ACADEMIC PROGRAM REVIEW

BIOLOGICAL SCIENCES

GROSSMONT COLLEGE

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Revised November 8, 2017

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SIGNATURE PAGE:

This program review report for 2013-2108 **is respectfully submitted by the members of the Grossmont College** BIOLOGICAL SCIENCES.

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DEPARTMENT/PROGRAM
ACADEMIC PROGRAM REVIEW

SECTION 1 – OVERVIEW.
DEPARTMENT HISTORY & PREVIOUS PROGRAM REVIEW RECOMMENDATIONS

1.1 Introduce the self-study with a brief department history. Include changes in staffing, curriculum, facilities, etc. (You may wish to cut/paste your previous department history and then add to it). Additionally, please list degrees and certificates your department offers.

The Biology Department serves student's needs in three areas of study: 1) General Education (GE) in the Life Sciences area, 2) Preparation for Allied Heath career programs, such as Nursing or Respiratory Therapy, and 3) Biology majors, which includes students planning to transfer and pursue pre-professional studies such a medicine, dentistry, veterinary, physical therapy and basic/applied research. Our GE courses (Principles of Biology--120, Marine Biology, Environmental Biology, Human Biology, Genetics & Evolution, and Sustainability) reflect the department's commitment to offer classes across the breadth of biological study. Some have labs and some do not. Any student completing an associate's degree at Grossmont or preparing for transfer will take a Biology or Anthropology course so we serve the vast majority of Grossmont students, and BIO 120 is a Gateway Course. Our Allied Health preparation courses are: Human Anatomy, Physiology, Anatomy & Physiology I & II and Paramedical Microbiology. All Allied Health courses have labs and require BIO 120 as a prerequisite. The Biology majors courses are all 200-level courses and articulate with CSU's and UC's. The three majors courses are Cellular & Molecular Biology, Ecology, Evolution and Organismal Biology, and Biostatistics. All majors courses include a laboratory component. Each course has a full-time faculty coordinator who is responsible along with the Department Co-Chairs, for maintaining the currency of course curricula and coordinating with technical staff and adjunct faculty. Biology is proud of its long history of constant improvement in response to changes in student demand, student needs, the growing demands in the health care and biotechnology fields, transfer requirements at CSU's and UC's, and the Department's reevaluation of directions and trends in the field of Biology and Biology education. The Biology Department offers 2 degrees: Associate of Science in Biological Sciences and Associate of Science for Transfer in Biology. These 2 degrees differ only in the GE component.

While small transitions have marked the Biology faculty and staff over the years, changes began in the year 2000 that changed how the department functions with the first of several retirements of long-serving faculty and technical staff members. As of the writing of this report in Spring 2019, most of the 13 full-time faculty and technical staff positions in the Biology Department have turned over since 2000. The most recent retirement was Sue Caldwell, lead physiologist, in 2018. Two technical staff positions have opened due to departures or medical emergencies with new full-time and emergency replacement staff filling those positions. Since the last program review in 2013, one full-time hire has taken place (Selene Miles, 2016). Anticipated retirements in the next review cycle include Virginia Dudley (BIO 105 coordinator, past CoChair), Michael Golden (BIO 110 coordinator), and Craig Milgrim (current CoChair, majors co-coordinator, BIO 114 and 230 coordinator). Historically, the department has had 10 full-time faculty members. Even with the hiring of Miles and anticipated hire to replace Sue Caldwell, we have 1 fewer full-time members than the historical level despite increased enrollment and course offerings.

Since our last Program Review in 2012 – 2013, the Biology Department has undergone substantial changes. The department serves at least 50% more students with 20% less full-time faculty, all while continuing to earn the college's highest level of efficiency. The 20% deficit in Full-Time faculty is unchanged from our last Program Review, despite the aforementioned growth in section offerings and the previous Program Review recommendation to address the FT/PT ratio. One position, which has been open for more than a decade, served students in our Gateway course, Principles of Biology (Bio 120). Currently, 77% of Bio 120 sections are taught by adjunct faculty. The latest vacated FT position coordinated and taught the Human Physiology program. Human Physiology is one of the three "legs" of the Allied Health preparation curriculum. As a result of this vacancy, Biology was forced to cancel two full sections and rearrange one full section in Spring 2019. In the past 2 decades, Biology has never cancelled full sections due to a lack of qualified faculty. As the department heads into the 2020's, there is the expectation that three of its longest serving full-time faculty will retire. The department has had increasing difficulty finding enough qualified adjuncts to cover all sections.

Another change over the last five years is that the department has greatly expanded its use of laptop computers across the curriculum. All three program areas use laptop computers in the lab setting for data analysis, bioinformatics, and computer simulations to teach experimental design and evolution. The number of sections per semester using computers as an integral part of the curriculum has

expanded from 3 to 43.

At the core of our department's ability to offer lab courses is our technical staff. At the time of our last Program Review, we had three full-time technicians and one part-time technician. In early 2016, our part-time technician retired after 30+ years with the department. To meet the need of our expanding course offerings, the part-time position was not refilled. In its place a previously frozen full-time position was activated and filled in early 2018, bringing our technical staff to 4 full-time positions. The technical staff is responsible for all aspects of our department's laboratory classes, including purchasing equipment & consumables, managing the supply budget, maintaining & repairing equipment, prepping each laboratory class, managing work study students, and assisting instructors in labs.

Biology relocated to a new laboratory building (Building 30) in Spring 2007, and the department still resides in this facility. The first floor of the building houses the Biology Department, including faculty offices, lab rooms, technical staff offices, a break room and laboratory preparation and storage areas. The Science Learning Center (SLC) is a large study area open to all District students for group and individual work on the hallway of the first floor of building 30. Some of our natural history displays and supplemental study specimens are on display in this room and are viewable during non-class hours by students. Some faculty use the space to hold tutoring or review sessions and adjuncts with no office use the space to hold office hours. The department continues to maintain four unique outdoor laboratories-- a greenhouse, an enclosed shade garden and pond (called the Lath House) and an open space Reserve used to observe plants and animals in their natural habitat. Faculty and technical staff share the responsibility for maintaining these facilities. The district, in partnership with the department, is responsible for maintaining our Native Plant Garden. The district was charged and agreed to maintaining the wooden structures in the garden, water lines and assistance in the watering schedule, as well as large pruning and lighting (which the district has yet to install) for night classes.

The specialized materials and equipment for two of our courses require that we offer supplemental learning opportunities for students in Anatomy and Microbiology courses. The Science Learning Center houses our Anatomy Learning Center (ALC). Students taking Anatomy courses in the Biology Department may check out anatomical models and have access to peer tutoring. The Microbiology Open Lab (MOL) is an extension of the course work in Paramedical Microbiology. Students are required to spend time in the MOL to complete required class projects. Due to the expansion of Paramedical Microbiology sections during the week, the MOL is now open on Saturdays. The ALC & MOL are supervised by one full-time faculty

member who receives the teaching equivalent of a 3-hour lab each semester. This compensation is new in the last few years. This ALC/MOL coordinator hires peer tutors, sets the schedule, trains the ALC/MOL tutors, manages the tutor budget and, in conjunction with technical staff, maintains our collection of bones and anatomical models used for student study. The budget of tutoring has stagnated over the last several years resulting in a decrease in tutoring hours even while the number of students taking Anatomy courses has increased. Our technical staff provides valuable and necessary oversight of both centers.

In the past two years, Grossmont has become one of very few community colleges in the region to offer students the opportunity to participate in a hands-on basic research project on campus. The Roly Poly Research Project provides students with an opportunity to see what doing science really is like in a low-stress, fun environment. Participation in the program is 5-10 students per semester, several of whom present posters at a regional scientific meeting each year.

1.2 Your last program review contains the most recent Academic Program Review Committee Recommendations for the program. Describe changes that have been made in the program in response to recommendations from the last review including any activity proposals funded and what the results were. (Be sure to use the committee recommendations and not your own). Include the recommendations from the last program review in this section.

Each of the Program Review recommendations are included below with responses

The Committee recommends the following:

1. Reexamine the fulltime / part time ratio in order to determine the need for full-time faculty member(s) when the budget improves.

    - The department has participated actively in each round of faculty requests. In 2017 we were granted a position and hired a 120 Coordinator, to replace one of the long-vacant positions. Other year's processes (until 2018-19) did not result in any hires for Biology.
    - In 2019, Biology requested 2 FT positions with the goal of restoring 1) the other Bio 120 instructor position that has been vacant since a retirement prior to the program review period, 2010, and 2) a Physiology instructor position to replace a 2018 retirement. The Physiology position was approved and we are in the hiring process.

2. Work with the Institutional Review Committee to create a plan to stabilize funding

for regular supply, maintenance and equipment expenses.

- Through Department advocacy, our supply budget has been stabilized. The last increase was in conjunction with course offering expansion in Fall 2016. In Fall 2017, the supply budget was increased to accommodate consumables and some of the equipment costs associated with this expansion.

3. Maintain current community programs and create a plan for continuing these programs when these grants expire (Bridges, Health and Science Pipeline Initiative, Life Sciences Summer Institute).

- Biology has secured line-item funding for LSSI and we continue this partnership as well as the Salk Education Outreach program.
- The Health Science Pipeline Initiative no longer exists.
- The Bridges to the Baccalaureate at SDSU is currently on hiatus (Fall 2017-present) due to a lack of commitment to the program by SDSU. We have fulfilled our part of the agreement and have completed paperwork for grant renewal. We hope to hear about the decision this year.
- Biology has developed additional connections with UCSD, USD, SDSU, and beyond, to publicize and help students apply for summer research and internship opportunities, such as Bridges programs at other colleges.

4. Maintain tutoring facilities (ALC, Micro LC).

- Both department-based tutoring centers, the Anatomy Learning Center and Microbiology Learning Center, continue to operate.
- The position of coordinator is now funded at the rate of 0.15 LED per semester for Fall and Spring. Both centers are open in the Summer but no funding is provided for a coordinator. The current coordinator volunteers time to ensure operation. Technical staff provide a necessary supervision during the Summer when the coordinator is unfunded.
- The tutoring budget has stagnated as have efforts to gather data on how tutoring impacts student success. With increases in the minimum wage and longevity increases, the stagnant budget funds less tutoring hours despite the expansion of Anatomy and Microbiology sections.
- The funding for both centers was unexpectedly cut during Spring 2019 by $12000. Current funding levels cannot support the centers for a single semester. The department is currently exploring ways to fund these much needed centers for the future.

5. In order to support the expansion of tutoring facilities, use the MSC model to explore ways to quantitatively measure the influence of the ALC on student success.

    - There is currently no institutional funding or commitment for measuring the impact of tutoring on student success.
    - The ALC/MOL coordinator continues to advocate for support from the college with collecting data on tutoring impacts.

6. Consider developing a method for students to report on their post-academic progress.

    - Individual full-time faculty gather information on graduates as they make contact (see 5.7).
    - We are proud of our history of hiring our graduates. The latest example is our new FT technician who graduated from Grossmont and transferred to SDSU to earn her Bachelor's degree before returning to work for us, first as a part-time TA and tutor and now as a technician. Another Grossmont graduate will be teaching for us as an adjunct in fall, while she completes her Ph. D. at UCSD-SIO.

7. Using the Course History Information Report, continue to submit curriculum modification proposals for those courses that have not been reviewed by the Curriculum Committee in more than four years or curriculum deletion forms for those courses that have not been offered in the last three years.

    - All Biology Course Outlines of Record are now updated on a 5 year schedule. Several of our courses are due for updates during this semester and we are in the process of making those updates.

8. Use student-learning outcome data for continued course and program improvement.

    - Biology has recently updated its PSLO's to match the nationwide Vision and Change initiative of the American Association for the Advancement of Science. Faculty are currently updating SLO's to match the revised PSLO's.
    - Biology continues to participate in the 6-year SLOAC cycle (see Section 3).

SECTION 2 - CURRICULUM DEVELOPMENT AND ACADEMIC STANDARDS

To answer these questions, refer to your department's catalog descriptions from the most recent college catalog (see “Courses of Instruction” section. This is the blue section). If your program has an Associate Degree or Certificate program, refer to the relevant pages from the catalog (see “Associate Degree” section. This is the yellow section).

2.1 Describe how your course offerings have changed since the last program review. Have you added or deleted courses since the last review? If so, why? Include new or deleted programs, degrees and certificates.

In response to changes in the needs of the Allied Health programs, Biology added a 1-unit Human Physiology Lab (Bio 141L). We deleted a 2-unit Human Physiology lab (Bio 142) since it was no longer needed by our college’s Allied Health programs nor surrounding CSU’s (in particular SDSU). Bio 141L is fully aligned with the course of the same number at Cuyamaca College.

The only new course offering since our last program review is a 200-level Human Cadaver Dissection class (1 unit). The department maintains 2 Human Cadavers (one male and one female), which are rotated on a 3-year schedule. The Dissection class is held when new cadavers arrive to prepare them for viewing by Anatomy students.

We do have a new degree offered, the ADT in Biology, which is in the 2018-19 Catalog, which is essentially the same as the A. S. degree.

2.2 Describe your department’s practice for determining that all course outlines reflect currency in the field, relevance to student needs, and current teaching practices.

Each course coordinator is responsible for reviewing and keeping course outlines current. The co-chairs monitor overall course outline currency to ensure all outlines are updated every 5 years. Course coordinators are:

- Shina Alagia: Bio 144 & 145-Anatomy & Physiology I & II
  - Collaborates with Allison Shearer on Anatomy
  - Collaborates with Coordinator of Physiology
- Virginia Dudley: Bio 105-Life in the Sea; Bio 132-Marine Mammals
- Michael Golden: Bio 110-Environmental Biology; Bio 112-

Environmental Issues

- Selene Miles: Bio 120-Principles of Biology
  - Collaborates with other FT120 instructor, Craig Milgrim
- Allison Shearer: Bio 140- Human Anatomy; BIO 251: Human Dissection
- Craig Milgrim: Bio 114-Heredity, Evolution and Society; Bio 230-Cell, Molecular and Evolutionary Biology (majors course)
  - Collaborates with Bonnie Ripley who teaches companions majors course Bio 240
- Michele Perchez: Bio 152-Paramedical Microbiology
- Bonnie Ripley: Bio 215-Biostatistics; Bio 240-Ecology, Evolution and Organismal Biology
- TBD: Bio 141/141L-Physiology Lecture and Lab and Bio 118-Human Biology is currently vacant. A hire committee has formed and we hope the position will be filled before Fall 2019.

2.3 How does your department use student engagement strategies in the classroom? How are your faculty including current issues in course content? Consider environmental, societal, ethical, political, technological, and/or other issues when answering this question.

Bio 105

- Discussions in evolution allow students to understand human connections to society and the natural world, and, highlight the importance of species diversity and global ecology. The topic of Natural selection and evolution is specifically taught in one whole lecture plus 3 hours of lab.
- Climate change is the topic of one whole lecture and consistently integrated, like evolution, in many other topics.
- The Pacific Garbage Patch is another major topic where all the above issues must be integrated into the lecture. Ocean acidification, El Ninos, shark finning, dumping of chemicals into the ocean, the protection of threatened species, coral reef die-off, current news events and more are important issues that students explore through lecture, video, reading, interactive activities are used in lecture, field work, field projects, lab work, and exchanging ideas in the classroom.
- A 100+ page Lecture and Laboratory Guide was written by the course coordinator and is sold at cost in the Grossmont College Bookstore.
- A new, heavily revised laboratory manual was written by the course coordinator and published by a major publishing company.
- Current issues are specifically and secondarily included in nearly every

lecture.

- Since “Nothing in Biology makes sense except in the light of evolution” (Dobzhansky), the topic of evolution is applied to many aspects of nearly every lecture. Discussions in evolution allow students to understand human connections to society and the natural world, and, highlight the importance of species diversity and global ecology. The topic of Natural selection and evolution is specifically taught in one whole lecture plus 3 hours of lab.
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Bio 110

- Evolutionary biology is a running theme throughout this course.
- The Riparian lab has been modified to participate with the San Diego River Foundation (SDRPF) in their assessment of the types and sources of trash in the Forester Creek watershed in El Cajon. The students go to the creek and sort and categorize trash pulled out of the creek by other volunteers. The instructor is also a ‘Stakeholder’ in the program and has attended community events in El Cajon where the SDRPF solicits ideas from the community as to how to improve the quality of the watershed. Students participate after hours for extra credit. This experience has taken theoretical laboratory concepts and allowed the students to apply them to real-world issues.
- Each Spring, Bio 110 students participate in Earth Day for extra Credit. They then give a short report to their class. Participation by students has been steadily increasing over the past three years.
- This course also uses the ‘discussion feature in Canvas (LMS). Recent discussion shave been about Climate change, Vaccinations, Plastics pollution and human migration patters related to environmental degradation.
- The Bio 110 instructor along with a Geology Instructor helped plan and implement the native plant gardens and native rock types around campus.
- Students are encouraged to use iNaturlaist to record observations out I the field or on their own time.
- Students will become involved in a Citizens Science research on the SD Zoo’s Burrowing Owl project beginning in the fall, 2019 semester.

Bio112

- Bio 112 has been converted to a hybrid course using computer simulation modules along with lecture. The course has filled since these changes were implemented.
- Bio 112 is entitled ‘Contemporary Issues in Environmental Sciences’ so by definition, the course goal is to be current. Climate change, experimental design, and epidemiology are the most recent topics covered.

Bio 114

- Class discussion of ethical arguments for genome editing and human cloning.
- Student presentations at the beginning of class of recent news articles related to genetics, evolution, biotechnology.
- Brainstorming followed by class discussion to draw out connections and experiences of the students with class topics.

Bio 120

- In order to engage students during the first lecture class, the controversial topic of Genetically Modified Foods is surveyed and discussed, and linked to General Biology and themselves. Then the question is asked do you think that General Biology is relevant to the general public?
- Discussion and presentation on climate change. The follow-up assignment provided is called "What You Can Do" which requires students to select a topic of personal interest that supports that decrease in climate change (by increasing biodiversity, decreasing fossil fuel, water use, and waste production). In order to supplement the curriculum, students are provided with optional assignments covering variety of environmentally topics with high student-interest.

BIO 140, 141, and 141L

- Weekly discussions of news events pertaining to public health.
- Discussion of new research in anatomy, physiology, and pharmacology.
- Specific recent patient case studies are used to enhance conceptual understanding and importance of these topics.

Bio 144 and 145

- Discussion on global warming and carbon dioxide level when respiratory system is lectured on.
- In class discussion about stem cell research, results of Obesity research and research about effect of estrogen on nervous system and how it's linked to possible homosexuality.
- Topics of interest such as recent vitamin D research, Viagra and associated drugs, procedures for forensic biology, pharmacology, new diets such as Keto

Diet etc. are regularly discussed in context of the appropriate class content.
- New research in Pharmacology, exercise Physiology, cancer research, Immunology etc. are discussed to enhance student understanding of associated concepts.

Bio 152

- Faculty stay up to date by reading journals and magazines, using them to discuss human health topics-- STDs on the rise, penicillin allergy linked to MRSA and C-diff risk, bacteria alters environment to speed wound healing.
- Shows a combination of videos highlighting and/or expanding on topics covered in class (beginning SPRING 2015-present): “Contagion” movie and worksheet (REINFORCES EPIDEMIOLOGICAL CONCEPTS), “The Polio Crusade” (ILLUSTRATES THE POLIO SCARE AND EFFORTS RESULTING IN VACCINE DEVELOPMENT), “The Vaccine War” and paragraph free-write (DISCUSSES THE BENEFITS OF VACCINE AND CONTROVERSY OVER SAFETY ISSUES), “Hunting the Nightmare Bacteria” documentary and worksheet (ILLUSTRATES THE DRUG RESISTANCE EPIDEMIC), “How to Survive a Plague” documentary and worksheet (COVERS HIV EPIDEMIC from the years 1987-1996, HIGHLIGHTING ACTIVISM THAT LED TO DRUG TREATMENTS that save many lives today).

Bio 215

- Examples in class are chosen on topics relevant to topics in the news, such as health metrics for pregnant women in refugee camps, measuring effects of toxic contamination on marine life, incidence of zika virus and Ebola, and examples from the Roly Poly Research Project data; examples of infographics created with new technology are included in slide shows and/or linked in Canvas as course supplements whenever I run across new examples; data from current political polls and surveys are used as examples of sampling and error estimation.
- Students are directed to the news web site FiveThirtyEight.com on the first day of class to look for examples of how data are used in everyday news reporting for a small assignment. Students this semester chose articles ranging from how statistics on immigration can be misleading to how the rates of rape on college campuses are reported and we discussed the impact of understanding what the data really show and how to build an informed opinion.

Bio 230

- Course material includes readings from the journal Science published by the

American Association for the Advancement of Science (AAAS). This is the same organization that is spearheading the re-evaluation of undergraduate science education. Department PSLOs are based on this project. Readings include reviews of the latest research in cell & molecular biology as they relate to the core content of the class. For example, recent articles on the Abiogenesis (the origin of life on Earth) for the core of readings on current Evolutionary models in this area.

- Other examples where current research is incorporated in understanding core concepts
    - Pharmaceutical Research
    - Genome sequencing
    - Hereditary mapping (e.g., as related to commercial products offered through 23andMe and Ancestry.com

Bio 240

- "Science in the news" topics are shared with students via emails or links in Canvas when they are directly relevant to a recent/upcoming lecture topic. Recent examples include horses wearing zebra pajamas to show the effect of stripe patterns on fly bites, and DNA analysis showing that a tree species on an isolated Indo-Pacific island is most closely related the Asian species.
- Student assignments include examining demographic data from different countries, including Iraq and Nigeria, reflecting on racial make-up of populations tested in research studies, and inventing an organism, such as something from a science fiction movie.
- Lab specimens include examples of foods eaten in diverse cultures, such as corn fungus and enoki mushrooms as well as cultivated mushrooms, for example.

2.4. What orientation do you give to new faculty (both full- and part-time), and how do you maintain dialogue within your department about curriculum and assessment? What strategies do you have in-place that ensure consistency in grading in multiple sections and across semesters (e.g., mastery level assessment, writing rubrics, and departmental determination of core areas which must be taught)? Consider department practices, academic standards, and curricular expectations (i.e. SLOs and teaching to course outlines)?

The Biology Department utilizes a system of Lead Instructors/Course Coordinators to mentor new faculty, as well as to act as point-persons for curriculum development. The Lead Instructors provide Course Outline

of Record (COR) documents to each new instructor to guide the scope and other details of delivering the course content. CORs are critical to providing an equivalent experience across multiple sections of the same course. The Course Coordinators for the Department were listed in Section 2.2. During each Biology Department meeting held during Professional Development week (when nearly all faculty and staff are in attendance), the last half hour of the meeting is devoted to break out sessions for each course that has adjuncts (including new faculty). During these sessions, orientation materials and important course business is addressed. In addition, Biology 120 often has a separate meeting to address specific curriculum concerns, such as the use of lab software programs. On occasion, the Allied Health courses (Biology 140-145) have additional meetings to address any specific concerns there.

In Spring 2018, the department met to discuss the adoption of Program Student Learning Outcomes (PSLOs) based on a draft that Milgrim & Ripley prepared. The significance of these PSLOs, is that they are based on the American Association for the Advancement of Science (AAAS) recommendations in their "Vision and Change in Undergraduate Biology Education: A Call to Action". The content is viewable here http://visionandchange.org/files/2011/03/Revised-Vision-and-Change-Final-Report.pdf. This document provides a summary framework for the major concepts in the field of Biology, and proposes a shift from a teaching methodology that promotes the accumulation of random facts, to one which teaches to the broader themes of the subject. Since our department has long-held this direction in the teaching of the subject, it is quite natural for us to adopt the framework. During the Fall 2018 semester Biology Department meeting held during Professional Development week, copies of the finalized version was distributed to all faculty attendees. As we continue on our cycle of updating course outlines we will be modifying course SLO to align to the new PLO.

Many of our courses are only taught by one instructor so instruction is inherently consistent across sections. Specific examples of how we ensure consistency between sections with multiple sections **and** multiple instructors are:

- **Bio 120**: New lead faculty member has started to request Syllabi from all Bio 120 instructors. These are comparted to the Course Outline of Record. All instructors share a common lab manual with Learning Outcomes for each laboratory exercise. The lab manual is currently under revision, with several laboratory exercises having been modified already and a number up for revision. Revisions by the lead instructor are discussed with other full-time faculty and the biology laboratory technicians. Larger discussion as to which exercises need to be revised or replaced will be discussed with full-time and adjunct faculty in near future.

- **BIO 140, 141, and 141L:** Lead instructor emails sample content to all instructors (study guides, lab preparation notes, etc.) on a biweekly basis. Adjunct instructors submit sample quizzes, homework, and exams to lead instructor for review and suggestions. The BIO 140 and 141L lab manuals are standard across all sections and the 141L manual just underwent major revisions.
- **Bio 144 and 145:** Lead instructor provides a comprehensive resource list to all adjuncts, after they are hired. For past several semesters, lead instructor has also been providing syllabus, sample exams, entire lecture files for first few chapters, study guides etc. to all new adjuncts that teach Bio 144 and 145 and also meets with all adjuncts that teach Bio 144/145 routinely for exchange of ideas and to endure all of us are on the same page. Adjuncts also submit sample exams and lab practical exams for review. Additionally, lab manuals, used across the sections, contain the exercises and lab activities for all instructors to follow.
- **Bio 152**: This course utilizes a common lab manual for all sections. Lead instructor evaluates all new 152 faculty at a minimum during their first time teaching the course. She provides feedback on course organization and level of rigor. For lab, a week-to-week instructor guidelines document provides: 1) highlights, objectives, and tips and tricks for each lab; 2) any deviations from the lab manual; and 3) nuts and bolts information about where items go, protocols for refilling reagents, etc. (how we do things organizationally). Instructors also receive the lab tutors guide so they understand the tutor duties, what they can help students with and general safety protocols.
- **Bio 240**: Demand for this course is high enough to offer two sections, so the department is intensively mentoring (sharing all class materials, giving demo lectures, providing feedback, discussing grading and policies) an adjunct to teach a second section of this demanding course so that student success and learning outcomes are consistent between the sections and while the usual instructor is on sabbatical. Both sections will use the same lab manual.

2.5 Referring to the Grade Distribution Summary graphs (see Appendix 1), comment on how your department patterns relate to the college, division and statewide patterns. For course-by-course graphs, provide an explanation for any courses with different grade/success patterns than others. This may relate to major's courses vs GE, first-year vs second-year or basic skills vs transfer. Please describe how the department handles any unusual grading patterns. If you have any information that allows calibration of your

grading data to external standards (performance of your students on standardized tests or licensing exams, transfer and/or employment success) please provide those to us and explain the connection. [The Program Review Data Liaison can help you with this section and will be providing you with all required data.]

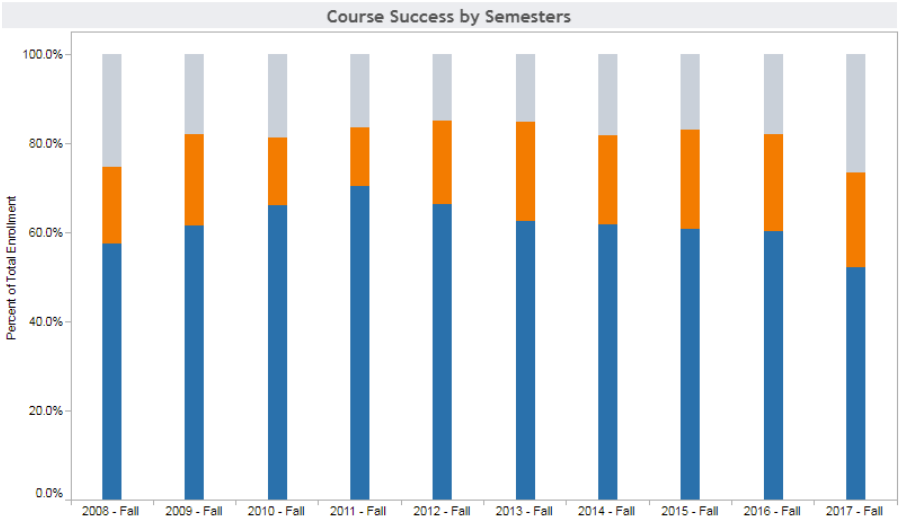
Overall departmental student success and grade distributions have been stable over the program review period, with slightly higher levels in more recent spring semesters. The department awards about 10% more C's and 10% less A's than the college overall with California community college biology departments about halfway in between. We pride ourselves on preparing students for the demanding curriculum for Allied Health programs and upper-division courses at transfer institutions (see section 5.7), however we are working on ways to increase student success while maintaining appropriate rigor (see section 5.2).

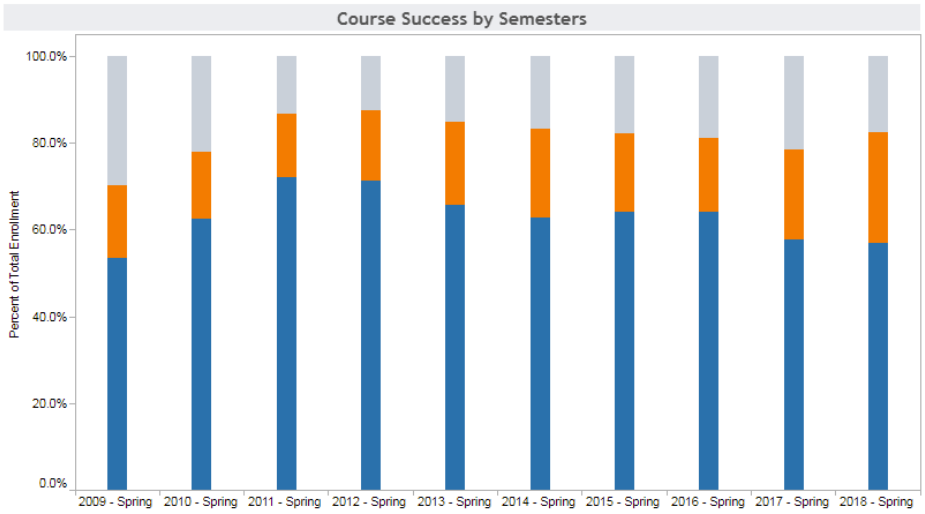
When looking at course grade distributions it is important to understand that there are three different programs in the department offerings—GE courses (105-120), preparation for Allied Health programs (140-152), and biology majors (200's) each with different student populations and characteristics.

- In the GE courses, there are similar patterns for most courses. BIO 118 is the only course offered online which explains its lower success and retention rates. BIO 114 had a large difference between fall and spring semesters, however it is only a single section each semester with a relatively small class size (around 25) so some variation is expected from term to term.
- For the Allied Health courses, students have a choice of taking 140, 141, 141L and 152 or 144, 145 and 152, usually in that order. Most of the students are Nursing majors and the Nursing program has a point system which pressures applicants to earn A's and B's to be competitive for entry. As a general rule, students with C's in prerequisites will not gain entry into the program. As a result, students drop the courses when they have a C, leading to an unusual number of withdrawals. This primarily affects 140, 141, and 144. Once students have passed 144 they do much better in 145 and students usually don't take 152 until after they have passed the other courses so the success rate is much higher.
- Almost all biology majors take the two-semester sequence 230 and 240. Additionally most students transferring to SDSU take 215, Biostatistics, which has only been offered in spring terms for the

past five years. Grade distributions show that most students are successful in BIO 215. The instructor uses a modified flipped classroom approach and has been honing the content of worksheets and activities to support students successfully learning the material for over 15 years. Student success in BIO 240 is consistently above 80% while success in BIO 230 is much lower and variable. Student surveys and pretests have shown that their preparation for BIO 230 (biology experience and chemistry knowledge from the prerequisite course, CHEM 141) is also highly variable. Bio 230 covers molecular and cellular aspects of Biology that are not visible to the naked eye. As a result, it requires a level of conceptual thinking that many students have little prior experience, which could pose challenges to their success.

For BIO 120, we investigated the course success in more detail since this comprises the majority of our offerings. The two graphs below show trends over time for BIO 120 only, for Fall terms and for Spring terms. In the past couple of semesters we have increased the number of sections and have seen an overall decline in student success, which is possibly due to two reasons: students with later registration days (and fewer units already completed) are getting into the courses and we have had to hire adjunct faculty with little to no teaching experience to staff these sections.





2.6 If applicable, provide a comparison of the retention and success rates of distance education (online) sections (including hybrid) and face-to-face sections. What are your department policies on course delivery method? Is there anything in the data that would prompt your department to make changes? (Required data will be provided by the Program Review Data Liaison – insert graph here).

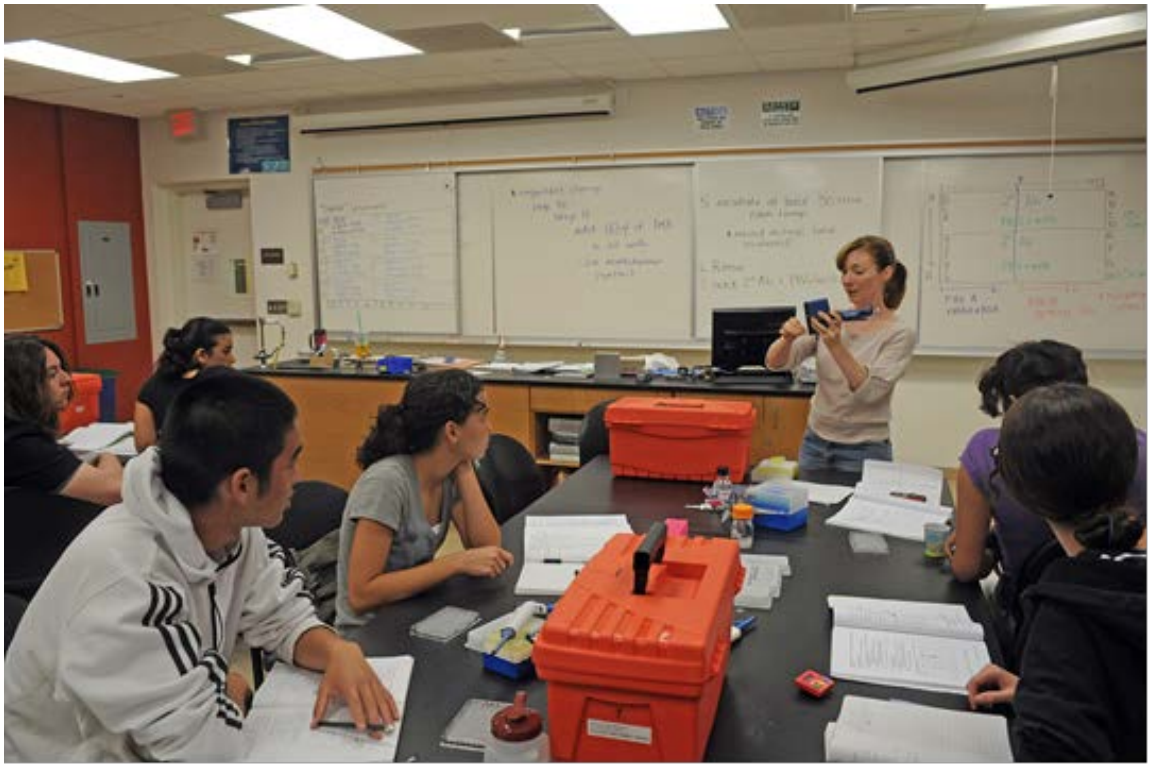
Over the program review period, the only course offered in an online format was 118, Human Physiology, a lecture-only (no lab) GE course. The retention and success data shown in the Outcome by Course (GE) graphs in Appendix 1 demonstrate substantially lower success than other GE courses. The instructor teaching this course has retired. More recently, the department has offered a hybrid section of BIO 120 with lecture online and lab on campus and a hybrid section of Sustainability. Results are too recent to be included in this program review. The department philosophy regarding online courses are that laboratory content must be on campus and exams are administered on campus.

2.7 If applicable, include the list of courses that have been formally articulated with high schools. Describe any articulation and/or curricular collaboration efforts with K-12 schools. (Contact the Dean of CTE if you have questions).

The Biology department has no courses that are articulated with high schools. A

small number of students enroll in our courses from the Middle College High each semester and are generally very successful.

We do teach a course related to the Biotechnology industry via partnerships with the San Diego Workforce Partnership (SDWFP) and the Southern California Biotechnology Center (SCBC), the Life Science Summer Institute (LSSI). LSSI is entering its 8th year. LSSI is an 8 week program for High School students. It begins with a week-long "boot camp" course in Biotechnology techniques taught at Grossmont and then they go to a 7-week internship at a research lab (e.g., Scripps Research Institute).



2.8 Please describe how the program ensures that articulations are current. Identify any areas of concern or additional needs that your department has about articulation with four-year institutions.

The department works with Articulation Officer Dee Aceves regularly to initiate and update articulation agreements. All of our courses are articulated with CSU and UC for transfer and the course for majors articulate with most universities.

When there is any change in policy at transfer institutions, Dee or the Transfer Center director Sarah Moore usually alerts us that something has changed. Two new articulations have been made during the program review period. A new Sustainability major as SDSU was created and after students inquired in the department about it, we realized that our Sustainability course (BIO 112) was not articulated so the process was initiated and approved. Now students can complete their preparation for this major at Grossmont. The second articulation was confirmed this semester. Historically, UCSD did not accept BIO 215 as preparation for the major. We have requested articulation several times in the past and it has always been denied. This time it was accepted. This is great news for biology students, because previously if they did not know whether they were transferring to UC or CSU they would need to take both MATH 160 and BIO 215 to hedge their bets. Now they only need to take one. This is a savings of three units and conforms to the Guided Pathways philosophy of streamlining student pathways to transfer.

SECTION 3 – STUDENT LEARNING OUTCOMES (SLOs)

3.1 Describe any changes (e.g., addition/deletion of SLOs, postponement of assessments) your department has made to your SLO assessment cycle. Include a brief description of why these changes were necessary. NOTE: Changes should include reassessment of SLOs requiring further attention.

The major change being made across all course SLOs are the integration of the newly adopted Program SLOs in 2018. In Spring 2018, the department met to discuss the adoption of Program Student Learning Outcomes (PSLOs). The significance of these PSLOs, is that they are based on the American Association for the Advancement of Science (AAAS) recommendations in their "Vision and Change in Undergraduate Biology Education: A Call to Action". The content is viewable here https://live-visionandchange.pantheonsite.io/wp-content/uploads/2013/11/aaas-VISchange-web1113.pdf. This document provides a summary framework for the major concepts in the field of Biology, and proposes a shift from a teaching methodology that promotes the accumulation of random facts, to one which teaches to the broader themes of the subject. Since our department has long-held this direction in the teaching of the subject, it is quite natural for us to adopt the framework. During the Fall 2018 semester Biology Department meeting held during Professional Development week, copies of the finalized version was distributed to all faculty attendees. As

we continue on our cycle of updating course outlines we will be modifying course SLO to align to the new PSLO.

The new PSLOs adopted as listed below:

Vision and Change Core Concept	Program SLO
Evolution	Students will explain how differences are the result of changes in characteristics due to natural selection and other forces of evolution
Pathways and Transformation of Energy & Matter	Students will compare and contrast the ways that different kinds of cells, organisms or the community take in, use, and transfer energy to meet their metabolic needs (Homeostasis)
Information Flow, Exchange and Storage	Students will be able to describe how genetic information is stored, expressed, and transferred to offspring
Structure & Function	Students will be able to explain how a specific structure has a specific function based on its characteristics
Systems	Students will be able to explain how molecules, cells, organs and/or organisms interact with one another and their environments.

SLOs for classes coordinated by a full-time instructor are up to date. The exception to this is BIO 120, as Selene Miles was recently hired to coordinate the program. As we update and modify our SLOs to align with the PSLOs the class will restart its 6 year cycle of SLO evaluation.

SLO's were assessed in Bio 110 but the SLOs are being changed to better reflect the PSLO's.

BIO 112 and 114 are "orphan" classes with no full-time faculty to coordinate them. As a result their SLO evaluation cycle has been postponed.

3.2 Give examples of how your department/unit has used SLO assessment results to improve a course, course sequence, and/or program over this program review cycle. In your narrative, please pay particular attention to assessment of courses that directly lead to a certificate/ degree/transfer (e.g., English 120, Psychology 120) and/or constitute a high enrollment course. For help with this prompt, please see the chart on the following page:

BIO 140 will be updating its SLOs in the next assessment cycle such that they map more closely with the newly adopted PSLOs. For example, our current generic SLO #1 in BIO 140 “Explain the interrelationship between structure and function.” Will be modified to align more closely with the PSLO asking for a specific example, and within that example the student will be required to assess how a change within the developmental structure would correlate to changes within the adult structure. Current SLO #2 “Trace the pathway of blood through the heart and identify the relative oxygen content of the blood in each chamber.” will be deleted and a more appropriate SLO incorporating the evolutionary significance of a 4 chambered heart to human form and function will be created.

For BIO 215, the last report on SLO was in SP15. Students did poorly at evaluating whether histograms were normally distributed or not, so the worksheets where histograms are made were edited to explicitly include “normality’ as part of the requirements for full credit. The other problematic SLO was #5, “choose appropriate statistical test” with only 47%. Since then, more practice choosing tests has been incorporated into worksheets and quizzes, the flow chart for tests has been included in the Table Packet students can refer to during the exam, and an additional lab and worksheet have been added to help learn Chi-Square test, which was particularly challenging for students. In addition, the assignment that should help them prepare to do this task (designing experiments) was increased in point value and more time allowed for instructor feedback before the due date.

For BIO 240, the new Program SLO align well with course content and tried directly assessing them in a comprehensive final exam in FA18 (Question 1 was evolution, 2 was structure & function, 3 was transformations, and 5 was systems). The results are below.

Outcome	Passing Score	Passing	Passing %	Notes
1	3 or 4/4 pts	21/31	68%	Improved by 25% from unit exam
2	3/3 pts	12/31	39%	Students able to give an example structure and say what its function is, but not really able to explain what about the structure enables it to do its function (the size, shape, etc.)

3	5, 6 or 7/7 pts	24/31	77%	Students able to sketch and label the cycle, but not explain the transformations.
5	4, 5 or 6/6 pts	17/31	55%	This turned out to be a poor question that students just didn't answer completely—revision of assessment needed.

As a result of these assessment results, questions explicitly asking students to describe the relationship between structure and function were incorporated into lab exams and homework throughout the semester. The instructors also have been explicitly using the vocabulary of **transformations** and **systems** throughout the semester as well as highlighting how evolution has shaped structures. SLO will be reassessed SP19 to evaluate the success of these changes and the course outline will be updated to align current course SLO to these Program SLO.

An example from BIO 152 is the SLO "be able to calculate and create dilutions properly", which is assessed as part of a quiz. The last assessment showed that only 30% of students were successful. A variety of quiz questions are given for assessment. Given the low performance historically on this SLO, some interventions have been implemented to increase success. A good part of a second lab session is devoted to discussion of the two basic types of math problems we do, then doing practice problems, both as a class, and individually. The students work on at least one problem given in class and check it with the instructor. They are strongly encouraged to work on more problems assigned from the lab manual in class that day while they can receive instructor help. Additionally, a pre-lab worksheet is now given to assess their abilities to do dilutions problems. The sheet walks them through the terminology, problem set-up and solving. It attempts to break down all of the steps so they can work the problem on their own and turn it in before doing the lab that first session. Due to the SLO rotation schedule, I have yet to assess the impact. It seems anecdotally to work for some students in terms of encouraging them to really try with the math. But, perhaps overall, doesn't impact success.

In Bio 230, the instructor has seen improved student performance by using rubrics to define learning outcomes. Some rubrics are provided in advance, most are not. Instructions for each assignments include specific instructions driven by the rubrics. The rubrics provide solid, analytical, objective information to students about their writing. Students then use this information to improve their writing on subsequent assignments.

3.3 What resources (time, professional development, curriculum approval process, etc.) did you need to carry out these improvements? Please explain.

The department sets aside time to discuss SLOs in fall and spring FLEX week meetings. For individual courses, instructors discuss with each other as needed outside of class time in informal meetings or via email. Some SLO are difficult to assess and need to be rewritten and professional development regarding better SLO would be helpful. Currently adjunct faculty are not required to participate in SLO assessment as it is an activity outside of their contractual duties. With the majority of our classes being taught by adjuncts, complete assessment of our SLO is challenging.

3.4 What evidence did you collect to demonstrate that the planned improvements were successful? If you have yet to assess the improvements, what evidence do you plan to collect?

BIO 140 will be collaborating on and using selected standard questions in exams (by mutual agreement between lead instructor and primary anatomy adjunct) to assess updated SLOs. Success rates on these selected questions will be aggregated and discussed to see how we can modify our instruction in the future.

BIO 152 will be collecting data from 3 sections taught by full time faculty every semester starting in Fall 2019, to see any real trends of improvement over time and make better adjustments at least year-to-year as needed (if not sooner).

BIO 215 changes have been ongoing for several semesters. Small improvements in performance resulted from some of them. Since further changes were need, re-assessment was postponed. Formal assessment and reporting is scheduled for FA19. The course outline is also under review and SLO will be revised in collaboration with MATH 160, PSYCH 215 and ECON 215 faculty consultation scheduled for FA19.

For BIO 240 the same SLO will be assessed the same way SP19 with immediate discussion of results and plans for FA19 implementation of any changes.

For Bio 230, the instructor uses standard exam questions each semester and uses the results to modify the questions to solicit better student responses. As an

example, one question on iron metabolism has been modified from an open response to a directed response format to better assess students' knowledge of components of this central metabolic process.

3.5 How will you use this evidence to ensure ongoing course/course sequence/program improvements are sustained?

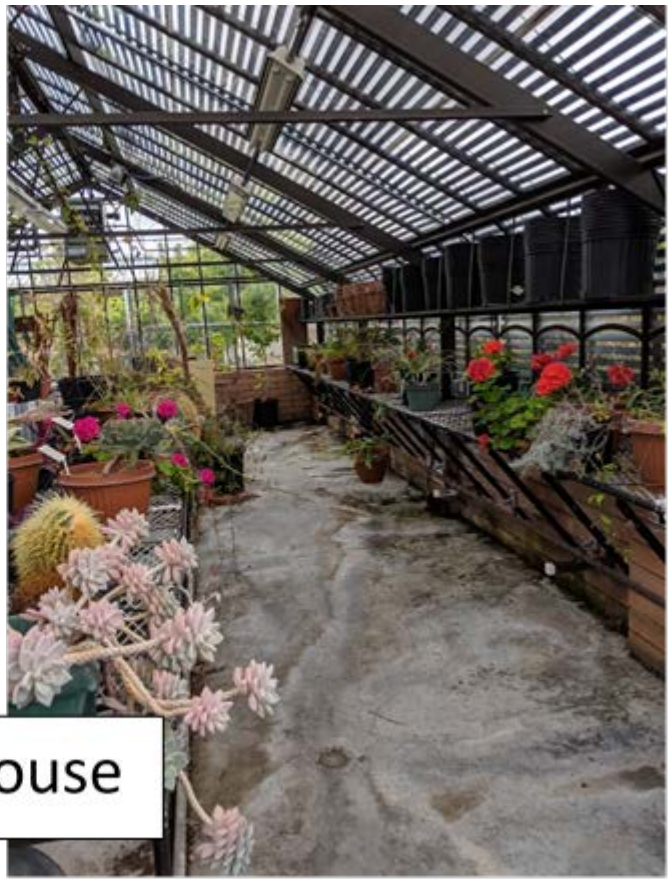
In the Allied Health classes, revision and refinement of SLOs based on student success data and inter-class coordination can be used to help ensure uniformity of the preparation of our Allied Health students. It is critical that students from our program, regardless of which track they take (BIO 140/141/141L or BIO 144/145) have a consistent foundation upon which they can build their success once they finish their pre-requisite classes.

Specifically for BIO 152, assessment results will be used to identify skill gaps in order to target ways to improve student success to narrow the gaps. Adjunct instructors will also be invited to the process of SLO development, assessment and course improvement.

For BIO 215 and BIO 240, changes have been incorporated into routine curriculum and regular assessment of learning outcomes will continue.

Bio 230 continually updates each assessment instrument and the associated material based on students' successes. The goal being to ensure the instruments accurately reflect each student's ability to demonstrate their mastery of the topics.

Green House



Lath House

Native Garden


Wildlife Sanctuary
& Outdoor Laboratory

Reserve


Ltl Acorn
062°F 017°C

SECTION 4 - FACILITIES AND SCHEDULING

4.1 List the type of facility spaces your department/program utilizes for instruction. This can include on-campus, off-campus, and virtual.

The Biology department utilizes a variety of spaces to conduct classes for multiple course sections. The nature of the space is as varied as method of instruction that Biology department provides to the students. These include:

1. On-campus Lecture classrooms: The Biology department typically offers double section courses where lectures for two sections are conducted together by a single faculty. These require large classroom sizes of up to 72 students. Single-section courses may have 24-50 students for lecture and we use a variety of rooms around campus. Lecture courses are sometimes scheduled in the laboratory rooms in building 30 when space is available so that computer carts can be used. Most faculty make use of the white boards, smart carts, projector and projector screens, and sometimes a microphone and audio system as well.

2. On-campus Lab spaces: The Biology department occupies the first floor of building 30 where there are 6 dedicated laboratory rooms with capacity from 28-36 students. One room is for the Microbiology lab, one room if for Anatomy labs, one is for Life in the Sea, one is for Environmental Biology and Organismal Biology, one is for BIO 120, and the last one houses the remaining lab courses. Lab spaces are stocked with supplies and materials (including models and preserved specimens) used in these specific courses (sometimes extensive) including sets of compound and dissecting microscopes. The lab rooms were designed to meet the needs of the department when the building was built in 2007. We control the schedule of our lab spaces and they are scheduled efficiently with labs throughout the day, evening and weekends with as little as 10 minute passing times.

3. Outdoor Lab spaces: The Biology department uses both designated and informal outdoor lab spaces including the Biology green house (located on the east side of the building # 30) the Biology lath house (located between building 31 and the Child Development Center), the pond (which contains thousands of microscopic pond organisms used for viewing in the ‘pond’ lab. the Native Plant Garden (west of building 30) and the native Coastal Sage Scrub preserve, located to the west of the perimeter road. For instance, the students have been monitoring ‘critter’ cams each semester to determine what species of birds, mammals and reptiles live or visit the preserve. The green house and lath house contain plant specimens that are used in a variety of labs in multiple courses

throughout the semester. Students also visit these spaces as part of some lab activities. Additional landscaping around campus is also used informally for cut plant specimens and to collect animals (such as snails and roly-polies) for a variety of labs. Instructors sometimes take students on informal strolls pointing out different types of plants and animals as an extension of office hours where students are expected to be able to identify specimens as a learning outcome. The campus landscaping and grounds provide a valuable addition to the in-class materials, as several acres of lawn have been converted into Native Plant teaching gardens.

1. Off-campus field trips: Some of our courses (Bio 105, 110 and 240) have regular field trip labs that replace in-class attendance. Typically, field trips are conducted on weekends or during scheduled weekday class times. Students may also be required to visit the Birch Aquarium and/or Natural History Museum. These locations are announced to students at the beginning of the semester and a description of these field trips are provided on Canvas so that students are informed of these trips prior to their enrolling in the class and alternative assignments are offered for students with financial and/or accessibility limitations. The San Diego region is a rich ecological background that we take advantage of to enhance our student's appreciation for the living world. Field trip sites range from the rocky intertidal shores of La Jolla to the world-renowned San Diego Zoo to the Laguna mountains of the Cleveland National Forest.

Left: False Point, La Jolla, site of field trips for Bio 105, 110 and 240
Right: Students with a baby octopus, a species frequently seen at the site.

5. Virtual Space: Biology department offers online courses and hybrid course sections that are conducted online while the exams are conducted on campus. These course sections are offered using Canvas as the classroom management system. Most face-to-face courses also use Canvas as a supplement for course materials and some assignments.

4.2 Are the spaces listed in 4.1 adequate to meet the program's educational objectives?
Yes___ No_X__

- If you checked 'yes', please explain how your department/program utilizes facility space so your department can meet its educational objectives. Please provide an explanation of specific facility requirements of your program, and how those requirements are being met.

- If you checked 'no', please explain how your department/program is not meeting its facility space needs to adequately meet its educational objectives. Please provide an explanation of specific facility requirements of your program, and how those requirements are not being met.

Demand for courses has allowed the Biology department to increase the number of sections offered over the past several years. However lecture classrooms have been increasingly difficult to schedule for double sections (up to 72 students). The high WSCH/FTEF of this teaching format makes them valuable to the college, however plans for building remodels are decreasing the number of large classrooms on campus. Scheduling courses that are in demand is sometimes limited by lecture room availability.

The number of sections that can be taught for Microbiology and Anatomy/Anatomy & Physiology are maxed out. For some labs, additional cabinet spaced are needed and in Anatomy new models and microscope slide sets are needed. We expanded BIO 120 into an additional lab room two years ago, when we were promised cabinets to store the needed supplies. The cabinets have yet to be purchased, so the materials and supplies are being kept on exposed counter tops or simply left on carts as there isn't enough room to store everything in the lab room.

The outdoor Coastal Sage Scrub reserve needs better a more dependable budget in order to maintain the trails, build a sidewalk between access gates on

the perimeter road and a safe crosswalk.

4.3 What proactive steps have you taken with regards to facility and scheduling to improve the ability of your department to meet the educational objectives of your program and ensure that students can complete their program in a timely manner?

Biology has been proactive in managing the days and times of course sections to meet apparent student demand. Some formats, such as evening Anatomy courses and one-day BIO 120 courses have been discontinued due to poor student success. Students have choices of sections that are offered at different times during the day, evening and weekends. This maximizes students' ability to find course sections that suit their schedule and meet their goal of completing their program, in a timely manner. Courses that are in high demand are also taught with as many sections as possible in the summer to help students complete their needed courses, particularly BIO 120 and Microbiology. We have offered a couple of online course options over the past five years and expanded those to include BIO 120 recently.

Our use of lab spaces is extremely effective. We offer not only tightly scheduled labs but we also switch the sequence of activities of individual labs so that equipment can be wheeled in and out of one lab to the other. This change allowed us to expand offerings of BIO 120 by teaching the lab in a second lab room.

We have designated faculty and staff that are responsible for ongoing overseeing of maintenance of our outdoor green house, lath house and Native Plant Garden and Wildlife preserve. The district has a shared responsibility for maintaining the Native Plant Garden and to install lighting for night classes that use it.
Such faculty members routinely communicate with college facilities and seek internal funding in order to make sure that these outdoor lab spaces are well maintained and safe for student use. Our lab technicians closely monitor the state of our storage space, outdoor labs etc. and are involved in the scheduling process. Making sure that the needed computer carts, equipment and resources are scheduled on different weeks during the semester by different courses allows us to make the most of our equipment.

Finally, the Biology department works closely with the campus scheduler in order to make sure that our large lecture classes are scheduled in appropriate classrooms and are equipped with the proper technological devices such as computer, projector, document camera etc. Faculty are also willing to be flexible

in order to schedule courses on days and times that rooms are available and are conscious of keeping courses from overlapping with one another (for example Bio 215 and Bio 230). We try to keep majors courses from overlapping with courses that biology majors are likely to take in Math, Chemistry and Physics however a more coordinated plan across the divisions would be useful.

4.4 Identify and explain additional needed technological and equipment resources that could further enhance student learning in these spaces.

In order to meet the growing need for technology proficiency, Biology has incorporated use of software in our gateway courses like Bio 120 as well as upper level courses such as Bio 141L and Bio 215, Bio 230 and Bio 240. Students from these courses represent transfer student to allied health programs including Nursing and Bio majors that transfer to four year institutions. Currently we have 52 laptops that serve a very large number of our Bio 120 students and others as well. We are having to replace these laptops as they become worn out, disappear occasionally and as the software changes. An increase in our supply budget, specifically designated for the purpose of purchasing additional laptops will greatly enhance our ability to serve our students. With the recent reorganization of the college participatory governance structure and consequent postponement of the budget request process, our requests for additional funding to replace and upgrade laptops have had to go into an ad hoc process, the results of which we have not yet been notified.

We also constantly replace models in our anatomy labs, as they tend to fall apart after a few semesters. Another need is routine replacement of our microscopes that are used regularly in our Bio 140, 144, 145, 152, 240 and 120 sections.

We also have a centrifuge that we share between Bio 141L and Bio 145 labs, in our hematology labs. The centrifuge we currently have is beginning to malfunction and have parts that are disintegrating. Having the ability to increase our supply budget, to incorporate ongoing purchase of equipment such as centrifuge, microscopes and models, histology slides etc. will greatly enhance our ability to provide superior instruction and hands on learning.

We still have some issues with the facilities in Building 30. When it was constructed an acid tank was installed to collect and filter effluent from the labs. That acid tank failed in 2011, was turned off by District Facilities and has not been repaired. All the labs in Building 30 draw deionized water from a common system. In later 2017 & 2018, water quality fell dramatically, and the

system is now maintained by an external contractor. During the diagnosis period, the department absorbed the cost of purchasing certain microbiology supplies from an outside vendor. Finally, in order to accommodate the expansion of BIO 120 sections Fall 2016 a partial remodel was done on one lab room. Despite promises from administration to complete the remodel including installing lab grade benches and cabinets, the room remains unfinished as it continues to serve hundreds of additional students.

4.5 Are students trying to access your program impacted by the facility spaces listed in 4.1?
Yes__X_ No_ __

- If you checked 'yes', please explain how students are being negatively impacted by unmet facility needs experienced in your department/program. Please provide some specific examples.
- If you checked 'no', please explain how your department/program is actively managing its facility space needs to meet its educational objectives and provide student access to your program. Please provide some specific examples.

Limitations are described in 4.2. More sections of several courses could be offered based on demand, but we do not have the lab rooms and facilities to offer them.

4.6 If applicable, please include any additional information you feel is important regarding facilities and scheduling that was not included above including non-classroom spaces such as offices, storage, preparation areas, open workspaces for students/tutoring, etc.

In addition to lab space and storage space, Biology department also has restricted office space. Currently we have no capacity to offer office space to our adjuncts. With new contract and paid office hours, adjunct faculty can finally hold office hours but within the department there is little scope of offering office space to adjunct faculty. Currently we have two faculty offices that are unoccupied; one of these is assigned to a number of adjunct faculty so that they can hold office hours, using the desks in the empty faculty office. The second empty faculty office was occupied by Mathematics department, in previous semesters but the Math faculty have moved out. This office is currently unoccupied and Biology is currently trying to repossess the empty faculty office.

The central area of the building is configured with office space for technical staff, a kitchen/break room, and preparation and storage areas to support the lab

classes. All lab rooms have doors leading into this area. The prep room space currently severely lacks storage space. There is no more room to add cabinets or storage units but additional supplies for the second set of BIO 120 labs has needed to be incorporated into the space. Unless we are allowed additional space, Biology department, as things stand, can no longer add more sections of any course, irrespective of demand or long waitlist.

The first floor of building 30 also has a large open room equipped with tables and chairs that students can use for study groups or meeting with faculty. Some adjuncts use this space for office hours. It is used formally as the department tutoring facility for Anatomy, referred to as Anatomy Learning Center or ALC in short. The room is currently open 7:30A to 9:50P Monday through Thursday and 7:30A-2P Friday and Saturday. The tutoring activities take place within this open time for approximately 20 hours per week and serves students from 11 sections of Bio 140, 144 and 145. This facility not only serves students from Grossmont College but a substantial number of Cuyamaca students also use this facility (30% of total student usage is from Cuyamaca). Students have access to models, microscopes and slides, and peer tutors to enable them to study outside of lab time, which is critical to success of our Anatomy and Anatomy & Physiology students. Although we have effectively offered this facility throughout the times of budget cuts, now the future of this critical facility is unknown as the designated budget for this tutoring facility has been abruptly and without prior notification, dropped from the LTRC budget.

We are working to maintain the tutoring facility with the help of donated TA hours to finish Spring 2019. An accessory to this facility is our Microbiology open lab (MOL) that allows for a tutor to be present in the Microbiology labs when students are working there on their unknown specimens. Future of the MOL too, remains uncertain at this point, without an ongoing budget.

Currently we are collaborating with the Dean to secure funding to continue offering this valuable service, but have not been assigned any additional funds as of May 2019. Cuyamaca has not been able to offer any support for the center despite the large numbers of students from that campus using the facility. Our current yearly budget for BOTH the ALC and MOL is $9400, which will not be sufficient to cover a single semester of tutoring if we want to keep historical hourly offerings.

SECTION 5 – STUDENT EQUITY AND SUCCESS

NOTE: See Appendix 2 for enrollment data; Appendix 3 for student success data.

5.1 What are the identifiable patterns with regards to overall trends in enrollments in your department? Explain what is causing these trends (e.g. campus conditions, department practices). Once you have identified and explained your enrollment patterns, then address what your department has done/is doing to address identified issues. Examples of any changes you made to manage enrollment are encouraged.

In addition, you should examine your enrollment data, disaggregated by gender, age and ethnicity. For any of these student groups in your department with enrollment data at lower or higher proportions than college-wide numbers, describe what factors you think is causing these patterns [Data and a summary of notable patterns will be provided by the Program Review Data Liaison].

Total Enrollment

Over the program review period, Biology department total enrollment has steadily increased in both fall and spring semesters. At the same time that overall enrollment at the college has decreased about 10% over the program review period, enrollment in Biology has increased about 20%. Typically the college has lower enrollment in spring semesters than in fall, but the biology department has enrollment as high in spring as in fall. We added sections in summer as well, with an increase from 200 to 293 students enrolled from 2013 to 2017.

The explanation for the growth has been the increase in section offerings to meet pre-existing student demand. The number of declared Allied Health majors at Grossmont has increased from about 1750 to about 3000 from 2008 to 2018 and the number of Biological Sciences majors has more than doubled from about 450 to about 1150 over the same time frame (totaling more than 20% of Grossmont students). Most of our courses have had long wait lists since the contraction of the schedule during the 2008-2012 time period. However since 2013 we have increased the sections of BIO 120 offered each semester from 16 to 26 in response to the college's need to add FTES. This has included adding Friday, Saturday and online sections as well as a major change in scheduling the course into a second lab room. (This step was drastic—it required the "second room" sections to change their lab schedule so that the two rooms are on different schedules as we do not have enough equipment to support two whole setups in the same week.) We have also increased BIO 140 & BIO 152 by one section each. These two courses are now at the maximum possible that we can provide

based on the lab spaces needed for these courses. In Fall 2008 there were a total of 46 students active on waitlists on the first day of classes and by Fall 2018 there were 282 so the increased sections have continued to fall short of demand.

The changes in our overall scheduled offerings have not all been increases, however. The two GE courses with labs, BIO 110 (Environmental Biology) and BIO 105 (Life in the Sea), have had a decrease in enrollment over the program review period, such that we have reduced the number of sections offered of each from 10 to 4. It is possible that growth in BIO 120 has hurt enrollment in Bio 110 & 105 but we don't know. Anthropology has also begun teaching hybrid courses that compete for the same GE student population which may also have decreased demand. . Faculty have advertised for these courses in the Summit and with fliers posted around the college and changed schedules to better serves students, resulting in increased enrollment again however.

Another change in the schedule to maintain department efficiency was to stop offering BIO 215 every semester and only offer it in spring, which started in 2009. Although protected because it is part of the AS program, BIO 215 was historically capped at 15 students and commonly had enrollments below 15. Demand for BIO 215 has gradually increased with 20 students enrolling consistently since spring 2013. The limiting factor on the course size has been the laptop computers the students use in lab activities. As the department has increased the number of computers available, we found we could support a larger class size, and the course max was officially increased to 20 for Spring 2017. With the increased enrollments, the department decided to go back to offering BIO 215 every semester beginning Fall 2017 to help students complete the AS.

Areas where student demand could allow us to expand offerings are currently impossible due to lab rooms for specific courses being completely scheduled and/or lack of qualified adjuncts to teach the courses.

Disaggregated Enrollment

The Biology department is large enough that when we look at the data for all courses offered the disaggregated data should reflect the same trends as the college. However, there is a larger inequality between male and female students in biology (35:65) than at the college overall (45:55). This pattern is typical in biology and the department does nothing in particular to recruit and retain female or male students as a group. Ironically, women interested in science often gravitate to biology rather than math, chemistry or physics, but end up having to take almost as much math, chemistry and physics as they would as majors.

The Biology department enrollment disaggregated by age category shows that

the proportions of students older than 24 match the college. For the <19 and 19-24, the patterns have gotten closer to the college trend over the last three years, however we still have about 4% more 19-24 year olds and 4% less of <19 year olds than the college. These divergences from the pattern are not large enough to be a concern to the department.

For enrollments disaggregated by ethnicity, the data show that the Biology department has followed the college trend of approaching equal proportions of Hispanic and White students at about 37% each. In the other ethnicity categories, the Biology department had stable proportions until fall 2015, with about 2% more Filipino students than the college and about 2% fewer Black students than the college. However starting fall 2016 the proportions of Black, Asian, Filipino and Two+ have been changing to match better to the college patterns. It is possible that increasing our sections of BIO 120 has allowed younger and more diverse students to access these courses whereas before the waitlists were so long that only students with earlier registration priorities were able to enroll. The proportions of Pacific Islander and American Indian/Alaska Native are small college-wide but are possibly even smaller in the Biology department.

These data show that our department generally matches the college in ethnicity/race proportions. The gender discrepancy also does not appear to need addressing as women are underrepresented across the sciences so a larger proportion of women than the college could be argued as a good trend. Our department is the most diverse department in the sciences providing role models for students from many different sub-populations. .

5.2 Discuss trends in student success and retention overall in your department and explain these trends (e.g. campus conditions, department practices). Also examine the success and retention data disaggregated by gender, age and ethnicity. For any groups that have success rates in your department at lower or higher than college-wide describe what factors you think cause those patterns. Provide examples of any changes you made to improve student success/retention, especially for groups that have equity gaps. [Data and a summary of notable patterns will be provided by the Program Review Data Liaison]

Total Success and Retention

Student success and retention in Fall semesters has remained relatively constant across the program review period with success about 62-64% and retention about 78-80%. In Spring, student retention has gradually increased since 2014 from 79% to 83% in 2018 while success has fluctuated from 64-67%. This is

interesting because success and retention usually follow the same pattern. Overall there is about a 2% higher success and retention in spring for the department that is consistent with the same pattern for the college. However overall success (and retention) are somewhat lower than the college overall and also below the college target of 75%. Furthermore, both success and retention at the college overall have been gradually increasing, while only our Spring retention matches this pattern. Summer retention and success pertains to only about 200 students and has been variable. Overall, summer success rates are on average higher than in the full-length terms, which is consistent with college patterns.

A possible explanation for lack of increases in these metrics over the past couple of years is the rapid department expansion combined with a limited pool of adjuncts to staff them with. We have had to hire people who have never taught a class before--although we prefer hiring adjuncts who have taught at community colleges before. Some new faculty are great but it takes a while to hone your craft so these new instructors are not necessarily the best people to have teaching our courses from the student's perspective. Biology is a rigorous academic discipline and we may not expect our overall success and retention rates to be as high as some other departments, but we think we can do better.

There are courses where student success is higher (see discussion of Grade Distributions) and there are sections of some courses with wide ranges of student outcomes across the sections offered. This is particularly true for BIO 120. Since about 40% of the course sections that the department teaches are BIO 120 sections, focusing on this course would go a long way toward improving student outcomes for the department overall. BIO 120 has also been identified as one of the 12 Gateway Courses and we have been participating in the Gateway Courses initiative.

The first step the department made to focus on student success in BIO 120 was hiring a new tenure-track person to be the course coordinator for BIO 120 in spring 2017. Since the last coordinator retired in 2010, full-time faculty have been coordinating the course among many other duties. This is an important role in our department where we define the duties of the course coordinator as responsible for on-boarding and mentoring adjuncts, revising and updating the in-house lab manual, managing the SLO processes, and taking the initiative on curriculum modifications. Our new faculty member has stepped gracefully into this role and although she is only in her third year with us, she is a very experienced instructor having taught at several other colleges in the region before coming to Grossmont. She has already begun making much-needed upgrades to the lab manual. The new lead has also represented the department on the

Gateway Courses task force and facilitated discussions at department meetings to begin our department inquiry into practices that might better support our students in BIO 120.

Another factor related to student success in our department is the large class sizes. Most courses are taught in double sections, so there are 72 students in lectures. The department has engaged in an extended study of class size as compared to other community colleges in the San Diego area. Numerous studies have shown a link between student success and student to teacher ratios (class size). Some selected articles and excerpts below:

> *But it appears that very large class-size reductions, on the order of magnitude of 7-10 fewer students per class, can have significant long-term effects on student achievement and other meaningful outcomes. These effects seem to be largest when introduced in the earliest grades, and for students from less advantaged family backgrounds.*
>
> From: Class Size: What Research Says and What it Means for State Policy
> Matthew M. Chingos and Grover J. "Russ" Whitehurst Wednesday, May 11, 2011
> https://www.brookings.edu/research/class-size-what-research-says-and-what-it-means-for-state-policy/

> *Small class sizes closed the gap in academic performance between men and women.*
>
> From: Small classes reduce performance gaps in science, June 27, 2018 - University of Minnesota,
> https://www.sciencedaily.com/releases/2018/06/180627160214.htm

Our study of class sizes show remarkable consistency in class maxes for biology lab classes. At Cuyamaca College and all the colleges in the San Diego Community College district, the maximum enrollment for Biology lab class is 24. At Grossmont the maximum ranges from 36 for General Education classes to 30 for Bio 230. Allied Health preparation courses range from 32 (Anatomy, Physiology) to 28 (Microbiology). Our department has begun considering a systematic effort to lower the lab class maxes to match those in our local area in the Allied Health courses and BIO 120. Since the Biology department facilities are beyond their current maximum for supporting numbers of class sections, reducing the class maxes will effectively reduce enrollment in Biology. Based on these factors, we have set our target at 28 for the course labs with lowest success rates. This reduction has the effect of also reducing the "double section"

lectures from 72 to 54 (25% reduction).

Despite these challenges, the department makes many efforts to support student success. The department relies heavily on student peer tutors to support student success. We actively recruit and train tutors for all multiple-section courses, BIO 230 and 240. Overall student success strategies that the department has adopted are (see Appendix 5):

- Preparation for Allied Health students handout—distributed in all sections of BIO 120
- Student Success Tips for BIO 120—or similar recommended in all sections
- Distribute information about student support services, such as tutoring, in syllabi, on Canvas pages, including the Specialized Services for Students flyer, links to Grad Coaches on Canvas pages, and helping connect students with resources whether they are struggling with health, mental, academic family, or financial issues.

Disaggregated Success and Retention

When data are disaggregated by gender, and interesting pattern emerges. In contrast to the overall college pattern of female students having higher success rates, male students have about 5% higher success in biology courses than female students. This is also despite the fact that males make up only about a third of our students. Student success and retention are higher in summer in keeping with the college pattern. This difference is not large enough however, that the department feels like specific measures need to be taken to improve female student success specifically.

Student success and retention data disaggregated by age show a similar pattern to the college with older students doing somewhat better than younger ones. The differences are about 5% (and within 5%) of college patterns, so we do not see any particular attention needed for students of different ages.

When data are disaggregated by ethnicity, there are too few students in the AI/AN and Pacific Islander groups to see any pattern, and these groups are not included in the graphs. There is an equity gap for Hispanic students and an even larger one for Black students, with only about 45% success. Campus-wide, Black students are 60% successful so they appear to be struggling more in our department. Upon reviewing these data, the department discussed continuing and expanding a collaboration with Umoja. Faculty gave a presentation to UMOJA students at the beginning of the Fall, 2018 semester on how to be successful in Science courses. It was well attended, and the coordinator said we made the Department appear to really care about the student's success. From that workshop Michael gained two students for the Bio110 Fall semester.

Some examples of equity strategies employed by faculty in the department:

- Use diverse cultural and gender identities in concept examples and when discussion historical contributions to the field;
- Provide free ticket vouchers for low-income/homeless students to Natural History Museum and Birch Aquarium for required field trips and free guest passes on zoo trip for students needing a ride from a friend;
- List resources on the course syllabus and in Canvas for low income, homeless, abused, mental health issues etc. (in three languages) and encourage students to use them and/or attend student services-sponsored on campus events;
- Level exams with increasing point value to encourage students to stay in class and improve in performance over the semester;
- Early semester “value and identity” assessment to help students engage and invest into their classes in the context of their own personal goals and life circumstances;
- Explicit and open discussion of controversial issues in our society and the world as appropriate to course topics, such as immigration, social justice, disparities in health care, identity, environmental justice;
- Emails and/or in-person conversations with every student who doesn’t pass the first exam and/or seems to be struggling, to find out what is going on and to refer the student to appropriate resources;
- Management of assignment due dates, policies, and exam make-ups to allow students flexibility if work or family issues interfere with course;
- Open discussion of dealing with stress and anxiety in daily life, including inviting Matt Ring to make presentation in class;
- Making class time count for learning and minimizing busy work assignments;
- Intrusive help for struggling students during in-class activities.
- Assignments that require visits to the Career Center to prepare students for job applications and to consider career options
- Increase the use of computer-aided instructions that provides a more interactive and individual experience
- Rewrite course materials and lab manuals containing dated (potentially offensive) language.
- Reminding students when they feel discouraged that as long as they keep moving forward they are succeeding
- Handouts provided and discussed early in the semester to each student in each section regarding campus resources, getting organized (notebook, planner), study tips, and reading techniques

- Handouts provided for Allied Health and any student who will be taking anatomy, physiology, and microbiology indicating the skills and content necessary in preparation for those courses
- Homework assignments on time management, the required number of hours of studies explicitly stated and scheduled in time management assignment
- Homework and in-class assignments providing practice in reading and study skills such as flashcards
- Syllabus description of the function of office hours, inviting all students to use these for asking questions, discussing effective ways to read the textbook, how to prepare for lab quizzes, looking over questions regarding lecture/lab, utilizing the textbook and lab manual, how to manage time efficiently, or getting more organized.
- Individualized and group review of completed exams during office hours in order to discuss biological concepts, exam preparation, test-taking techniques and strategies
- Small incentive (extra credit) provided for students reviewing first exam with intention of familiarizing and acclimatizing students to office hours
- In-class activities in study guide providing practice for various topics, with additional practice and answer keys provided on Canvas for student review.
- Employing “intrusive interventions” as suggested by “Teaching Men of Color Program:” that is, providing early alerts (monitoring key predictors of students’ success such as attendance, low scores on exams or major assignments, arrive to class late or leaving class early, submission of incomplete work, or disengagement in class discourse) and then contacting student and/or referring to services
- Other interventions as suggested by “Teaching Men of Color Program:” Providing and mandating use of academic support, asking students how things are going on-on-one, offering unsolicited help (important since men of color may be apprehensive), praising publicly (but authentically) in actual performance
- Small, basic pre-lecture reading homework assignments required on Canvas
- Formative assessments (lecture quizzes) provided on Canvas to familiarize students with exam style questions
- Requiring students to complete particular lab questions in preparation for the lab exercise in class

-

5.3 Describe specific examples of departmental or individual efforts, including instructional innovations and/or special projects, aimed at encouraging students to become actively engaged in the learning process in their classes.

Student engagement is encouraged in courses across the department. Here are some examples:

Bio 105

- Dudley is the lead author of a widely-selling Marine Biology Lab Manual that is used in 90% of the activities in a laboratory setting. All 16 exercises are designed to engage students, in a hands-on experience, with important topics in the course.
- Several field labs are 100% student-centered. Students are actively applying classroom material in real ecological settings and solving problems, with many lectures during which they must apply what they have learned to new situations and answer questions either individually or in a group. A free exchange of ideas on various topics in the classroom is emphasized.
- A 100+ page Lecture and Laboratory Guide was written by the course coordinator and is sold at cost in the G.C. Bookstore.
- Special projects include a “Photo Essay” where students photograph animals in their habitat and research information about them and a Plant Press where students collect specimens of place from the beach, press them and research information about them.
- In-class discussions prompted by questions about topical issues such as climate change, the Pacific Garbage Patch, endangered marine species and other relevant global marine environmental concerns.
- A diversity of learning strategies are employed to increase student success.
- Reading assignments and problems are given that specifically challenge students to apply principles discussed in lecture to new situations not specifically discussed.

Bio 110

- Canvas pre-lab quizzes have resulted in students coming in to lab better prepared to be successful in the laboratory learning assignment.
- A Climate Change computer modeling program is being tested in Bio 112 and will be incorporated into one of the Bio 110 labs.

- Students engage in off-campus projects such as the San Diego River Park, Earth Day Fair, 'I Love a Clean San Diego" and the SD Zoo's Citizen Science projects.
- All lab projects are completed in a group setting. Peer teaching is also encouraged.
- Co-hosted CA Native Plant Society Native Garden Tour 2016 on our campus along with adjunct instructor(s) and encouraged student participation through discounted tickets and extra credit.
- Students have been participating in what was an original 199 project with a student who put two 'critter' cams in the reserve. We now monitor the camera's each semester adding to the bird, mammal and reptile species list for the reserve.
- Students go over the exam answers in groups, helping each other understand the material (after my review).

Bio 114

- Formative assessments such as using ABCD cards are used to gauge the understanding of and query the thinking of all students in the class.
- Think-pair-shares during each lecture session to engage students with the material and with each other.
- Canvas Discussion Board posts to further reinforce the spirit of community and connection within the class.
- Modification of assignments with student input to match student interests and needs.
- Participation in One-Theme-One-Campus for 2014-2017.
- Brought CA Native Plant Society Native Garden Tour 2016 to campus and encouraged student participation through discounted tickets.
- Participation in Roly Poly Research Project by guiding students on a pilot project using of microsatellites to identify population differences.

Bio 120

- Instructors have created many strategies of engagement. The first is at the beginning of the semester: students complete an autobiographic survey online, providing possible major, topic interests, study techniques currently used, perspective on current enrollment in Bio 120, prior enrollment in Bio 120, etc.
- Students who are self-identified as Allied Health majors, or otherwise required to take Anatomy, Physiology are provided with a handout showing skills and content relevancy of Bio 120 to these classes.

- Students are often a minor amount of bonus points for making an office hour appointment to review Exam 1 individually or as a group, in order to review content, discuss test-taking strategies, manage test anxiety. In addition, students are asked to do a post-exam survey regarding their appointment to review Exam 1 individually or as a group, in order to review content, discuss test-taking strategies, manage test anxiety. In addition, students are asked to do a post-exam survey regarding their strategies, strengths and weaknesses, and reflect on possible improvement strategies.
    - Every semester: provide multiple choice questions during lecture activities. Students respond using answer cards marked with ABCD to provide their feedback anonymously. All students are required to show their cards. This is followed by discussion of each question and answer.
    - Within the Study Guide provided for each section, students are provided with practice problems that are initiated in lecture class. Students Think-Pair-Share practice problems in class and then continue more examples following class. Answer keys are provided on Canvas for students to self-evaluate.
    - Provides several opportunities for students to become involved at the campus and local levels: For several semesters students have attended in Film Screenings and Lectures for a small amount of extra credit. Examples: Fall 2017 – Food Project movie, Spring 2018 – Public debate on GMOs, Spring 2017 – Climate Change march, Spring 2017 – May Day rally, Spring 2018 – March for Science, Fall 2018 – Climate Change march
    - Incorporate computer simulations to teach basic concepts of experimental design, data analysis and evolution
    - Update lab exercises to emphasize concepts and problem-solving
    - Use of “checkpoint” multiple-choice questions throughout lecture requiring each student to respond, using lettered colorful cards to check for comprehension in large lecture class, in lieu of more expensive I>Clicker response system
    - Small group written activities to engage each student, then whole class review interspersed throughout lecture period. Generally, these activities cover the most challenging topics.
    - Short videos in lecture and lab of relevant but engaging content (parasitized Zombie Snails, sea biscuit echinoderm development, etc.)
    - Provide incentives for attending local marches and rallies, and campus/local lectures such as One Campus/One Theme SM
    - Ask students to do a self-evaluation after their first exam for a small incentive (extra credit)

- Engaging students in discussion of current biological topics, discoveries, events

Bio 140, 141, and 141L

- Prior to the semester start a “Orientation Guide” to Allied Health classes is posted
- online, and encourages students to make time for office hours and tutoring as early as week 1 of the semester.
- Students perform a study skills and self-evaluation (mindset, motivation, and preparation) activity at the beginning of the semester.
- Students complete pre and post class homework every week to encourage better time management and out of class reading.
- Exams are leveled with increasing point value per semester to account for student growth in study skills and content mastery.
- Students do a post exam I reflection and correction activity to help students assess their strengths and weaknesses on exam preparation and exam taking.
- In BIO 140 lab students participate in peer instruction during cat dissections.
- All bonus points are activities prior to exams that assist students in test taking and study skills to help students perform better. Incorporated in these activities are stress reduction techniques.
- Allied Health students and program leaders visit class every semester to ensure that students are aware of requirements for entry, ways to be successful, and how the pre-requisite classes fit in the the “big picture” of a college education.
- The BIO 141L lab manual recently underwent significant revision to reflect current physiology knowledge and practices.
- The BIO 140 manual was revised twice within the last cycle, most recently in 2015.

Bio 144, 145

- Students are provided with links to Calendar, tutoring services, A&R and multiple other campus services prior to the beginning of semester.
- Students are provided with comprehensive list of skills they will require in Bio 144 and 145, and are encouraged to make time for office hours, study in library and study in tutoring centers.
- Students complete multiple homework, with each lecture exam, to learn how to critically think and apply concepts learned in class.

- Several practice quizzes, figures, animations and pre-recorded lectures are provided within Canvas to facilitate learning of complex Physiological concepts and anatomical structures.
- Both Bio 144 and 145 Lab manuals were thoroughly reviewed and revamped as well as enhanced during 2017-2018. New exercises were added, dissection photography and histology images were added as well.
- Students conduct a post exam-1 reflection and study habit activity to help assess their strengths and weaknesses.
- In Bio 144, Students participate in several activities in lab, to facilitate learning of anatomical terminologies and definitions.
- In Bio 145, students participate in writing a "Brochure" assignment that allows students to learn about a disease/condition by independent research, design a brochure and for some, Present their findings in front of their peers. Students have expressed very positive feedback regarding this assignment, time and again.
- Allied Health students and program representatives visit classes every semester to reinforce the importance of preparedness and proper skill set, in order to be successful in the ever demanding allied health programs.
- Mental health personnel visit classes every semester to provide students information about on campus mental health resources and students are referred students to mental health services and grad coaches.
- Bio 144 and Bio 145 students participate in group dissection activities throughout the semesters.
- Bio 144 and 145 students participate in fun and informative Physiology activities in lab.

Bio 152

- Shows a video and has discussion based on "Life on Us"—emphasizes the relevance of microbes to human physiology and health—fecal transplants to help not only gut problems but other problems too (Multiple Sclerosis); intentional ingestion of tapeworms to train immune cells and avoid damaging excess inflammation; high parasite (*Toxoplasma*) rates in certain human populations (due to raw meat consumption) leads to more risky behaviors (pathogen influence on host behavior).
- The section in which a full week of lecture if presented in a single 2hr 50min class has more engagement techniques in order to keep them on track.
    - Homework: Generated my own assignments: scientific naming, bacterial cell structure, macromolecules, metabolic pathways and nutritional mode fill-in (book-sourced) , enzyme map fill-in (book-sourced),

disinfectant/antiseptic guidelines, nosocomial infections, graphing for pH and O_2 requirements vs. growth given sample data;
    - Online homework associated with new book, InQuizitive and/or Smartwork assignments linked to book.
    - Journaling FALL 2016: Helps students see how many hours of preparation they put in, what activities they do, and whether they are meeting their goals for work in the course. 3) Reading Apprenticeship assignments SPRING 2018-FALL 2018: Students explore their reading comprehension techniques, and learn new ones to try using disease case study readings.
- Lab manual was updated FALL 2014 (Custom manual featuring LeBoffe and Pierce short edition, plus extra handouts): more and improved photographs of procedures and equipment to engage students in the material.
- New labs were added: ELISA epidemiological study, coliforms sampling (SPRING 2013). Clarifies and updates course content for students. UPDATE in FALL 2018 to eliminate all but one handout addendum.
- One Campus, One Theme participation in campus wide fairs during FALL 2014-SPRING 2017 Water Theme, and FALL 2017, FALL 2018, FALL 2019 Food Theme: Student presented posters on disease topics. FALL 2015, SPRING 2017 and FALL 2017, SPRING 2018. Develops communication skills and campus connections.
- Community Service Learning workshop SPRING 2016: Students attended CSL Fair on campus and wrote a report about what 3 tables they visited and which project they would most like to participate in and why helps them think about their larger role in society.
- Exam Reflection FALL 2016-present: Students think about their performance, provide reasons for grade earned and formulate a plan for improvement; sheets are returned with written suggestions for student resources that would support their success.
- Classroom informational visits (varies by availability from semester-to-semester): Respiratory Therapy director informs about the program, Nursing students inform about the program and their experience in it, Mental Health counselor visit when those services were new to campus (FALL 2016).
- Study Habits survey SPRING 2018-present: At the beginning of the course, students assess their student habits, study environment, barriers to success, with written feedback from instructor and follow up class discussion as to what the appropriate number of hours are for optimal success in the course.
- Club Co-advising for Invisible Club (political engagement), FALL 2017-present: Help students develop leadership qualities and strengthening organization skills via voter registration, political panel events, attending club fairs

- Announced to students about CVT student scans practice session, SPRING 2014: Collaboration with Cardiovascular Technology program, allowing students to learn more about the CVT program.

  BIO 215

- Using topics for examples that fall within student interests, based on early semester assignments where students choose the topics;
- Using actual data on students from the class, such as heights or their chocolate preferences to work as examples;
- Incorporating hands-on activities including measuring and counting live plants and animals to provide data for analysis.
- Students are assigned to take their resume to the Career Center and have it evaluated and then edit and re-submit it to instructor;
- Statistics jokes and cartoons in every lecture;
- In-class worksheets and review problems to practice before exams.

  Bio 230

- Instructor collaborates with student organization that focuses on Medical School aspirants (AMSA-GC, American Medical Student Association of Grossmont College). Provides information on meeting schedule and, when available, invites speakers from the group to address the students.
- Former students, when available, are brought in as guest speakers to discuss their experiences after transfer.
- Students participate in a Career exploration module in collaboration with the Grossmont Career Center.

5.4 Explain how the program incorporates opportunities for student engagement outside of class time and/or in collaboration with other departments (e.g. interdisciplinary course offerings, learning communities, internships, research projects, service learning, or participation in community events, tournaments, competitions, and fairs) to enhance student learning.

The Biology department has prided itself on engaging students outside the classroom in a variety of ways including involving students in research being done by faculty. Examples include Independent Research, environmental research and activism, and engaging students in teaching and learning processes

through tutoring and preparation of classroom demonstrations. Attendance to on-campus Learning Workshops helps students explore career opportunities, as well as sharpen skills needed in multiple courses (how to choose good resources, how to avoid plagiarism, etc.). Faculty also encourage participation in the Community Service Learning Fair and One Theme Fair to promote broader civic engagement.

One opportunity that the department has promoted in the last two years is the Amgen biotech “Who dunnit” kit project. The activity uses DNA technology to solve a murder mystery and is for high school students. Department tech Cami Yonally has supervised recruiting Grossmont students, training them in the activity (over 50 so far) and coordinating opportunities for them to lead workshops for high school students. Over 150 high school students participated in the activity during an on-campus event last spring.

The Roly Poly Research Project

In late 2016, Bonnie Ripley proposed a student focused research project. With the help of CoChair Milgrim (funding & scheduling), Senior Tech Sharon Farley (lab setup, purchasing needed materials, general coordination) the project was started in Spring 2017. This project is called the Roly Poly Research Project an is usually held for two hours on Friday afternoons. The work investigates the metapopulation dynamics of wood lice on campus, which means we study how they use the habitat and what factors influence their population size. Experiments so far have established the walking speed of roly polies, survival of juveniles from birth to sexual maturity, measured survival after applying several different marking techniques, and attempted to determine if they have a food preference between Coastal Sage Scrub and native European plants. The meetings are informal and flexible so that students can attend when it fits their schedule and are not too intimidated to participate. Tech Staff and department faculty have assisted Bonnie and students. An adjunct professor provided expertise in roly poly DNA analysis. Students mostly come from the BIO majors courses.

Since Spring 17, almost 50 students have attended at least one project meeting (remember these are “optional” meetings on Friday afternoons) of which about 20 attended regularly through at least one semester. Most of the students are Latino, low-income and/or from immigrant/refugee families as well as Dreamers, veterans and LGBTQ students. Many are excellent, high-achieving students but there are also many students who are mid-range or even failed a biology class who join the group. One student has used work on the project to get honors credit in Bio 215, two students have presented results at regional conferences (UCSD

Summer Research Conference and the Southern California Academy of Sciences Annual Meeting) and nine students have done 1-unit 199 Special Projects (most in the first summer) to get credit for working on the project. Eleven of the students who have participated so far have transferred and report success in their university courses and on-time progress toward graduation.

Bridges to the Future Program

This is a program housed within the Biology Department, and funded by the National Institutes of Health (Bridges to the Baccalaureate). Perchez is the Program Coordinator. The goal of the program is to increase the successful transfer and retention of students to 4 year universities (students of Native American, Hispanic, Latino, African-American, and Pacific Islander descent). The Bridges program at Grossmont provides students with opportunities to:

1. network with peers and community professionals
2. attend career informational workshops
3. attend field trips to local research facilities
4. receive support and guidance by having direct access to several faculty mentors

From the years that the Bridges to the Future grant has been funded (2013-Spring 2017), 3-5 meetings were held each semester during the academic year on the Grossmont campus. During the Fall semesters, the topics of the meetings were the following: Meet and Greet (scholars share experience about the summer internship program component with new candidates), Letters of Recommendation

and Personal Statements (the what, why and how), and, either Transfer Experience (former students provide tips on how the transfer experience went) or Transfer Center presentation (general overview of transfer, as well as focusing on specific schools and majors of attendees). Spring semesters had the following topics: Meet and Greet (to accommodate new candidates), field trip to either The Scripps Research Institute [see photo] or Salk Institute (to get students excited and motivated to continue on their career path after meeting and hearing from real scientists during lab tours/presentations), career panels or speakers (Pharmacy, Nursing, Physician's Assistant), SDSU Summer Internship (the SDSU Bridges Coordinator talks about the program and meets the candidates). Recruitment for the program is held throughout the academic year, although the heaviest recruiting is focused on the Fall semester, so that students can be mentored and establish a cohort for the entire year.

The highlight of the program is the opportunity to participate, via competitive admission, in the summer internship program component at SDSU. The internship provides enrollment in skill-building courses in the sciences, and the opportunity to conduct basic research in a supportive environment. A small stipend is paid to students participating in the program. The program culminates in the presentation of a mock-grant proposal that each student has developed from their own interest, and worked on during the eight week program.

Other Research and Internship Opportunities

We provide information about a variety of local internships via the web pages of faculty and others and place as many students as we can in these. Over the program review period two students have done a one-unit 199 to participate in the full-time U.S. Navy Marine Mammal Care and Training Internship where they get hands-on care with sea lions and dolphins. Full time faculty developed connections with UCSD's REU (Research Experience for Undergraduates) that accepted 3 students in their summer program called the Temporal Dynamics of Learning. Three students have been accepted to the USD Summer REU fellowship in climate change science. A former Grossmont College student who is now a Ph. D. student at UCSD Scripps's Institution of Oceanography took eight Grossmont students as volunteers for SP18 and into the summer to help carry out her thesis research on the effects of acidification on the exoskeletons of crabs. Three students have gone to Colorado for a month in the summer to work on a NSF REU fellowship with Dr. Howard Whiteman, who is a collaborator on a data analysis project about salamander populations. Two more students worked on the project as a 199 Special Project in summer 2017 (one of them continuing through 17-18 and into FA18). These formal research experience program can be critical to students' self-concept as scientists as well as helping to make their

applications for medical school and graduate school competitive.

Another Bio 199 independent research project for a student was due to a connection between the student and our lead Microbiology technician Susan Henderson. The student was enrolled in Grossmont's Middle College program. The project continued over 3 semesters and included readings from the scientific literature, completion of Bio 120 and the summer Biotechnology "Bootcamp". The student was taught basic Microbiology techniques by technical staff. The student engaged in discussions on the scientific method and experimental design with faculty. The student went on to a prestigious college in Washington where he has earned an ongoing scholarship and is competing for a research fellowship. He maintains contact with faculty as they collaborate on his ongoing pursuit of degrees in synthetic biology.

Faculty also worked with a different Middle College High School student in SP18 to fulfill that student's required internship hours. This student has the goal of working in medicine, so she joined many lab days in the Microbiology lab to learn the basic but important skills of culturing, staining, and biochemical testing of bacteria. Her project was to isolate bacteria from her skin and identify them. She researched and read scientific papers to help develop her project protocol using traditional culture methods.

BIO 110 students have been participating with the San Diego River Park foundation on a federal clean water grant to assist in the collection and assessment of the amount, nature and origin of trash in the Forrester creek. Students have also been involved in monitoring and analyzing the data from the 'Critter cameras set up in the Coastal Sage Scrub preserve. Beginning Fall, 2019, Students will become participants in the SD Zoo's Citizen Science projects (specifically monitoring the locally endangered Burrowing Owl).

5.5 If state or federal licensing/registration examinations govern the program, please provide data and comment on student success trends.

Not applicable.

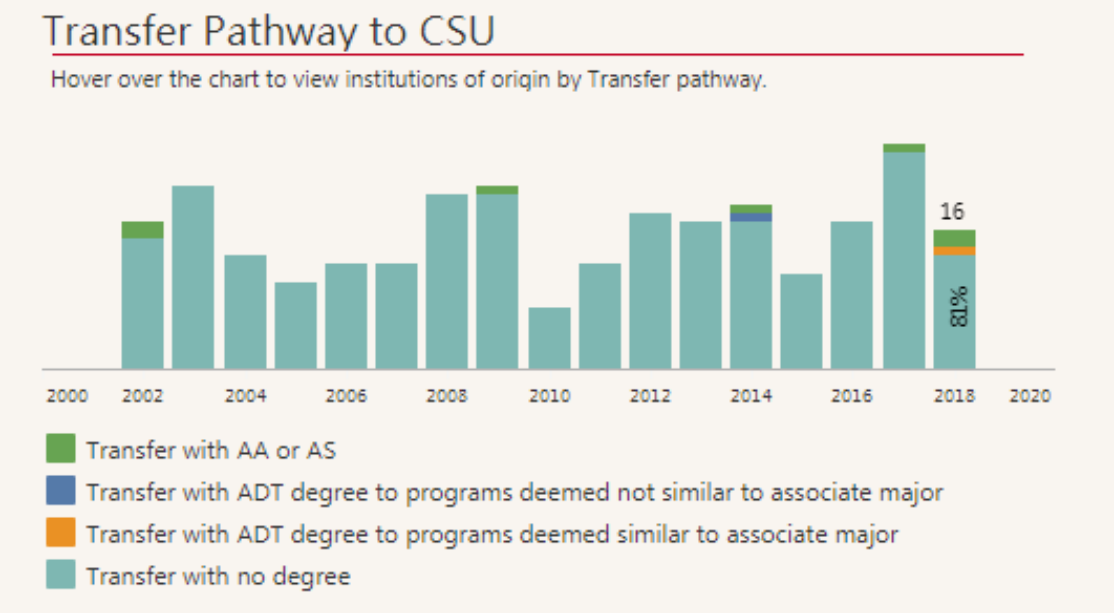
5.6 If your program offers a degree or certificate in the college catalog, explain the trends regarding number of students who earn these degrees and/or certificates, including any changes that you have made to increase awards. Insert the "Degrees and Certificates" data table in this section. [This data table will be provided to you by the Program Review Data Research Liaison.]

Grossmont College offers a Biological Sciences (A.S.) degree (no certificate) and has for the college's history. In 13/14 we awarded 3 and have awarded 5 every academic year since then (see Division table at end of this section). Although these numbers are very small, they are consistently increased over historical patterns and we are proud of that change. The table below shows degrees awarded going back to 06/07 for context.

Table 5.1 Biology Department Degrees Awarded 2006/07 to 2012/13

06/07	07/08	08/09	09/10	10/11	11/12	12/13
1	2	3	0	0	1	2

Although five is a very small number of degrees awarded based on having hundreds of biology majors on campus, we know that many of the students awarded University Studies degrees in Math, Natural Science and Computer Science (over 100 per semester) are biology majors. Anecdotally, many students who are transferring to UCSD (about 2/3 biology majors) do not take BIO 215 because it is not preparation for their major so they do not complete the Biological Sciences A.S. requirements. They also may not have completed the second semester of organic chemistry or of physics, especially if they are transferring to a private- or out-of-state school (where completion of the prep-for-major is not needed due to less competitive admission). The vast majority of biology majors are transfer-seeking students so they may not get the A.S. because they don't think they need it. Data that has recently become available from the Cal State Enrollment Dashboard shows that for example in 2018, out of 16 students in Biological Sciences areas that transferred from Grossmont into the CSU system, 81% transferred with no degree. [Source: http://asd.calstate.edu/dashboard/enrollment-live.html] These are successful outcomes for these students.



However, we would like to see the number of degrees increase. The two faculty teaching our majors have begun a publicity campaign, in every course, every semester, directed at their students about the benefits of obtaining the degree. Besides systematically encouraging our students to apply for their degrees, the department has worked on increasing degrees awarded over the last five years in three ways: a philosophical change in accepting a modification to the major, developing the biology program map flyer, and developing the ADT.

The first change has been accepting the Psychology/Sociology/Anthropology statistics course (215) as a substitute for BIO 215 to fulfill the degree requirement if the student requests a modification of the major. Historically this had not been done, but the lead faculty reviewed the course outline for PSYC 215 when a student made the request and discovered that the two courses are now extremely similar. At the time we had cut back our BIO 215 course offering to one section in one semester and recognizing that this limited student access to the course, the department made the decision to accept the modification request to help students complete our degree. Since then we have routinely granted this request. This is also useful for students who cannot fit BIO 215 into their schedule since multiple sections of PSYC 215 are offered each semester. This change alone is probably responsible for the consistent increase in degrees awarded. Department conversation during the writing of this program review led to the decision to additionally accept MATH 160 as an alternative to Biostatistics and we have initiated changing the degree requirements formally in the catalog for next year to reflect these changes. The articulation of BIO 215 with Math 10 at UCSD may

result in more degree completions.

After talking to students and realizing that they were taking extra semesters to finish their programs because they didn't realize that many courses have prerequisites, Ripley started developing a diagram to help students map out their pathway to degree completion in 2013. The project quickly became an idea that the other departments in STEM were interested in adopting, and the division has developed drafts of their maps. The Institutional Effectiveness Council recommended that the project be instituted college-wide in 2015. Numerous problems ensued, including the size of the project for one person to do. However, eventually all important stakeholders around campus, including counseling and admissions and records experts have agreed on a format and language that is flexible but simple. Furthermore, now that the college has officially adopted a Guided Pathways approach, these program maps are likely to become a signature centerpiece toward achieving the goals of that approach. Although the maps are still not publicly available in a consistent format campus-wide, the biology department has been providing students with the program map when they inquire about the biology major and has received positive feedback from students. The median units to degree for the biology A.S. has ranged from 94 to 122 over the past five years and our goal is not only to increase degrees but also to decrease the time it takes students to complete.

Finally, we have been working on the ADT degree since they were implemented and finally have gotten it approved and it is in the 2018-19 Catalog. About 1/3 of biology majors transfer to SDSU so we expect that will increase our degrees. Cuyamaca started offering the AST in 2017-18 and had 30 awards in the first year. In the past year, Grossmont has lost degree award students (at least 4--BR) to Cuyamaca because they want the AST.

Table 5.2 MNSESW Division Degree & Certificate Awards, 2013/14 to 2017/18

Award	13/14	14/15	15/16	16/17	17/18	Total
Biological Sciences AS	3	5	5	5	5	23
Chemistry COA	2	2	0	5	5	14
Chemistry AS	0	2	1	6	8	17
Exercise Science--Athletic Training AS	0	0	0	0	0	0
Exercise Science & Wellness AS	7	10	3	7	15	42
Exercise Science & Wellness COA	6	11	3	6	11	37
Geography AS	3	1	0	1	2	7
Geography AA-T	1	1	6	5	8	21
Geology-AS	1	0	1	1	0	3
Geology AS-T	1	1	1	2	1	6
Mathematics AS	25	36	22	26	28	137
Mathematics AS-T	22	35	29	36	55	177
Oceanography AS	0	1	0	0	0	1
Physics AS	0	9	5	5	8	27
Physics AS-T	3	10	15	10	24	62
University Studies--Science & Math	5	4	2	0	0	11
University Studies--Math, Nat. & Comp. Sci	111	119	122	100	145	597
General Studies--ESW	3	1	2	2	6	14
General Studies--Science & Quant. Reas.	58	55	36	45	62	256
MNSESW Total (Degrees & Certificates)	251	303	253	262	383	1452
College Total (Degrees & Certificates)	2870	3134	3170	3576	4101	16851

5.7 If you have any information on what students who major in your department go on to achieve after they leave Grossmont, please share that with us. For example, where do they transfer and do they graduate on time? What careers do they pursue? What are starting salaries in the field? Do you know if they go on to employment in their field and professional success? What impact did Grossmont have on their lives?

Allied Health Professions Majors

Many students are successful at entering the program of their choice, staying through the program, earning licensure and becoming employed. (One of the issues with pre-nursing students is the pressure to earn a B or above to be competitive, so many students drop the class if even if they are passing because a C is not competitive for nursing programs.) Many nursing majors have graduated and are locally employed at hospitals such as UCSD, Sharp Hospital, and Alvarado Hospital. Two of our alumnae have earned M.S.N.s and are now

Grossmont Classified Staff employed as Student Success Advisors in the Grossmont College Nursing Program. Two of our students are now at Vanderbilt University finishing a Master's Program in perfusion therapy after completing the Respiratory Therapy program and pre-requisites at Grossmont. Several of our students have completed the Orthopedic Technology program and are locally employed in hospitals such as Sharp and Kaisier Permanente. We have alumni working as Cardiovascular Technologists at hospitals in almost every state along the West Coast. We also have several alumnae who have attended Columbia's nursing program to complete their M.S.N.s. Two alumnae have finished their DPT and OTD programs at St. Augustine University in San Diego. **Photo below: Transfer institutions where Allied Health students have gone, hung in Michele Perchez's office.**

Biology Majors

All but a handful of students in the biology major's course (215, 230 and 240) intend to transfer. About 2/3 plan on attending UCSD and 1/3 plan on attending SDSU. The most common majors are Cell Biology/Human Biology (for pre-med/pharmacy/dental) students at UCSD and Biological Sciences and Microbiology at SDSU. Tables showing actual numbers of transfers are included below. The majority of students going to a UC go to the San Diego campus. Likewise, 5-15 of students transferring to the CSU system go to the San Diego campus with 1-5 per year going to the San Marcos campus. A handful of students

transfer to the Sacramento, East Bay, Dominguez Hills, San Bernardino, Humboldt, Long Beach, San Francisco, Channel Islands or Monterey Bay campuses each year. Not all students taking these classes are biology/medical majors—we have had students transferring in Forensic Science, Psychology, Cognitive Science, LGBT Studies, Nutrition, Kinesiology, Public Health, Environmental Science, Anthropology, Sustainability, and Public Policy. Of biology majors, about 2/3 of students plan to go to medical, dental, optometry, veterinary or pharmacy school. The other third are interested in some kind of research science in biochemistry, behavior, ecology, evolution, or environmental science of some kind. Students also are accepted for transfer (and go to) to private and out-of-state universities such as Loma Linda, University of Massachusetts Boston, University of Colorado, the University of West Florida and the University of Utah but these are less than 10% of students.

We have a small amount of data on how long it takes students to complete their coursework at Grossmont. Typically students transfer in 1-2 academic years from taking their first class in the department (at least the ones who make sure to tell us about it). Informal feedback from students after they transfer indicates that they are well prepared for their university courses by the Biology Department courses—defined as earning A's and B's and successfully completing their degree. Data from the CSU system below shows that 100% of our students are persisting into their second year and maintaining a GPA about the same as their entering GPA. They are finishing their degrees in two or less years from when they transfer (and are writing asking us for letters of recommendation for their next steps). And finally, our students do go on to graduate school and medical/professional school. I know of at least 2 Grossmont grads already in medical school. Students who already had a bachelor's degree and came to Grossmont to do their prep for medical school do not fare as well. One is going to med school outside the US and the other has finally gotten admitted after a post-bac program. One former student who was here doing pre-pharmacy also had to do a post-bac but was eventually accepted. We write a handful of recommendation letters each semester for several students for dental, pharmacy and masters programs as they are finishing up their BS degrees. At least three former students are now graduate students at Scripps Institution of Oceanography and have completed their master's and are working on Ph. D. theses.

Grossmont Transfers Into CSU System in Biology Majors							
		12/13	13/14	14/15	15/16	16/17	17/18
Entering	Headcount	17	19	11	17	26	16
	GPA	3.13	3.06	3.08	2.98	3.11	3.22
	Full-Time %	100	100	100	100	100	100
One Year	Continuing %	100	100	100	100	100	100
	GPA	3.07	3.01	3.35	2.98	2.92	2.92

Data from: http://asd.calstate.edu/dashboard/enrollment-live.html

GROSSMONT TO UC TRANSFERS

UC Campus	Major	12/13	13/14	14/15	15/16	16/17
Berkeley	Natural Resources/Conservation	1	1	1		
Davis	Biological and Biomedical Sciences	1	2			1
Irvine	Biological and Biomedical Sciences					1
Los Angeles	Biological and Biomedical Sciences					
	Natural Resources/Conservation					1
Riverside	Biological and Biomedical Sciences		1	1	1	
Santa Barbara	Biological and Biomedical Sciences		1			1
	Natural Resources/Conservation		1	1		
Santa Cruz	Biological and Biomedical Sciences	1		1	1	
	Natural Resources/Conservation		1			
	Biology	2	4	3	2	4
	Biochemistry	3	2	3	5	5
	Cell Biology	2	3	9	8	8
	Microbiology		1	2	3	
	Ecology & Evolution	1	1	1		2
	Neuroscience	2	2	3	3	1
	Public Health			1		3
San Diego	Cognitive Science	1	1	2		4
	Total	14	21	28	23	31

Data from: https://www.universityofcalifornia.edu/infocenter/transfers-major

SECTION 6 - STUDENT SUPPORT AND CAMPUS RESOURCES

6.1 Are the college's student support services (Tutoring, Counseling, Health Center, Library, Financial Aid) adequate to meet your student's needs? Please elaborate on your answer.

All instructors provide statements in their syllabi with regard to student access to A.R.C. (Accessibility Resource Center, formerly DSPS) as well as tutoring in the Learning and Technology Resources Center. Large numbers of students use the LTRC tutoring for Bio 120, 14, 141, and 152. The LTRC has recently started an online tracking system for tutoring, and usage can now be tracked and shared. (See inset table below, for student visits Spring 2019 January – March 15 2019) We actively encourage them to do so in class and actively recruit successful students to work as tutors; however we rarely have enough qualified tutors available to meet demand for Allied Health classes (particularly BIO 141 and BIO 152). Currently due to budget issues there are not enough LTRC tutor hours to meet student demand.

Course	*# Visits*	*Course*	*# Visits*
110	89	**145**	30
120	797	**152**	26
140	257	**230**	22
141	144	**240**	56
144	109		

The Anatomy Learning Center (ALC), which was established in 1997 in conjunction with Biology 198 (Supervised Tutoring), is a way to provide students with extra time to use the anatomical models, microscopes, slides, and histology. Qualified tutors are hired on a regular basis to provide assistance to students who use the ALC. Allison Shearer, the supervisor of the ALC, and Sharon Farley, the Senior Biology Tech work in coordination to provide assistance by means of tutoring, extra models, handouts, and microscopes. Thirty percent of student usage comes from Cuyamaca anatomy students with a weekly visit of approximately 500 students, and anecdotally students state the ALC is key to their success in these classes. The ALC operating budget for this program has traditionally been $23000 per year, despite increases in tutor pay (original budget was set with tutor pay at $8.50 per hour). The budget was recently cut by $12000 and the ALC is at risk of cutting hours. Therefore, our tutoring budget is far less than adequate to sustain support services. At this time the ALC remains open due to generous TA hour donations from other members of the department. Hours were cut from this semester, and on Saturdays only 1 tutor is working. Additionally, several “volunteer” tutors have been serving in the tutoring center out of a deep appreciation and community the students built during their time taking the class. These students care very much about giving back to the school and are an example of the ties built within a learning community.

The Microbiology Open Lab has been a staple since the beginning of this

institution. For many years, it remained unstaffed by student tutors, with enrolled students working independently on the three lab unknown assignments. Due to increasing liability concerns, by Spring 2015, the request for funds to hire student tutors (who have successfully completed the course) had been approved. Since then, the number of MOL hours that are fully staffed by student tutors has fluctuated due to both the availability of qualified tutors that can fit the time slots into their schedule, and, more recently, increases in tutor pay (which has limited the number of hires possible). In Spring 2017, the MOL re-opened on Saturdays due to the addition of a 6th section of the course and concomitant loss of weeknight hours. Since all approximately 180 students use the MOL to complete their assignments (no classroom time is set aside specifically for these), it will be necessary in the future to find more stable funding for tutor hours to assure maximization of student success. These hours were cut to 6 hours per week for Spring 2019 due to the sudden budget cuts to tutoring.

The Biology Department greatly appreciates the library staff which has been very receptive to suggestions from Biology faculty members. Without the help of the librarians, we would not have time to contribute/evaluate many suggestions for the collection. Specifically, some of our references need to be routinely updated. Examples include textbooks and other books in areas with rapidly changing topics such as physiology, endocrinology and cell biology. Medical texts or references need to be automatically updated when new editions are published.

The Library staff members have also routinely called upon the biology faculty members to review the collection for outdated or no longer useful books. Certainly, textbooks over 10 years old are less useful, but the Library's guidelines on the standards used for evaluating the usefulness of books for Grossmont's collection should be clarified the next time a review is conducted.

The Library's Limited Loan section is regularly used by most biology faculty members as a means to make text books, articles, etc. available for free student use. For example, there are multiple copies of textbooks for BIO 110, 112, 120, 215, and 240 on reserve and students use them, even complaining that they are so frequently checked out. Some instructors are using the library's "online reserve" option, which allows students off-campus access to some limited loan materials. Mostly, faculty members seem to rely on their personal collections as the primary reference resources and do not assign papers that require students to use the library. In Bio 110, any recent general biology textbook is allowed, saving the students literally over $100 per textbook.

As a department, we work closely with Student Services as needed. Areas of recent cooperation include: establishing pre-requisite clearance procedures;

working with ARC on accommodations in lab classes; collaborating with Counseling Liaison (Renee Tuller) regarding advising prospective and current Biology and related majors (i.e., Medicine) and the Transfer Center. Regarding general information each instructor presents the many resources available to students at Grossmont College to each class. This information is offered verbally, and well as in the syllabi. Faculty utilize and post on their classroom management platforms (Blackboard, and now Canvas) the Student Services flier (also comes in Arabic and Spanish) that lists a variety of campus supports for students. Faculty also utilize the Announcements feature of their classroom management platforms to remind students about the various services and workshops that will benefit their outcomes, such as encouraging visits to presentations by the Transfer Center and Financial Aid (grants and scholarship monies from a variety of sources including "bridge" grants for emergencies— Dreamkeepers). Many students make use of office hours to discuss not only academic issues, but personal and career issues as well. It is in this venue that students are also directed and encouraged to make use of programs such as A.R.C., EOPS, Mental Health services, Health Services, Counseling and Gizmo's Kitchen.

6.2 What services do students in your department/program use most often or that make the most difference? Can you provide any examples where services have clearly improved student retention and success?

Overall the services that students use the most are probably tutoring and counseling. We don't have very much information on how important these services are to students. In FA15, a survey of around 65 BIO 240 students about tutoring with 22 respondents. Fifty-five percent of respondents had used tutoring and 76% of those indicated that they thought the tutoring helped them improve their grade via learning the material better.

We know of several students in the department who have gotten funding via Dream Keepers that has allowed them to finish the semester. A lot of our students are in the EOPS program and are grateful for those services. For a couple of students who we have had a chance to observe before using accommodations versus after using accommodations, these services have helped them achieve higher grades on exams. Anecdotally, that number of students who use ARC services has increased in the past cycle (perhaps due to better awareness and removal of stigma) and greatly benefit from their accommodations. All lab instructors work closely with ARC to meet legal accommodations for practical exams and accommodations using lab equipment such as microscopes and dissection tools.

The Transfer Center does an exceptional job providing information and resources to students preparing to transfer. Many students take advantage of the transfer application workshops and visit the Pre-Professional School specialist, Sue McPhatter. She and Sarah Moore have done an excellent job compiling useful information and making it available on the Transfer Center web site as well as speedily answering questions and helping individual students. They also pass along information on programs that transferring students can apply for that we would not know about otherwise.

6.3 Are college support services adequately supporting your faculty and staff? Consider the following support services: IT, Instructional Operations, Business Services, Printing, Bookstore, Maintenance, CAPS, and any other support services important to your faculty and staff.

The services the department uses the most is Printing. Most faculty are completely satisfied with the prompt, cheerful and accurate work provided by the staff. For adjuncts that teach in the evening on weekends, there has been difficulty obtaining printing jobs since the hours of the department were cut.

One of the greatest challenges we encounter is with the Bookstore. The 35-42% mark up on textbooks and inability to stock older or used editions of textbooks makes many book requirements cost-prohibitive to our students. Often faculty refer students to other vendors, or to former students, to allow for the usage and sale of used but still valuable textbooks. Also, even though in-house lab manuals are cost effective, we often experience issues with the bookstore having enough manuals in stock at the beginning of a semester.

The department has collaborated with Groundskeeping to maintain plant specimens in convenient areas that we use regularly as well as special care requirements of the native plant gardens. IT and Maintenance requests are routinely fulfilled in a reasonable time. Some of the issues with the building have not been resolved, but that is not due to a lack of effort on the part of the Maintenance staff.

SECTION 7 – ON-CAMPUS/OFF-CAMPUS INVOLVEMENT

The first table you see in this section is INFORMATIONAL ONLY, so you can understand what type of information you should be providing for this section. The

second table you will see is the suggested table format you should use to display your information for this section.

TABLE ONE: INFORMATIONAL ONLY – PLEASE ADDRESS THE CONTENT IN THIS TABLE

OFF CAMPUS	ON CAMPUS
Marketing Flyers, brochures, booths, radio	**Marketing** Flyers, brochures, booths, Summit newspaper
Discipline Specific activities Conferences, Clubs/Organizations, Department Events, Licensing Meetings, Technical Reviews/peer reviewing manuscripts/textbooks and other discipline-specific volunteer activities, regional and state task forces	**Campus Volunteerism** Involvement in college and other department's activities (campus open houses, science fair, water project, helping out as a theater usher or at a sports team event)
Community Involvement Advisory committees, serving in regional groups, K-12 outreach, Job Fairs, other college-related but not discipline-specific activities	**Interdisciplinary Collaboration** Collaborating on shared events, cross-listed courses, working with campus student services, linked courses (sharing of expertise/resources between departments to benefit student success, such as guest lectures, shared lab activities, simulation or other special events)
Professional Development Attendance, creation/presentation, grants, sabbaticals	**Professional Development** Workshop Attendance, creation/presentation of professional development activities, grant-writing and sabbatical projects

Table two on the next page shows how you should organize your activity data. Complete this table with your commentary.

If you need assistance in creating a table, please contact the Program Review Chair. If you are using word, simply select 'insert' from the main menu, then table, and then select the number of columns and rows you want for your table.

TABLE TWO:

Faculty	Activity/Committee	Year(s)	Value to Student Success
Allison Shearer,	Anatomy Learning		Provides valuable, guided

Full Time	Center Coordinator (ALC) and Microbiology Open Lab (MOL) Coordinator	2013-present	study time to students enrolled in BIO 140, 144, 145, and 152. The ALC also serves Cuyamaca students (~30% of total attendees).
	Pre BIO 140 Orientation	2014-2016 face to face 2016-present online	Assists entering BIO 140 in preparation for workload and rigor of pre-Allied Health classes. Emphasizes time management skills.
	FELI Program (Five Day Experiential Learning Institute)	2015	Improved understanding of Diversity and Equity; incorporated new in-class engagement techniques
	Coordinate Allied Health Program Presentations	2013-present	Increases student awareness of Allied Health options, allows students to interact with programs so they have a better understanding of expectations for future programs, emphasizes importance of pre-requisite material.
	Safe Zone Training	2017	Training to increase awareness and support for the LGBTQ community at Grossmont.
	Mental Health First Aid Provider Training and Certification	2017	Trained to help students in crisis, recognize and offer support to students with mental illness.
Shina Alagia, Full Time	*Interdisciplinary collaboration:* Worked with the Allied Health Division to promote specific programs such as Respiratory therapy and Occupational	2012-2018	My classes are for allied health majors with a high percentage of students intending to transfer to Nursing program. While there are other allied health programs that might be better

	therapy to students. Regularly invites representatives from allied health departments to classes in order to disseminate information about these programs to students.		suitable to some students, yet, students often do not know enough about these programs. I try to bridge this gap by bringing representatives of other allied health programs to my classes, so that those students in my classes, without much knowledge of other allied health programs besides nursing, get a chance to know about these programs. Certain percentage of my students have a better chance at succeeding at various other allied health programs than nursing and I connect those students to these programs.
	Department Co-Chair	2012-Present	Hiring, training and evaluating adjuncts, recruiting tutors for Tutoring Center, responding to student grievances
	Professional Development: Wrote and published two lab manuals, for Bio 144 and 145. Both lab manuals were updated(from previous versions), revamped and published, as part of sabbatical project. Worked with a publisher that provide low cost text books	2017-2018	Lab activities pertaining to the Bio 144 and Bio 145 classes are designed not only to complement learning and hand on work but also to make sure that the curriculum stays up to date and articulate to appropriate transfer institutions. In the updated lab manuals, new Physiology labs were introduced, in order to keep the articulation agreement current.

	and also use recycled paper, in order to keep the lab manuals reasonably priced and affordable to students. Took histology pictures from the slides in lab, researched for copyright free images on line and also collected good quality pictures taken by students in class(who were given due credit in the lab manual).		Number of new images were also included in the labs, in order to promote understanding of anatomical structures and dissection procedures.
	Safe Zone Training *Sabbatical Committee* *API Committee*	2018 2012-13 2018-2019	
Michele Perchez, Full Time	Presenter, Umoja Panel on student success tips Reading Apprenticeship workshop Presenter, Diverse Women in STEM Panel, GC American Association of University Women	Fall 2018 Spring 2018 Spring 2018 Spring 2017	speaking with students about preparation for success learn more ways to help students be more engaged in their reading process speaking with students about challenges and joys of work in a non-traditional fields maintain motivation to continue to consider and use techniques to build more student-centered, supportive

			classroom environments
	“We’re All In” campaign De-brief Session		mentoring of students in Bridges to the Baccalaureate Program
		Spring 2017	learn about local job opportunities for Biotech careers
	Homer Peabody Award for Excellence in Teaching and Mentoring recipient	Fall 2016	Strengthening ties to colleagues at local institution, bringing back
	Calbiotech facility visit	Spring 2016	more information for our students about programs and services
	Panel Speaker, “Developing Skills to Design and Administer Effective Mentoring and Retention Programs” UCSD	Spring 2016	outreach to community (prospective students) Fosters thought on topics directly related to student success (expectations for success, is success innate, how to succeed)
	Presenter/facilitator, GC Open House, “Microbes Display”	Fall 2016	outreach to Grossmont and Cuyamaca students for career development in STEM fields
	Attendee, Re-fresh Fridays series, “The Power of Expectation”, “The Genius in All of Us” book launch, “What It Takes to be Great”	Spring 2015	outreach to students in engagement techniques to

	Organizer, “Get Your STEM On: Navigating Your Career in Science, Technology, Engineering and Math” half-day workshop. GC event funded by S-STEM grant through SDSU	Spring 2015	increase success efforts to improve success for students who attended Mindset vs. regular orientation preparation
	Co-Organizer, “A New Perspective of Science Lecture Hall Engagement: How to Get Your Mind Right for Class” by speaker Dr. Antoinette Linton (Umoja-sponsored)	Summer 2015	better prepare students for GC, know better what preparation and exposure they will have coming to GC
	Mindset Orientation sessions for Biology 120 students	Fall 2015	Mentoring of students, career information workshops, field trip to local research institutions (Salk Institute, The Scripps Research Institute), networking, competitive application to summer internship at SDSU
	HASPI Collaboration with local high school teachers	Spring 2013-Spring 2017	support students in development of leadership, organizing, planning, executing skills; fosters community involvement
	Bridges to the Baccalaureate Program Coordinator	Fall 2017-present	

	Co-advisor, Indivisible Club Fall 2017-present		
Bonnie Ripley, full-time	*Participation in Citizen Science*—EBird—143 species in 130 checklists INaturalist—41 observations of 29 species (arthropods and reptiles)	2017 to now	Provides opportunity to engage with students and colleagues about natural history; set example for continuing to learn new taxa and encourage curiosity and engagement
	Institutional Effectiveness Council (co-chair), Academic Program Review Committee, District Institutional Effectiveness Council, Accreditation Steering Committee, hiring committees for Biology Faculty, CPIE Dean (twice) and Research Analyst Student Services Program Review Committee	2014-2018	Maintain accreditation status so we can serve students; provide data so that departments can examine trends and patterns in order to better understand student needs; help college allocate resources to areas most important to student needs
	NILOA Assessment Reading Apprenticeship in Physics and One-Day Workshop		

	Safe Zone Ally Training We're All In Debrief Planning Forums Women in STEM Labs Webinar AAC&U Diversity, Learning & Student Success Conference Summer Institute on Diversity	 2018 2018 2016 2017, 2018 2014-2018 2015 2015 2014	Building awareness and skills to become a better instructor, via cultural competency as well as learning tools and techniques to enhance teaching and assessing outcomes in STEM
	Presented on-campus professional development "How to Memorize Anything", "Who Are Our Students", "College Data Sources" "Using the EMA Report", "Creativity Across the Curriculum" A narrated slideshow "What is Accreditation All About?" Videos (3) explaining program review data.	2013-2018	Help faculty either directly or indirectly help students learn as well as understanding data about our students to better serve their needs
	Curriculum Institute Accreditation Institute Institute on Best Practices in Institutional	2017 2018 2014	Learned policies and procedures related to Accreditation and Program Review, to help the college improve in these areas to

	Effectiveness		better serve students
	Outreach/publicity: Maintain web pages to inform/relate to students and community about RPRP, Biology Outside the Classroom Roly Poly Research Project Poster in Bldg 30 hallway Sustainability & Innovation Corner—Bldg 30 hallway display cabinet with posted info on Science Club, RPRP and rotating articles/infographics about green technology and science Social Media presence: **Facebook** pages: Science Café at Grossmont and Roly Poly Research Project; **Instagram** pages for RPRP and a personal page	Since 2015 Since 2017 Since 2010 Since 2018	Helps students find information about my courses and activities; encourages student engagement via dialogue about books, museum displays, etc. Advertises project Gives students something to read while standing in the hallway and may trigger their interest in areas of science they didn't know about Maintains day-to-day contact with students outside of class to increase engagement (5-20 followers per semester)
Selene Miles, Full Time	Updated BIO 120 manual- integrated new SIMBIO labs and revised multiple old lab exercises Equity-Minded	2018-2019 Spring 2019	Improves engagement and proficiency of BIO 120 students in lab class Training in the Umoja program and how it relates to

	Practices, presented by Umoja counselor		instructors and students of all classes
	"Creating a Collaborative and Engaging Classroom" workshop	Fall 2018	Learn new active learning and collaboration strategies, as well as effective use of technological media
	"Great Minds Don't Think Alike: Collaborative Activities That Will Engage Students" workshop	Fall 2018	Explore group projects for topics such as lack of diversity in STEM, using posters or infographics, chalk talk or four-sided debates. Committee with goal to increase student success particularly with a focus on student equity gaps
	Gateway Courses committee member, Biology representative	Fall 2018-present	Introduction and application of a semester's long series of reading practices to assist STEM students in better comprehension
	STEM Faculty 101: Reading Apprenticeship, 6-week workshop	Spring 2018	Discover new methods of supporting active participation in the classroom
	"Facilitating Students' Active Partnership in their Learning" workshop	Spring 2018 Spring 2018	Learn more ways to help students be more engaged in their reading process Becoming familiar with the 7 programs available to students, identifying which students may not be included

	Reading Apprenticeship Workshop “Designing Student-Centered Environments” workshop	Spring 2017	in these programs
Steven Miller, Adjunct	“Undergraduate Faculty Genetics Education Workshop” American Society for Human Genetics Conference “Professional Skills Training: Becoming an Effective Teacher” American Physiological Society “Faculty Institute for Teaching and Learning” Grossmont College “The College Classroom” UC San Diego	October 2014 Spring and Summer 2014 June 2015 Winter 2016 March 2017	Introduction to models for implementation of evidence-based teaching methods for genetics instruction. Motivations and means to improve course design, instruction, and assessment to engage a diversity of students. Pedagogy and practice toward improving achievement of underserved and underrepresented student populations in the community college system Principles of evidence-based instructional practices for implementation in University-level courses Equity, diversity, and inclusion as well as broadening participation and persistence in Science, Technology, Engineering, and

	"Southern California Project Kaleidoscope Regional Network Annual Meeting" "Faculty Experiential Learning Institute" Grossmont College and Academy for College Excellence "Summer Institute for Scientific Teaching" Yale Center for Teaching and Learning "Transforming STEM Teaching Faculty Learning Program" UC Berkeley	Summer 2017 Summer 2017 Spring and Fall 2017	Math (STEM) Communication, listening, building community, and identifying student strengths in higher education institutions Instructional design to encourage learning and inclusion among diverse STEM students through collaborative team-teaching demonstrations Engagement and implementation of evidence-based pedagogy and instructional practices for STEM instructors
Gary Waayers, Adjunct	Co-advisor, Indivisible Club Fall 2017-present Volunteer, 350.org Volunteer, Audubon Bird-A-Thon	annually	support students in development of leadership, organizing, planning, executing skills; fosters community involvement

Frank Santana, Adjunct	Transforming STEM, SDSU	Fall 2018	Equity, diversity, and inclusion as well as broadening participation and persistence in Science, Technology, Engineering, and Math (STEM)
Victoria Cone, Adjunct	Student Success and Equity Committee, Academic Senate Representative	Spring 2019	Advocate for student success and equity
Nick Gekakis, Adjunct	Online teaching training 12 Gateway Courses Workshop	Fall 2018 Spring 2019	Improve student success As 120 instructor, participate in planning department activities
Cami Yonally, Tech	Led Yoga sessions for Veteran's Club and at Las Colinas Building Marshall Safe Zone Ally and Mental Health Training Wellness Committee Member and Yoga Instructor	Summer & Fall 2018 2017	Help students de-stress
Michael Golden, Full Time	Member AFT exec committee SIDICCA Mentor Hiring Committee, Vice Chancellor of HR Volunteer and	Fall 2014-present Fall 2014-Spring 2015 Fall 2014 Fall 2014-present	 Helping to increase diversity in hiring Outreach and increase

	instructor for the SD Sierra Clubs Wilderness Basics Course (WBC)		knowledge about natural ecosystems
	Guest Lecturer in Gregg Robinson's Sociology Class on Climate Change	Fall 2014	Cross-disciplinary/ Cooperative teaching
	Canyoneers course, SD Natural History Museum.	Fall 2014	To increase knowledge of the natural world in SD county
	Workshop: Fossil discoveries in Anza Borrego Desert State Park	Fall 2014	To increase knowledge of the natural world in SD county
	Awarded Innovator of the Year for work on Drought Tolerant Landscape Education Zone	Fall 2014	Helping to turn campus vegetation into drought tolerant and relevant lab material for teaching and learning.
	Hiring Committee for Biology Department	Fall 2014- Spring 2015	
	Hiring Committee for Grossmont College's President	Spring 2015	
	Photo published in California's Botanical Landscape, Sierra Club 2015	Fall 2015	
	199 Special Project with Student; Critter camera in Coastal Sage Scrub Reserve	Fall 2015	Helping students become engaged in real-world data collection and analysis

	Gave tour to Governing Board members of GC's Coastal Sage Scrub preserve.	Spring 2016	Help Governing Board understand the importance of our outdoor labs and the needs for further funding.
	Attended DACA/ DAPA training	Spring 2016	Better understand our diverse student body
	Co-hosted with Steve Miller the California Native Plant Societies Spring Garden Tour	Spring 2016	Students involved in volunteering for extra credit and free admission
	Secured funding and oversaw major trail renovation and maintenance in the Coastal Sage Scrub preserve	Fall 2016	Improved both learning environment and safety
	Member, Undocumented Student organization.		
	Completed Canvas course		
	Member of AFT bargaining committee		

	Conducted mock interview for PUENTE students Hosted Field Trip to Silverwood Audubon reserve for the California Geological and the Earth Science's department College Professional Development presenter representing the Sierra Club for AFT retirees 'call to action'. Speaker, GC's May Day: Climate Change Participated in joint GCCCD-SDCCD Dreamers event Completed Title IX training Awarded Distinguished Faculty of Grossmont College Awarded John and Suanne Roueche Excellence Award, League for Innovation		

	Mentor, PUENTE student Presented 'bone show' at Hilltop Middle school, National City Hiring committee, Associate Vice Chancellor of HR Public Safety Committee member Presenter, Umoja Panel on student success tips Stakeholder, SD River Park Foundation		
Craig Milgrim, Full Time	Member, College Planning and Resources Department CoChair Trustee, SDCCCD; VP of Diversity & Equity Joint Workshop on Extraterrestrial Life	2014-2016 Spring 2007 – present December 2018 – present Fall 2018	Focus planning and funding on improve student success Scheduling and funding to support student access and success Gain knowledge about state wide student success and equity efforts.

	with Physics instructor Phil Blanco		
	Brokered compromise between Senate and AFT regarding 2019 committee re-structure		Resulted in implementation of revised committee structure to move forward stalled efforts across campus
	Partnerships · USD – joint grant · UCSD – joint grant REU program · Southern California Center – Life Science summer institute for High School Students · Salk Education	Annually	All programs focused on underrepresented student populations in the Sciences
	Mentor – Middle College student, Bio 199 independent research	2016	Provided opportunity for Middle College, Hispanic student to learn about the scientific process
	Teaching Excellence award	2019	
	Author: Bio 230 Lab Manual Bio 230 & 120 Study Guides Lab Manual Bio 230 & 120 Study Guides	Annually	Provide low cost access to lab manuals and study guides
	Utilized Bio 120 OER textbook	2017 – present	Provide no cost alternative to course textbook

7.1 Referring to the above table, what activities contributed most to student success?

Based on research into what California community college students need to succeed (RP Group, (Re) Defining Student Success https://rpgroup.org/Portals/0/Documents/Archive/Project-Description-Summer2014.pdf), our participation in trainings such as the Safe Zone Ally, collaborations with Umoja and other student service areas, and teaching and learning workshops for STEM are likely to have had the biggest impact on student success.

7.2 Please provide an overall reflection on your department's activity displayed in your table.

- Our faculty work in a variety of ways to engage students both in the classroom and outside of the classroom. We contribute to out-of-class support for student success by offering directly-applicable support to in-class academic success and to assist students in personal growth beyond content mastery.
- Our faculty also participate in a variety of shared-governance activities and many contribute to activities encouraging students to become socially and politically active and aware.
- It is clear that our faculty remain committed to engaging and supporting students from a diverse background, and that we are working to continually improve our instructional skills and adapt to our ever-changing student population.

7.3 Are your overall faculty professional development needs sufficient to ensure students are successful in your program?

Yes __**X**__ No _X___

If no, please describe what faculty professional development needs are not being met.

Our answer is more or less "yes", for full-time faculty but "no" for part-time faculty. Although there are a variety of opportunities offered on campus for full-time faculty to develop our ability to engage students and support them in culturally relevant ways, these opportunities are not taken advantage of by all faculty. Part-time faculty are less likely to participate in these activities, especially the most profoundly effective such as week-long workshops. Our current system of funding these opportunities does not make it easy for them to do so. In the future, on-campus opportunities that are adjunct-friendly (such as the Summer Institute on Diversity in 2014) as well as finding ways to encourage and support attendance to conferences (such as capitalizing on local opportunities when they

arise, such as the AAC&U Conference in San Diego in 2015) would be welcomed. Since half of our course load is taught by adjuncts, without investing in their development we will not be able to transform the success of students in our program.

SECTION 8 – FISCAL & HUMAN RESOURCES

NOTE: All required data tables and graphs will be compiled and delivered to you by the Program Review Data Liaison.

	FA13	***FA14***	***FA15***	***FA16***	***FA17***
Earned Enroll	1769	1882	1970	2047	2189
Max Enroll	1901	2045	2094	2233	2329
% Fill	**93.1**	**92.0**	**94.1**	**91.7**	**94.0**
Earned WSCH	10316.0	11176.2	11415.0	12003.1	12950.4
Total FTEF	14.33	14.98	15.45	16.33	18.32
Earned WSCH/FTEF	**719.7**	**745.9**	**738.9**	**734.9**	**707.0**
	SP14	***SP15***	***SP16***	***SP17***	***SP18***
Earned Enroll	1775	1919	1980	2173	2140
Max Enroll	1909	2080	2071	2320	2321
% Fill	**93.0**	**92.3**	**95.6**	**93.7**	**92.2**
Earned WSCH	10272.2	11140.4	11425.0	12777.4	12563.0
Total FTEF	14.47	15.67	15.82	18.72	18.37
Earned WSCH/FTEF	**710.0**	**711.1**	**722.3**	**682.7**	**684.0**
	SU13	***SU14***	***SU15***	***SU16***	***SU17***
Earned Enroll	183	184	278	335	262
Max Enroll	180	176	312	312	384
% Fill	**101.7**	**104.5**	**89.1**	**107.4**	**68.2**
Earned WSCH	1106.4	928.5	1481.8	1707.9	1625.1
Total FTEF	1.35	1.55	2.88	2.88	3.38
Earned WSCH/FTEF	**819.5**	**599.0**	**514.0**	**592.3**	**480.3**

Fiscal Resources

Refer to the Table provided that shows Enrollment, % Fill, Earned WSCH, FTEF and WSCH/FTEF to answer these questions. Data for Fall, Spring and Summer semesters are provided separately.

8.1 Describe any patterns in enrollment; maximum enrollment and % fill in the program since the last program review. What are typical section maximum sizes (capacity) for your courses and what dictates those caps? Have you changed the number of sections offered and/or section sizes in response to changes in demand? If so, what effect has it had?

Enrollment has increased steadily in the department since the last program review despite overall declines at the college as already discussed in section 5.1. The department has been increasing sections, as can be seen in the increase in FTEF by 4 from FA13 to FA17. Even as we have increased sections we have kept the fill rate at least 94% in Fall and at least 92% in Spring semesters. Summer session results have been more variable, with over 100% fill down to 68% fill, however we have more than doubled offerings over this time frame. The department carefully examines course fill and waitlists every semester and increases or decreases section offerings to meet demand. As discussed in section 5.1, we have increased sections of BIO 120 but low fill rates in BIO 110 and 105 prompted us to decrease sections offered from 10 to 4 each over the program review period. However, BIO 110 (Environmental Biology) and BIO 105 (Life in the Sea), suffered decreases in enrollment over the program review period, such that we reduced the number of sections offered of each from 10 to 4. In addition, Anthropology's GE course with lab, expanded their offerings which also affected enrollment in our two GE courses with lab. The course coordinators for BIO 110 and BIO 105 began advertising for these courses with posters, fliers and ads on Griffin Radio. In addition, the BIO 105 coordinator changed the class schedule times to better fit student needs. BIO 105 enrollment improved. BIO 110 has yet to show the same results.

Lecture only and online courses in the department have a max of 50. Lab courses have a max of 36 with the exceptions of BIO 230 (at 30 due to limitations on lab equipment), BIO 215 (20 due to limitation of laptop computers but this was increased from 15 as we have gotten more computers) and BIO 152 (28, due to bench stations in micro lab). Most courses are taught as double sections, where two lab sections meet together for lecture (72 student lectures).

8.2 Describe and explain any patterns in Earned WSCH, FTEF and Earned WSCH/FTEF since the last program review. Please explain changes in FTEF due to changes in faculty staffing levels. For courses/sections with low Earned WSCH/FTEF explain their importance in the program and measures the department/program has taken/plans to take to improve efficiency and/or balance low and high efficiency offerings and/or maximize course % fill.

The Biology department maintains a WSCH/FTEF of over 700 in Fall semesters, over 680 in Spring semester and an average over 600 in Summer terms. Although we have a couple of sections with smaller course sizes, we more than make up for those with the double sections of BIO 120 and other multi-section courses with lab. For those smaller course, we do try to make sure they are full. For example, the start time of BIO 215 was shifted so that it doesn't overlap with times of courses that students tend to take in the same semester, such as BIO 230.

As our FTEF has gone up 4 we have only added one full-time faculty, so the %FT has decreased from 58% to 46% (see 8.6).

8.3. For money that you get from the college and/or from Perkins funds as part of your budget, is this amount adequate? What is this money used for to operate your department? If it is not adequate, please explain how additional funds would be used to improve student learning and success.

Biology has one general supply budget that serves all classes in the department. It has one specialized supply budget for Paramedical Microbiology due to the specialized and expensive needs of this program. Both budgets are overseen by our 2 Senior Technicians, Sharon Farley-Furlan and Susan Henderson. The senior techs do an outstanding job maximizing the value the departments gets from these funds.

Both general supply funds cover the consumable needs for lab classes such as paper towels and disposable supplies such as plastic pipettes and slide cover slips. In addition, there is a fund to cover mileage expenses for instructors who organize field trips and maintenance of some equipment (dishwasher, autoclave, and microscopes). Within the general supply funds there are sufficient funds to meet some one-time needs such as maintenance of outdoor laboratories, models (e.g., Anatomy), replacing prepared microscope slides and glassware.

The faculty and techs collaborate regularly to ensure that students receive the latest and best equipment and materials to maximize student learning. We have successfully increased the amount of materials and equipment to maximize the hands-on learning experience of students in lab via a series of funded activity proposals. In our general education labs, we have increased available supplies and equipment so that students can work in smaller groups. In BIO 230 classes, students have materials so that they can work individually and in groups of 3 or less. Newer, more powerful microscopes were purchased for BIO 240 to improve the learning experience for students, which BIO 110 students also get to use. In the Allied Health preparation classes, the number of models has been increased both in the class and the Anatomy Learning center.

The current line item supply budgets are adequate to meet need of the existing schedule. In response to the move into the new Science building in Spring 2007, the budget was increased. Between 2007 and 2015, the budget was increased several times in response to inflationary pressures. The most recent increase came in Fall 2017 in response to the increase in sections in Fall 2016. However one-time funds for replacement and augmentation of student laptops are needed for the already-implemented expansion of computer-aided instruction.

Better funding for the Coastal Sage Scrub reserve would ensure a safer and better outdoor classroom. Presently the coordinator has to solicit funds as needed. Better to have a funded, on-going maintenance program for the reserve.

8. 4 If your program has received any financial support or subsidy outside of the college budget process (grants, awards, donations), explain where these funds are from, how they are used, and any other relevant information such as whether they are on-going or one-time.

The Roly Poly Research Project used a $500 grant from ASGC to pay for 8 student registrations and travel to the Southern California Academy of Sciences meeting in May 2017. Additional funds (about $250) have been supplied by the Biology Department account at the GCCCD Foundation, into which several of the department faculty regularly contribute out of their paychecks. Enough money for some supplies (about $100) has been funded by sales of Grossmont College school spirit scarfs and donation of the proceeds to the project. (Additional small supply purchases have come from the Biology Department budget.) Ripley also received a $25,000 grant from the NSF for summer salary on salamander population dynamics both to go to the field site and collaborate in person with PI

Dr. Howard Whiteman of Murray State University (Kentucky) and to send two students to Colorado for REU projects.

Human Resources

NOTE: Please refer to the table provided by the Program Review Data Liaison to answer the following questions.

	FA13	***FA14***	***FA15***	***FA16***	***FA17***
FT Faculty Count	8	8	8	8	9
PT Faculty Count	11	15	15	17	21
Full-Time FTEF	7.43	7.23	7.11	6.63	7.85
X-Pay FTEF	0.95	0.40	0.75	0.40	0.67
Part-Time FTEF	5.95	7.35	7.59	9.30	9.80
Total FTEF	14.33	14.98	15.45	16.33	18.32
FT Percent	**58.5%**	**50.9%**	**50.9%**	**43.1%**	**46.5%**
Permanent RT	0.51	0.51	0.64	0.64	0.64
Temporary RT	0.70	0.70	0.70	0.70	0.70

	FA18	***SP19***
FT Faculty Count	***9***	***8***
PT Faculty Count	***20***	***20***
Full-Time FTEF	8.52	7.52
X-Pay FTEF	0.60	0.60
Part-Time FTEF	9.35	9.50
Total FTEF	18.47	17.62
FT Percent	**49.4%**	**46.1%**
Permanent RT	0.64	0.64
Temporary RT	0.70	0.75

8.5 Describe the roles and responsibilities of full-time versus part-time faculty in your department. If any trends or changes are apparent in the past six years, please explain the reasons for them.

Differences between the roles and responsibilities of full-time and adjunct faculty are, in large part, due to the specific position descriptions and the current CBA. It is our department's policy to not assign responsibilities to adjunct faculty for which they are not being paid. At this time, adjunct faculty are paid to teach assigned classes, prepare lessons for those classes, conduct assessments and assign grades.
Below is a list of roles and responsibilities unique to all full-time faculty in the Biology Department

- Required attendance at all Department meetings including Flex
- Assist in screening and selection of adjunct faculty
- Coordinate a specific set of classes (see Section 2.2 for details)
- Monitor adjunct faculty syllabi and assessment instruments to ensure proper level of rigor
- Mentor adjunct faculty
- Coordination with co-chairs and technical staff
- Preparation of lab schedules (each semester)
- Monitor equipment and supplies for labs in the courses they coordinate
- Maintain outdoor laboratories (Greenhouse, Lath House, Native Garden, and Reserve)
- Maintain COR currency
- Write and assess SLO's for the courses they coordinate.

8.6 Are the current levels of staffing of faculty adequate? Discuss part-time vs. full-time ratios and issues surrounding the availability of part-time instructors as well as duties and responsibilities of full-time faculty members that influence their loads (such as reassigned time and use of overload).

The current faculty staffing levels are inadequate to meet the needs of the department's courses and students. As discussed in Section 1.1, Biology has expanded its offerings in its Gateway Course, Bio 120 and several Allied Health preparation courses (Anatomy, Microbiology and Physiology) in response to student demand. This can be seen when comparing FA15 data for Part-Time FTEF and FT percent vs. FA16 – SP19. (We included data for FA18 & SP19 to illustrate that the drop is an ongoing trend.) As a result, our

FT percent ratio dropped below 50% for the first time in the Department's history.

As discussed in Section 1.1 – Biology historically has had 10 full-time faculty. In 2007 & 08 2 FT faculty whose main responsibility was Bio 120 retired. One of those positions was filled in Spring 2017. In Dec 2018 another FT faculty member retired. In Spring 2019, Biology was told that it would be allowed to fill the position vacated in Dec 2018.

Over this time period, the department has been increasing the number of sections offered. Concomitantly, the availability of qualified adjunct faculty has declined. Other local colleges have hired a number of full time positions in the past three years, decreasing the local pool of adjuncts. The new adjuncts we have managed to recruit generally have less than 2 semesters of experience (some have none). The availability of qualified adjuncts in Anatomy, Physiology and Microbiology has been the greatest. In SP19, Biology was forced to cancel 2 fully enrolled 4 unit sections and 1 fully enrolled 5 unit section (108 students) in Physiology and Anatomy due to this lack of qualified adjuncts.

The reassigned time for chair duties in Biology is 0.64, which is split between two co-chairs. We currently have one full-time faculty who receives discretionary reassigned time for tutoring coordinator (for the department) to total about 0.15 for the department (since 2017). For most of the program review period, Michael Golden has 0.3 contractual reassigned time to serve as AFT liaison, but he stepped down from this role last year. Bonnie Ripley has had 0.4 discretionary reassigned time to serve as the Program Review Data Liaison since 2014, on top of which she added 0.2-0.35 for Accreditation Liaison over 2016-18 while still teaching 0.7. She has stepped down from the Accreditation Liaison position, so the department is now down to 0.4 of non-departmental reassigned time, which only minimally impacts the FT ratio in the department. All faculty with reassigned time have continued to teach enough courses in the department to have overload, although all only do so if scheduled, filled courses need to be staffed.

8.7 If staffing levels are not adequate, give a justification of your request for increased Full Time faculty based on how this position would contribute to basic department function and/or the success, retention and engagement of students in the program.

Biology has 2 immediate needs for Full-Time faculty:

- Physiology Course coordinator (vacated in Dec. 2018 by retirement) – currently all Physiology lectures and labs are taught by adjuncts or Full-Time faculty working involuntary overload—**HIRE COMPLETED**
- Biology 120 Instructor (vacated in 2007 by retirement) – Bio 120, a 4 unit class, is the department's Gateway course with 26 sections each Fall and Spring and 7 sections in Summer. All sections fill (2124 students per academic year). At this time, 14 of 59 sections are taught by full-time faculty (24%). Even with this position filled the percentage taught by FT faculty would rise to just 31%. However, the work of mentoring/supporting adjuncts and the work of improving course success for students would be shared between two full-time faculty and therefore be more systematic and comprehensive.

Benefits to Department and students would include reducing the need for involuntary overload among current faculty, stabilize course offerings, prevent further cancellations of full sections, and increase instructor availability for students outside of class. With the Physiology course coordinator vacant, supervision of adjuncts and coordination with chairs and technical staff is not happening. As discussed in section 2.5, student success in BIO 120 has decreased with the expansion of sections offered and this may be the result of the increase in sections taught by inexperienced adjuncts.

8.8 In the table below, list non-faculty positions that are responsible to your program (by title rather than by individual name). This list should include classified staff as well as work study and student workers.

At the core of our department's ability to offer lab courses is our technical staff. At the time of our last Program Review, we had three full-time technicians and one part-time technician. In early 2016, our part-time technician retired after 30+ years with the department. To meet the need of our expanding course offerings, the part-time position was not refilled. In its place a previously frozen full-time position was activated and filled in early 2018, bringing our technical staff to 4 full-time positions. We need so many technicians partly due to the hours the department operates—7:30-10:00 Monday thru Thursday and 8:00-5:30 on Fridays and Saturdays. As many as 6 labs are running at the same time during peak hours, and each lab may require preparation of materials by the staff on a daily basis.

The technical staff solicits applicants for up to three work-study students each semester. These students help clean the labs, do dishes, and perform routine tasks such as filling racks of pipette tips. The department hires student tutors for

the Microbiology Open Lab hours and Anatomy Learning Center each semester. In addition, faculty teaching double lecture sections qualify for TA hours. All the full-time and some of the part-time faculty recruit and supervise former students to help them with grading and other office tasks.

8.9 Briefly describe the duties for each position. Include a discussion of any changes in terms of non-faculty staffing and describe the impact on basic department function and/or the success of students in the program. Are current staffing levels adequate in non-faculty positions? If not, give a justification of your request for increased resources.

The technical staff is responsible for all aspects of our department's laboratory classes, including purchasing equipment & consumables, managing the supply budget, maintaining & repairing equipment, prepping each laboratory class, managing work study students, and assisting instructors in labs. One technician is specialized for preparing materials for the Microbiology courses. One technician is responsible for the greenhouse, lath house and most field collections. Our current staffing levels are adequate.

SECTION 9 – SUMMARY AND RECOMMENDATIONS

9.1 Summarize program strengths in terms of:

- Outreach
- Engagement
- Retention

Outreach: We are a "hub" for distribution of biotechnology classroom kits as a collaboration with the Salk Institute and local high schools. Our program works Life Sciences Summer Institute and San Diego Workforce Development program to run a Biotechnology Bootcamp that recruits local high school students. We have run Amgen Workshops with technical staff to increase program awareness. Faculty participate in the Grossmont College open house.

Engagement: Faculty are committed to engaging with students in large classes on a daily basis. Many faculty hold office hours in the ALC and the ALC has (on average) 500 student visitations per week. Faculty arrange field trips for engagement outside of a classroom. The native garden provides an opportunity for all Grossmont students and the public to learn about the local ecology of San Diego.

Retention: Many faculty engage in early intervention to assist struggling students, and specific outreach to failing students early in the semester. Early semester strategies include: photographs to encourage knowing student names, interactive icebreakers, use of Canvas to engage with students online, and a passion for subjects we teach and for getting to know our students.

9..2 Summarize program weaknesses in terms of:

- Outreach
- Engagement
- Retention

Outreach: Our classes have always been so full that we've gotten lucky and haven't thought a lot about outreach and advertising ourselves to students. However, perhaps we should for classes that are not filling.

Engagement: Having large classes (lecture sections of 50-80 students) makes it challenging to engage each student in a meaningful way to impact their education.

Retention: Retention in rigorous classes will always be a challenge- particularly for Allied Health classes in which a "C" grade is not going to lead to future program acceptance, but we are constantly trying to find innovations to help us improve retention.

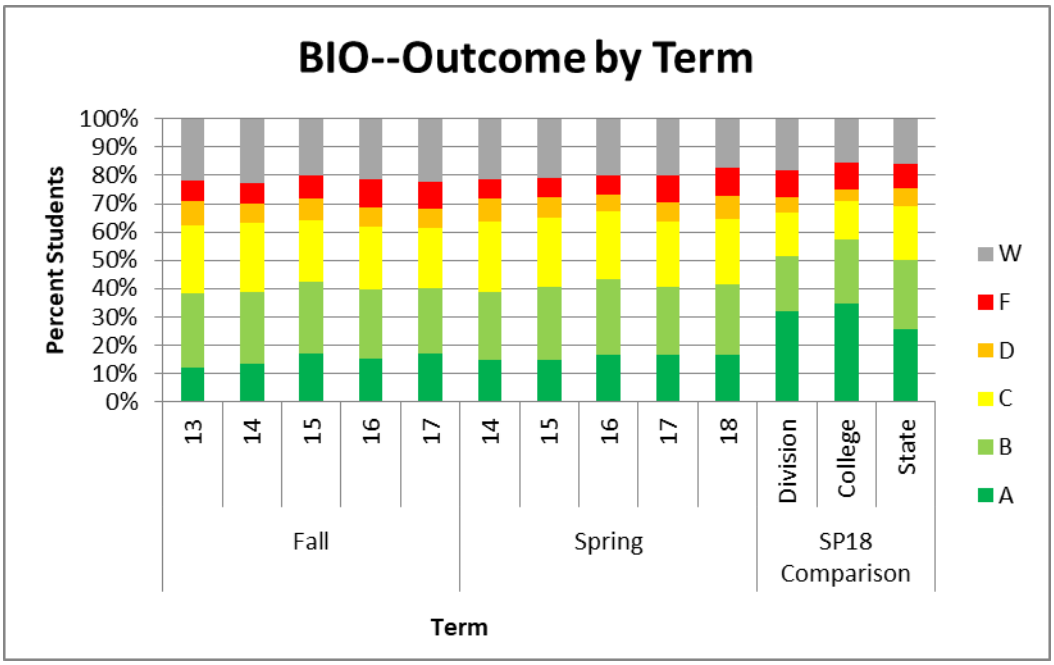
9.3 Describe any concerns that may affect the program before the next review cycle such as retirements, decreases/increases in full or part time instructors, addition of new programs, external changes, funding issues etc.

- Continuing to see higher adjunct to full-time faculty ratio
- Anticipated number of retirements that need to be quickly refilled, past replacements have been extremely slow to be refilled, potential for canceled classes due to lack of qualified instructors
- Continued issues finding qualified/experienced adjuncts – particularly for classes that require more specialization (majors, Allied Health).
- ALC and MOL funding has been severely cut and we cannot provide the past level of support to assist with student success.
- As our building and outdoor lab facilities age, have a clear plan and campus support to quickly repair classrooms, update technology, and keep outdoor labs functioning.

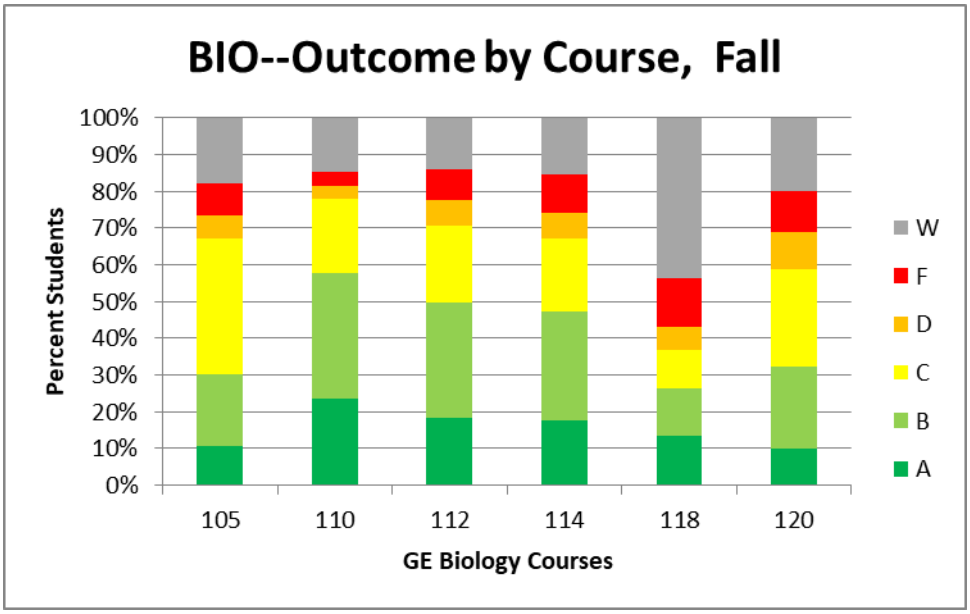
9.4 Make a rank ordered list of program recommendations for the next six-year cycle based on the College's new Strategic Plan which includes outreach, engagement, and retention.

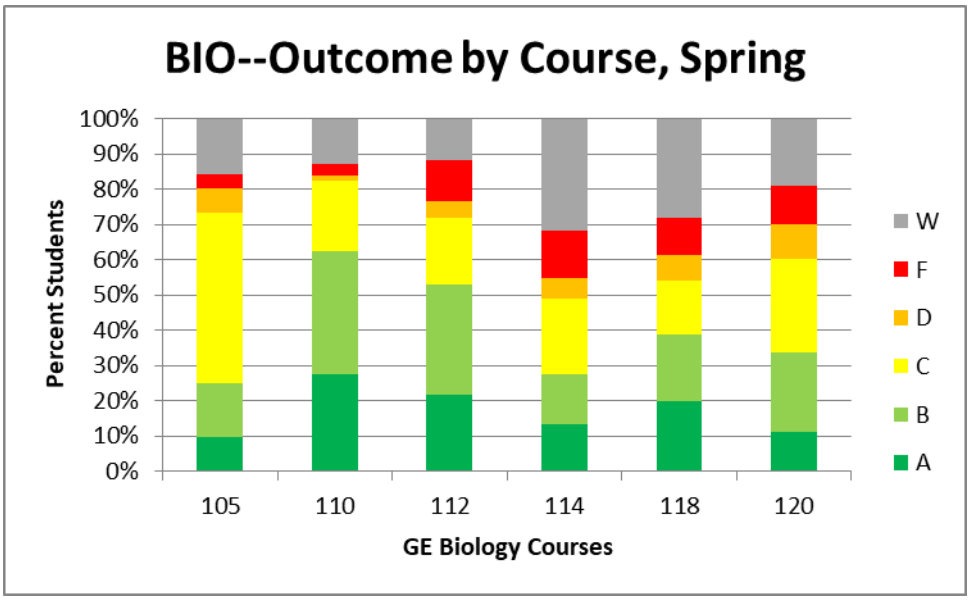
- Continue efforts to increase student success and decrease equity gaps in performance
- Hire two additional BIO 120 full-time faculty
- Hire one additional Allied Health faculty
- Restore and increase funding for biology department tutoring services
- Continue to seek funding for upgrading and replacing computers and equipment
- Maintain and improve outdoor learning spaces
- Replace 1 retirement in 2020 and two additional upcoming retirements during the next 6 year Program Review Cycle.
- Increase students applying for Grossmont Biology Associates degrees

APPENDIX 1: Grade Distribution Summary

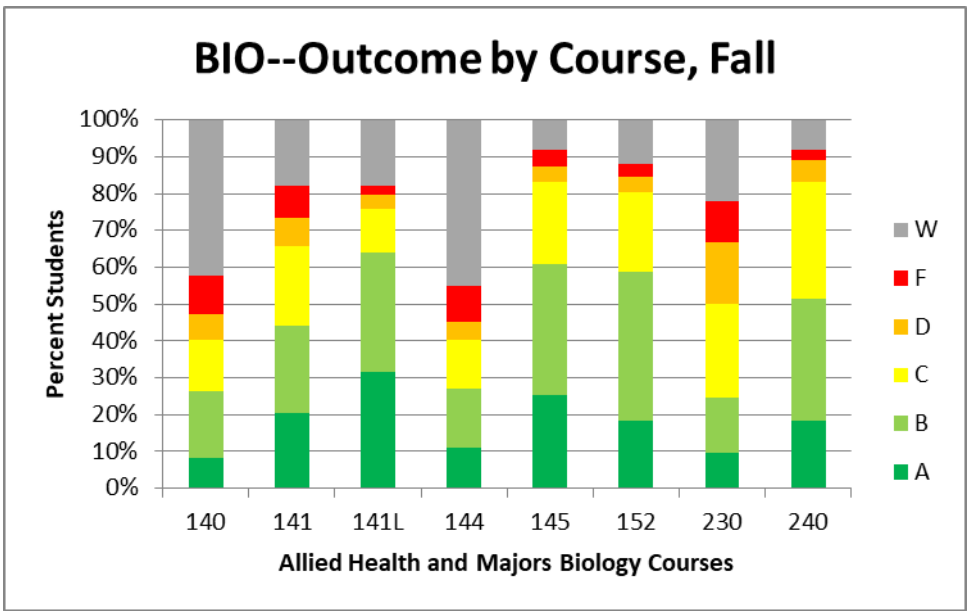


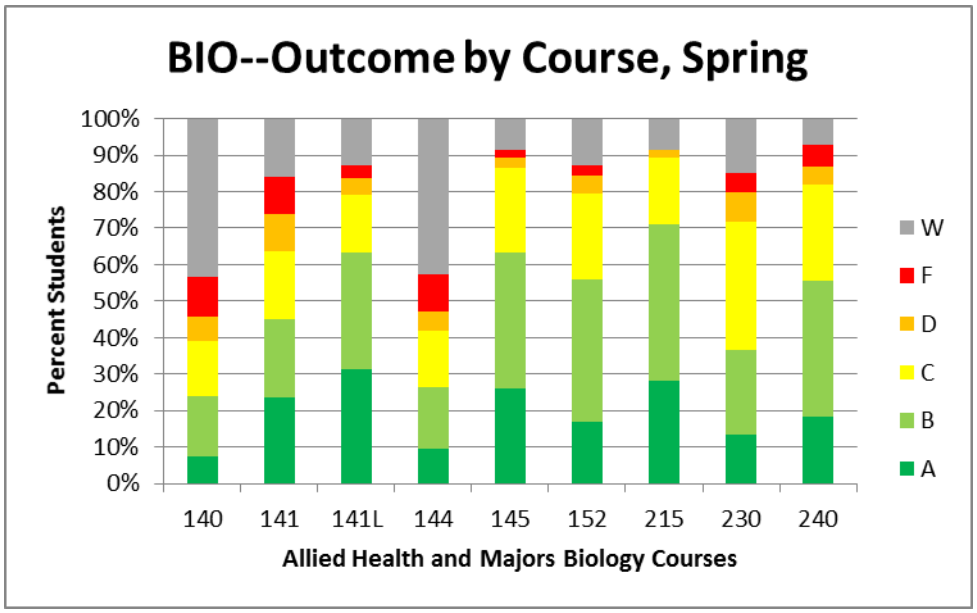
Outcomes for GE Courses



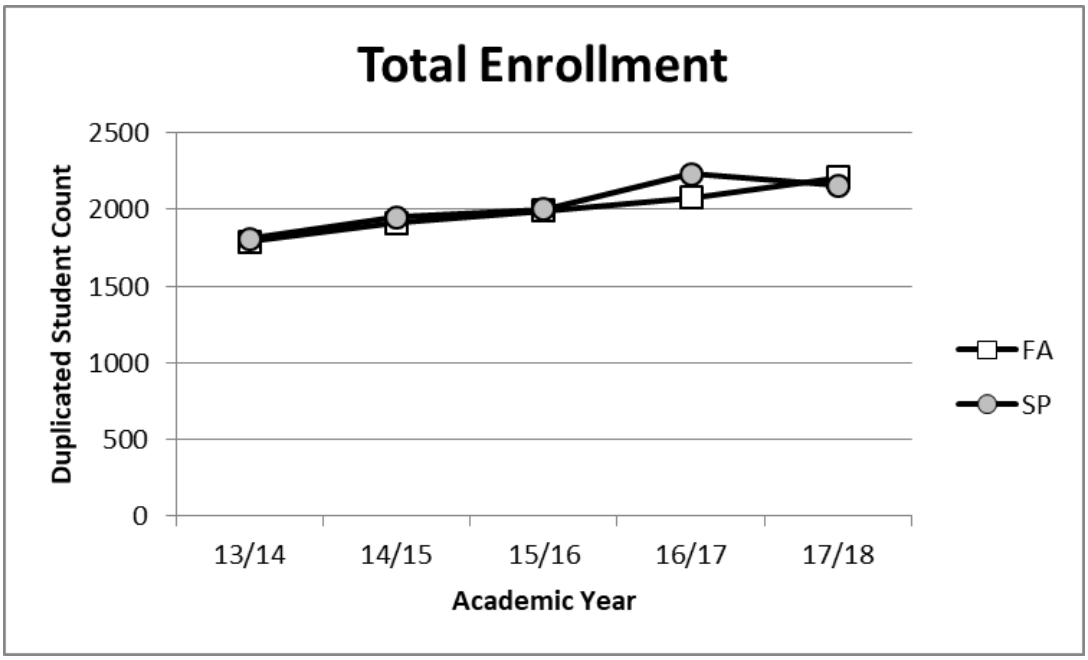


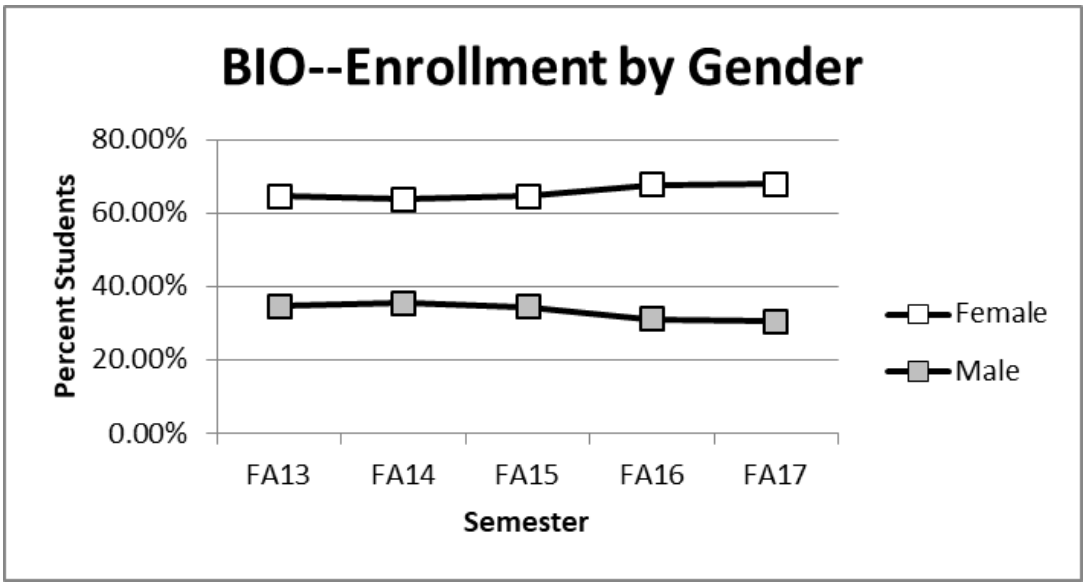
Outcomes for Allied Health and Majors Courses

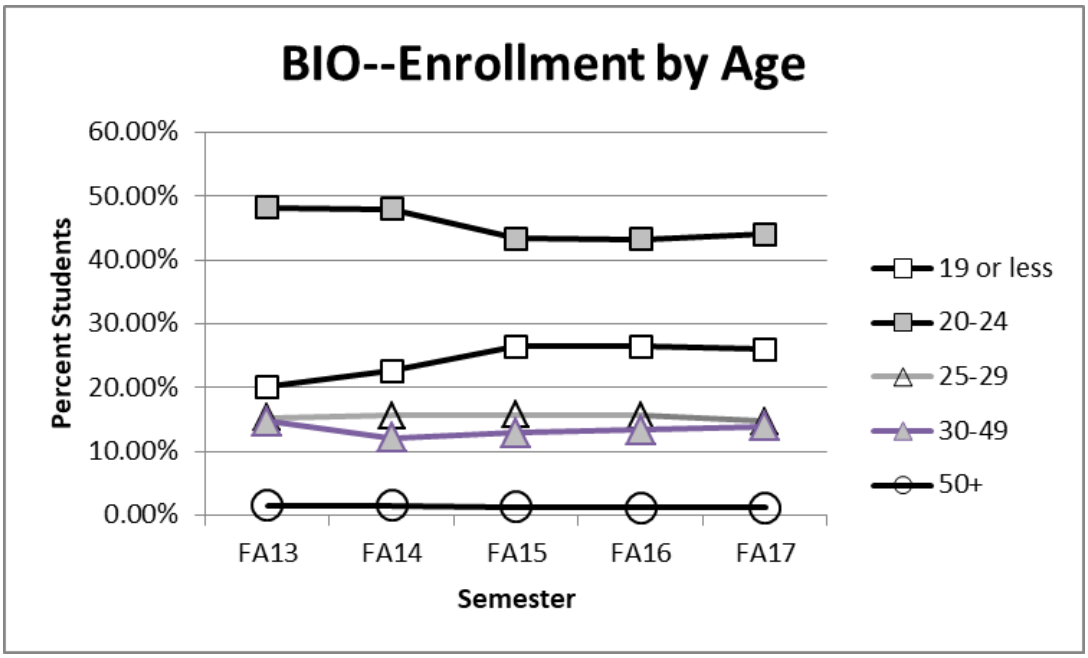


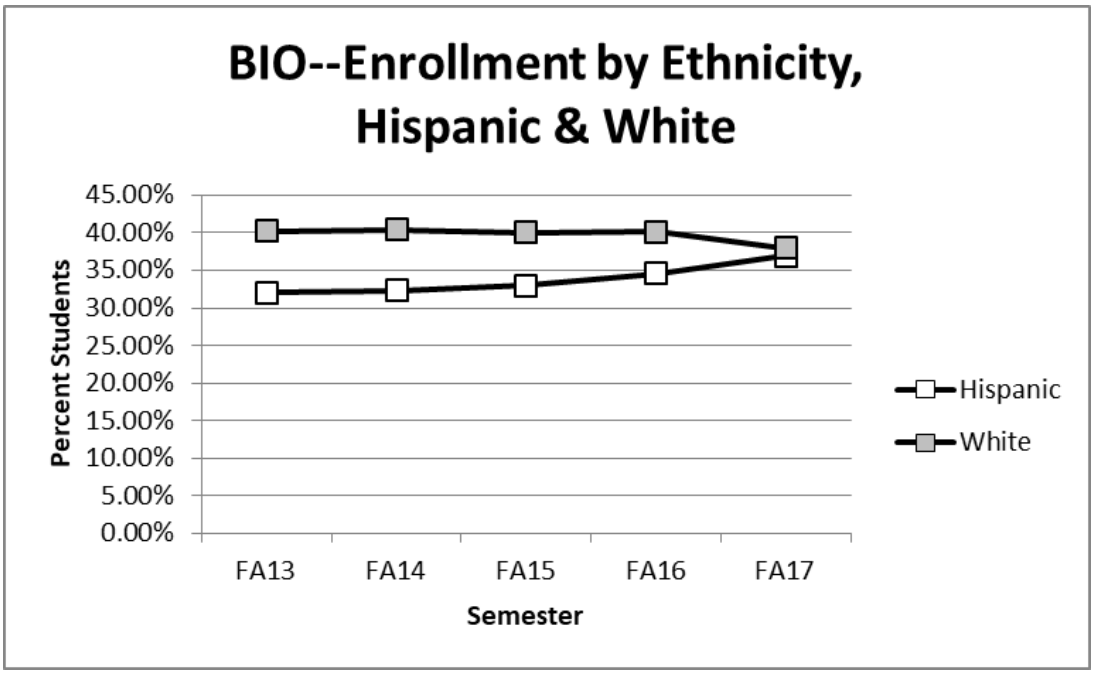

BIO--Outcome by Course, Spring
Percent Students
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
140
141
141L
144
145
152
215
230
240
Allied Health and Majors Biology Courses
W
F
D
C
B
A

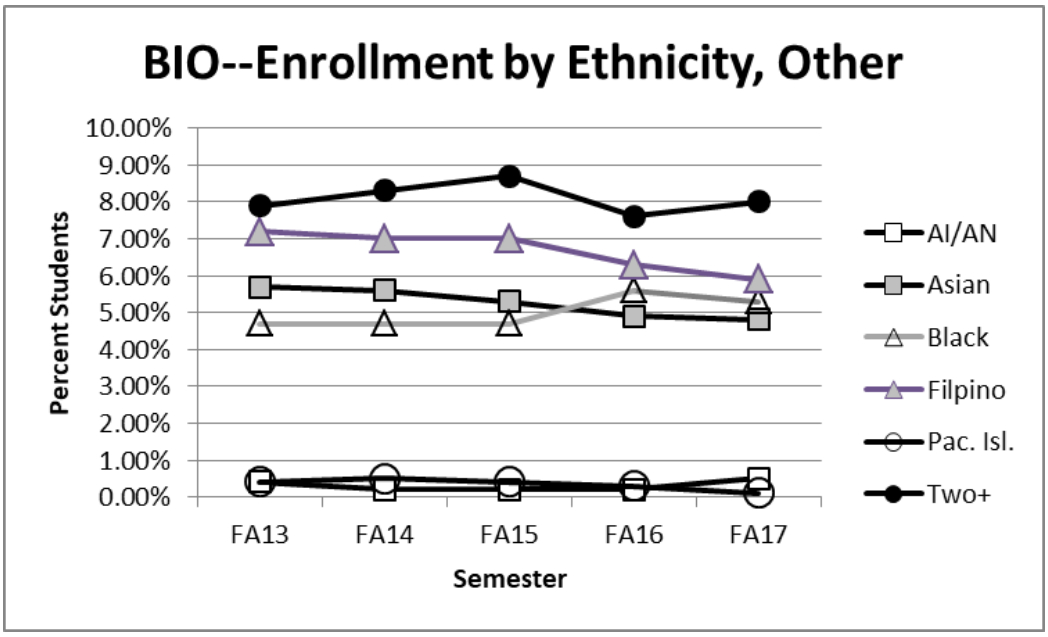
APPENDIX 2: Enrollment Data





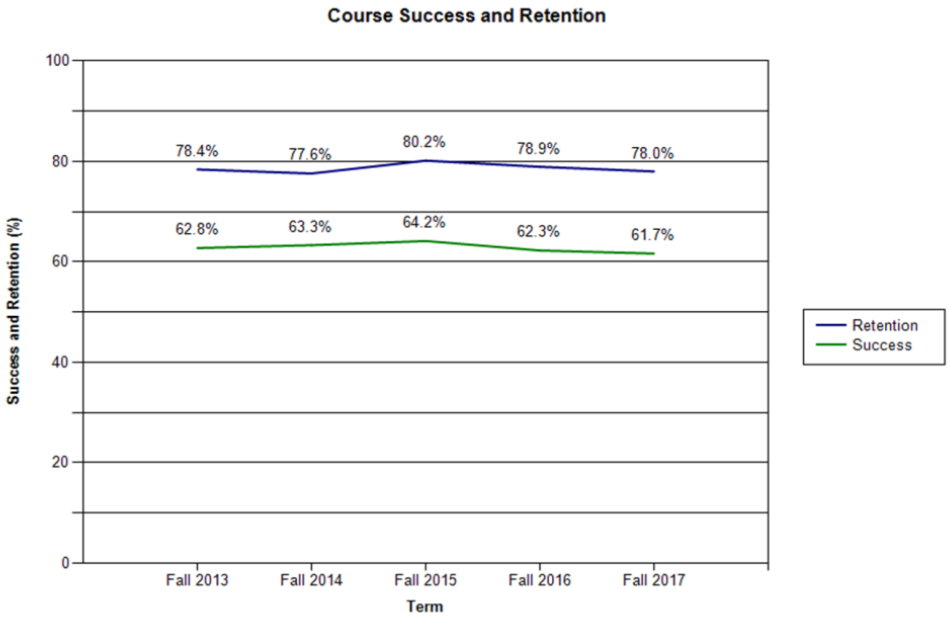

BIO--Enrollment by Age
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Percent Students
FA13
FA14
FA15
FA16
FA17
Semester
19 or less
20-24
25-29
30-49
50+


BIO--Enrollment by Ethnicity, Hispanic & White
45.00%
40.00%
35.00%
30.00%
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
Percent Students
FA13
FA14
FA15
FA16
FA17
Semester
Hispanic
White

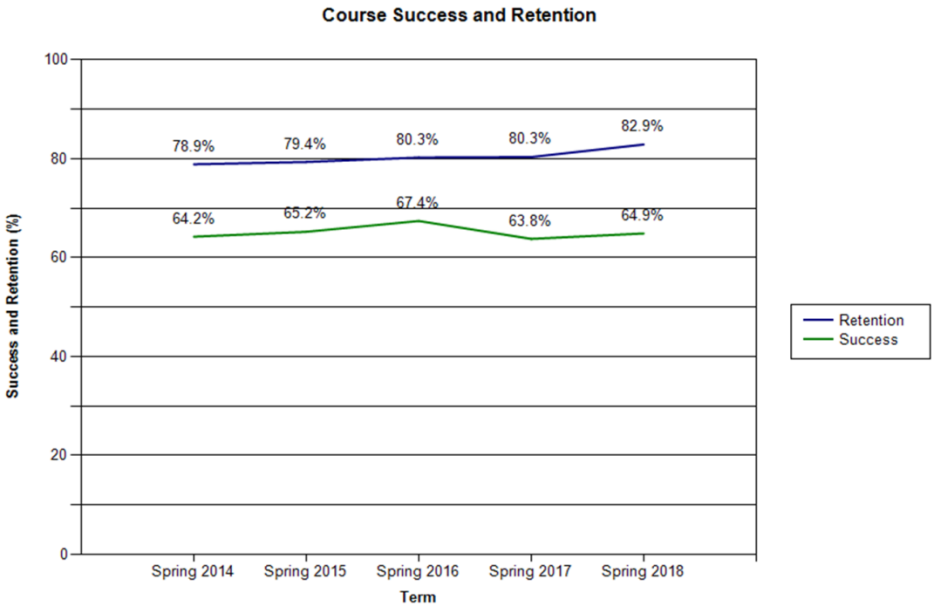

BIO--Enrollment by Ethnicity, Other
10.00%
9.00%
8.00%
7.00%
6.00%
5.00%
4.00%
3.00%
2.00%
1.00%
0.00%
Percent Students
FA13
FA14
FA15
FA16
FA17
Semester
AI/AN
Asian
Black
Filpino
Pac. Isl.
Two+

APPENDIX 3: Student Success Data

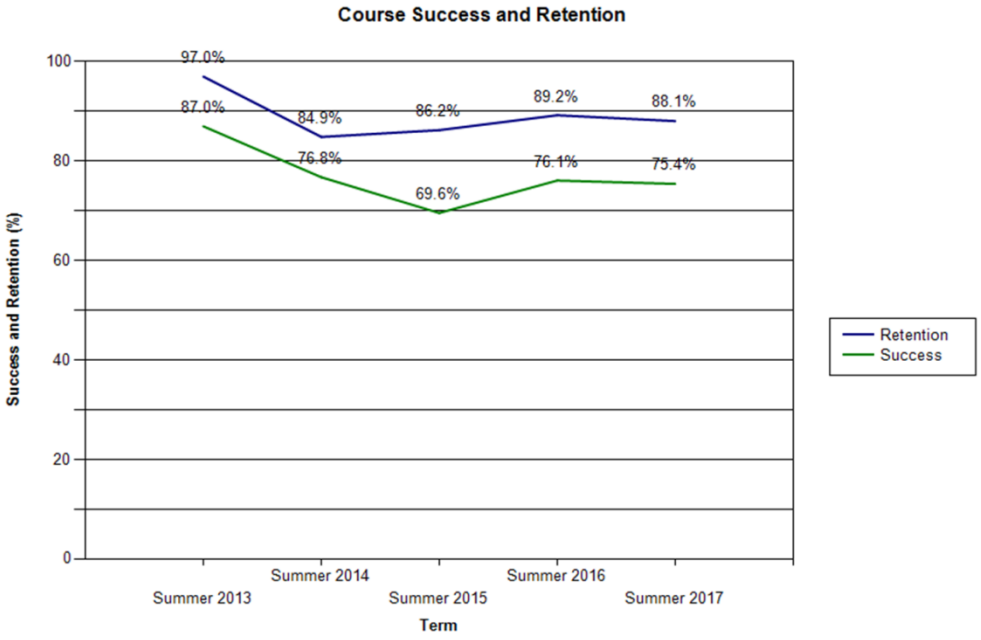
Fall



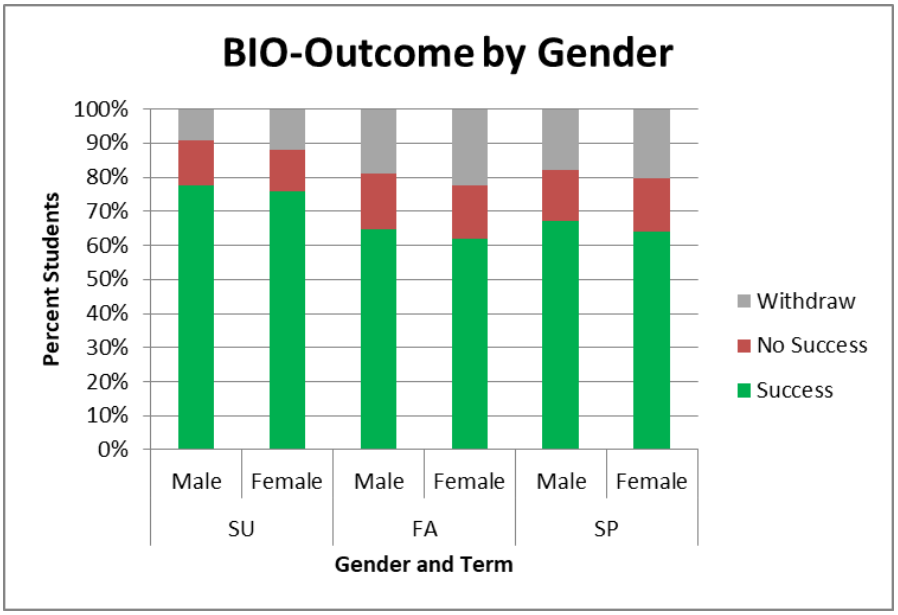
Spring

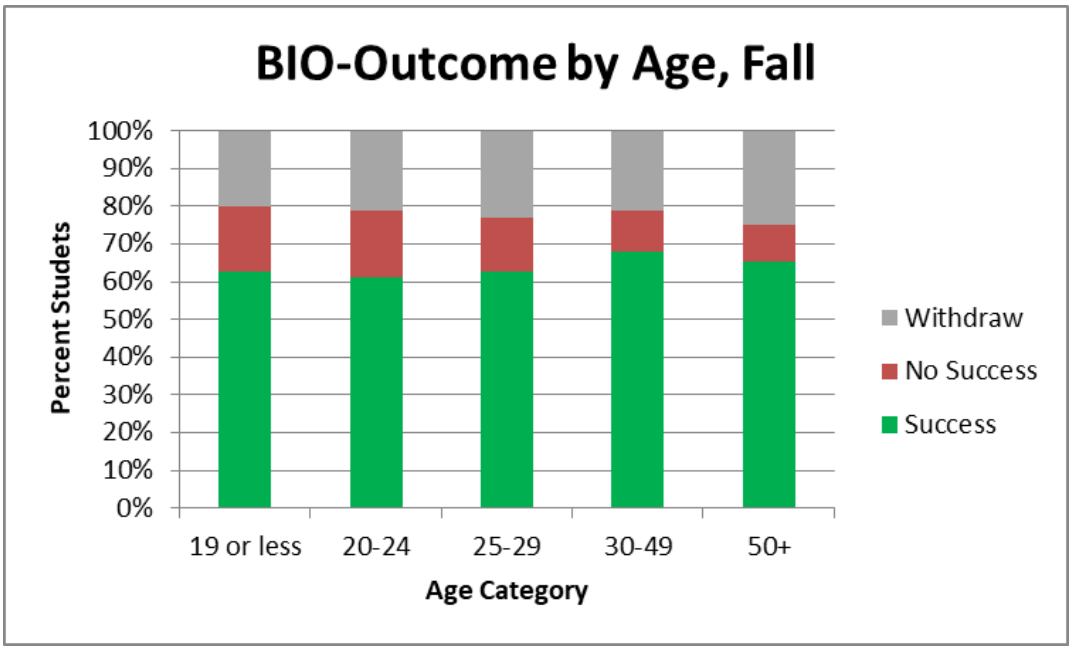


Summer

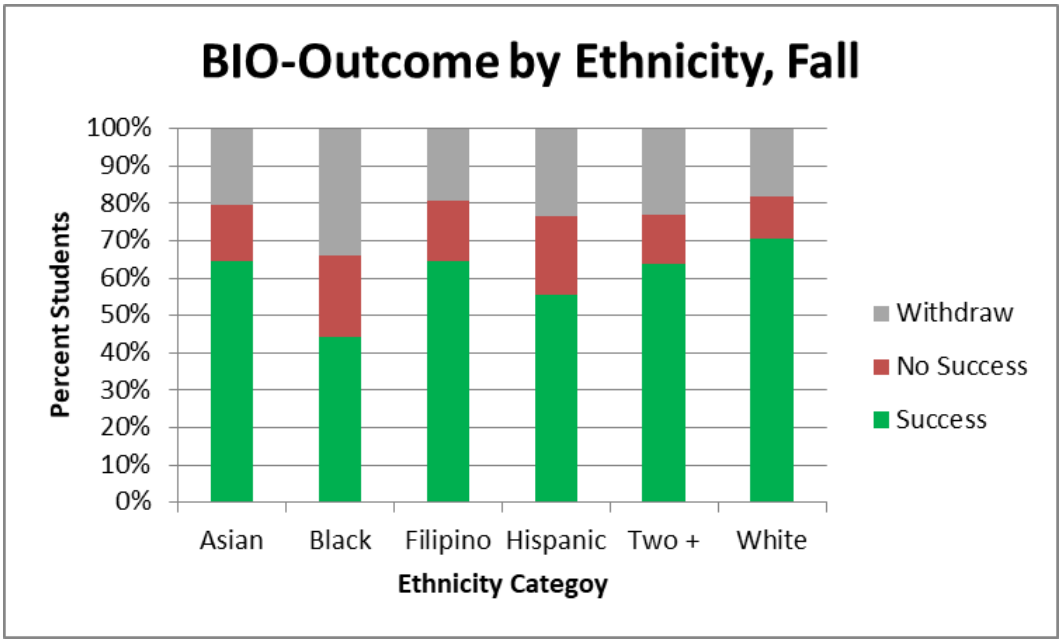


Disaggregated





Patterns for spring are similar, so graph is not shown.



Patterns for spring are similar, so graph is not shown.

APPENDIX 4: Checklist Documentation (SLO, Instructional Operations, Articulation Officer, Library)

Instructional Operations Report

Subject and Number	Governing Board Approval Date
BIO 105	May 2014
BIO 110	May 2014
BIO 112	May 2015
BIO 113	May 2011
BIO 114	May 2015
BIO 118	May 2014
BIO 120	May 2014
BIO 132	May 2014
BIO 140	May 2017
BIO 141	May 2016
BIO 141L	May 2016
BIO 144	May 2017
BIO 145	May 2017
BIO 150	May 2013
BIO 152	May 2014
BIO 215	May 2014
BIO 230	May 2015
BIO 240	May 2014
BIO 251	May 2015

***BIO 113 is the summer Biotechnology Bootcamp course for high school students, not offered this year.**

***BIO 150 is a Geography/Geology course that is cross-listed with our department.**

***All courses with 2014 approval dates are currently being worked on and will be submitted in Fall 2020.**

SLO Report

Review of SLO Assessment Reporting for Biology
Spring 2019 Program Review
By Felicia Kalker, SLO Coordinator
4/11/19

SLO Assessment Cycles to be Included in This Report:

- Fall 2009 – Spring 2015 (Trac Dat will only have assessment results from 2012 on)*
- Fall 2015 – Spring 2021 (All assessment results should be in Trac Dat up through at least Fall 2017)
- I realize that 199 and 299 courses are offered infrequently, so there may not be assessments recorded if the courses are not offered.

TD = Trac Dat

Biology Information

For program review, I check to make sure that the previous cycle's results were recorded, and I check to make sure that the current cycle is up to date (see note above*).

Course	SLO #	Comments
BIO 105	#1-3	SLO #1 (a different version) was on the 6-year plan and the others were not. SLO #1 in TracDat doesn't match the 6-year plan. None of these SLOs have results in TracDat. Notes from dept. chair : The SLO's match the COR which were updated in 2015. I am guessing the assessment information has been lost when the old SLO's were inactivated.
BIO 110	#1-2	Assessment results last reported Spring 2016.
BIO 112	#1-3	SLOs not marked to be assessed in 6-year plan and not in TracDat. I am looking at Trac Dat and see 3 SLO's that match the COR.

		We have no FT person teaching this course. As the college does not pay adjuncts to do SLOs our dept does not do assessments on adjunct only courses. This is likely why there is not assessment
BIO 113	Any	SLOs not in 6-year plan at all and not in TracDat. This course is for a special program funded by outside grants. We don't do SLO assessment on this course
BIO 114	#1-2	SLOs not marked to be assessed in 6-year plan and not in TracDat. Same as Bio 112
BIO 118	#1-4	Assessment results last reported Fall 2015.
BIO 120	#1-4	The 6-year plan indicates only #4 will be assessed, as of Fall 2015, however, no results for any SLOs are in TracDat. We have been without an FT Bio 120 coordinator since 2007. The replacement was hired in Spr 2017. She will do the next round of SLO assessments
BIO 132	#1-2	SLOs not marked to be assessed in 6-year plan and not in TracDat.
BIO 140	#1-3	Assessment results last reported Fall 2015.
BIO 141 and 141L	#1-3	Assessment results last reported Fall 2015.
BIO 142	#1-3	The 6-year plan indicates only #2-3 were to be assessed, as of Spring 2016, however no results are in TracDat. This course does not appear to be in TracDat. This course has been deleted from our curriculum
BIO 144	#1-3	Assessment results last reported Spring 2016.

BIO 145	#1-4	Assessment results last reported Spring 2016. SLOs in TracDat appear to be different from the 6-year plan. SLOs have been updated since the 6-yr plan and the ones in TracDat are identical to those in current COR
BIO 152	#1-3	Assessment results last reported Spring 2016.
BIO 215	#1-5	Assessment results last reported Spring 2016.

BIO 230		SLOs # 1-2 were reported Fall 2016; remaining SLOs in schedule for 2018 so may not yet be entered. I do the SLO's for this course. The 3 that were added will be done on the next cycle
BIO 240	#1-4	SLOs #1,4 updated in 2018. SLOs 2-3 updated in 2015/16.
BIO 251	#1-3	Assessment results last reported Fall 2015.

ARTICULATION REPORT

Date: February 23, 2019

To: Allison Shearer, Biology Department Faculty

From: M. Denise Aceves, Articulation Officer

Re: Biology Department • Program Review Checklist

The process of articulation is two-fold. First, transferability must be established. A transferable course is one that is taken at a community college and can be used for unit credit at a university. The next step, is the articulation of courses deemed transferrable. Articulation is the formal, written agreement that identifies courses on a "sending" campus that are comparable or acceptable in lieu of specific course requirements at a "receiving" campus. Thus, articulation identifies courses that a student should take at community college to meet university degree requirements.

In response to your request for articulation information, Biology courses at Grossmont College are well-articulated. All formal articulation with our 4-year public education partners can be found at *ASSIST.org*, which is the public articulation repository available to current and potential college students. Please note that ASSIST.org currently only reflects articulation information through 2016-2017.

All courses in this discipline are transferrable to both CSU and UC Systems, with the exception of Biology 113 which is only transferrable to the CSU. Furthermore, courses in this discipline have been evaluated by the CSU and UC systems to meet requirements for general education. As a result, approved Biology courses assist students in meeting CSU General Education Breadth requirements in the area of Scientific Inquiry and Quantitative Reasoning. Similarly, there are approved Biology courses in the Physical and Biological Sciences area of IGETC. All courses that have received transferability and general education designations are notated as such at the end of each course description in the Grossmont College Catalog. The courses with course to course articulation by department with specific CSUs and UCs can be found on *ASSIST.org*.

Locally, our public 4-year educational partners include: San Diego State University (SDSU), California State University San Marcos (CSUSM) and the University of California, San Diego (UCSD). Articulation with the San Diego State Biology Department is robust and Grossmont College's Biology courses have attained course to course articulations, click here for a detailed report from *ASSIST.org*. In addition, Grossmont College has complete course to course articulation

for the SDSU major preparation for the Biology major, click here for a detailed report from *ASSIST.org*. Similarly, the Biology Department has existing course to course articulation by department with CSU San Marcos and in their Biological Sciences major. Lastly, our courses have been articulated by department with UCSD and in the General Biology major as well as in the other seven emphasis. The Biology department is encouraged to review their course to course articulations with the other CSUs and UCs on *ASSIST.org* and work with me, the Articulation Officer, to develop new articulations.

The Biology Department has also successfully offered the Biology Associate of Science for Transfer (AS-T) as of this academic year (2018-2019) in compliance with Senate Bill 1440. To this end, the Biology Department has worked collaboratively with the Curriculum Committee, Instructional Operations and the Articulation Officer to establish the Biology AS-T. Similarly, the department has been responsive to Course Identification (C-ID) required for courses in the degree.

Articulation is facilitated with current, concise and thorough course outlines. It is imperative that the outlines and text books listed be current. The requirement that course outlines be updated every 5 years through the Grossmont College Curriculum process is vital. Students benefit from the many colleges and universities who have articulated our courses in Biology. Below I have listed the link to *The Course Outline of Record: A Curriculum Reference Guide Revisited*, a document adopted by the Academic Senate for California Community Colleges in Spring 2017, as well as the latest standards for CSU GE Breadth and IGETC.

Curriculum Resources

- The Course Outline of Record: A Curriculum Reference Guide Revisited
- Guiding Notes for General Education Course Reviewers
- Standards, Policies & Procedures for Intersegmental General Education Transfer Curriculum, Version 1.9

You are welcome to contact me directly at mariadenise.aceves@gcccd.edu with any questions regarding this report.

Library Resources for Biology

Books
The library Biology area, comprised of call numbers QH, QK, QL, QM, and QP, breaks down as follows:

	Print Books	Electronic books	Print Reference
QH	535	1983	0
QK	148	457	0
QL	511	509	17
QM	63	79	2
QP	218	1295	9

There are also two online reference book collections that contain thousands of entries related to the field of Biology. These collections, or databases, are called "Gale Virtual Reference Library" and "Credo."

Books are purchased using a complex allocation formula to ensure that departments get their fair share of this year's (18/19) $80,000 annual library book budget. The allocation formula allows for a book budget of $2,770.74 in Biology this year – a banner budget year due to a one-time grant funding. Biology has thus far spent $2382.48 of that budget.

All electronic materials, whether books or journal articles, can be accessed anytime, anywhere.

Periodicals
Most of the Biology periodicals are in electronic format, within library periodical databases. This allows for keyword searching, and anytime, anywhere access.

The library subscribes to a number of multidisciplinary databases, all of which contain tens of thousands of articles related to Biology - including Academic OneFile, Academic Search Complete, and Gale General OneFile. Some databases specific to Biology include HealthSource – Consumer Edition, Medline, and a number of Nursing databases.

Media
The library makes available four streaming video databases that cover all subject areas; for example, the electronic databases 1) Films on Demand, 2) Intelecom, 3) Kanopy, and 4) the San Diego County streaming service called Swank. The video material in these databases is readily available electronically 24/7, without ever having to come to the library. Therefore they work well as a complement to classroom presentations.

May 2019, by Patricia Morrison, Librarian, Grossmont College

APPENDIX 5: Examples of Department Handouts to promote student success across BIO 120

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Allied Health Preparation Courses: Prospective Student Information Packet

This informational packet has been compiled by the Biology course coordinators for the Allied Health Preparation classes at Grossmont College. The purpose of this packet is to inform you of the knowledge and skills required to succeed in these rigorous courses.

General Skills Necessary to Succeed in any Pre-Allied Health Biology Course

- ✓ SUCCESSFULLY COMPLETE all pre-requisite and recommended preparation courses.
  - o Biology 120 or the equivalent
  - o English 110 or above or the equivalent
  - o Math 90 or above or the equivalent

- ✓ FLUENCY IN THE ENGLISH LANGUAGE including Oral, Written and Reading Comprehension.

- ✓ Students must have very strong study and time management skills:
  - o 2-3 dedicated hours of independent studying per classroom hour of instruction per week
    - For example, a 4 unit class would require 8 or more hours of study time per week.
  - o Many students who find it difficult to succeed in these courses have other time demands and cannot commit to the minimum (or more) suggested study time. **Honestly assess and recognize your ability to commit the time and effort that is required to succeed in these courses. Be conservative as you schedule your time, some students will need more than the minimum suggested study time in order to pass these classes. Always assume you need more study time rather than less**.

- ✓ Students must be able to read and follow directions for laboratory classes.

- ✓ Students need to independently read and understand scientific material in textbooks.

- ✓ All classes require strong spelling and writing skills in English. This includes mastery of vocabulary including spelling without any aids such as “word banks”.

- ✓ In written assignments**,** students must display knowledge of and use APA style citations. All Allied Health Preparation courses include extensive writing assignments.

- ✓ Students are required to have strong math skills (up through basic algebra and including

usage of scientific calculators).

- ✓ Students will often work in groups, therefore working within and leading a group is a necessary skill.

- ✓ Critical thinking and problem solving skills.

- ✓ Students must be able to work independently on graded homework and lab assignments.

- ✓ Basic through intermediate computer skills including: typing, following internet links, submitting documents as PDFs via Blackboard, and downloading and printing files using Blackboard.

- ✓ Strong note-taking skills (without the use of a computer).

Content Based Knowledge and Skills Necessary For Entering Pre-Allied Health Classes

Students entering any Pre-Allied Health class at Grossmont College should already have mastered the following concepts, processes and skills drawn from pre-requisite and recommended preparation courses.

1. Students must understand the process of Evolution by Natural Selection.

2. Students must understand the process of DNA replication and be able to list its steps.

3. Students must understand the process of transcription and translation and be able to list the steps.

4. Students must be able to summarize and interpret scientific data and create graphs (both by hand and using computers).

5. Students must be able to name and give the function of all eukaryotic cellular structures including all organelles.

6. Students must know and explain all stages of the cell cycle for both mitosis and meiosis.

7. Students must know the steps, including reactants of each, and products of aerobic and anaerobic cellular respiration.

8. Students must know the following basic chemistry knowledge:
    a. atomic structure
    b. formation of ions

c. chemical bonds
d. chemical properties of water
e. pH
f. organic molecules
g. hydrophobicity/hydrophilicity
h. basic types of chemical reactions

9. Students must understand the 4 types of biological macromolecular structure and function (particularly enzymes).

10. Students must understand the concepts of osmosis and tonicity and their cellular effects.

11. Students must understand and give examples of active transport, facilitated diffusion and simple diffusion with respect to the cellular membrane.

12. Students should be able to list the major body organs and systems in vertebrates and their functions. (see Rat Dissection in Bio 120 Comparative Vertebrate Lab).

13. Students must be able to independently use a compound microscope and prepare fresh slides.

ADDITIONAL Course Specific Content & Skills

BIO 140: Human Anatomy (5 units)
-general knowledge of major body organs and systems
-ability and maturity to work within dissection groups

BIO 141: Human Physiology (3 units)
-general knowledge of major body organs and systems (including structure and functions)

BIO 142: Human Physiology Lab (1 units)
-solutions and concentrations
-ability and maturity to work within dissection groups

Bio 144: Anatomy and Physiology I (4 Units):

- Ability to discuss the major levels of biological organization from the atomic level to the organismic level
- Ability to use a compound microscope to identify cellular and sub-cellular structures on prepared slides
- Ability to explain and illustrate the concept of homeostasis using examples applicable to daily life.

BIO 152: Microbiology (5 units)
-taxonomic hierarchy (levels of classification)
-Kingdom and Domain systems of classification (and distinguishing characteristics of taxa)
-scientific naming
-cellular structure (emphasis on prokaryotic cell)
-know basic genetics terminology (emphasis on molecular biology terms)

****

Success Tips for Biology 120

How to Learn in Lecture

- Review the slideshows and skim the textbook chapters before coming to class. Note topics that are confusing and make sure to pay attention to that part of the lecture.
- Arrive on time, with the lecture slideshows or outlines printed and/or notebook and pencil/pen ready to go.
- Write down everything your instructor writes on the board. Try to write down the keywords mentioned by your instructor for each figure/slide. Draw a star by anything that the instructor draws attention to. Put a question mark by things you don't understand. If you miss something, leave a space in your notes (do not ask your neighbor). Fill in any gaps later by checking with your study group or reading the textbook.

How to Learn in Lab

- Read the lab activity before coming to class. Make a flow chart of experimental methods or highlight key steps in procedures so that you know what to expect. Put a question mark by things you don't understand and pay special attention to those topics in the pre-lab lecture.
- Arrive on time and prepared with your lab manual and ready to take notes.
- Try not to feel overwhelmed by the procedures. All the steps are listed in the lab manual, so work with another student to follow them one at a time. Your instructor may not go over everything you need to do, so plan on reading the procedures from the lab manual every day. Ask for help if you are getting frustrated.
- As you are working through the activities, try to notice the phenomena that the pre-lab lecture covered. Remember that you are doing the activities in order to observe important biological phenomena happening in real time. This should help you learn them! Your objective should NOT be to finish the activities in the shortest possible time so that you can leave early.
- You must work with other students in order to complete the activities. It can be hard to work with others that you may not know or like; however, the real world workplace has the same problem. Be observant of the skills and talents of the other students at your table as well as their weaknesses.

How to Read the Textbook

- Start with a blank sheet of paper and your book. First skim the chapter and write the section headings and subheadings down on the paper with spaces in between them, to form an outline of the chapter. Then read the sections, writing down a summary of each section or subsection in your own words in your outline. After each section, put a check by the parts you understand and a question mark by the parts you don't understand or have a question about (write it down in the margin).
- Follow-up on the parts you have questions about with the instructor, other students, or the tutors.
- Approach reading your textbook with this in mind: You will not *learn* all the material by reading the text once straight through! You may even need to re-read some of the text several times just to understand some topics.
- Make sure to NOT read and study sections of the textbook that your instructor has not covered.

How to Study

- Recopy and organize your lecture notes later in the day, making sure to fill in any gaps left in content that you missed (either by double-checking with other students or from the textbook).
- Rewrite your lecture notes and textbook notes, integrating them together. Start with an outline of topics, and then fill in the information in your own words. You can also do this in a "mind map" format rather than an outline, where you draw circles or boxes for each key concept, then connect them together with arrows showing the relationships between them.
- Make flash cards of vocabulary words and simple factual information. Keep them in your back pack and run through them at least once a day.
- Make up acronyms, rhymes, or whatever weird association you can come up with to remember the information, as needed. (Example: blood flows from the **A**trium to the **V**entricle in the heart because it goes in alphabetical order)
- Draw diagrams and graphs over and over again until you can write them completely and correctly without missing any parts from memory. Try to redraw them in a different way if you can think of one or combine information from several topics into one diagram.
- Spend time discussing concepts that are more complicated with your study group, the tutor, your professor, or friends and family members. Notice if topics from class are in the news or in the world around you.
- Write out several-sentence descriptions of key concepts until you can do it completely and correctly from memory.
- Make up practice problems (written or multiple choice) and quiz yourself and your study group members. Check the answers with your instructor or a tutor if you are not sure.
- Run though lists of information in your head when you are driving, jogging, or otherwise mentally unoccupied and look up anything you can't remember when you get back to your desk.
- *Keep doing these things until you are **sure** you know **everything** completely and correctly*.

How to Take Tests and Quizzes

- Get at least 6 hrs of sleep the night before.
- Eat a real meal with 10-20g protein before the exam.
- Go to the bathroom before class starts. If you need tissues, get them before class starts.
- Get to class on time or even early on exam days. Have a second alarm clock or have a friend call or text you to make sure you are on your way to class on time if you need to.
- Make sure you have the right GradeMaster form and/or blue books, working pens and sharp pencils with erasers or mechanical pencils with spare lead in them.
- Look through the whole exam when you get it to plan your time. Check the backs of the pages, note how many answers you should be filling in on your GradeMaster, and note how many points different questions are worth. Set a goal for how long to spend on each section and get in the habit of checking the clock or your watch regularly during the exam period.
- First, quickly answer the questions you know. Then go through and think out the answers you are less sure of, and finally guess on the ones you don't know. Recheck and edit your answers to all questions before you turn it in, especially checking that you have not left any answers blank.

Biology Department Program Review-Follow-up Questions

After reading each report the program review committee develops a list of follow-up questions. This allows us to get a deeper understanding of your department's operations and guides our commendations and recommendations for the next program review cycle (6 years). We have tried to make the questions clear and very specific to minimize the effort needed to answer them. Please have the answers to the questions below back to me by **email no later than September 13, 2019**.

Section/Page	Question	Response
3.1	Bio 112/114: What is the plan for the orphan courses? When and how will SLO data be collected and processed given the absence of a full-time instructor to coordinate?	Our department policy regarding so called "orphan" classes has not changed since SLO's were mandated by Accreditation. When the adjunct teaching the class is agreeable to donating their time to gather and report on SLO's then the SLO's are evaluated. If the adjunct is unwilling as is their right under the CBA, then the SLO evaluation is delayed. We have been fortunate that when these classes have come up for SLO review, the adjunct has been willing to donate their time to complete the required tasks (that is, these classes have never missed a required 6 year SLO evaluation)
3.3	How will you collect data from orphaned classes taught by adjuncts? Which other departments have you spoken to that have managed this issue?	We think we have covered this in the prior response. We have seen no reason to consult with other departments as our process has worked up to this point.
3.5	Can you provide an example of an assessment instrument for BIO 230?	Bio 230 has 2 SLO's listed in the COR. SLO #1 is evaluated as a structured short answer problem on the Final Exam. SLO #2 is evaluation in a 2 day in-class guided discussion that includes written preparation and oral presentation.
4.4	What is the replacement and/or maintenance schedule for anatomy models?	Currently it is based on need and budget. Some models have a very long lifespan (for example, skulls) and rarely need replacing. Other models (muscle models, eyes) have more parts and need to be replaced more often. Allison and Shina keep in contact with Sharon about models wearing down and maintain a "wish list" of models we foresee needing replacement in the future. There is no average age of the models in the department due to their variation in usage and complexity.

4.6	Does Cuyamaca not have space to conduct anatomy tutoring at their own location? Would having them separate, help?	They do not. Yes, having Cuyamaca host their own tutoring center would reduce the burden on our costs due to less wear and tear on models and more access to one-on-one tutoring help for our own students. This year we will not be allowing Cuyamaca students to use our centers. Our funding structure is expected to change in the next semester, and we will (hopefully) be funded by the LTRC budget for 90% of our needs. TA donations will continue to account for about 10% of our budget. Due to the new funding we will be restricting access in accordance with current LTRC policies.
5.6	What are the benefits to obtaining a degree? What information on this topic is being given to students? If 81% transferred to the CSU system without degrees, what's the push now for degrees?	For students, the benefit of obtaining a degree is a sense of completing a step closer to their educational goal. There is some evidence that students who complete an Associate degree have some advantage both in securing transfer and more advanced degrees. The completion of a degree shows that the student completes what they begin and have a commitment to a well-rounded education. In addition, having a degree provides advantage when seeking employment or internships while in pursuit of their Bachelor's degree or in the event their plans to complete the bachelor's degree are delayed in the short term. For the college, our number of degrees awarded is linked to the state's Student-Centered Funding Formula which awards approximately 10% of our total funding based on the number of AS and AST degrees awarded. Ripley and Milgrim, the 2 FT instructor coordinating the Biology degree program work individually and collaboratively to encourage students to complete their AS or AST degrees. We make announcements in class encouraging students to apply for the degrees and why it is a good idea. Now that the Transfer Degrees exist, students obtaining them get priority to transfer into the CSU system and will essentially be unable to access SDSU without having an ADT in impacted majors such as Biology.
5.7	There was a large jump in cell biology majors who transferred to UC schools (from 2 and 3 to 9, 8, 9). What might account for this increase?	The rapid and continued expansion of the biotechnology industry has resulted in scores of new career possibilities in the public and private

		sector. The field is one of the fastest growing and San Diego is one of its main hubs. In addition, more medical, dental, PA and similar schools look more favorably on degrees in Cell Biology due to the rapid changes in the medical field that require a deeper knowledge of health and disease at the cellular/molecular level.
6.1	Tutoring: Is there a way faculty and staff could revisit new tutoring options/solutions? Is there a way to have Faculty/Staff "Volunteer Tutors/hours" to help mitigate budget constraints for tutoring?	One of the best ways to deliver tutoring is via office hours. Getting students to take advantage of office hours is a challenge. In addition, while 1 hour/week of paid office hours is available for adjuncts, many do not have the time to use this benefit. In our recent division meeting, Aaron Stark offered a novel approach to encouraging students to use office hours. In summary, his message was to tell students that students who use office hours are more successful. The goal is to convince students that office hours and tutoring are not only for when a student is in "trouble". We discussed this approach in our subsequent department meeting and are trying it in our courses this semester. Currently full-time faculty volunteer office hours to run the ALC. Part time faculty have not been able to do so. Volunteer tutors, I have learned, are not allowed so we must pay all student employees as NANCE TA or Tutors. I have inquired about embedded tutoring funds to help us out. We hope that the proposed budget the LTRC just put forward is approved in toto as it would cover almost all of our tutoring needs- including summer hours. Expansion of departmental tutoring within the department space is an option. We have the space in the large common study area, 30-162, but lack the fiscal support. This implication of this question, that faculty are a good substitute for peer tutoring is problematic at best. There is amble research to support the advantages of peer tutoring (e.g., http://www.nea.org/tools/35542.htm). Students who would not seek tutoring from faculty will readily make use of peer tutoring. Peer

		tutoring also provides students with a role-model for success that cannot be duplicated by interacting with faculty. This issue here is the institutional failure to prioritize tutor funding. We have not had a stable, predictable tutoring budget for the last 12 years (Our ALC & MOL opened in 2007). Last semester, the complete lack of administrative action resulted in the college appropriating $4000 from our supply budget, monies that had been ear marked for necessary supplies for our labs, to pay for tutors. This academic year, despite knowing all last semester that tutor funding was in jeopardy, the President and VPAA made no efforts to prioritize and fund tutoring. As long as faculty "volunteer" to fill gaps in funding that are entirely preventable, the longer the problem will continue While Biology tutoring facilities (ALC and MOL) remain highly in demand and are in constant use, historically we have had to justify the position of an official coordinator and ongoing budget. Until last year, budget was somewhat predictable which allowed us to anticipate student needs and schedule the tutoring room usage along with tutor hiring ahead of time. While the department has come up with solutions like full time faculty holding office hours and faculty donating TA hours to pay for the tutors, this is not a sustainable solution given that we simply don't have adequate number of full-time faculty to volunteer in tutoring centers. We have had extensive conversation with Dean and some conversation with ALC coordinator about the possibility of reopening ALC as a Bio 198 no pay/no credit course but that will require data collection systems installed in ALC and greater release time for FT faculty to be present within ALC at all times during open hours. Unless, college admin commits to providing these resources and support, Biology's Tutoring center must be funded adequately by allocating part of LTRC

		budget. So, in short, there is NO WAY to have faculty volunteer tutoring hours more than they are already doing and the solution is short term while mismanagement of budget seems to be an ongoing problem within our college and district.
7.0	Please fix the table for Perchez, Miles, and Miller so the information matches up correctly across columns There appears to be missing information on the table for Golden (p 86-87)	Done. Updated version will be included in final version of PR.
8.3	Are there any grants that would support the Coastal Sage Scrub reserve on an ongoing basis?	Mostly No. We have tried through the years. We have received two ASGC grants of approximately $500 and $1300 respectively in the past. We are mostly dependent on the Biology Department supply budget, Campus Groundskeepers and the General Campus budget. Requests for assistance from California Native Plant Society and the Cuyamaca Ornamental Horticultural program have not resulted in any response. However, we do have some new contacts with these organizations and will look into it again.
9.0	Despite extensive application of strategies to improve student equity, engagement and success, to what do you attribute the low success rates in some courses (I.e. 140/144) and equity gaps in the department? What strategies are planned to increase success rates in 105, 120, 140 & 144? What additional strategies are planned to increase success in 118 (online course)?	We need to continue to impress upon counseling to NOT encourage students to bypass BIO 120 (this is allowed for declared pre-nursing majors due to a requirement by the accreditation program). Students continue to struggle with reading a text and tell me they haven't had to read textbooks before (Selene is currently working on reading strategies for BIO 120 students, but with such a large cohort of instructors... hard to gauge how many instructors have required reading). With only 12% of our Bio 120 sections staffed by FT instructors, it is difficult to control what is going on in the classroom. We were without a Bio 120 course coordinator for 12 years. Selene Miles has recently joined our FT faculty. After 2 semesters getting up to speed on teaching Bio 120, she is beginning to address issues of consistency across the 50+ sections of Bio 120 (per academic year). We recently petitioned to reduce the class maxes of all our lab classes to 25 to bring them in line with the Biology courses at Cuyamaca and

		SDCCD. Administration denied the request despite clear data that lowering student to teacher ratios increases success. We were able, using the CBA, reduce the class maximum in Bio 141 from 70-80 to 50 while at the same time increasing the academic rigor to be more in line with the allied health programs this course feeds. Anecdotally, instructors report that students are taking, 12+ units without a holistic view - they do not consider life stressors when they register- so they take on a 4-5 unit Biology class while trying to work 40 hours a week, learn to read and speak English, be a parent of 4, care for sick parents, and/or commute an hour each way for class. In addition to other classes they take on stressors that they don't feel comfortable telling us about. We need to do better on helping our students practice self-care so they can succeed. **Allison Shearer is** working on designing and implementing a non-credit short term bridge class focusing on study skills and Allied Health preparedness, which she will propose as a sabbatical project. The low success rate in Bio140/144, according to my observation is partly due to students underestimating the level of rigor, time commitment and out of class study time required to succeed in these courses. I would like to add that these courses are now part of Nursing Credit courses and the success rate should be compared to parallel allied health program success rate and not to general ed courses such as Bio 120. An average student juggles to play multiple roles in life and may not be able to dedicate the effort required to successfully complete these courses. Other half of the problem lies within the inadequacies in state of California's high-school system. As we are aware that an average college student reads at the level of a 6^{th} grader. While they might strive and fair in a general ed course with some effort, an

		Anatomy/anatomy and Physiology course will be far more challenging to successfully complete. A third factor to consider is, many nursing students now bypass the prerequisite of Bio 120/college level biology course and go straight into Bio 140/144 with a high school biology course due to the action of Nursing accreditation institute, ACEN. CA high school system ranks 40th in nation in categories of achievement, support and level. So, we are taking in highly underprepared students straight into a Nursing Credit course and trying to achieve teaching content, instill skill, teaching how to study, tutoring, mentoring and occasionally counseling. Add to that the fact that our class sizes are nearly three times as many as comparable classes with SDCCD and other districts (64 versus 24-25 in other districts). It's no surprise that the success rates in these classes are low. As many strategies as we devise, the very nature of the course and factors beyond our control do have a significant bearing on the success rates of Bio 140 and 144. Considering that the majority of students in BIO 120 are pre-allied health students, collaboration between BIO120 instructors and the instructors of those courses (140/141/144/145/152) on what students need to be able to do in order to succeed may be useful. As the department has been working on curriculum this semester we realized that conversations around the exit skills/entry skills might be fruitful. We have tentatively planned a flex meeting for all BIO 120 instructors where we share comprehensive final exam examples and discuss strategies to ensure student learning at the required level of rigor to prepare students for the upper level courses. The challenge will be to do so at the same time as increasing overall student success and equity in BIO120! BIO 105 a rigorous course but also a very high retention percentage. Students like the course, stay in and usually succeed with at least a C.

		Top students who are university ready earn the A's and usually score in the high 90's. Students are given: opportunities for an exceptionally amount of bonus points, a 100 page guide with lecture and lab outlines, exam and quiz objectives and study guides, pre-exam review quizzes and regular invitations for individual help during office hours. This semester (Fall 2019) I am giving students a pre-lab quiz for every lab to assist them in being better prepared for success in the lab. I could consider lowering grade cut-offs and simplifying exam questions, in other words making it an "easier" course on par with some other life science transfer courses. I don't think lowering class max here would contribute any more to student success. The department has expanded its online offerings since the time frame of the program review data. In addition to 118 we have sections of BIO 120 in a hybrid format with online lecture and in-person lab as well as a hybrid format for the GE course 112. Full-time, part-time and emeritus faculty are teaching these courses. We will continue to review success rates and learning outcomes in these courses and encourage faculty to seek more training on effective online course delivery methods.

GROSSMONT COLLEGE
FALL 2019 **BIOLOGY**

PROGRAM REVIEW COMMITTEE
SUMMARY EVALUATION

The committee recommends maintaining this program. Following are the committee's specific commendations and recommendations.

The Program Review Committee commends the department for:

1. Maintaining extremely efficient use of lab space
2. Employing equity strategies, continual improvement of instructional skills, and adapting to a diverse and continually changing student population
3. Writing and producing lab manuals and supplemental materials that are provided to students at low cost
4. Contributing to the success of transfer students in the UC and CSU system, with high graduation rates
5. Participating in a diverse and extensive array of on- and off-campus professional growth activities that benefit students
6. Having Grossmont College's highest WSCH/FTEF and consistent high fill rates (over 90%), at a time when college enrollment is declining

Committee recommends the following:

1. Ensure SLO data for all courses is input into TracDat
2. Develop a formal process to create a schedule that allows students to take multiple courses in STEM majors concurrently, including coordination between Bio, Chemistry & Physics, and courses at Cuyamaca
3. Given the large number of adjuncts in the department, explore solutions that make professional development opportunities more accessible to adjuncts
4. Develop and implement a plan to improve student success in Bio 120, 140, and 144. by regularly evaluating and applying best practices

College President

Program or Department Chair

Academic Program Review Chair

BIOLOGY

Academic Year	Fall		Spring	
	% Fill	WSCH/FTEF	% Fill	WSCH/FTEF
2013-14	93.1	719.7	93.0	710.0
2014-15	92.0	745.9	92.3	711.1
2015-16	94.1	738.9	95.6	722.3
2016-17	91.7	734.9	93.7	682.7
2017-18	94.0	707.0	92.2	684.0