you will be redirected to the start of the program review module.	**Yes**