Comprehensive Program Review Report

Program Review - Biology

Program Summary

2022-2023

Prepared by: Heather Moore

What are the strengths of your area?: The Biology Department has three categories of course offerings: (1) Majors Courses (2) General Education Courses and (3) Allied Health Courses. This program review will address the academic quality, success, and assessment of these categories independently and summarize workload and internal and external relationships for the entire department.

Academic Quality and Success:
(1) Majors Courses

Considering the last three years of data, the success rates for Biology Majors course BIOL 1 went from 72% (2019-2020), to 77% (2020-2021), and then to 64% (2021-22). The success rates for BIOL 2 went from 96.2% (2019-2020), to 79.5% (2020-2021), and then to 68.3% (2021-2022). Dis-aggregated data for BIOL1 indicate the multi-year success rate of ethic groups were not different than the average but this may be due to sampling size, only hispanics were represented in all 3 years of dis-aggregated data. There was a gender difference where hispanic females (70.1%) performed better than hispanic males (62.8%). Dis-aggregated data for BIOL 2 indicates that multi-year success rates are equal in across the sampled ethnic groups; 83% success for hispanics and 82.6% for Whites (other ethnic groups were too underrepresented in the data set to have returned statistical differences). When gender was factored in, hispanic males (86.8% success) performed better in the course than Hispanic females (80.4%). There were no other reported gender differences in success in whites but this looks as if it was due to sampling errors as white males were not reported due to too few being enrolled.

BIOL 1 FTES went from 33.9 in 2019-2020, to 38.70 in 2020-2021, and 32.40 in 2021-22. BIOL 2 FTES went from 16.5 in 2019-2020, to 12.60 in 2020-2021, and 12.30 in 2021-22. Overall enrollment in BIOL 2 has been maintained at a relatively high level over a five-year period, compared to 2015-16 when FTES was 8.4. These courses both have 3 hours of lecture and 6 hours of lab per week. These courses represent a significant proportion of the workload of the faculty that teach them (84% of a full-time load). This large load necessitates a reduction in the other courses that these instructors teach. As a result, we continue to see a reduction in some of the general education course sections (BIOL 21 and BIOL 22) and BIOL 40 when those instructors teach the majors.

(2) General Education Courses

BIOL 20 (Frontiers in Biology) success rates over the last three years are 81% in 2019-2020, 85.2% in 2020-2021, and 74.3% in 2021-2022. The lower success rate in 2021-2022 corresponds to the decrease in success rates for all biology courses during this time period. The BIOL 20 success rate continues to exceed the departmental rate (68.8%). There are multiple contributing factors for these results, including changes to the withdrawal policy, the return to in-person teaching, incoming students who completed high school remotely, and a high rate of student absences due to the COVID-19 virus.
BIOL 20 has significantly increased FTES from 149.2 in 2019-2020, 162.60 in 2020-202, and 163.80 in 2021-2022. This increase can be attributed to the increase in offerings including asynchronous online and hybrid options, in addition to face-to-face modalities. 2020-2021 was the first year that FTES data has been presented where online and the Center campuses have been separated; 81.80 FTES were online in 2020-2021, and 70.80 were online in 2021-2022. Over the two years where data could be separated by Instruction Method, the success of online courses is 81%, Hybrid is 67.9%, and Face-to-Face is 80.9%.

BIOL 21 (Plant Biology) success rates were 83.2% in 2019-2020, 78.0% in 2020-2021, and 61.6% in 2021-22. Biology 21 FTES went from 17.3 in 2019-2020, 16.00 in 2020-2021, and 14.5 in 2021-22. For 2020-2021, 8.17 of the FTES were online. No online courses were offered in 2021-2022 since the in-person lab requirement returned when not in emergency authorization due to COVID

BIOL 22 (Animal Biology) success rates went from 79% in 2019-2020, 75% in 2020-2021, then to 67.5% in 2021-2022. This drop in success rate could be due to new instructors taking over the class or a lower number of students taking the course. BIOL 22 FTES had increased from 20.3 in 2019-2020 to 22.33 in 2020-2021, and then dropped in 2021-2022 to 14.00. The increase from 2019-2020 to 2020-2021 is due to the addition of online courses caused by the pandemic. No online courses were offered in 2021-2022 since the in-person lab requirement returned when not in emergency authorization due to COVID.

BIOL 25 (Human Ecology) success ranged from 78% in 2017-18, to 81% in 2018-19, to 79% in 2019-2020. The FTES in BIOL 25 went from 9.1 in 2019-2020, to 7.90 in 2021, and then 5.8 in 2021-2022. in 2020-2021, 4.3 FTES were online. No online courses were offered in 2021-2022 since the in-person lab requirement returned when not in emergency authorization due to COVID

(3) Allied Health Courses

Our FTES in BIOL 30 went from 132.00 2 in 2019-2020, to 135.40 in 2020-2021, and then dropped to 119.2 in 2021-2022. The FTES for BIOL 31 went from 73.2 in 2019-2020, 85.2 in 2020-2021, and 75.8 in 2021-2022. Biology 40 FTES went 63.6 in 2019-2020, to 70.87 in 2020-2021, and then dropped to 56.20. The increase in 2020-2021 can be attributed to more students attempting the classes online; many instructors were able to accept more students online because they were not restricted by the physical capacity of the laboratories. When we returned to face-to-face courses in 2021, we had to reduce class size due to social-distancing practices which limited lecture and lab capacity. Although we don't have data from 2022-2023 yet, instructors are accepting additional students from their waitlists so we expect future FTES to increase.

The success rate for BIOL 030 (Human Anatomy) improved from 63.4% in 2019-2020, to 83.8% in 2020-2021, but then fell to 61.9% in 2021-2022. Historically, success in this course is below the overall success rate at COS and the division, and is often the lowest of the Biology courses. Although the improved success in BIOL 30 in 2020-2021 was exciting, it was most likely skewed by the excused withdrawal (EW). In 2020-2021, 23% of all students enrolled in BIOL 30 opted for the EW over an earned grade, presumably because they were doing poorly in the class. Since EW grades are excluded from success rates, the success rate data is confounded by the EW effect. When success rates are compared across instructional method, the face-to-face multi-year success was 67%, online was 82.6% (represented by 2020-2021 and 2021-2022), and hybrid was 57.4% (represented by only 2021-22).

Now that the EW is only granted with proper verification, the success rate in BIOL 30 decreased to what it has been historically. There are several thoughts as to why BIOL 30 success rates are relatively low. There are no prerequisites for BIOL 30 and this course is a prerequisite to enroll in BIOL 31, Human Physiology. Therefore, any student with any of a huge array of backgrounds can enroll. Not all incoming students to BIOL 30 are truly committed to the rigors of becoming a health care professional. This is not necessarily because of poor instruction or quality of students, but may simply be that the students are not prepared for the rigors of a fast-paced science course which assumes that students know how to effectively absorb highly technical and detailed information and incorporate it into a larger framework. We must maintain continuous improvement by attempting to understand better the reasons why students drop BIOL 30 and the causes of remaining students receiving non-passing grades, and correct those over which we have control. It should be noted that the students who do succeed in completing the allied health prerequisite courses (BIOL 30, 31, and 40) are finding success in the Nursing Program and the Physical Therapy Assistant Program. Additionally, the relatively high success rates we have in BIOL 31 and BIOL 40 may be facilitated by the grade outcomes of BIOL 30. Students who perform well in BIOL 30 have practiced valuable study techniques and time management skills, and are prone to dedicate more time to studying effectively when enrolled in the more difficult BIOL 31 and BIOL 40 courses.

Biology 31, Human Physiology, is another prerequisites for allied health programs. The success rates for BIOL 31 for the last three academic years have been 84% in 2019-2020, 88.5% for 2020-2021, and 74.2% in 2021-22. The positive trend in 2020-2021 must also be looked at in a way that considers the EW effect. 23% of students enrolled in BIOL 31 opted for the EW grade over an earned grade in 2020-2021. This effect greatly confound the data presented as success. We are no longer offering Bio 31 as an online course due to the in-person lab requirement, but we are offering a hybrid course option. When we look at success based on Instruction Method, face-to face success was 75.4% and hybrid was 69.1% for 2021-2022 (this was the only academic year that this data was gathered).

Biology 40, Microbiology, is another prerequisites for allied health majors. The success rates for BIOL 40 went from 77% in 2019-

2020, to 74.7% in 2020-2021, and 70.2% in 2021-22. Although the success trend did not exactly follow that of BIOL 30 or BIO 31, the EW effect should still be considered in 2020-2021; 26% of students enrolled in BIOL 40 opted for the EW grade over an earned grade. This course was only offered as an online or hybrid option in 2020-2021 due to the pandemic. When success rates are broken down for the year based on Instruction Method, face-to-face success rate was 84.5%, online was 69%, and hybrid was 69.2%. We are no longer offering BIOL 40 a hybrid or online course.

Workload:

The Biology Department's productivity was 19.88 in 2019-2020, 19.16 in 2020-202, and fell to 16.85 in 2021-2022; the departmental FTES was 515.17 in 2109-2020, 551.6 in 2020-2021, and fell to 494 in 2021022. This decrease in productivity can be explained by the transition from online courses to face-to-face where class capacities and social distancing rules prevented instructors from accepting additional students. The reduction in FTES is a trend that our College and most Colleges experienced. We do not yet have data from 2022-23 to analyze but based on registration, we expect the FTES to grow in the future, and our productivity to increase as a direct result of increased enrollment.

The allied health courses have the highest productivity in the department. In 2021-2022, BIOL 31 has a FTES/FTEF ratio of 19.4, BIOL 30 has 19.1, and BIOL 40 has 15.3. These courses also provide the majority of the FTES for the department, 251.2 FTES in 2021-22. Success in the division over the past three year period went from 76.3% 2019-2020, to 82.8% in 2020-2021, to 68.8% in 2021-2022. This trend is also greatly influenced by the EW effect. 19% of all students enrolled in biology courses opted for an EW grade rather than an earned grade in 2020-21. Now that the EW is no longer an option, our department's success rates align with what they have been historically.

There has been a significant increase in the number of sections of Majors biology courses offered. In 2021-2022, BIOL 1 and BIOL 2 accounted for 44.7 FTES. These courses have a significant number of contact hours per week (3 hours of lecture and 6 hours of lab). In order to maintain our productivity, these courses are taught with a single lecture and a double lab. Therefore, the instructor for these courses teach 3 hours of lecture and 12 hours of lab per week for the major courses. This greatly affects the load of the faculty that teach these courses; it affects the lab room utilization, and it affects the lab preparation requirements. We feel the demand for the major courses is solid because we are turning away students trying to add BIOL1.

The FTES of BIOL 20 has consistently increased over the last three year period. BIOL 20 FTES accounts for the largest portion of our department's FTES and has grown steadily, despite the reduction in enrollments seen across the College: 149.2 in 2019-2020, to 162.6 in 2020-2021, and 163.8 in 2021-22. The increase in BIOL 20 is due to additional adjunct faculty being hired and our expansion of online and hybrid options. In 2020-2021, 81.8 FTES were online and in 2021-2022 70.8 were online.

The demand for the Biology classes is continuing, even in the turbulent time of the pandemic and as we return to normalcy. Our FTES between 2019-2020 and 2021-22, fell 21.17. For comparison, in this same three year period, the English and Math divisions at COS have respectively lost 266.91 FTES and 183.57 FTES. Data collected during this time period demonstrates that the Biology department has a Fill-Rate consistently over 100%. This indicates that even while we are increasing the number of courses offered, faculty are continuing to accept additional students into their classes. Since we are increasing course offerings and filling class sections beyond the cap, this demonstrates a continuing unmet demand for biology courses.

Internal Relationships:

The Biology Department interacts with internal support services including the MESA program and the Student Success Center on the Hanford campus, which provides tutors, models, workshops, microscope slides and study areas for Biology students. Historically the department has benefited from grants which provide the department with resources including funding for our supplemental instruction leaders (SI). Faculty volunteer time to mentor and supervise the SI leaders and tutors supporting their discipline.

Faculty also volunteer their time to advise and support science/biology related student clubs including SETA and the Alliance of Biological and Chemical Sciences (ABCS). In 2019-20, members of the biology and chemistry departments formed the Alliance of Biological and Chemical Sciences (ABCS). This club helps students realize the intimate connection between biology and chemistry, expands on COS' course offerings through a mixture of activities including educational talks by COS faculty, special guest speaker talks, hands-on laboratory experiments, community service activities, and social activities. ABC meets every other Friday from 11:00am to 12:00 pm, averages about 20 attendants for each meeting, and chooses biology and chemistry related themes to explore each semester. The students conduct experiments relating to their themes, such as recreating the chemistry

of Mono Lake to make tufas and extracting DNA from strawberries. In the spring of 2021, the club hosted a two day camping trip to Mono Lake after they chose to explore limnology (the study of lakes) for the semester. In the fall of 2021 we invited Dr. Brandon Pratt, an expert on fire ecology, to speak to the club when they chose to explore the effect of wildfires on the environment.

Recently, a long-standing initiative to provide support to incoming STEM Freshmen students came to an end at COS with the ending of the REALM grant and program. Historically, a grant aimed at supporting incoming Freshmen STEM majors has been in place serving COS students for over 10 years, but due to interruptions in federal funding cycles, funding for such a program has ended abruptly leaving a noticeable gap in support structure for newer STEM majors. On a more positive note, the state of California has established funding for the MESA programs, which is similar to many aspects of the REALM-like programs. We are proposing to harness the advantages of these new funds by proposing improvements to the MESA programs at COS to incorporate some of the features of REALM to expand MESA offerings in an effort to disconnect the beneficial student programs of REALM from funding cycles and, instead, establish a more permanent set of offerings using COS funds (which could be supplemented with grant funding in the future). We propose the current MESA coordinator position be expanded to establish a new full-time classified position to oversee the MESA program as well as to establish a permanent and formal program to support incoming STEM majors in their first year that retains the most important aspects of the REALM program.

The value of the REALM program to student outcomes is tangible in retaining STEM majors and in success within STEM courses. In Cohort 4 of the REALM program (2019-2020 academic year) 36 students were enrolled in the program. Out of these 36 students, 33 were still enrolled at COS a year later (92% retention rate) and 28 remained as STEM majors (78% of original group; 85% of remaining students). The successful outcomes also extend to students transferring to universities. The REALM cohort from 2018-2019 had 38 students, 15 of which transferred and 15 were still enrolled at COS as STEM majors (accounting for 79% of students; as of Fall 2021). REALM students realized better outcomes during summer classes, too. For CHEM 20 the success rate for all students taking the class during the summer terms was 44%, but the success rate among REALM students was 92%. Summer MATH classes saw similar increases in success rates with Math 154 having an overall 47% success rate and 100% of REALM students succeeding. Math 65 has a 42% overall success rate, but again, 100% of REALM students successfully completed the course.

The REALM program consisted of several summer orientation events, requiring students to take two summer courses (a college skills seminar course and a STEM course), a hands-on laboratory experience and several community-building events scheduled through the school year (usually in partnership with MESA). Students were required to join the MESA program and meet regularly with a MESA academic coach throughout their first year. Another part of the program was to provide textbooks for STEM courses during the first year. A final part of the program was for REALM students to have a dedicated counselor, with whom they were required to meet, regularly.

We are proposing to continue some or all of these activities but with modification, lumping all parts into a more comprehensive MESA+ (MESA-plus) program. We intend to continue having a formal program that students join to create collaboration and community-building opportunities, which helps students feel included and to be part of a community from the beginning of their COS journey. The class requirements will remain and are financially self-sufficient through tuition income. A one or two day orientation held right before the start of the Fall semester will help establish rapport among students and between students and faculty, integrate new students into the rich STEM community (and thus helping sustain the community), and provide students with information to help them begin their COS journey well-informed and feeling confident to rise to the challenges of college life. We propose to keep the MESA membership requirement and to continue requiring incoming STEM majors to regularly meet with their assigned MESA coach. Continued inclusion of a counselor specializing in STEM students is also part of our request. We suggest to eliminate the lab experience as this was one of the most expensive line-items from REALM. Perhaps, these could be brought back after securing extramural funding in the future. We, also, recommend phasing-out the textbook loan program by not purchasing new textbooks, but we should continue loaning any textbooks already owned that are still being used by teachers.

Costs associated with this proposal include supporting a COS classified employee serving as a full-time MESA+ coordinator ($75k + benefits), an orientation event with food and a few giveaways to students ($500-$1000), supporting 50% (or an appropriate percentage based on workload) of a dedicated STEM counselor ($35k), and four community-building events with food and giveaways (2/semester, $500 each, $2000 total). The MESA coaches and tutors are part of the MESA program and already receive funding, so they are not included in this proposal. The part-time MESA coordinator is already partially supported by COS, and we request that some of the additional MESA funding coming from the State be used to expand this position to full time. The dedicated counselor is, also, already partially supported and we request that institutional funds continue to support this important resource for students.
Recently, a long-standing initiative to provide support to incoming STEM Freshmen students came to an end at COS with the

ending of the REALM grant and program. Historically, a grant aimed at supporting incoming Freshmen STEM majors has been in place serving COS students for over 10 years, but due to interruptions in federal funding cycles, funding for such a program has ended abruptly leaving a noticeable gap in support structure for newer STEM majors. We are proposing that the current MESA coordinator position be expanded to establish a new classified position to oversee the MESA program as well as to establish a permanent program to support incoming STEM majors in their first year that retains the most important aspects of the REALM program.

External Relationships:

The Biology Department has facilitated several external relationships. COS science classes use the Kaweah Oaks Preserve for educational purposes. Additionally, COS students use the greenhouse for botany related activities. A COS Biology faculty member volunteered as a speaker and guide for the Water Education Foundation's annual spring tour. Faculty members also volunteered as speakers and workshop demonstrators for Expanding Your Horizons, a program to promote and introduce STEM fields to young female students from area middle schools.

Wayne Preston, a former anatomy and physiology professor, partnered with the COS Foundation to establish an endowment which will provide two Biology student scholarships ($500/each). Heather Moore and Jesse Wilcoxson worked together to identify the scholarship recipients for the 2022-2023 academic year. In addition to the scholarships, Mr. Preston also provided a small fund to help assist with the costs of anatomy and physiology instruction.
What improvements are needed?: The Biology Department must be able to grow our course offerings while maintaining the consistency and rigor of the curriculum. The coordination of offerings, along with coordination of course materials at the different campuses, needs to be a priority.

Beginning in the Fall of 2018, the science division has had the equivalent of two full-time faculty members on our Hanford campus. We are currently offering all three nursing/allied health prerequisites on this campus, in addition to providing other science offerings for the general education pattern. FTES had increased to 107 in 2019-2020 when the majority of our courses were taught online and we were not limited by spatial constraints. It dropped to 62 in 2020-2021 and grew to 74.2 in 2021-22. This growth is most likely due to students wanting to return to face-to-classes and the removal of the social distancing requirements that limited course capacity. In the Fall of 2022, Bio 30 and 31 were waitlisted and many of the waitlisted students were able to enroll. Overall the growth in FTES and total offerings in Hanford is beneficial, but it has also introduced some unforeseen growing pains. We have inadequate lab space and storage, and have only part-time tech support. The Hanford campus has expansion plans in the near future, specifically more infrastructure including additional science classrooms by 2026. As science classrooms and labs are added, we will need more technical support and additional storage.

In Tulare our FTES had grown to 74.67 in 2019-2020, dropped to 40.7 during 2021, and then grew to 69.4. Starting in the Spring of 2022 we began offering two of the three nursing/allied health prerequisites on this campus, in addition to providing other science offerings for the general education pattern.

The laboratory space is very limited on the Hanford campus because all laboratory courses for all divisions of the College share the same classroom which prevents these courses from overlapping on the schedule. This includes courses that would draw very different students and not create student course conflicts. On the Visalia and Tulare campuses, Biology 20, the non-major general education science, and the nursing/allied-health science classes can be taught at the same time. In Biology, we assess our students using applied laboratory exams (identification of microscopic/macroscopic samples, gross anatomical structures, etc). Since these exams require microscopes, models, and/or specimens, they require a significant amount of time to set up and clean up between classes. This creates scheduling conflicts and prevents back-to-back course offerings, and ultimately decreases efficiency and greatly limits which courses can be offered and the times we can offer them. In the future, the lack of available laboratory space would prevent science, and other divisions who utilize the laboratory classroom, from offering additional sections during normal business hours. It is our division’s hope that as additional classroom and laboratory space is provided on the Hanford campus that our division membership can be part of the planning to ensure that the space is properly equipped.

In order for the Biology Department to offer sufficient general biology sections and maintain our standard of rigorous instruction, we need to hire additional faculty. In 2020 and 2021 we hired only to replace professors who retired, and now feel we are in a position where we need a growth position in Biology. Due to a highly competitive job market, we have lost some of our best adjunct instructors. When adjunct instructors leave it is often without much advanced notice and this has happened several occasions over the last academic year. The sudden vacancy has caused full-time faculty to have increase their course loads to levels they would not normally elect; ask our adjuncts, and even retired instructors, to teach an additional section; and,

has even required us to cancel classes (even those that are fully enrolled). We are requesting a full-time faculty growth position in Visalia to teach both BIOL 20 and BIOL 30.

Describe any external opportunities or challenges.: The most significant external challenge to our division has been COVID-19. In March of 2020, the pandemic caused our on-campus activities to immediately cease and we quickly moved all of our courses online. This caused faculty to dramatically alter their pedagogy, especially regarding the delivery of inquiry-based labs. We moved our lectures to video-conferencing platforms, all assessments to Canvas, and adopted simulated laboratory experiences, app-based learning tools, and did our best to provide valuable online learning experiences for our students. Predominantly synchronous and asynchronous online and hybrid options for courses persisted through the academic year 2020-2021. Based on restrictions due to COVID coupled with student demand and faculty modality choice, we anticipate that hybrid and asynchronous online options will remain in our near and distant future. The honest evaluation of how we are doing remains very much an unknown. The 2019-2020 and 2020-2021 success data may significantly skewed by moving courses online. Since the Fall 2019 semester courses were all face-to-face and then Spring 2020 was all online, and then the 2020-21 academic year was predominantly online, but included some face-to-face options, we can't concretely analyze the impact of modality. In 2020-21 245.40 FTES were from online courses and in 2021-22 this dropped to 84.6. With the limited data that is available (and the relative small sample sizes) there is no way to properly analyze the effectiveness of asynchronous online, hybrid vs. face-to-face, especially given the profound EW effect especially for the 2020-2021 year. When roughly 20% of students are choosing to not earn grades, gauging our success becomes precarious. Besides students, presumably with poor grades, opting out of the data set, we may also be experiencing some grade inflation due to student dishonesty during assessments.

We can however reflect on the rate of EW during Spring 2020 and the academic 2020-2021 year as a consequence of the transition to online instruction coupled with complications in students' lives as they were impacted by COVID-19. The District granted 4877 EW grades in 2019-2020 and 9529 EW grades in 2020-202; this accounted for 14% of the census enrollment. The overall rate of the EW grade for Biology courses was 19% which is higher than that of the District. When we look at the EW in Biology by ethnicity, African-American (17%) and Hispanic (14%) students where more likely than the other ethnic groups to withdrawal from their courses. The rate for White students was 12%. The withdrawal rates ranged from BIOL 2 with the least at 7% to BIOL 40 with the highest at 26%. For all of our courses the withdrawal rate for our Hispanic students was higher than White students, but was numerically similar to that of the District (approximately 2-3%). Can the higher withdrawals be attributed to lack of access to technology or reliable internet, learning/teaching styles that struggle online, or extrinsic factors? Unfortunately we may never know but the EW trends will continue to influence our program review for several years, and more importantly, impact our students progress toward degree or program completion. In the future as we get farther away from 2020-2021 in our analysis, we expect the data to be more robust regarding student success.

Overall SLO Achievement: SLO assessments across the Biology division were disrupted by COVID. Many of our assessment plans are based on practical laboratory exams or students' laboratory skills that could not properly be evaluated online. The SLO that we tried to complete online were impacted by students not completing the coursework and/or not taking the assessment seriously since there was an option for the EW grade. This EW option remained for students through the final exams, and well beyond for Spring and Fall of 2020; and, instructors were not made aware of EW grades in their courses after final grades were submitted. For 2020-2021, 19% of all BIOL students did not complete our courses and took the EW option. Unlike the success rates generated by the program review database which can easily remove the EW student records, our SLO data includes it, and that data could only be separated by retroactively removing individual student records which is not practical. If approximately 19% of our SLO data is unreliable, it is difficult to suggest valid conclusions and form solid plans for improvement.

In the Fall semester of 2021, the majority of the Biology courses returned to face-to-face instruction and the EW grade option for students had been removed. We have assessed SLO in many of our courses and feel that we are making adequate progress in our SLO and PLO work.

The BIOL 21, BIOL 30, BIOL 31, and BIOL 40 Student Learning Outcomes were assessed in Spring 2022. The information has been entered into Trac Dat and improvement plans have been established. Overall, the results were meaningful and we will continue to develop new assessments and reconfigure our pedagogical approaches to improve student success. Specifically, in BIOL 21, new visual aids will continue to be developed for the laboratory component of this course to further enhance student success into the next assessment cycle.

Changes Based on SLO Achievement: No changes are recommended. Our immediate work will focus on developing accurate assessments that can be completed in the 2022-2023 academic year.

Overall PLO Achievement: We were tasked with assessing the PLO's for the Associate of Science in Biology for Transfer (AS-T) program. To accomplish this a committee has been formed, made up of the Biology Major's instructors, to review outcomes, create assessment plans, and interpret the assessment results for this program. During the latest committee meeting, an assessment plan was created for the 2022-2023 school year. It was determined that an assessment during the previous school

year could not be accomplished due to the lack of face-to-face labs required to accurately assess the program outcomes, and the confounded data created by the EW effect.
Changes Based on PLO Achievement: Biology is on-track with our SLO assessment cycle and our PLO is progressing. We have no plans to change the cycle at this time
Outcome cycle evaluation: The three-year evaluation cycle for the Biology Department appears to be effective. No changes to the cycle are being contemplated.

Action: 2022-2023 Expand course offerings on our Visalia campus for allied-health and non-majors biology students

Hire a full-time faculty member to teach BIOL 20 and BIOL 30

Leave Blank:
Implementation Timeline: 2022 - 2023
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Identify related course/program outcomes: SLO in BIOL 20 and BIOL 30
Person(s) Responsible (Name and Position): Heather Moore and Brad Goodbar
Rationale (With supporting data): FTES in BIOL 20 and BIOL 30 are the highest in the division, and both courses are in demand and fill to capacity and beyond each semester. It has become unfeasible to expect adjunct instructors to cover this demand. There are not enough adjunct faculty in our area and historically we have a high turnover rate among our adjunct faculty due to a highly competitive job market; we have lost very capable adjunct instructors to full-time employment opportunities at other Colleges. Current faculty are teaching the maximum number of sections and overfilling sections to meet the demands of the students and College administration.
Priority: High
Safety Issue: No
External Mandate: No
Safety/Mandate Explanation:

Resources Description

Personnel - Faculty - Full-Time Biology Faculty (Active)
Why is this resource required for this action?: The associated payroll costs (salary and benefits) to hiring a new faculty member.
Notes (optional):
Cost of Request (Nothing will be funded over the amount listed.): 125000

Link Actions to District Objectives

District Objectives: 2018-2021
District Objective 1.1 - The District will increase FTES by 1.75% over the three years
District Objective 2.1 - Increase the percentage of students who earn an associate degree or certificate (CTE and Non-CTE) by 5 percentage points over three years
District Objective 2.2 - Increase the number of students who transfer to a four-year institution by 10 percent over three years
District Objective 2.4 - By 2021, Increase the percentage of CTE students who achieve their employment objectives by 5 percentage points

District Objectives: 2021-2025
District Objective 1.1 - The District will increase FTES 2% from 2021 to 2025.
District Objective 2.1 - Increase the number of students who earn an associate degree or certificate (CTE and non-CTE) by 5% from 2021-2025.
District Objective 2.2 - Increase the number of students who are transfer-ready by 15% and students who transfer to four-year institutions by 10% from 2021-2025.
District Objective 2.4 - Increase the percentage of CTE students who achieve their employment objectives by five percentage

points (job closely related to field of study and
attainment of a livable wage) and the number of CTE students who successfully complete 9+ CTE units in a single year by 10% from 2021-2025.

District Objective 3.1 - Reduce equity gaps in course success rates across all departments by 40% from 2021-2025.

Action: 2022-2023 Expand course offerings at Tulare campus (TCC)

Hire a full-time faculty member to teach BIOL 40 and BIOL 20 at TCC.

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Implementation Timeline: 2022 - 2023
Leave Blank:
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Identify related course/program outcomes: SLO in BIOL 40 and BIOL 20
District Objectives:
Goal 1: increase enrollment relative to workforce development needs
Goal 2: improve rate at which students complete degrees
Goal 3: tailor and implement programs to match the demands of ongoing changes in workforce development

Person(s) Responsible (Name and Position): Linda Flora, faculty; Francisco Banuelos, Dean; Louann Waldner, TCC Provost, and Jonna Schengel, Dean of Career Technical Education, Nursing and Allied Health
Rationale (With supporting data): To provide equity across campuses for allied health students, Microbiology (BIOL 40) should be offered on the Tulare campus(TCC). Microbiology is a required course for students wishing to apply to the COS Registered Nursing program. The addition of a second full-time faculty position at TCC will provide an opportunity to add non-majors courses such as BIOL 20, as well as additional sections of Anatomy and Physiology. These increased resources are strongly supported by California's K-16 Education Collaboratives Grant Program, specifically by the Strong Workforce 7 initiative that is dedicated to producing more local nurses in Tulare County. To this end, COS CTE has partnered with Tulare, Visalia, and Lindsay School Districts, CSU Fresno, and several southern valley medical facilities to create the PRE Nursing Pathway project. The objective is to create a healthcare pathway for Tulare County high school students. Students chosen for the program will begin their preparatory coursework during their senior year of high school and continue into cohort groups sponsored at the Tulare campus. It is therefore vital to increase the availability of Anatomy, Physiology, and Microbiology courses to provide adequate opportunities for students in this program as well as students whose primary campus is TCC.
BIOL 40 startup costs can be partially or fully funded by the above-mentioned programs. Plus there are additional monies available for program support staff/ education supplies.

Priority: High
Safety Issue: No
External Mandate: No
Safety/Mandate Explanation:

Resources Description

Personnel - Faculty - Full-time biology faculty for the Tulare Campus. (Active)
Why is this resource required for this action?: Payroll costs (Salary and Benefits)
Notes (optional):
Cost of Request (Nothing will be funded over the amount listed.): 125000

Link Actions to District Objectives

District Objectives: 2018-2021
District Objective 1.1 - The District will increase FTES by 1.75% over the three years
District Objective 2.1 - Increase the percentage of students who earn an associate degree or certificate (CTE and Non-CTE) by 5 percentage points over three years

District Objective 2.2 - Increase the number of students who transfer to a four-year institution by 10 percent over three years

District Objectives: 2021-2025
District Objective 1.1 - The District will increase FTES 2% from 2021 to 2025.
District Objective 2.1 - Increase the number of students who earn an associate degree or certificate (CTE and non-CTE) by 5% from 2021-2025.
District Objective 2.2 - Increase the number of students who are transfer-ready by 15% and students who transfer to four-year institutions by 10% from 2021-2025.
District Objective 2.4 - Increase the percentage of CTE students who achieve their employment objectives by five percentage points (job closely related to field of study and attainment of a livable wage) and the number of CTE students who successfully complete 9+ CTE units in a single year by 10% from 2021-2025.
District Objective 3.1 - Reduce equity gaps in course success rates across all departments by 40% from 2021-2025.

Action: 2022-2023 Expansion of the MESA program

Build a more comprehensive MESA+ (MESA-plus) program to support incoming and current STEM majors

Leave Blank:
Implementation Timeline: 2022 - 2023
Leave Blank:
Leave Blank:
Identify related course/program outcomes:
Person(s) Responsible (Name and Position): Josh Puhl
Rationale (With supporting data): Recently, a long-standing initiative to provide support to incoming STEM Freshmen students came to an end at COS with the ending of the REALM grant and program. Historically, a grant aimed at supporting incoming Freshmen STEM majors has been in place serving COS students for over 10 years, but due to interruptions in federal funding cycles, funding for such a program has ended abruptly leaving a noticeable gap in support structure for newer STEM majors. On a more positive note, the state of California has established funding for the MESA programs, which is similar to many aspects of the REALM-like programs. We are proposing to harness the advantages of these new funds by proposing improvements to the MESA programs at COS to incorporate some of the features of REALM to expand MESA offerings in an effort to disconnect the beneficial student programs of REALM from funding cycles and, instead, establish a more permanent set of offerings using COS funds (which could be supplemented with grant funding in the future). We propose the current MESA coordinator position be expanded to establish a new full-time classified position to oversee the MESA program as well as to establish a permanent and formal program to support incoming STEM majors in their first year that retains the most important aspects of the REALM program.

The value of the REALM program to student outcomes is tangible in retaining STEM majors and in success within STEM courses. In Cohort 4 of the REALM program (2019-2020 academic year) 36 students were enrolled in the program. Out of these 36 students, 33 were still enrolled at COS a year later (92% retention rate) and 28 remained as STEM majors (78% of original group; 85% of remaining students). The successful outcomes also extend to students transferring to universities. The REALM cohort from 2018-2019 had 38 students, 15 of which transferred and 15 were still enrolled at COS as STEM majors (accounting for 79% of students; as of Fall 2021). REALM students realized better outcomes during summer classes, too. For CHEM 20 the success rate for all students taking the class during the summer terms was 44%, but the success rate among REALM students was 92%. Summer MATH classes saw similar increases in success rates with Math 154 having an overall 47% success rate and 100% of REALM students succeeding. Math 65 has a 42% overall success rate, but again, 100% of REALM students successfully completed the course.

The REALM program consisted of several summer orientation events, requiring students to take two summer courses (a college skills seminar course and a STEM course), a hands-on laboratory experience and several community-building events scheduled through the school year (usually in partnership with MESA). Students were required to join the MESA program and meet regularly with a MESA academic coach throughout their first year. Another part of the program was to provide textbooks for

Program Review - Biology

STEM courses during the first year. A final part of the program was for REALM students to have a dedicated counselor, with whom they were required to meet, regularly.

We are proposing to continue some or all of these activities but with modification, lumping all parts into a more comprehensive MESA+ (MESA-plus) program. We intend to continue having a formal program that students join to create collaboration and community-building opportunities, which helps students feel included and to be part of a community from the beginning of their COS journey. The class requirements will remain and are financially self-sufficient through tuition income. A one or two day orientation held right before the start of the Fall semester will help establish rapport among students and between students and faculty, integrate new students into the rich STEM community (and thus helping sustain the community), and provide students with information to help them begin their COS journey well-informed and feeling confident to rise to the challenges of college life. We propose to keep the MESA membership requirement and to continue requiring incoming STEM majors to regularly meet with their assigned MESA coach. Continued inclusion of a counselor specializing in STEM students is also part of our request. We suggest to eliminate the lab experience as this was one of the most expensive line-items from REALM. Perhaps, these could be brought back after securing extramural funding in the future. We, also, recommend phasing-out the textbook loan program by not purchasing new textbooks, but we should continue loaning any textbooks already owned that are still being used by teachers.

Costs associated with this proposal include supporting a COS classified employee serving as a full-time MESA+ coordinator ($75k + benefits), an orientation event with food and a few giveaways to students ($500-$1000), supporting 50% (or an appropriate percentage based on workload) of a dedicated STEM counselor ($35k), and four community-building events with food and giveaways (2/semester, $500 each, $2000 total). The MESA coaches and tutors are part of the MESA program and already receive funding, so they are not included in this proposal. The part-time MESA coordinator is already partially supported by COS, and we request that some of the additional MESA funding coming from the State be used to expand this position to full time. The dedicated counselor is, also, already partially supported and we request that institutional funds continue to support this important resource for students.
Priority: High
Safety Issue: No
External Mandate: Yes
Safety/Mandate Explanation:

Resources Description

Personnel - Classified/Confidential - Classified Employee to Coordinate MESA (Active)
Why is this resource required for this action?: Payroll expenses
Notes (optional):
Cost of Request (Nothing will be funded over the amount listed.): 95000

Adjustment to Base Budget - Increase STEM counseling hours to support at least 10-15 hours per week of STEM counseling. Currently, MESA offers only 5 hours per week in STEM counseling. (Active)
Why is this resource required for this action?: Doubling or tripling the number of hours for a part-time MESA STEM Counselor to 15 hours will help serve over 170 MESA students.
Notes (optional):
Cost of Request (Nothing will be funded over the amount listed.): 35000

Link Actions to District Objectives

District Objectives: 2018-2021
District Objective 2.1 - Increase the percentage of students who earn an associate degree or certificate (CTE and Non-CTE) by 5 percentage points over three years
District Objective 2.2 - Increase the number of students who transfer to a four-year institution by 10 percent over three years
District Objective 2.4 - By 2021, Increase the percentage of CTE students who achieve their employment objectives by 5 percentage points

District Objectives: 2021-2025

District Objective 2.1 - Increase the number of students who earn an associate degree or certificate (CTE and non-CTE) by 5% from 2021-2025.
District Objective 2.2 - Increase the number of students who are transfer-ready by 15% and students who transfer to four-year institutions by 10% from 2021-2025.
District Objective 3.1 - Reduce equity gaps in course success rates across all departments by 40% from 2021-2025.

Action: 2022-2023 Improve student laboratory engagement with PCR technology in Hanford

Purchase thermocycler and PCR reagents to update the Hanford campus lab materials.

Leave Blank:
Implementation Timeline: 2022 - 2023
Leave Blank:
Leave Blank:
Identify related course/program outcomes: SLO in BIOL 40
Person(s) Responsible (Name and Position): Erik Arteaga
Rationale (With supporting data): Currently the Hanford campus does not have a thermocycler for PCR experimentation. This will update the Hanford lab materials to match what is offered at the Visalia campus for BIOL 40, thus ensuring student lab experiences in BIOL 40 are equitable across our campuses that offer BIOL 40.
Priority: High
Safety Issue: No
External Mandate: No
Safety/Mandate Explanation:

Link Actions to District Objectives

District Objectives: 2018-2021
District Objective 2.1 - Increase the percentage of students who earn an associate degree or certificate (CTE and Non-CTE) by 5 percentage points over three years
District Objective 2.2 - Increase the number of students who transfer to a four-year institution by 10 percent over three years

District Objectives: 2021-2025
District Objective 1.1 - The District will increase FTES 2% from 2021 to 2025.
District Objective 2.2 - Increase the number of students who are transfer-ready by 15% and students who transfer to four-year institutions by 10% from 2021-2025.
District Objective 3.1 - Reduce equity gaps in course success rates across all departments by 40% from 2021-2025.

Action: 2022-2023 Improve student access to environmental laboratory experiences which utilize our greenhouse

Renovate irrigation for green house and expand inventory of equipment and consumables for plant science experimentation

Leave Blank:
Implementation Timeline: 2022 - 2023
Leave Blank:
Leave Blank:
Identify related course/program outcomes: Bio 2 and Bio 21 SLO
Person(s) Responsible (Name and Position): Brad Goodbar and Matthew Waterhouse
Rationale (With supporting data): The environmental laboratory experiences ceased in 2020 due to COVID. It has taken investment, financial and time spent, to reinvigorate our greenhouse and native garden. It is going well but we are still looking to improve our student experience within the environmental labs.

In the last year, we have hired a landscape maintenance company to come in once a week and trim plants, remove weeds and maintain the irrigation system for the native plant garden. By maintaining the garden once a week, we can handle the extremes in temperature that take place throughout the year with regards to water requirements. It also gave us a much better opportunity to make new modifications to the garden by removing dead plant material, making changes in soil structure, and adding new plants.

We also have been able to hire several students throughout the years to clean out the greenhouse of debris and broken materials. The drains on the floor have been cleared and nonessential materials have been removed from the floor. Part of the problem is the excess water built up from the spray water system. This standing water ultimately leads to a buildup of algae on the floors which becomes slippery and adds excess weeds and pests. We are at the point now re-potting many of the plants into larger pots and the acquisition of new plants to replace plants that were lost during the past few years. Ultimately, we would like to make this part of the lab tech position at the Tulare campus.

We are no longer sharing the greenhouse with the Sequoia Riverlands Trust due to their inability to maintain and monitor their half of the greenhouse. We have now doubled our workspace and want to now have the ability for students to develop and run long-term labs within the facility.

In the near future, we would like to hire an irrigation company to redesign and implement a new irrigation system for the greenhouse. This system would be integrated in the current system but would run above the plants on the side tables and down the center. This system would consist of drip extensions that would hang down from the central lines running east/west on the top beams of the greenhouse. A combination of sprayers and misters would also be incorporated into this system. The sprayers would be for smaller, more delicate plants and the misters would increase humidity levels within the greenhouse. The estimated cost of the renovation is $10,000,

We want to purchase additional equipment and consumables to support experimentation within the Bio 2 course. Students will design and conduct an experiment testing the influence of one abiotic variable on plant growth. This experiment requires that students employ scientific to properly propose a hypothesis, critically think through the variables and design an appropriate experiment, run the experiment, collect data, analyze data, and form meaningful conclusions. The estimated cost of the experimental supplies is $5,000,
Priority: High
Safety Issue: No
External Mandate: No
Safety/Mandate Explanation:

Resources Description

Equipment - Instructional - Renovation of green house irrigation system. (Active)
Why is this resource required for this action?: Updating the deteriorated green house irrigation system to maintain the plants, which are used for educational purposes and support the plant biology laboratories.
Notes (optional):
Cost of Request (Nothing will be funded over the amount listed.): 6000

Link Actions to District Objectives

District Objectives: 2018-2021
District Objective 2.2 - Increase the number of students who transfer to a four-year institution by 10 percent over three years

District Objectives: 2021-2025
District Objective 1.1 - The District will increase FTES 2% from 2021 to 2025.
District Objective 2.2 - Increase the number of students who are transfer-ready by 15% and students who transfer to four-year institutions by 10% from 2021-2025.
District Objective 3.1 - Reduce equity gaps in course success rates across all departments by 40% from 2021-2025.

Program Review - Biology

Action: 2022-2023 Establish a leaf-cutter ant-farm display for STEM student engagement

Purchase ant-farm display to be housed in the John Muir building

Leave Blank:
Implementation Timeline: 2022 - 2023
Leave Blank:
Leave Blank:
Identify related course/program outcomes: SLO in non-majors and majors Biology courses
Person(s) Responsible (Name and Position): Josh Puhl
Rationale (With supporting data): We are requesting support to establish a new educational and community-engagement resource at COS in the form of a live leaf-cutter ant-farm display. This display would be fully enclosed, built and maintained by COS STEM faculty and students, and available for viewing/study by both COS students, staff and faculty as well as the public.

The display would be established in a publicly-accessible area on the Visalia Campus (e.g., hallway in John Muir) and would be totally self-contained to eliminate any individual ants getting out. The ant farm would be used for several purposes including as a teaching tool where students will observe living social insects interacting with each other and their environment. It would also be used by students participating in the Friday Night Lab program and potentially in computer science courses for automated monitoring and tracking of live subjects by machine learning and artificial intelligence computer programs.

The ant farm would serve several different goals/missions of COS. It would provide immediate and ongoing academic and instructional value by making available interactive and hands-on activities useful in Biology courses such as Human Ecology, Animal Biology, and Major's General Biology 2 to teach students about insect structure, animal/fungus symbiosis, social organization among animals and self-contained ecosystems; all critical and contemporary issues of Biology. The farm creates many opportunities for exploring and creating computer vision and automated computer tracking/monitoring systems to observe colony members which could provide exciting and distinctive ideas from which lessons in computer science and computer programming could be developed. The farm also serves as a unique and interesting community-engagement tool. It would be an exhibit to share with members of the COS community as well as the general public and will hopefully become a Visalia Campus landmark and regular stop for campus tours for new students and dignitaries alike to show off COS' STEM programs and accomplishments.

The display will be built and maintained by COS students along with assistance and mentoring by COS faculty and staff. Initially, Drs. Josh Puhl and Matt Waterhouse will take ownership of the display's creation and maintenance. The plan is to assign several interested students to perform the maintenance duties but Drs. Puhl and Waterhouse will provide oversight and supplemental support, as needed. To help reduce risks associated with the project, COS resources will obtain guidance from the curators of a similar display at the California Academy of Sciences museum in San Francisco. We will consult these external mentors prior to construction to ensure containment and safety for all involved.

The project's costs will initially be for construction and will be around $1000-$1500 (one-time costs). These funds will be to purchase materials and to acquire some ants to start a colony. Ongoing costs are estimated at $200-$500 per year to purchase food, replacement substrates, and to cover any repairs/maintenance of the enclosures as well as to add new sensors and instrumentation (e.g., cameras, additional environmental sensors, etc.). The facility costs will be focused on running several low-power lighting systems, a small air circulation system and, if necessary, a small heater. The Dean over the sciences has expressed a preliminary willingness to help with ongoing costs but is hoping the initial costs, plus the first year or two of maintenance will be funded through above-base funding awards. We will, also request ongoing maintenance funds from the COS Foundation and/or the Friday Night Lab program. Total funds requested here total $2000.

The ant-farm display we are proposing would be a unique addition to COS STEM offerings for direct and immediate use in the classroom and would provide a truly unique exhibit to share with people across the COS community and general public. We hope the display will show-off the great things happening in the STEM programs at the College all while helping provide educational opportunities to a variety of students across multiple STEM disciplines.
Priority: High
Safety Issue: No

Program Review - Biology

External Mandate: No
Safety/Mandate Explanation:

Resources Description

Equipment - Instructional - Purchase ant-farm display to be housed in the John Muir building (Active)
Why is this resource required for this action?: The ant fram display will be used to educate students on their particular ecosystem. It will support learning in and outside of biology labs.
Notes (optional):
Cost of Request (Nothing will be funded over the amount listed.): 2000

Link Actions to District Objectives

District Objectives: 2018-2021
District Objective 2.1 - Increase the percentage of students who earn an associate degree or certificate (CTE and Non-CTE) by 5 percentage points over three years

District Objectives: 2021-2025
District Objective 1.1 - The District will increase FTES 2% from 2021 to 2025.
District Objective 2.2 - Increase the number of students who are transfer-ready by 15% and students who transfer to four-year institutions by 10% from 2021-2025.
District Objective 3.1 - Reduce equity gaps in course success rates across all departments by 40% from 2021-2025.

Action: 2021-2022 Improve support to MESA and incoming STEM students

Hire a MESA coordinator whose position includes managing the MESA program and developing a permanent program to support incoming STEM majors in their first year. The later would mirror the REALM program which has now ended.

Leave Blank:
Implementation Timeline: 2021 - 2022
Leave Blank:
Leave Blank:
Identify related course/program outcomes: BIOL 1 and BIO 2 SLO and Biology PLO
Person(s) Responsible (Name and Position): Josh Puhl
Rationale (With supporting data): Recently, a long-standing initiative to provide support to incoming STEM Freshmen students came to an end at COS with the ending of the REALM grant and program. Historically, a grant aimed at supporting incoming Freshmen STEM majors has been in place serving COS students for over 10 years, but due to interruptions in federal funding cycles, funding for such a program has ended abruptly leaving a noticeable gap in support structure for newer STEM majors. We are proposing that the current MESA coordinator position be expanded to establish a new classified position to oversee the MESA program as well as to establish a permanent program to support incoming STEM majors in their first year that retains the most important aspects of the REALM program.
The value of the REALM program to student outcomes is tangible in retaining STEM majors and in success within STEM courses. In Cohort 4 of the REALM program (2019-2020 academic year) 36 students were enrolled in the program. Out of these 36 students, 33 are still enrolled at COS (92% retention rate) and 28 remain as STEM majors (78% of original group; 85% of remaining students). The successful outcomes also extend to students transferring to universities. The REALM cohort from 2018-2019 had 38 students, 15 of which transferred and 15 are still enrolled at COS as STEM majors (accounting for 79% of students). REALM students realized better outcomes during summer classes, too. For CHEM 20 the success rate for all students taking the class during the summer terms was 44%, but the success rate among REALM students was 92%. Summer MATH classes saw similar increases in success rate with Math 154 having an overall 47% success rate and 100% of REALM students succeeding. Math 65 has a 42% overall success rate, but again, 100% of REALM students successfully completed the course.
The REALM program consisted of several summer orientation events, requiring students to take two summer courses (a college skills course and a STEM course), a hands-on laboratory experience and several community-building events scheduled through the school year (usually in partnership with MESA). Students were required to join the MESA program and meet regularly with a

MESA academic coach throughout their first year. Another part of the program was to provide textbooks for STEM courses during the first year. A final part of the program was for REALM students to have a dedicated counselor, with whom they were required to meet, regularly.
Permanently terminating the REALM program or equivalent will likely have a noticeable and negative effect on student outcomes in COS STEM program. We are proposing to continue some or all of these activities but with modification, lumping all parts into a more comprehensive MESA+ program. We intend to continue having a formal program that students join to create a group identity, which helps students feel included and to be part of a community from the beginning of their COS journey. The class requirements will remain and are financially self-sufficient through tuition income. A one or two day orientation held right before the start of the Fall semester will help establish rapport, integrate new students into the rich STEM community (and thus helping sustain the community), and provide students with information to help them begin their COS journey well-informed and feeling ready to rise to the challenges of college life. We propose to keep the MESA membership requirement and to continue requiring incoming STEM majors to regularly meet with MESA coaches. Continued inclusion of a counselor specializing in STEM students is also part of our request. We suggest to eliminate the lab experience as this was one of the most expensive line-items from REALM. We, also, recommend phasing-out the textbook loan program by not purchasing new textbooks, but we should continue loaning any textbooks already owned that are still being used by teachers.
Costs associated with this proposal include supporting a COS classified employee serving as a full-time a MESA+ coordinator ($50k-$75k + benefits), an orientation event with food and a few giveaways to students ($500-$1000), supporting 50% (or an appropriate percentage based on workload) of a dedicated STEM counselor ($35k), and four community-building events with food and giveaways (2/semester, $500 each, $2000 total). The MESA coaches and tutors are part of the MESA program and already receive funding, so they are not included in this proposal. The part-time MESA+ coordinator is already partially supported by COS, so the coordinator line-item above would have part of the cost offset. The dedicated counselor is, also, already partially supported. Total costs come to approx.115k-130k.
Priority: High
Safety Issue: No
External Mandate: No
Safety/Mandate Explanation:

Update on Action

Updates

Update Year: 2021-2022 09/18/2022
Status: Continue Action Next Year
The coordinator was hired and we are now working to expand the program.
Impact on District Objectives/Unit Outcomes (Not Required):

Link Actions to District Objectives

District Objectives: 2018-2021

District Objective 2.2 - Increase the number of students who transfer to a four-year institution by 10 percent over three years

Action: 2021-2022 Improve assessment efficacy of objective questions on exams and quizzes

Purchase scantron software and compatible scanner with item analysis.

Leave Blank:
Implementation Timeline: 2021 - 2022
Leave Blank:
Leave Blank:
Identify related course/program outcomes: SLO for BIOL 1, BIOL 2, BIOL 20, BIOL 21, BIOL 22, BIOL 25, BIOL 30, BIOL 31, BIOL 40
Person(s) Responsible (Name and Position): Courtney Traugh, Professor
Rationale (With supporting data): Scantron's Remark software and a compatible scanner has the capability to do item analysis of exams, showing class averages not only for the exam as a whole, but for individual questions. Having the ability to quickly

assess the class' performance on individual questions would allow instructors to root out poorly written or inequitable questions. Further, this software would enable instructors to determine if the class as a whole performed poorly on specific sections of the exam and would inform decisions to revisit topics. On the whole, this software and a compatible scanner would improve student assessment and performance on student learning outcomes.

The scanner would be housed in a shared space so that all biology instructors could access it. Access could be expanded to include other divisions and/or instructors from other divisions who are interested in analyzing their assessments. Our plan is to pilot the scanner in Visalia. Assuming the pilot goes well, we may submit future proposals to purchase additional scanners for the Tulare and Hanford campuses.

The associated estimate of cost is provided in our supporting document section within program review
Priority: Medium
Safety Issue: No
External Mandate: No
Safety/Mandate Explanation:

Update on Action

Updates

Update Year: 2022 - 2023 09/07/2022
Status: Action Completed
Purchase was unable to be funded.
Impact on District Objectives/Unit Outcomes (Not Required):

Resources Description

Equipment - Instructional - Scantron software and equipment: IN4/2312 (Active)
Why is this resource required for this action?: Improve assessment efficacy of objective questions on exams and quizzes
Notes (optional):
Cost of Request (Nothing will be funded over the amount listed.): 9500

Link Actions to District Objectives

District Objectives: 2018-2021

District Objective 4.1 - Increase the use of data for decision-making at the District and department/unit level

Action: 2021-2022 Provide full-time support for Hanford laboratories.

Hire a full-time science technician to prepare lab materials for our laboratories offered on the Hanford campus.

Leave Blank:
Implementation Timeline: 2021 - 2022
Leave Blank:
Leave Blank:
Identify related course/program outcomes:
Person(s) Responsible (Name and Position): Erik Arteaga and Heather Moore
Rationale (With supporting data): At the start of the Fall 2021 semester there was no laboratory technician employed at the Hanford campus. Without a laboratory technician instructors must allocate more time for laboratory design and cleanup. To maintain equity among all three campuses we are requesting funds to hire a full-time laboratory technician. Previously in Hanford, our part-time laboratory technicians have only remained employed for short periods of time because they are able to find full-time employment opportunities elsewhere. The turnover rate has been significant, specifically there have been four individuals in this role in the past five semesters. As soon as we feel that we have adequately trained the technician, he/she leaves COS, and we are then retraining. A full-time laboratory position would likely attract an individual looking for long term employment thus eliminating the retention issues associated with part-time technicians. Additionally, Hanford campus has plans

to expand its infrastructure including addition of science classrooms and labs, and hiring a full-time laboratory technician would help with the transition of supporting more science courses.
Priority: High
Safety Issue: Yes
External Mandate: No
Safety/Mandate Explanation: The laboratory technician is expected to maintain a safe environment for students by maintaining safety data sheets, disposing of hazardous wastes, and properly storing chemicals.

Update on Action

Updates

Update Year: 2022 - 2023 09/07/2022
Status: Action Completed
A part-time technician was hired and she has remained in the position. All labs are adequately covered in our current space.
Impact on District Objectives/Unit Outcomes (Not Required):

Link Actions to District Objectives

District Objectives: 2018-2021

District Objective 1.1 - The District will increase FTES by 1.75% over the three years

Action: 2022-2023 Microbiology lab equipment at Tulare campus (TCC)

Begin offering Microbiology and expand Biology 20 sections in Tulare.

Leave Blank:
Implementation Timeline: 2022 - 2023
Leave Blank:
Leave Blank:
Identify related course/program outcomes: SLO in BIOL 40 and BIOL 20
District Objectives:
Goal 1: increase enrollment relative to workforce development needs
Goal 2: improve rate at which students complete degrees
Goal 3: tailor and implement programs to match the demands of ongoing changes in workforce development

Person(s) Responsible (Name and Position): Linda Flora, faculty; Francisco Banuelos, Dean; Louann Waldner, TCC Provost, and Jonna Schengel, Dean of Career Technical Education, Nursing and Allied Health
Rationale (With supporting data): To provide equity across campuses for allied health students, Microbiology (BIOL 40) should be offered on the Tulare campus(TCC). Microbiology is a required course for students wishing to apply to the COS Registered Nursing program. The addition of a second full-time faculty position at TCC will provide an opportunity to add non-majors courses such as BIOL 20, as well as additional sections of Anatomy and Physiology. These increased resources are strongly supported by California's K-16 Education Collaboratives Grant Program, specifically by the Strong Workforce 7 initiative that is dedicated to producing more local nurses in Tulare County. To this end, COS CTE has partnered with Tulare, Visalia, and Lindsay School Districts, CSU Fresno, and several southern valley medical facilities to create the PRE Nursing Pathway project. The objective is to create a healthcare pathway for Tulare County high school students. Students chosen for the program will begin their preparatory coursework during their senior year of high school and continue into cohort groups sponsored at the Tulare campus. It is therefore vital to increase the availability of Anatomy, Physiology, and Microbiology courses to provide adequate opportunities for students in this program as well as students whose primary campus is TCC.
BIOL 40 startup costs can be partially or fully funded by the above-mentioned programs. Plus there are additional monies available for program support staff/ education supplies
Priority: High
Safety Issue: Yes
External Mandate: No

Program Review - Biology

Safety/Mandate Explanation:

Resources Description

Equipment - Instructional - Microbiology lab equipment (Active)
Why is this resource required for this action?: Microbiology (BIOL 40) has never been offered in Tulare. Specialized equipment, such as an autoclave and incubators will be needed for labs.
Notes (optional):
Cost of Request (Nothing will be funded over the amount listed.): 50000

Link Actions to District Objectives

District Objectives: 2018-2021
District Objective 1.1 - The District will increase FTES by 1.75% over the three years
District Objective 2.1 - Increase the percentage of students who earn an associate degree or certificate (CTE and Non-CTE) by 5 percentage points over three years
District Objective 2.2 - Increase the number of students who transfer to a four-year institution by 10 percent over three years
District Objective 2.4 - By 2021, Increase the percentage of CTE students who achieve their employment objectives by 5 percentage points

District Objectives: 2021-2025
District Objective 1.1 - The District will increase FTES 2% from 2021 to 2025.
District Objective 2.1 - Increase the number of students who earn an associate degree or certificate (CTE and non-CTE) by 5% from 2021-2025.
District Objective 2.2 - Increase the number of students who are transfer-ready by 15% and students who transfer to four-year institutions by 10% from 2021-2025.
District Objective 2.4 - Increase the percentage of CTE students who achieve their employment objectives by five percentage points (job closely related to field of study and attainment of a livable wage) and the number of CTE students who successfully complete 9+ CTE units in a single year by 10% from 2021-2025.

Action: 2022-2023 Microbiology supplies at Tulare campus (TCC)

Expand biology course offerings in Tulare, specifically in BIOL 40 and BIOL 20.

Leave Blank:
Implementation Timeline: 2022 - 2023
Leave Blank:
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Identify related course/program outcomes: SLO in BIOL 40 and BIOL 20
District Objectives:
Goal 1: increase enrollment relative to workforce development needs
Goal 2: improve rate at which students complete degrees
Goal 3: tailor and implement programs to match the demands of ongoing changes in workforce development

Person(s) Responsible (Name and Position): Linda Flora, faculty; Francisco Banuelos, Dean; Louann Waldner, TCC Provost, and Jonna Schengel, Dean of Career Technical Education, Nursing and Allied Health
Rationale (With supporting data): To provide equity across campuses for allied health students, Microbiology (BIOL 40) should be offered on the Tulare campus(TCC). Microbiology is a required course for students wishing to apply to the COS Registered Nursing program. The addition of a second full-time faculty position at TCC will provide an opportunity to add non-majors courses such as BIOL 20, as well as additional sections of Anatomy and Physiology. These increased resources are strongly supported by California's K-16 Education Collaboratives Grant Program, specifically by the Strong Workforce 7 initiative that is

dedicated to producing more local nurses in Tulare County. To this end, COS CTE has partnered with Tulare, Visalia, and Lindsay School Districts, CSU Fresno, and several southern valley medical facilities to create the PRE Nursing Pathway project. The objective is to create a healthcare pathway for Tulare County high school students. Students chosen for the program will begin their preparatory coursework during their senior year of high school and continue into cohort groups sponsored at the Tulare campus. It is therefore vital to increase the availability of Anatomy, Physiology, and Microbiology courses to provide adequate opportunities for students in this program as well as students whose primary campus is TCC.
BIOL 40 startup costs can be partially or fully funded by the above-mentioned programs. Plus there are additional monies available for program support staff/ education supplies

Priority: High
Safety Issue: Yes
External Mandate: No
Safety/Mandate Explanation:

Resources Description

Adjustment to Base Budget - Offering BIOL 40: Microbiology and other STEM Biology courses require on-going costs for supplies to conduct the new labs in Tulare. (Active)

Why is this resource required for this action?: The on-going funds will be used to purchase the following lab supplies: slides; test tubes; petri dishes; growth mediums, both solid and liquid; inoculation loops; pipettes and tips;
These are in addition to weekly supplies that support all of the new biology labs that will be offered.
Notes (optional):
Cost of Request (Nothing will be funded over the amount listed.): 12000

Link Actions to District Objectives

District Objectives: 2018-2021
District Objective 1.1 - The District will increase FTES by 1.75% over the three years
District Objective 2.1 - Increase the percentage of students who earn an associate degree or certificate (CTE and Non-CTE) by 5 percentage points over three years
District Objective 2.2 - Increase the number of students who transfer to a four-year institution by 10 percent over three years
District Objective 2.4 - By 2021, Increase the percentage of CTE students who achieve their employment objectives by 5 percentage points

District Objectives: 2021-2025
District Objective 1.1 - The District will increase FTES 2% from 2021 to 2025.
District Objective 2.1 - Increase the number of students who earn an associate degree or certificate (CTE and non-CTE) by 5% from 2021-2025.
District Objective 2.2 - Increase the number of students who are transfer-ready by 15% and students who transfer to four-year institutions by 10% from 2021-2025.
District Objective 2.4 - Increase the percentage of CTE students who achieve their employment objectives by five percentage points (job closely related to field of study and attainment of a livable wage) and the number of CTE students who successfully complete 9+ CTE units in a single year by 10% from 2021-2025.

Action: 2022-2023 Improve Lab Environment

Replace broken lab chairs in John Muir Biology Labs, 150 chairs in total.

Leave Blank:
Implementation Timeline: 2022 - 2023
Leave Blank:

Program Review - Biology

Leave Blank:
Identify related course/program outcomes:
Person(s) Responsible (Name and Position): Francisco Banuelos
Rationale (With supporting data):
Priority: High
Safety Issue: Yes
External Mandate: No
Safety/Mandate Explanation:

Resources Description

Equipment - Instructional - Armless laboratory Chairs (150 total) (Active)
Why is this resource required for this action?: Many of the chairs are broken, have missing bolts, or loose bolts
Notes (optional):
Cost of Request (Nothing will be funded over the amount listed.): 125000

Link Actions to District Objectives

District Objectives: 2021-2025
District Objective 1.1 - The District will increase FTES 2% from 2021 to 2025.
District Objective 2.1 - Increase the number of students who earn an associate degree or certificate (CTE and non-CTE) by 5% from 2021-2025.
District Objective 2.2 - Increase the number of students who are transfer-ready by 15% and students who transfer to four-year institutions by 10% from 2021-2025.
District Objective 2.4 - Increase the percentage of CTE students who achieve their employment objectives by five percentage points (job closely related to field of study and attainment of a livable wage) and the number of CTE students who successfully complete 9+ CTE units in a single year by 10% from 2021-2025.