Comprehensive Program Review Report

Program Review - Biology

Program Summary

2021-2022

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 a 68% (2018-2019), to 72% (2019-2020), and then 77% (2020-2021). The success rates for BIOL 2 went from a 76.6% (2018-2019), to 96.2% (2019-2020), and then 79.5% (2020-2021). The data continue to suggest that students who pass BIOL 1 are well prepared for BIOL 2. Dis-aggregated data indicates that success rates are better in nearly all ethnicity categories when compared to the entire department and when compared to the 6-year data for the District. BIOL 1 dis-aggregated data shows that multi-year, 3-year, success rate of 68.8 % for Hispanics and 72.6% for Whites. BIOL 2 dis-aggregated data shows that multi-year, 3-year, success rate of 87.5% for Hispanics and 77.4% for Whites.

BIOL 1 FTES went from 35.10 in 2018-19, then dropped to 33.9 in 2019-2020, and increased to 38.70 in 2020-2021. BIOL 2 FTES went from 14.0 in 2018-19, to 16.5 in 2019-2020, and then 12.60 in 2020-2021. 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 have increased over the last three years; 77% in 2018-19, 81% in 2019-2020, and 85.2% in 2020-2021. The dis-aggregated data for BIOL 20 indicate that the success rates were higher in BIOL 20 than for the entire Biology Department. The multiyear success rate of BIOL 20 students is 81.2%. BIOL 20 has significantly increased FTES from 136.40 in 2018-2019, to 149.2 in 2019-2020, and to 162.60 in 2020-2021. This increase can be attributed to the increase in offerings of asynchronous online and hybrid options, in addition to face-to-face modalities. 2020-2021 is the first year that FTES data has been presented where online and the Center campuses have been separated; 81.80 FTES were online for BIOL 20.

BIOL 21 (Plant Biology) success rates are 61.9% in 2018-2019, 83.2% in 2019-2020, and then 78.0% in 2020-2021. Biology 21 FTES went from 17.5 in 2018-2019, to 17.3 in 2019-2020, and then 16.00 in 2020-2021. For 2020-2021, 8.17 of the FTES were online and the remaining were from the Visalia campus.

BIOL 22 (Animal Biology) success rates went from 82% in 2018-19, 79% in 2019-2020, and then 75% in 2020-2021. BIOL 22 FTES has increased from 16.0 in 2018-19, to 20.3 in 2019-2020, and then 22.33 in 2020-2021. For 2020-2021, 11.67 FTES were online, 3.50 from the Tulare campus, and 7.17 from the Visalia campus.

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 8.8 in 2018-19, to 9.1 in 2019-2020, and then to 7.90 in 2021. 4.3 FTES were online and 3.6 FTE were from the Visalia campus.

(3) Allied Health Courses

Our FTES in BIOL 30 has remained steady at 135.8 in 2018-19, 132.00 2 in 2019-2020, and 135.40 in 2020-2021. The FTES for BIOL 31 has increased for the past three years, 74 in 2018-19, 73.2 in 2019-2020, and 85.2 in 2020-2021. Biology 40 FTES has also increased from 65.7 in 2018-19, to 63.6 in 2019-2020, and then 70.87 in 2020-2021. Please note, the increase in BIOL 31 and BIOL 40 comes with no additional faculty teaching these courses, and results from instructors accepting additional students into classes or by taking on an additional sections.

The success rate for BIOL 030 (Human Anatomy) improved from 55.3% in 2018-2019, to 63.4% in 2019-2020, to 83.8% in 2020-2021. 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 rate trend in BIOL 30 is exciting, it may not be real because of the significance of the excused withdrawal (EW). In 2018-2019 academic year, for BIOL 30, 676 grades were earned and 0 EW grades were granted; in 2019-2020 595 grades were earned and 65 EW were granted due to COVID-19; and in 2020-2021, 520 grades were earned and 156 EW were granted, also due to COIVD-19. 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 the EW returns to an application with proper verification, we anticipate the success rate in BIOL 30 to decrease. There are several thoughts as to why historically 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 77% in 2018-19, 84% in 2019-2020, and 88% for 2020-2021. This positive trend must also be looked at in a way that considers the EW effect. In 2018-2019, 364 grades were earned and 3 EW grades were granted; in 2019-2020 346 grades were earned and 20 EW grades were granted; and, in 2020-2021, 327 grades were earned and 99 EW grades were granted. In 202-2021, 23% of students enrolled in BIOL 31 opted for the EW grade over an earned grade. This effect would greatly confound the data presented as success.

Biology 40, Microbiology, is another prerequisites for allied health majors. The success rates for BIOL 40 went from 76% in 2018-2019, to 77% in 2019-2020, to a 74% in 2020-2021. Although the success trend did not follow that of BIOL 30 or BIO 31, the EW effect should still be considered. In 2018-2019, 326 grades were earned and 0 EW grades were granted, in 2019-2020, 297 grades were earned and 21 EW grades were granted; and, in 2020-2021, 270 grades were earned and 93 EW were granted. In 2020-2021, 26% of students enrolled in BIOL 40 opted for the EW grade over an earned grade.

Workload:

The Biology Department's productivity remained relatively steady. It was 19.5 in 2018-19, 19.88 in 2019-2020, and 19.16 in 2020-2021; the departmental FTES has increased from 503.4 to 551.6 over the past three years. The allied health courses have the highest productivity in the department. In 2020-2021, BIOL 31 has a FTES/FTEF ratio of 24.5, BIOL 30 has 22.5, and BIOL 40 has 19.3. These courses also provide the majority of the FTES for the department, 292 FTES in 2020-2021. Success in the division increased over the past three year period from 70.3% 2018-2019, to 75.8% in 2019-2020, and 82.1% in 2020-2021. This trend is

also greatly influenced by the EW effect. In 2018-2019, 2485 grades were earned and 3 EW grades were granted in all courses taught in the science division; in 2019-2020, 2391 grades were earned and 184 EW were granted; and, in 2020-2021, 2253 grades were earned and 512 EW were granted. In 2020-2021, 19% of all students enrolled in biology courses opted for an EW grade rather than an earned grade.

There has been a significant increase in the number of sections of Majors biology courses offered. In 2020-2021, BIOL 1 and BIOL 2 accounted for 51.3 FTES. This was an increase from any other year evaluated. 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, 21, and 22 has consistently increased over the last three year period. BIOL 20 FTES accounts for the largest portion and has grown steadily: 136.4 in 2018-2019, 149.2 in 2019-2020, to 162.6 in 2020-2021. 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 for BIOL 20.

The high demand for the Biology classes is continuing. We have experienced an increase of 48.2 FTES over the past three years. This growth is occurring at the same time that other divisions are shrinking. For comparison, in this same three year period, the English and Math divisions at COS have respectively lost 219.8 FTES and 302.9 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 above the cap. Since we are increasing course offerings and filling class sections beyond the cap, this demonstrates a continuing unmet demand for biology courses.

Internal Relationships:

Although our abilities to convene have been disrupted by COVID-19, 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 volunteer their time to advise and support science/biology related clubs such as SETA and the Alliance of Biological and Chemical Sciences (ABCS). In 2019-20, members of the biology and chemistry departments formed a new student-run club called the Alliance of Biological and Chemical Sciences (ABCS). This club, which 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.

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.

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 which are coordinated with Sequoia Riverlands Trust (SRT) related field trips. 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. The Biology department participates in the REALM Grant. The REALM (Resources for Engagement and Active Learning through Mentorship) Grant, a federally-funded STEM support program helps new STEM students by providing: extended summer orientations; academic coaching, tutoring; specialized counseling, textbook loans, and university visits. In addition, the grant provides funding for faculty for equipment purchases and professional development at conferences such as American Association for the Advancement of Sciences, National Association of Biology teachers, and Online Learning Consortium.
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 from 96.2 in 2017-18 to 107 in 2019-2020. It dropped to 62 in 2020-2021 due to classes being moved from face-to-face to online due to the pandemic. The biology division FTES in 2020-2021 dropped for all three campuses but grew overall due to online offerings; the online offerings provided 245.4 FTES in 2020-2021. 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 over the past few years from 48 in 2017-18 to 74.67 in 2019-2020. In 2020-2021 it dropped to 40.7 FTES as courses were shifted to online. Starting in the Spring of 2022 we will be 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, we have added faculty. Specifically, in the Spring of 2020 we hired a biology majors/microbiology position in Visalia and a microbiology/general biology position in Hanford. In the Spring of 2021 we hired a full-time anatomy and physiology position and a majors/general biology position. During this same time we lost two full-time faculty to retirements.

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. With the data that is available (and the relative small sample sizes) there is no way to properly analyze the effectiveness of synchronous online, 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. Although Biology is using Protorio, a proctoring extension within Canvas for student assessments, faculty have shared anecdotal evidence suggesting cheating is regularly occurring.

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.

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 has been removed, so our hopes are that despite COIVD-19 impacts we can remain in our classrooms and labs, and return to accurately measure meaningful SLO. For courses that have asynchronous online or hybrid options, faculty will need to discuss SLO assessments that are equitable for our in-person and virtual learners.

Changes Based on SLO Achievement: No changes are recommended. Our immediate work will focus on developing accurate assessments that can be completed in the 2021-2022 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 2021-2022 school year. It was determined that an assessment during the previous school year (2020-2021) 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: 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.

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Implementation Timeline: 2021 - 2022

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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.

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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

Program Review - Biology

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

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.

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Implementation Timeline: 2021 - 2022
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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:

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.

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Program Review - Biology

Implementation Timeline: 2021 - 2022
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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.

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: 2020-2021 Maintain current enrollment in anatomy and physiology

Hire a tenure-track anatomy and physiology faculty member

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Implementation Timeline: 2020 - 2021
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Identify related course/program outcomes: SLO Bio 30 and Bio 31
Person(s) Responsible (Name and Position): Heather Moore
Rationale (With supporting data): Last Spring our senior anatomy and physiology instructor retired. She typically taught a double Human Physiology course and a double, or often a triple, anatomy course. When she announced retirement we were granted a one-year temporary position to cover her teaching load. This position will end in May of 2021. We need to replace this position in order to meet the student demand for these courses.

Bio 30 and Bio 31 have some of the highest FTES in Biology, 149.2 and 72.2, respectively for 2019-2020, and they also have the highest FTES/FTEF ratios at 22.6 for Bio 30 and 23.46 for Bio 31 (data from 2019-2020). The high demand exists because both courses are prerequisites for our most prevalent major, nursing. The courses are critical to the success of the nursing program and the Biology division.

Current full-time and adjunct faculty are attempting to meet continued requests by the administration for expanded course offerings by overfilling their courses. Current faculty are teaching the maximum number of students possible and in order to increase course offerings to meet the demands of the administration and students.
Priority: High
Safety Issue: No
External Mandate: No
Safety/Mandate Explanation:

Program Review - Biology

Update on Action

Updates

Update Year: 2021-2022 09/03/2021

Status: Action Completed

Action is complete. Courtney Traugh was hired for this role. To our division, she brings content expertise and teaching experience in Human Anatomy and Human Physiology courses taught in different modalities (online, hybrid, and in-person). She previously served our division in her role as a full-time temporary anatomy and physiology faculty.

Impact on District Objectives/Unit Outcomes (Not Required):

Resources Description

Personnel - Faculty - Biology - Anatomy and Physiology faculty replacement position (Active)

Why is this resource required for this action?: Anatomy and Physiology courses have the highest demand within the Science Division, with enrollment "bottlenecks" that hold students from progressing through their educational pathways.

Notes (optional):

Cost of Request (Nothing will be funded over the amount listed.): 100000

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

Action: 2020-2021 Provide student access to environmental laboratory experiences which utilize our greenhouse and native garden

Hire a part-time technician to maintain the green house and native garden.

Leave Blank:

Implementation Timeline: 2020 - 2021

Leave Blank:

Leave Blank:

Identify related course/program outcomes: Students should be afforded hands-on experiences with a variety of native and exotic plant species. Numerous courses (Biology 2, 20, 21, 25) utilize this facility.

Person(s) Responsible (Name and Position): Brad Goodbar

Rationale (With supporting data): Specimen from the greenhouse and native garden are required for Bio 02, 20, 21. The maintenance of the greenhouse and garden was provided in past years by volunteers, consisting of faculty and students. Although the philanthropic gesture of these individuals' time is greatly appreciated, the condition of the greenhouse and garden has deteriorated. We have lost specimen because volunteers mistook the plants as unwanted and they were disposed of, only later to be needed in a laboratory.

Over the past three years Bio 20 has grown in FTES at a greater rate than any other biology offering. It grew from 117.6 in 2017-18 to 149.2 in 2019-2020. The demand for this class is persisting on all 3 campuses. Bio 2 and 21 has also increased in FTES over the same time period.

We also feel exposure to nature is critical for our student experience in biology courses. The student experience becomes more meaningful and memorable when learning is hands-on. When students can observe nature first hand, their level of engagement and intrigue increases which improves student success. In recent years there have been several publications citing the lack of access to outdoor opportunities for minorities. This trend has been coined, "access to nature inequality" and even "the nature gap". Many of our students have lived in Tulare County their entire lives yet never visited Sequoia National Park or Yosemite. Through field trips and laboratory experiences that utilize natural resources like our green house and native garden we are providing those opportunities which will help close the access to nature gap.

Program Review - Biology

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

Update on Action

Updates

Update Year: 2021-2022 09/03/2021
Status: Action Completed
In Fall 2021, a groundskeeper was hired to maintain the native plant garden. Budget was also made available to hire a part-time employee to maintain the greenhouse.
Impact on District Objectives/Unit Outcomes (Not Required):

Resources Description

Personnel - Classified/Confidential - Part-time technician to assist with the adequate upkeep of the greenhouse and native garden. (Active)
Why is this resource required for this action?: The greenhouse and native garden are used for educational observations in BIOL 021 and BIOL 025
Notes (optional):
Cost of Request (Nothing will be funded over the amount listed.): 15000

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

Action: 2020-2021; Increase student access to Majors Biology and General Education Biology courses

Hire a tenure-track faculty replacement position and a tenure-track faculty growth position to teach BIOL 1 and/or BIOL 2, and the general education biology courses including BIOL 20 and BIOL 21.

Leave Blank:
Implementation Timeline: 2020 - 2021
Leave Blank:
Leave Blank:
Identify related course/program outcomes: Student learning outcomes for BIOL 1 and/or BIOL2, and the general education biology courses (BIOL 20, BIOL 21 and BIOL 25)
Person(s) Responsible (Name and Position): Brad Goodbar, Heather Moore
Rationale (With supporting data): In order to adequately cover both major and general education classes, we are requesting two tenure-track position for the Visalia campus. One position would be a replacement position due to a retirement that will take place at the end of this academic year, the other is a growth position. These positions would allow us to cover the Majors biology courses and better serve the students in general education and the Microbiology courses.

The FTES in the Majors biology courses and general education biology courses has increased over the past three years, but we are having difficulty meeting student enrollment demands due to a faculty shortage. The BIOL 1 FTES increased was brought about by offering double sections of BIOL 1 in both Fall and Spring semesters. BIOL 2 saw an increase in FTES from 13.8 in 2016-17 to 16.5 in 2019-2020. The recent increases have been sustained 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 are seeing a reduction in some of the general education course sections (BIOL 21 and BIOL 22) and BIOL 40 when those instructors teach the majors. Since the same instructors teach BIOL 1 or BIOL 2 and general education biology courses, we are rotating their schedules every other semester which creates shortages in course availability.
Priority: High
Safety Issue: No
External Mandate: No
Safety/Mandate Explanation:

Update on Action

Updates

Update Year: 2021-2022 09/03/2021
Status: Action Completed
Matthew Waterhouse was hired for this role. To our division, he brings content expertise, relevant field and teaching experiences, and versatility in his ability to teach a variety of biology courses. In the Fall semester Matthew will instruct non-major biology courses, and in the Spring he will instruct Bio 2 in addition to non-major biology courses.
Impact on District Objectives/Unit Outcomes (Not Required):

Resources Description

Personnel - Faculty - One replacement position and one growth position for two Biology, Anatomy & Physiology and General Biology & Ecology (Active)
Why is this resource required for this action?: The one replacement and one growth positions are needed in order to sustain course offerings in high-demand courses.
Notes (optional):
Cost of Request (Nothing will be funded over the amount listed.): 200000

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

Action: 2020-2021; Expand course offering on the Tulare campus

Acquisition of equipment necessary to offer Bio 31 for the Tulare campus.

Leave Blank:
Implementation Timeline: 2020 - 2021
Leave Blank:
Leave Blank:
Identify related course/program outcomes: SLO for Bio 31
Person(s) Responsible (Name and Position): Heather Moore
Rationale (With supporting data): The most commonly declared major in the District is Nursing. Human Physiology and Microbiology are prerequisites for the nursing program, but neither are offered on the Tulare campus. In order to meet demand and service the needs of the nursing students in Tulare it has been recommended by Tulare administration and faculty that we expand course offerings to include Human Physiology, BIOL 31.
Since we intend for the student experience in Bio 31 to be equitable across all three campuses, the equipment costs to set up

Program Review - Biology

BIOL 31 are initially significant. This would include the purchase of eight iWorx units and laptops to interface with the units. Additionally we would need to purchase the reagents and consumables used for labs that don't utilize the iWorx units. The iWorx units are currently priced around $5,000 per unit. Once purchased though the costs associated with iWorx maintenance are manageable and similar to the costs associated with other biology courses already taught in Tulare.
Last year we were awarded two iWorx units through Foundation for our Hanford campus. We will actively seek above-base budget, Tulare Center, and Foundation funding to help fund this growth.
Priority: Medium
Safety Issue: No
External Mandate: No
Safety/Mandate Explanation:

Update on Action

Updates

Update Year: 2021-2022 09/03/2021
Status: Action Completed
Funding was provided to equip our Tulare campus with iWorx stations needed to offer Bio 31. This course will be offered in Tulare beginning Spring 2022. This expands our offerings of the allied-health prerequisites, Bio 30 and Bio 31, on all three campuses.
Impact on District Objectives/Unit Outcomes (Not Required):

Resources Description

Equipment - Instructional - Instructional equipment needed to expand course offering of BIOL 031 at the Tulare Campus (Active)
Why is this resource required for this action?: BIOL 031 fill rates are amongst the fastest within the Division. The scarcity of the facilities at the Visalia Campus limits the number of sections that can be scheduled, therefore Tulare is a viable alternative and will serve the Tulare student population.
Notes (optional):
Cost of Request (Nothing will be funded over the amount listed.): 60000

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