

Program	LIFE SCIENCE
Does this program have a CTE component?	No
Academic Year	2018/2019
Review Period	6 Year
Service Areas	

A. Program Description and Goals

This section addresses the big picture. Prompts should help you describe your program and goals and the relationship to the institutional mission, vision and goals, and how the program is funded.

1. Describe the program and/or service area under review and how the program supports the mission of Santa Monica College.

The Life Sciences Department supports students through:

* Classes that fulfill the biology major as well as pre-medical/pre-dentistry/pre-pharmacy prerequisites (i.e. Biology 21– Cell Biology and Evolution, 22–Genetics and Molecular Biology, 23–Organismal and Environmental Biology)

* Courses that are prerequisites for various clinical areas such as nursing, respiratory therapy, physical therapy, and pharmacy (i.e. Anatomy 1 – General Human Anatomy, Anatomy 2 – Advanced Human Anatomy, Physiology 3 Human Physiology, and Microbiology 1 – Fundamentals of Microbiology)

* Courses that comprise essential components of the AA degree in Environmental Studies and the AS degree in Environmental Science (i.e. Biology 9 – Environmental Biology, Biology 10 – Applied Ecology and Conservation Biology, Biology 45-46 – Field Studies, and Botany 3 – Field Botany)

* A wide range of UC and CSU transferable classes with and without lab that fulfill general education goals and that are applied toward AA degrees and transfer to four-year institutions. These courses can be applied to the Global Citizenship requirement for the AA degree, and address the various interests that our students have in broadening their understanding of the natural environment and possibly pursuing careers in those areas (i.e. Biology 3 –Fundamentals of Biology; Biology 2 – Human Biology; Biology 9 – Environmental Biology; Biology 10 – Applied Ecology and Conservation Biology; Biology 15 – Marine Biology; Biology 15N – Marine Biology without lab; Botany 1 – General Botany; Botany 3 – Field Botany; Zoology 5 – Introductory Zoology).

* A broad range of nutrition classes designed to address the needs of both students majoring in nutrition, as well as those just interested in the topic (i.e. Nutrition 1 – Introduction to Nutrition Science, Nutrition 4 – Healthy Lifestyle: Food and Fitness; Nutrition 3, Introduction to the Dietetics Profession, Nutrition 7 – Food and Culture in America). An AS-T in Nutrition and Dietetics has recently been approved, including an updated course, Nutrition 8: Principles of Food with Lab.

* A range of independent studies opportunities in all fields mentioned above.

* Field Studies classes that promote an appreciation of the natural world. Although many of these courses highlight ecosystems of the southwestern United States, in recent years we have introduced students to destinations overseas, including Biology 46G– Natural History and Marine Biology of Costa Rica and Botany 1– General Botany offered in

Belize and Guatemala.

* Note that a prior goal was to provide instruction for students completing an AS degree in the Medical Laboratory Technician Program. Because our clinical partners have not been able to accommodate adequate numbers of students, we have not recruited additional cohorts for the program.

2. Identify the overarching goal(s) or charge/responsibilities of the program or service area. If appropriate, include ensuring/monitoring compliance with state, federal or other mandates.

Because our department is multidisciplinary, our goals are to adequately train students in those disciplines.

- 1) For students majoring in the biological sciences or related fields, we aim to address their educational goals (usually in the form of transfer to a four year institution or entry into an allied health career path), and to ensure that they acquire the skill sets that make them competitive and successful in their future endeavors.
- 2) In the case of students taking biological science classes for their general education goals, we not only want to help these “non-majors” achieve their academic objectives, but also to instill in them a better understanding of their natural environment and its interconnectedness to every aspect of their lives. Further, we are committed to increasing science literacy and critical thinking in these non-majors.
- 3) For students interested in a Nutrition pathway and/or degree, our aim is to provide the scientific foundation and the current scientific information to instill a strong foundation in Nutrition and Food Science, to prepare them for transfer to a four-year institution. This can be accomplished through the Nutrition AS-T, and/or the Nutrition Pathway. As with all students in the Life Sciences, our goal is to increase science literacy and critical thinking.

3. If applicable, describe how the Institutional Learning Outcomes (ILOs), Supporting Goals, and/or Strategic Initiatives of the institution are integrated into the goals of the program or service area.

Because of the nature of the life sciences, many of the ILOs, Supporting Goals and Strategic Initiatives are inherent to teaching each of the classes in the department.

Institutional Learning Outcomes

The following is a list of ILOs addressed in most every class: Personal Attributes, Analytic and Communication Skills, Authentic Engagement, and more specifically, there is a large number of classes in the department that focus on the following ILOs: Applied Social Knowledge and Values and Applied Knowledge and Valuation of the Physical World. They are namely: Bio 2, Bio 3, Bio 9, Bio 10, Bio 23, and to a certain extent Microbiology 1. Additionally, the organismal biology courses, such as Botany 1, Botany 3, Bio 15, Bio 15N, and Zoology 5.

Supporting Goals

Because the faculty in every discipline are continually honing their presentation and student engagement methods, the following Supporting Goals are addressed in most every class:

- 1) Innovative and Responsive Academic Environment through the addition of active and authentic learning tools, such as thing-pair-share, group projects, online adaptive learning modules, multiples means of assessment, and so on.
- 2) Supportive Learning Environment – the very nature of Science can be intimidating before students even walk into the classroom for the first time. For this reason, we have embraced the SI program on campus, and wish that we could have

more for all of the disciplines. Further, for the more rigorous lab courses (Microbiology, Physiology and Anatomy), we recently purchased a supply of lab manuals, so that every student will have access to one – at least during class time. We've applied for money to provide better digital presentation within the labs with the help of better digital cameras that attach to microscopes, and we've applied for money to purchase better equipment for teaching in Anatomy and Physiology. Finally, we are in the process of replacing our sea water tables in Science 134. This will not only allow us to provide a more stable environment to the organisms in the live collection, but also we will have a touch tank, and better viewing/accessibility for students to observe the organisms.

Strategic Initiatives

Close the gaps in educational outcomes among student groups.

- Analyze best practices for achieving equity in education outcomes
- Integrate and implement student success and equity plans with assigned responsibilities, benchmarks and timelines
- Maintain an innovative, responsive and inclusive academic environment, curricular programs, learning strategies and services.
- Increase the number of students who complete and succeed in all courses.
- Increase the persistence, completion, and success in all courses for African-American and Latino/a/x students, and other groups experiencing equity gaps.
- Increase the number and percentage of full-time instructional and non-instructional faculty from diverse backgrounds.

Expand SMC's identity by enhancing and diversifying educational and career opportunities and pathways for students.

- We have developed clear pathways to completion for Nutrition AS-T, Biology Major transfer and Environmental Science AS and AS-T. We also plan to develop a series of certificates of study for Post-Bac Allied Health and Organismal Biology.
- Our faculty are extremely active off campus. Several of our faculty are parents of young children, and they actively participate in Science Education at the schools of their children, Several are judges for local Science Fairs as well. Further, the collaborations that are established by our faculty with colleagues from a large number of colleges and universities, as well as non-profit organizations help to maximize the communication and partnerships across the LA region. Much of this is elucidated in other areas of this report, but I want to highlight two recent partnerships here, pertaining to the Marine Biology program. While we always had a working relationship with Heal the Bay, we have begun to grow this relationship into a multi-faceted partnership for marine organism collections, dive and research opportunities for both faculty and students, and also for internship possibilities in the areas of aquarium care, public aquarium docent training and public speaking. The second collaboration is with the Santa Monica Bay Foundation, in which we are working on securing funding to support up to 12 students to participate in a Marine Biology Research summer internship, where students will be housed in dorms at Loyola Marymount University, and collaborating with other non-SMC interns on a 6-8 week research project. The goal is to encourage more SMC students to transfer into the LMU Biology program upon completion of transfer requirements.

In each case, members of the department – both full time and part time – are continuously looking for ways to improve in

order to help students not only succeed, but to become outstanding citizens, regardless of where their academic path may lead them. Our faculty are passionate about research and finding research opportunities for students. Sending our students to programs outside of SMC provides students with life-changing experiences, and at the same time results in a great way to expand SMCs identity.

4. If your program receives operating funding from any source other than District funds identify the funding source. If applicable, note the start and end dates of the funding (generally a grant), the percentage of the program budget supported by non-District funding, and list any staff positions funded wholly or in part by non-District funds. Do not include awards for non-operational items such as equipment (ex. VTEA) or value added activities (ex Margin of Excellence).

From 2012-2018, Life Sciences has received support from the STEM Program (SMC/UCLA Science and Research Initiative). In 2013 and 2014, nearly \$300,000 was provided for equipment to upgrade laboratory instruction. Multiple gateway courses were identified as appropriate for Supplemental Instruction and SI Leaders have been employed in courses such as Human Biology, Fundamentals of Biology and Cell Biology and Evolution each semester since 2014. The ability to train students in research methods was also supported through multiple offerings of Science 10-Principles and Practice of Scientific Research, most recently in the current term, Spring 2019. One notable instrument that we acquired with grant funds is a fluorescence microscope, used in a Winter 2017 Science 10 research project but with functionalities that can also be incorporated into other areas of laboratory instruction. An application for STEM grant funding renewal was approved in October 2016 and we have continued our participation in the program in this new five-year funding cycle.

B. Populations Served

In this section you will provide information that describes who your program or service area serves. When comparing data from different periods, use a consistent time frame (ex. Compare one fall term to another fall term)

Saved Information For Populations Served

Area/Discipline Information Pertains To

BIOL: BIOLOGY

1. Describe your students in terms of ethnicity, race, gender, age, residency status, citizenship, educational goal, enrollment status, and full/part-time status. Note any changes in student or enrollment data since the last six-year program review and the possible reasons for the changes.

The following is for the department as a whole, and includes the comparison with the College demographic.

Ethnicity/Race

Out of the 6-year average total department student population per semester (3,482), the percentages are as follows in the Life Sciences Department:

28.7% White (high in 2012-2013), down from previous years

37.5% Hispanic (high in 2017-2018), up from previous years

16.6% Asian/Pacific Islander (high in 2012-2013), down from previous years

6.18% Black (high in 2015-2016), down from previous years

Overall, the different areas/disciplines within the Life Sciences Department have similar distributions (i.e. differences are not statistically significant), with the primary exception being the Biology Major's course series (Biology 21, 22, 23), where the student population includes:

31.0% White, down slightly from previous years

25.7% Hispanic, up dramatically from 15.3% in previous years

24.0% Asian/Pacific Islander, down slightly from previous years

4.5% Black, up slightly from previous years

Comparing the racial/ethnic distribution of populations of our students to that of the greater Santa Monica College population (31.2% White, 31.8% Hispanic, 18.8% Asian/Pacific Islander, and 9.8% Black), we see that, the numbers of Hispanic students in Life Science classes have steadily increased from 28.7% in 2010 to 37.5 in the current 2012-2018 review cycle. Since the last program review cycle, overall patterns have decreased slightly in the case of the White, Asian, and Black students. Black students are still underserved, particularly when considering our major's courses. The overall observed pattern is not unique to Santa Monica College, and is part of a larger national trend seen for women and minorities in both science education, as well as science based occupations. The latest data from the National Science Foundation show that nationally, less than 10% of students majoring in biological sciences fall under the category of "underrepresented minority", and that in the job market, only 11% of the science and engineering occupations are filled by this population (as compared to 69% White and 18% Asian populations).

Although our faculty work on improving both enrollment and success rates of underrepresented minority students (through a newly established STEM program, Student research projects, the BioBrightStart class [Bio 81], tutorial services in the Science Learning Center, as well as individualized mentoring), we hope to discover new ways of recruiting and inspiring incoming students, particularly black students.

Gender

The Life Sciences Department gender distribution is as follows:

62.6% Female

37.4% Male

The Life Sciences Department gender distribution is skewed toward females compared to the Santa Monica College average of:

54.9% Female

45.1% Male

The higher overall female population observed is due to enrollment in our Allied Health and Nutrition programs (most likely because these programs offer classes towards careers that traditionally attract more women – e.g. women make up 92.1% of nurses in the US [Department of Labor 2003 data]). In our department, 73.4% of the Allied Health students and 70.4% of our Nutrition students are female. The remainder of the Life Sciences student enrollment distribution as a function of gender falls in line with that of Santa Monica College as a whole.

Age

The median age distribution for the Life Sciences Department students falls in the same range as that of the college (i.e. 20-24). However, our department age distribution curve is narrower than that of the college, with fewer students in the very youngest or very oldest categories. In the younger side, we believe this is because the students lack the needed prerequisites to enroll and succeed in our classes. As a result, they spend their early college years completing those requirements. In the older categories, most individuals recognize the long years of education needed for establishing a career in the biological sciences, and therefore there is an inverse relationship between age and interest in enrolling in our classes.

Educational Goals

The primary educational goal for Life Sciences students falls in the category of “Transfer”, followed by “Educational development”, “AA degree”, and “Career objectives”. The distribution is similar to that of the college as a whole. The only change in the observed trend is an increase in students from 4-year institutions that complete some of their requirements at SMC. As little as eight years ago, none of our students fell in this category. The latest data show 4.7% of our enrollment as students from 4-year institutions.

Full/Part-time Students

There are fewer part-time students in the Life Sciences Department (50.7%) compared to the college (64.2%). The primary exception includes our Allied Health students where the distribution more closely matches that of the college.

Other Categories

In all other categories, the distribution patterns observed in the Life Sciences Department match that of the larger college community

2. Compare your student population with the college demographic. Are your students different from the college population?

See part B1 for comparisons.

3. What percentage of students in your program place in basic skills and, if applicable, how does this impact your program goals and/or curriculum.

Basic skills students make up an average of 13.27% of the Life Sciences enrollment as compared to 24.0% for the College. The averages go way down in both Microbiology and Physiology, as these are two classes that require pre-requisites. Clearly, the overall impact of the basic skills student population is not as great in Life Science, compared to the College as a whole.

The primary difficulty we face is that in classes where there are no prerequisites, our faculty work with students with an extremely broad range of skill sets. The difficulty for the instructors is to maintain the integrity of the courses, challenge the top students, but to also take the time to help students that lack some of the skills needed for success. Our faculty address these needs every semester with individualized strategies that work best for them, as well as for the differences amongst the students in most need. We are fortunate to have dedicated faculty that truly care about student learning and success.

MLT: MEDICAL LABORATORY TECHNICIAN

1. Describe your students in terms of ethnicity, race, gender, age, residency status, citizenship, educational goal, enrollment status, and full/part-time status. Note any changes in student or enrollment data since the last six-year program review and the possible reasons for the changes.

Nothing will be added here. This program is now non-functional.

2. Compare your student population with the college demographic. Are your students different from the college population?

NA

3. What percentage of students in your program place in basic skills and, if applicable, how does this impact your program goals and/or curriculum.

NA

NUTR: NUTRITION

1. Describe your students in terms of ethnicity, race, gender, age, residency status, citizenship, educational goal, enrollment status, and full/part-time status. Note any changes in student or enrollment data since the last six-year program review and the possible reasons for the changes.

Please see the entry in the "Biology" discipline. It is included there.

2. Compare your student population with the college demographic. Are your students different from the college population?

Please see the entry in the "Biology" discipline. It is included there.

3. What percentage of students in your program place in basic skills and, if applicable, how does this impact your program goals and/or curriculum.

Please see the entry in the "Biology" discipline. It is included there.

C. Program Evaluation

In this section programs/units are to identify how, using what tools, and when program evaluation takes place. Evaluation must include outcomes assessment as well as any other measures used by the program. Please use Section D to address program responses to the findings described in this section.

Programs/units with multiple disciplines or functions may choose to answer the following questions for each area. If this is your preferred method of responding, begin by selecting a discipline/function from the drop down, answer the set of questions and click "Save", your answers will be added to the bottom of page. Do this for each discipline/function. If you would like to answer the questions once, choose "Answer Once" from the drop down.

How would you like to answer these questions?

Saved Information For Program Evaluation

Area/Discipline Information Pertains To

BIOL: BIOLOGY

1. List the specific SLOs your program or discipline has chosen to focus on this year for discussion of program improvement.

SLOs are specific, measurable statements of 'what a student should know, be able to do, or value when they complete a course'. An SLO focuses on specific knowledge, attitudes, or behaviors that students will demonstrate or possess as a result of instruction.

This response is for all disciplines combined into a department-wide response.

SLOs addressed this year focus on three areas: the use of the scientific method, understanding of mechanisms that control processes at the molecular, cellular and organ system levels, and evaluating scientific claims presented in the media.

Use of the Scientific Method

Given a problem or set of conditions, write a hypothesis, and provide an experimental design, and identify dependent and independent variables, and control and experimental groups. (SLO #1 for Biology 2 and Physiology 3)

After careful observations of an organism or situation, pose appropriate questions and generate hypotheses; design and perform a test; gather, analyze, and interpret data; evaluate and reformulate hypotheses. (SLO#1 for Biology 3)

Apply the scientific method to investigate a question by formulating a hypothesis; researching the topic; performing tests; generating, analyzing, and presenting data; modifying and reframing the original hypothesis; and proposing new questions about the topic. (SLO #1 for Biology 21 and Biology 22)

Research a topic in current scientific literature, formulate a hypothesis using the research topic, design experiment(s) to test the hypothesis, perform experiment(s), analyze and present data, develop and defend conclusions, and evaluate original hypothesis and methodology. (Biology 23, SLO #1)

Understanding Biological Mechanisms

Name the systems of the human body, their general functions, the major organs that make up these systems, and the general contribution each organ makes to the system. (SLO #1 for Anatomy 1)

Correlate form to function for cellular structures involved with animal and plant metabolism, regulation of cell cycles, and signal transduction. (SLO #2 for Biology 21)

Evaluate and critique the relationships between data from molecular biology methods and genetic patterns of inheritance. (SLO #4 for Biology 22)

Identify the physiological mechanisms that each body system employs to maintain homeostasis. (SLO #2 for Physiology 3)

Evaluating Scientific Claims

Apply knowledge of human biological concepts to issues of general health, medicine, nutrition, reproduction, environmental issues appearing in the current media. (SLO #2 for Biology 2)

Demonstrate confidence in their understanding of biological concepts and the scientific method to evaluate and critique current media or a scientific report. (SLO #2 for Biology 3, SLO #3 for Nutrition 1, SLO #3 for Physiology 3)

Scientifically evaluate and critique nutrition trends using peer-reviewed research articles. (SLO #3 for Nutrition 4)

2. Describe how the program assesses SLOs and uses the results for program improvement including:

- **how outcomes are assessed and how often**
- **how and when the program or discipline reviews the results and engages program/discipline faculty in the**

process

SLOs are assessed every semester and for every course. Different areas use individualized means to assess the SLOs. These include exam/quiz questions, laboratory exercises, essays, and field reports. Based on these outcomes, individual faculty modify what they feel would best improve their results. Additionally, faculty discuss the assessment outcomes in group meetings at least twice per year (during departmental flex days) where they discuss possible necessary changes in methods, teaching material, student needs/preparation, etc.

Between 2013 and 2019, the Life Sciences Department completed SLO assessments in written format, where faculty were asked to identify the SLOs, explain their assessment tool(s), give the results of the assessment, suggest classroom improvement strategies, prioritize factors that would improve student learning, establish an implementation plan with timeline, and ask for departmental help when necessary. Since establishment of the electronic SLO assessment format, the Life Sciences Department average SLO assessment rate has been at 81.3% (as compared to 81.1% for the college). In the same period, the department SLO success rate has been at 78.7% (as compared to 76.2% for the college).

3. If your program or discipline issues a degree or certificate list each degree or certificate and the core competencies students are expected to achieve on completion.

Core competencies focus on the body of knowledge, attitudes, and behaviors a student will have acquired upon completion of a program or certificate and are assessed by either a capstone course or success rates on SLOs for core courses.

AS in Environmental Science and Certificate of Achievement in Environmental Science:

Program Learning Outcomes: Upon completion of the program, students will demonstrate through oral and written work knowledge of the physical, biological, and social sciences required to effectively address current environmental issues, and be prepared to pursue further study in an Environmental Science program (or related field of study) at the baccalaureate level. In addition students will be proficient in the research, analytical, and communication skills necessary to present a critical analysis of the interplay between natural and social systems, the attitudes and behaviors that impact and affect the environment, and proposed solutions to the myriad environmental challenges facing the world today.

AS-T in Nutrition:

Program Learning Outcomes: Upon completion of the program, students will demonstrate through oral and written work knowledge of the physical, biological, and social sciences required to effectively address current environmental issues, and be prepared to pursue further study in an Environmental Science program (or related field of study) at the baccalaureate level. In addition students will be proficient in the research, analytical, and communication skills necessary to present a critical analysis of the interplay between natural and social systems, the attitudes and behaviors that impact and affect the environment, and proposed solutions to the myriad environmental challenges facing the world today.

4. What other evaluation measures does your program or discipline use to inform planning? (For example, student

surveys, enrollment trends, student success, retention, degrees/certificates awarded, job placement, transfer rates, TIMS report, tutor usage etc.) Note trends and differences in performance by group (ethnicity, gender, age) or enrollment type (day/evening, on-ground/on-line).

Enrollment trends, success rates, course grade distributions, retention, and additional data from TIMS reports are all used to evaluate the program and address needs. Large negative fluctuations from the mean by individual faculty are addressed by the department chair, and faculty showing positive fluctuations are identified as exemplary mentors to help less experienced instructors. Overall success rates have been in line with those of the college as a whole, and we have seen major improvements due to prerequisite enforcement in many of our courses. Anatomy 1 is an exception, retention and success rates are lower than for other courses in the allied health series, despite the enforcement of an English 1 prerequisite. We also observe a significant participation and success gap in a number of courses when considering underrepresented students as well as students that lack strong language skills. To address equity concerns, we have worked with the Adelante Program, Black Collegians, the SMC/UCLA Science and Research Initiative (STEM program), and we partnered with the Physical Sciences Department to improve student-faculty interactions through the Diversity in the Sciences program. To address issues related to student language skills, we worked with the ESL department to establish a seminar series to address various potential areas of difficulty. In addition, Life Sciences faculty are developing vocabulary development worksheets with the guidance of our ESL colleagues.

MLT: MEDICAL LABORATORY TECHNICIAN

1. List the specific SLOs your program or discipline has chosen to focus on this year for discussion of program improvement.

SLOs are specific, measurable statements of ‘what a student should know, be able to do, or value when they complete a course’. An SLO focuses on specific knowledge, attitudes, or behaviors that students will demonstrate or possess as a result of instruction.

This discipline is non-functional.

2. Describe how the program assesses SLOs and uses the results for program improvement including:

- **how outcomes are assessed and how often**
- **how and when the program or discipline reviews the results and engages program/discipline faculty in the process**

This discipline is non-functional.

3. If your program or discipline issues a degree or certificate list each degree or certificate and the core competencies students are expected to achieve on completion.

Core competencies focus on the body of knowledge, attitudes, and behaviors a student will have acquired upon completion of a program or certificate and are assessed by either a capstone course or success rates on SLOs for core courses.

This discipline is non-functional.

4. What other evaluation measures does your program or discipline use to inform planning? (For example, student surveys, enrollment trends, student success, retention, degrees/certificates awarded, job placement, transfer rates, TIMS report, tutor usage etc.) Note trends and differences in performance by group (ethnicity, gender, age) or enrollment type (day/evening, on-ground/on-line).

This discipline is non-functional.

NUTR: NUTRITION

1. List the specific SLOs your program or discipline has chosen to focus on this year for discussion of program improvement.

SLOs are specific, measurable statements of ‘what a student should know, be able to do, or value when they complete a course’. An SLO focuses on specific knowledge, attitudes, or behaviors that students will demonstrate or possess as a result of instruction.

Please see the Biology discipline. All responses are compiled for the whole department.

2. Describe how the program assesses SLOs and uses the results for program improvement including:

- **how outcomes are assessed and how often**
- **how and when the program or discipline reviews the results and engages program/discipline faculty in the process**

Please see the Biology discipline. All responses are compiled for the whole department.

3. If your program or discipline issues a degree or certificate list each degree or certificate and the core competencies students are expected to achieve on completion.

Core competencies focus on the body of knowledge, attitudes, and behaviors a student will have acquired upon completion of a program or certificate and are assessed by either a capstone course or success rates on SLOs for core courses.

Please see the Biology discipline. All responses are compiled for the whole department.

4. What other evaluation measures does your program or discipline use to inform planning? (For example, student surveys, enrollment trends, student success, retention, degrees/certificates awarded, job placement, transfer rates, TIMS report, tutor usage etc.) Note trends and differences in performance by group (ethnicity, gender, age) or enrollment type (day/evening, on-ground/on-line).

Please see the Biology discipline. All responses are compiled for the whole department.

D1: Past year's Objectives

As part of the planning process, programs are expected to establish annual objectives that support the program's goals. Please document the status of the program/function's previous year's objectives. Add comments if you feel further explanation is needed.

Objectives

Objective:

Develop a laboratory and field studies course for the Environmental Science AA Degree and Certificate.

Status: Completed

Comments:

The proposed course will encourage completion of AS degrees in Environmental Science because it matches standards for environmentally-related biology courses at transfer institutions.

Objective:

Support students in the completion of the AS-T in Nutrition and Dietetics through planning and preparation for the first offering of Nutrition 8: Principles of Food with Lab.

Status: Completed

Comments:

Comments:

In Fall 2018, and again in Spring 2019, we offered Nutrition 8, our first laboratory course in Nutrition that completes the requirements for students pursuing an AS-T in Nutrition and Dietetics. There are extensive logistics involved in implementing this course, including arranging for the use of kitchen space and required salary support for on-campus staff at John

Adams Magnet School, and accumulating equipment and supplies needed for the laboratory exercises. This course will not only support SMC students who are pursuing a career in Dietetics, but will also allow students from neighboring colleges and universities the opportunity to complete this lower division major requirement which is not widely offered in Southern California.

D2. Looking Back

In this section, please document what you did last year as a result of what you described in Section C.

1. Describe any accomplishments, achievements, activities, initiatives undertaken, and any other positives the program wishes to note and document.

We have developed curriculum to address gaps in the transfer pattern for Environmental Science. The course is called Biology 10, Applied Ecology and Conservation Biology, and is a 4 unit lab course. The first section of Biology 10 is scheduled to be offered in the Fall semester of 2019. We also began offering a Nutrition laboratory course to fulfill a degree requirement for transfer in Nutrition and Dietetics (Nutrition 8). It was offered in Fall 2018 and again in Spring 2019. Moving forward, we anticipate offering once per year, in the Spring semester.

We have concentrated on activities and initiatives to enhance student success overall and to address disparities in achievement for students underrepresented in the sciences. Also, just before Spring semester 2019, our new full time Anatomy and Physiology faculty member, Collin Ellis, provided an information session for all interested students going into Anatomy. He provided tips on study skills, and what to expect. The Anatomy faculty intend on holding this one-day workshop for students before each semester.

We directed our focus on learning outcomes that emphasize understanding and application of the scientific process. Hands on experiences in the classroom and active learning projects during class time are being employed across the department. Additionally, student involvement in research projects, with the resulting publications and poster presentations at conferences, demonstrates the effectiveness of our approach. In addition, we have contributed to the Global Citizenship Initiative through the offering of Study Abroad classes in botany and natural history and sponsoring projects for the Global Citizenship Symposium.

In a related effort, curriculum updates were made for another required course, Physiology 3, to demonstrate how the current level of instruction meets C-ID standards. Additionally, with the time provided by sabbatical, Christina von der Ohe rewrote the laboratory manual for Physiology 3, and now all new part time instructors have adopted the manual. This allows for smooth transitions between classes, better focus for the lab techs, who are stretched thin, and has increased the number of “wet labs” (hands-on work, not simulations) that are done in Physiology.

Over the last few years, Dietetic Interns from USC enhanced classroom dynamics for Nutrition courses, as well as assisted with community outreach for the Wellness Center. Unfortunately, in Fall 2018, the Master’s-level internship in Dietetics partnership with USC was discontinued. For that reason, we were not able to continue the part-time position for a Registered Dietitian and Nutritionist in the Health and Wellness Center. Our last intern was with us in the Fall 2018 semester, and completed her program hours in December. As in the past, a Full-time Nutrition instructional faculty supervised this intern in Nutrition Education for a part of the required internship hours. In addition, this intern assisted with organizing service-learning opportunities for students in Nutrition 1 classes.

Additional Efforts to Enhance Student Success

We have engaged in five initiatives to address equity issues: SMC/UCLA Science and Research (STEM) Initiative, Diversity in the Sciences (Innovation and Progress Award), use of online learning platforms associated with the open access textbooks, adoption of Instructional Force Multipliers to optimize the use of digital resources as learning tools, and exploring Authentic Learning pedagogy in the laboratory curriculum.

We regularly mentor Supplemental Instruction Leaders in Biology 2, Biology 3, and Biology 21 classes, a process that began with STEM funding. Diversity in the Sciences is a joint venture with the Physical Sciences Department to promote effective faculty-student interactions.

We continue to adopt open access textbooks, where possible. The majors' series adopted open access books a few years ago, but in the last year, General Biology for non-majors (Bio3) and Environmental Biology (Bio9) have both adopted an open access textbook. Free online books have also been adopted for Biology 2, and are under consideration Microbiology 1 and for the entire Nutrition program. It's worth mentioning that where open access is not available, many Life Science faculty have made attempts to locate low-cost options with the intentions of minimizing cost to the student. We are hopeful that this expansion of low and no-cost textbooks will support existing data, which suggest that student success goes up with low and no-cost options.

Websites that allow development of online games for course review, such as Kahoot and Jeopardylabs, have been utilized for Biology 2, Biology 3, Biology 21, Botany 1 and Physiology 3. Authentic Learning pedagogy will enhance self-reliance in knowledge acquisition. We will continue to monitor the progress of all of these efforts toward ameliorating equity concerns.

Involvement of students in original research projects has been both an outgrowth of our participation in STEM activities as well as an extension of individual faculty research efforts. During Spring semester 2018, students enrolled in Science 10, and are working on projects that we hope will amount to another fruitful experience. We anticipate poster presentations of their work at the end of the semester.

Dr. Garen Baghdasarian has conducted studies on the effect of anthropogenic ocean acidification and increased temperature on coral bleaching. This research is focused on documenting the variation found among coral responses to the environmental conditions expected by the end of this century. Over the years, he has enlisted the help of approximately 20 students, and multiple publications. Making this experience for students even more interesting is that he collaborates with colleagues from U. Hawaii, CSUN and UCLA, and others from abroad. as I write this, he is in Tahiti on a scouting trip to take more students to further his research program. Participation in these research experiences is an invaluable asset to scientific development of all student participants.

Other members of the faculty have advised in a variety of independent research projects, including plant population studies and molecular biology. Even if these projects don't amount to publication, the experience of research outside of the classroom is an enriching one.

Departmental Activities

For our department flex activities in August 2018, we focused on much-needed team building activities, and then on sections of the program review form.

To better recruit and inspire the current student population, we must better understand how to serve the diversity of students in our classrooms. For this reason, during the 2018-2019 academic year, the department partnered with the Physical Science Department and held two town hall-type conversations about Racialized Equity, first about hiring with a racialized equity lens and a second focused on teaching with a racialized equity lens. Sherri Lee Lewis was our MC for both events. These conversations are the beginning of a long and necessary journey. We look forward to further exploring this topic in future conversations.

Interventions Related to SLO Assessment Data

Use of the Scientific Method

Efforts this year included greater alignment of laboratory curricula with expectations for health careers, modeling the collaborative nature of science through peer review, implementing an experiment involving research-grade instrumentation, use of published data for analysis and interpretation, and emphasizing statistical analyses appropriate for specific research data sets. As a result of a sabbatical leave project, the Physiology 3 laboratory manual was significantly revised to include recommendations from local health care programs that accept our students. Additions include new laboratories focusing on statistics and scientific literacy as well as vital signs and more than 20 case studies. Study aids such as mind mapping exercises and electrolyte imbalance critical-thinking problems were also incorporated. For Biology 21, the peer review feature in Canvas was utilized to assist students in refining the writing of journal-style laboratory reports on enzyme activity. Two rounds of peer review were included prior to the final submission of the report for grading by the instructor. Guidelines for providing thoughtful and substantive feedback were developed and rubrics were applied to evaluate both the submissions and subsequent reviews of other student's reports. For Biology 22, an Enzyme-Linked Immunosorbent Assay (ELISA) was designed for use with a state-of-the-art plate reader to simulate an assay that would be performed in both research and clinical laboratories. Original examples from the scientific literature were selected for data analysis and interpretation in Biology 22 and Physiology 3. For Biology 23, students were introduced to statistical methods suitable for analyzing original data collected by one of the professors during a population biology study of the North American pica and then shown how to apply those methods to a study of seed germination conducted in the laboratory. Data from the assessment of this common SLO for laboratory courses will be evaluated to determine the success of these interventions.

One of our ongoing objectives is to incorporate the principles of Authentic Learning (AL) into the laboratory exercises for the non-majors laboratory course Biology 3. Authentic Learning emphasizes applying knowledge in real-life contexts and situations. We want to use this approach to involve students more fully in the scientific process. The AL method has been incorporated into two laboratory exercises for the Scholars sections of Biology 3, with the goal of expanding to other sections in the coming year. Students were asked to choose variables to be tested in the study of enzymatic activity and also in an analysis of factors that affect blood pressure and heart rate. For both of these applications, students were highly engaged in designing the experiments and were able to make substantive connections to their everyday experiences. Based on these successful applications, we will continue to pursue opportunities to reflect the principles of Authentic Learning in our curriculum and assess the outcomes.

Interventions Related to SLO Assessment Data

Understanding Biological Mechanisms

All faculty are dedicated to promoting understanding of the mechanisms that control key biological processes. Instructors have employed various methods for presenting and reviewing the material to assist students in making the relevant connections. For Physiology 3, a library of lectures has been captioned in a complete update of the material presented. For

Biology 2, Biology 3 and Biology 21, online quizzing using publisher-provided systems has been incorporated as a method with demonstrated effectiveness for student success. A variety of academic games are also employed to involve students in reviewing material in an engaging format. For Biology 22, the molecular mechanisms underlying genetic patterns of inheritance are being probed through interpretation of original research data in an exam-style format. Explanations of the most recent advances in biotechnology, such as the CRISPR-Cas-9 system of gene editing that can be applied to gene therapy, have also been incorporated into this course. Through evaluation of SLO assessment data, we will continue to monitor progress in enhancing student comprehension of crucial biological mechanisms.

Interventions Related to SLO Assessment Data

Evaluating Scientific Claims

All of our courses have a common SLO that relates to evaluating scientific examples in the popular or scientific media. These activities can range from discerning the reliability of reported information, to addressing bioethical concerns, or to interpreting the outcomes of published experiments. For the past two years, Nutrition faculty have reviewed the scientific literature and compiled a list of current research studies related to various nutritional topics. The aim is to identify scientific articles that are appropriate for assessing student understanding of data analysis and interpretation. In the past year, strategies for reading and analyzing research articles were presented early in the semester and then applied to numerous examples of epidemiological studies throughout the remainder of the session. Faculty teaching biology majors' courses have selected examples of original research data that are used in class discussions as well as to assess critical analysis skills in testing situations. Data from the assessment of this common SLO will be evaluated to determine the success of these pedagogical innovations.

Contributions to the Global Citizenship Initiative

Through the courses in our field studies program, students can have experiences that not only bring them to locations overseas but also enhance their understanding of the interactions in our natural world. During Spring Break 2017, one faculty member led a trip to Costa Rica, teaching Biology 46G– Natural History and Marine Biology of Costa Rica. We planned to offer a similar experience involving two of our faculty members during Spring Break 2018, but did not gain sufficient enrollment to offer the course. During Summer 2017, a study abroad experience in Belize and Guatemala included Botany 1-General Botany along with Anthropology 21-Peoples and Power in Latin America from the Earth Sciences Department. We plan to continue offering these unique and valuable experiences for students and will look for additional ways to promote student participation.

Students completing biology projects in Science 10: Principles and Practice of Scientific Research have routinely contributed scientific posters or articles to the Global Citizenship Symposium. This process fits with the collaborative model of sharing scientific information worldwide.

2. Summarize how the program or service area addressed the recommendations for program strengthening from the executive summary of the previous six-year program review.

The three recommendations for the department were:

1. Expand efforts to improve preparation and success of underrepresented students and in particular explore strategies that can easily be institutionalized at the end of the STEM grant.
2. Evaluate and implement strategies to improve the success rates of students enrolled in on-line Life Science courses.

3. Follow through on the previous recommendation to collaborate with English, ESL, and Counseling to ensure students understand and are prepared for the level of writing required in science courses.

In all three of these recommendations, we have made continuous efforts to improve upon the

3. Describe any changes or activities your program or service area has made that are not addressed in the objectives, identify the factors (e.g., licensure requirements, state or federal requirements, CCCO mandates, regulations, etc.) that triggered the changes, and indicate the expected or anticipated outcomes.

N/A

4. If your program received one time funding of any kind indicate the source, how the funds were spent and the impact on the program (benefits or challenges).

Through multiple successful Margin of Excellence Awards, our department has received funding to enhance the instructional materials for laboratories, field studies, and the Science Learning Resource Center. To guide students in identifying structural features of laboratory specimens, updated dissection manuals and photographic atlases were obtained for the Anatomy laboratories. Microscope cameras interfaced with computer technology have been used to enhance the students' experience and learning of histology in human anatomy. Subscriptions to a set of online resources, including Digital Neuroanatomy, Acland Anatomy and Draw-It-To-Know-It, were made available to Anatomy and Physiology students. To enhance visualization of organisms in their native habitats, spotting scopes and video-production equipment were purchased for field studies courses. And updated equipment and models were obtained for the Science Learning Resource Center including compound microscopes with medical histology slides, a spleen/pancreas/duodenum model, and muscle models of the human arm and leg. We intend to pursue additional Margin of Excellence funding to meet replacement or augmentation needs for equipment and models critical to the learning goals across our curriculum.

5. Describe departmental efforts to improve the teaching and learning environment.

Faculty in our department have implemented the use of several tools to provide a more varied format for presentation of material, study materials and assessment of learning. From i-Clickers to Kahoot, to using student breadout sessions presentations, the department has made great strides in providing for students with a diversity of preparedness and of best learning practices.

To reach students with diverse learning styles, we incorporate more extensive Authentic Learning pedagogy into the laboratory curriculum for the Organismal Biology courses (Marine Biology, Botany and Zoology), Fundamentals of Biology and the Biology Majors' series. This approach involves students in critical thinking processes that connect biological concepts to real-life applications. A similar approach has been taken to update the Physiology 3 laboratory manual.

To address lower success rates in Anatomy, we have provided a lower cost textbook with additional online learning resources. Further, we have provided additional online resources addressing neuroanatomy and a visual atlas of the human body as well as employing microscope to video equipment to enhance an understanding of histology.

Throughout the curriculum, we continue to assist students in developing hypotheses, designing meaningful experiments, and analyzing and interpreting research results. Relating their learning to the outcomes of original studies provides engaging connections to the progress of science.

Our faculty are proponents of active learning strategies and plan to implement additional instructional force multipliers, as introduced by flex day speaker James S. May, into their instructional repertoires. Websites such as Quizizz, Kahoot, and Jeopardylab will be used to design content-aligned games. Various modes of adaptive learning will also be explored. Through SLO assessments, we will determine the extent of academic improvement resulting from these efforts.

6. If there is a tutoring component or other learning support service associated with the program, describe the relationship between the service(s) and the instructional program. If applicable, discuss any data you have compiled regarding student participation and the impact on student success.

Our Anatomy and Physiology courses make use of the Science Learning Resource Center (LRC), such that each student is required to spend 1 hour per week in the LRC, to study and complete a series of exercises. I do not have access to LRC data.

The LRC also has tutors for General Biology. It would be great to have tutors in other areas of discipline, but we have not been as successful in recruiting and maintaining student tutors in the LRC.

D2. Moving Forward

Discuss and summarize conclusions drawn from data, assessments (SLO, UO) or other evaluation measures identified in Section C and indicate responses or programmatic changes planned for the coming year(s) including:

- **how the assessment results are informing program goals and objectives, program planning, and decision-making**
- **specific changes planned or made to the program based on the assessment results**

Continue to update curriculum and equipment to keep up with the fast changing/advancing biological sciences field.

Continue to offer a broad range of classes for students to fulfill major requirements, professional program prerequisites, general education/continuing education requirements.

Establish new certificates of achievement in Post-Baccalaureate Allied Health and Natural History/Wildlife management, to provide guidance in these courses of study, as well as to further address Environmental Literacy initiatives.

Address low enrollment and success rates observed in ethnically underrepresented populations.

Continue to collect data and develop new and innovative ways to bridge the observed performance gap.

Overall success rates have been in line with those of the college as a whole, and we have seen major improvements due to prerequisite enforcement in many of our courses. Anatomy 1 is an exception, retention and success rates are lower than for other courses in the allied health series, despite the enforcement of an English 1 prerequisite. We also observe a significant participation and success gap in a number of courses when considering underrepresented students as well as students that lack strong language skills. To address equity concerns, we have worked with the Adelante Program, Black Collegians, the SMC/UCLA Science and Research Initiative (STEM program), and we partnered with the Physical Sciences Department to improve student-faculty interactions through the Diversity in the Sciences program. To address issues related to student language skills, we worked with the ESL department to establish a seminar series to address various potential areas of difficulty.

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language skills, we worked with the ESL department to establish a seminar series to address various potential areas of difficulty.

D2: Coming year's Objectives (Moving Forward)

Objective #1

Objective:

Update and improve laboratory manuals for Anatomy and Botany, in the hopes of reducing costs to students, as well as bringing more continuity to the program.

Area/ Discipline/ Function Responsible: BIOL: BIOLOGY

Assessment Data and Other Observations:

SLO Assessment Data

TIMS Report Data

Institutional Research Data

Other data or observed trends

cost of pre-published laboratory manuals

External Factors:

SMC Master Plan for Education

Timeline and activities to accomplish the objective: We anticipate being able to accomplish this in approximately one year.

Describe how objective will be assessed/measured: completion of the manuals will be the measures.

Comments: The cost of books and laboratory manuals has sky-rocketed, and we know that student success hinges upon a student's ability to access the learning materials. Homemade laboratory manuals will inevitably be a step in the direction of a more affordable, and greater student success.

Objective #2

Objective:

To address low enrollment and the achievement gaps by students from underrepresented populations.

Area/ Discipline/ Function Responsible: BIOL: BIOLOGY

Assessment Data and Other Observations:

SLO Assessment Data

TIMS Report Data

Institutional Research Data

External Factors:

Program Review Committee Recommendation
SMC Master Plan for Education

Timeline and activities to accomplish the objective: There is no set timeline to accomplish this objective. We will continually work towards the ultimate goal where there would be no correlation between ethnic background and success rates. Over the next six years, we will continually monitor our progress and modify our approach as needed.

Describe how objective will be assessed/measured: Using data from Institutional research to determine whether equity gaps are shrinking and ultimately disappearing.

Comments: Our department has been identified as one of three on campus that have the lowest retention rates and highest achievement gaps. While the Sciences can be intimidating before students even enter the classroom, we know that there is still more that we can do to help solve this equity crisis in higher education.

Objective #3

Objective:

To examine the potential need for the reorganization of the majors' series (bio 21, 22, & 23).

Area/ Discipline/ Function Responsible: BIOL: BIOLOGY

Assessment Data and Other Observations:

Other data or observed trends

External Factors:

Program Review Committee Recommendation

Timeline and activities to accomplish the objective: This evaluation process is the first step, and should be accomplished in the next year. If reorganizing is in order, then that process will extend beyond that.

Describe how objective will be assessed/measured: whether the articulation agreements can be maintained and/or renewed.

Comments: Several four-year institutions have been reorganizing their curriculum, and it is in the best interest of the students to align our curriculum with those institutions to which SMC Biology majors are transferring.

E. Curriculum Review

To comply with accreditation standards, programs are required to update their curriculum outlines of record (CORs) every six years. Be sure to submit your updated outlines to the Academic Senate Joint Curriculum Committee in time for them to be reviewed prior to or at the Curriculum Committee's last scheduled meeting of the year (check the committee's submittal deadlines at [\(click here for dates and deadlines\)](#). The Program Review annual report will note whether course outlines are up to date.

1. Discuss how the department reviews, revises, and creates new curriculum. Include the following information:

- **The process by which department members participate in the review and revision of curriculum.**

- **How program goals and SLOS are integrated into course design and curriculum planning.**
- **The relationship of program courses to other college programs (cross-listing, overlapping content)**
- **The rationale for any changes to pre-requisites, co-requisites and advisories.**
- **How the department ensures course syllabi are aligned with the course outline of record.**

Review, Revision, and Creation of Curriculum

The Life Sciences Department faculty meet in groups (e.g. Allied Health, Majors, Non-majors, Marine Biology and Zoology, etc.) annually or semiannually during departmental flex days. In these meetings, course content, textbook choices, SLOs, new laboratory assignments, and any other student success and/or retention issues are discussed. When necessary, minor adjustments are made to address evolving needs. When more substantial issues are raised, or if major modifications are needed (or a new course is required), the group (or an individual or group designee) bring the necessary information to the department general meeting (usually held on the last Thursday of every month) where all participants have opportunity for input. In these meetings we attempt to address and solve issues, and every attempt is made to reach consensus on a given matter. When necessary (e.g. in case of a new class), the matter is then forwarded to administration and curriculum committee.

The following courses were created over the last program review cycle:

Biology 10 – Applied Ecology and Conservation Biology

Establishment of Pre-requisites, Co-requisites, and Advisories

Department members work with curriculum committee and institutional research and use data on student success, GPA, and SLO assessment to address pre-requisite concerns. Through this process, effective Winter 2011, we now enforce prerequisites for Anatomy 1, Anatomy 2, Physiology 3, Microbiology 1, Biology 21, Biology 22, and Biology 23. Prerequisites will also be enforced for the MLT classes/program. For additional detail, please see discussion in section “C”, question 4.

Course Syllabi Alignment with Course Outline of Record

Instructors have access to course outline of record for the class they teach, and are expected to create syllabi aligned with the content of these documents. Every semester, instructors are expected to send in a copy of their syllabus to the department chair, and the syllabus is checked at that point. Additionally, course syllabi are checked during regular faculty evaluations. New faculty teaching classes are given not only the course outline of the record, but also copies of syllabi from senior faculty as a guideline. Additionally, whenever possible, new faculty are matched with a more senior instructor to help mentor them through their first semester, but also to make sure course content is aligned with departmental standards.

F. Community Engagement

In the prompts that follow, please delineate the partnerships you have with the rest of the SMC community as well as those

you have with external organizations.

1. If applicable, describe how your department staff members engage in institutional efforts such as committees and presentations, and departmental activities.

Kay Azuma- Academic Senate Sabbaticals Committee Member, Margin of Excellence Award Recipient, Full-Time Anatomy/Physiology Screening Committee Member

Garen Baghdasarian - Academic Senate Environmental Affairs Committee Member; International field research program involving students; Curriculum Committee Member.

Mary Bober- Academic Senate Representative, Academic Senate Information Technology Committee Member, Open Educational Resource Evaluator, Peer Evaluator for faculty in Physical Sciences Department, Full-Time Biology 21 Screening Committee member

Alfred Buchanan-Full-Time Anatomy/Physiology Screening Committee Member

Thomas Chen-Biology 3 Laboratory Program Co-Coordinator, Faculty Association Representative, Executive Committee of the SMC Faculty Association, FA Nominations and Elections Committee Chair, STEM Skills Workshop Presenter, Full-Time Biology 21 Screening Committee member.

Mary Colavito – Department Chairs/Coordinators Committee Member, STEM Skills Workshop Developer and Presenter, Margin of Excellence Award Recipient, Full-Time Anatomy/Physiology Screening Committee Member.

Collin Ellis – co-advisor of the Pre-Health Association student club.

Gabriel Gartner – Natural History Club Advisor, Margin of Excellence Award Recipient

Cynthia Gonzalez- Nutrition Internship Coordinator, Dietetics Majors Advisor, Academic Senate Representative, DPAC College Services Subcommittee, Internship Preceptor for partnership with USC.

Chris Grant – Faculty Association substitute and Academic Senate Personnel Policies Committee Member.

Sandra Hutchinson - Pre-Health Association Advisor, Full-Time Anatomy/Physiology Screening Committee Member, Academic Senate Sabbaticals and Fellowships Committee Member.

Oriana Kim-Rajab- Biology 3 Laboratory Program Co-Coordinator, Lab Manual Development for Biology 3, Full-Time Biology 21 Screening Committee member.

Valerie Narey- Academic Senate Representative, STEM Skills Workshop Developer and Presenter, Full-Time Biology 21 Screening Committee member.

Yvonne Ortega- Ombudsperson, Academic Senate Distance Education Committee Attending Member, C-ID Primary reviewer for Nutrition coursework for CCCD, Dietetics Majors Advisor, Internship Preceptor for partnership with USC

Poliana Raymer– Academic Senate Environmental Affairs Committee Chair, Faculty Association Representative, Club Grow Advisor, curriculum and laboratory exercise development for Biology 10.

Alexandra Tower – Department Chair, Global Council Chair, Study Abroad, Full-Time Anatomy/Physiology Screening Committee Member, and Full-Time Biology 21 Screening Committee Chair.

Christina von der Ohe – Adjunct Faculty Mentor, Laboratory Safety Guidelines Developer, Lab Manual Development for Physiology 3 and Biology 3, Full-Time Anatomy/Physiology Screening Committee Member

Paul Wissmann - Department Web Design, Department Technology Liaison, Margin of Excellence Award Recipient, Department textbook liaison with bookstore.

All full time faculty have been involved in evaluation processes for Life Sciences faculty.

One can't help but notice that most of our Full-Time faculty are extremely active, and the amount of campus-wide engagement is bound to go up as we lose up to 41% of our faculty to retirement and leaves over the next 5 years.

2. If applicable, discuss the engagement of program members with the local community, industry, professional groups, etc.)

Many of the faculty participate in various professional organizations (e.g. American Association for Advancement of Science; Nutrition Education International, American Society for Microbiology, Western Foundation, and Western Society of Naturalists). Other faculty volunteer their time and expertise at community events to give presentations, or act as judges at science symposia. Some specific examples include:

Garen Baghdasarian- Field-Related Research on Coral Bleaching in Hawaii, Taiwan, and Tahiti.

Mary Bober-Women's March, March for Our Lives

Thomas Chen-Endocrine Society Member and Chair of Sessions for Symposia

Collin Ellis – Works with an international group, to bring faculty from foreign countries for a week of interactions with US faculty. This year, he invited SMC faculty members from across campus to join the group who was visiting from China.

Gabe Gartner- organizes school demonstrations of Natural History with the Natural History Club students.

Cynthia Gonzalez - actively maintains a relationship with various sites that support Nutrition Internships for students majoring in the field. Gonzalez was instrumental in establishing “Volunteerships” (for nutrition students) with Project Angel Food, Meals on Wheels, Growing Great, and SOS Mentoring, as well as establishment of the Miguel & Virginia Gonzalez Memorial Scholarship for ongoing Hispanic students majoring in science or health professions.

Chris Grant – As a Physical Therapist, he maintains one patient who is disabled. On his days off, he works with this young man, so as not to abandon him when he began working for us.

Sandra Hutchinson-Organizer for science experiment day at Roosevelt Elementary School involving Pre-Health Association members and officers, Judge for Roosevelt Elementary School Science Fair, Judge for California State Science Fair

Lyle Nichols- Field-Related Research on threatened Picas in Bodie, California

Alex Tower – Presents annually to children at Le Lycee Francais de Los Angeles (LLFdLA) on an endangered species that

she and her family adopt on behalf of the school each year. Organizes sustainability booths for the children at the annual Fundraiser at LLFdLA.

Christina von der Ohe--Classroom Volunteer teaching Anatomy and Physiology lessons to grades K-5; Science Fair Organizer at Palisades Elementary School.

One can't help but notice that many of our Full-Time faculty are extremely active, and the amount of off-campus community engagement is bound to decline as on-campus responsibilities increase as a result of losing up to 41% of our faculty to retirement and leaves over the next 5 years.

3. Discuss the relationship among and between full and part-time faculty, involvement of part-time faculty in departmental activities, and part-time faculty access to resources and support.

Part-time faculty are invited to all department meetings, flex activities, and social events. Many have time conflict issues that prevent them from fully participating in these areas, but others are very involved, investing time well beyond what is contractually required of them. To help with their teaching, part-time faculty have access to everything at our general use room (general meeting/work area, computers, scanner, printer/copier, Scantron machine, paper shredder, basic office supplies). Additionally, the one open office space in the Science building is designated as “part-time office”, where they can work and/or meet with their students. Some full-time faculty voluntarily share their office space with part-time faculty. In general, we believe that our faculty, both full-and part-time, have a great working relationship among and in between each other.

One of our part-time faculty, Elizabeth Jordan, was invited to Chair the Academic Senate Environmental Affairs Committee in Fall 2018. She gladly accepted, and is doing a great job.

Others of our part-time faculty actively have students doing research Independent Studies.

G1. Current Planning and Recommendations

The following items are intended to help programs identify, track, and document unit planning and actions and to assist the institution in broad planning efforts.

1. Identify any issues or needs impacting program effectiveness or efficiency for which institutional support or resources will be requested in the coming year. [This information will be reviewed and considered in institutional planning processes but does not supplant the need to request support or resources through established channels and processes].

Full-Time Faculty

Multiple new full-time faculty are needed to ensure that the department keeps up with current trends in science education, including student involvement in research as well as relevant field studies experiences. We face this challenge with the recent net loss of 33% of our full-time faculty (including new hires and departures), with 8 retirements, 1 death and 1 resignation in the past five years. Just in the majors’ series alone, we have lost 4 full-time faculty in the last year. Each semester, we have several faculty on leave, and we are anticipating potentially four more retirements in the next one to three years. Without replacements, our ability to meet the demand for our courses with the rigor and consistency needed to maintain our program is already severely compromised. With fewer faculty having to take on more departmental responsibilities, we are less able to contribute to the greater campus-wide needs (committees, club advising and other services). It is also worth noting that with increased responsibilities, the need for semester-long leaves increase. Finally,

with departures far out-weighting the current pace of hiring, there will be fewer existing faculty to mentor incoming faculty when they do join the department.

Administrative Assistance:

The needs of the department have grown since we were allocated a half-time Administrative Assistant. Currently, there is too much for one person to handle between Life Science and Physical Science. Several deadlines have been missed, requisitions, absence forms, and other documents have not been submitted in a timely manner. Neither faculty needs nor student needs are being met. With the coming expansion of the department with the new Math and Science Complex, our needs will continue to grow. We absolutely need a full time Administrative Assistant of our own.

Laboratory Technical Assistance:

The needs of the department have grown since we were last granted a fifth laboratory technician, three years ago. We are offering a wider diversity of more laboratory-based classes, and more sections of several of the laboratory-based courses. At the moment, all of our lab techs are stretched so thin, that when a faculty member needs something last-minute, it is a tremendous burden that quite often cannot be accommodated. It really takes the spontaneity out of Science, and as such, is a disservice to the students and faculty alike. Further, there has been an uptick in the demands placed upon the faculty to accommodate ever more requests from DSPS in the lab practical exams. We are aware that DSPS counselors are doing what they need, but given our departmental constraints, particularly in Anatomy, we are unable to meet the requests. This has resulted in our faculty being accused of bullying the disabled students (with unrestrained shouting, no less), to which we take great offense. Our commitment to teaching and to the student experience could not be greater. With an additional laboratory technician, we will be able to find a path forward.

Department Chair Responsibilities:

Just as the needs of the department have grown over time, so have the responsibilities of the department Chair also increased. The current nine hours of reassign time for the position is simply not sufficient to manage the amount of responsibility and daily tasks. Further, with other obligations, such as teaching and perhaps an Academic Senate Committee Chair position with reassign time, there is a constant feeling of being woefully inadequate. Emails and phone calls have to go unanswered, and students in the classroom are done a disservice by being a student of the Chair. It is critical that for the third largest department on campus, with so many sub-disciplines, lab techs and collections, the Life Sciences Department Chair receive 15 hours of release time.

2. If applicable, list additional capital resources (facilities, technology, equipment) that are needed to support the program as it currently exists. [This information will be reviewed and considered in institutional planning processes but does not supplant the need to request resources through established channels and processes].

In order to maintain our program as it currently exists, we need updated faculty computers, as well as updated "smart classroom maintenance" in our labs and lecture halls. Once again, we request wireless presenters and microphones with voice amplification each instructional space.

Equipment needs for existing courses include heated water baths and digital blood pressure monitors to support the Authentic Learning laboratory exercises being developed for Biology 3, an additional ELISA Plate Reader and associated software to detect immunity-based reactions for Biology 22, torso, joint, reproductive organ, and endocrine models for Anatomy 1, and plasticized (preserved) human sections and organs for Anatomy 1 and Anatomy 2. (Due to the high cost of acquiring the number of anatomical models needed, these will also be included in the 5-10 year plan, section G2, question 2.) Locked cabinetry is needed in at least one lecture hall to house anatomical models. Ventilation needs to be improved for the Anatomy labs to minimize exposure to fumes from preserved dissection specimens.

Facilities and additional equipment are also needed to support Nutrition 8-Principles of Food with Lab, a course required for the AS-T degree in Nutrition and Dietetics. For now, the laboratory component for this course will be conducted in a kitchen facility at John Adams Middle School (JAMS), for which the Nutrition program pays out of the Foundation account. In the future, it would be much more efficient to have our own lab in the Science Building – perhaps when the Anatomy labs move to the new Math and Science Complex. Lottery funds were used to outfit five student workstations with kitchen utensils and small pieces of equipment, but additional equipment has been needed due to a lack of functional range tops at JAMS. Additionally, each semester, \$3200 will be needed to compensate a food services director and a custodian at JAMS, who must be present during our use of the school facilities. At this rate, although it's the most economical of the current options, the course being held at JAMS is not a financially sustainable solution.

While we have been fortunate to acquire state-of-the-art educational equipment for many of our laboratories, we are in need of repair and maintenance funds to keep these instruments in prime working order. A service contract for maintenance of all the departmental microscopes is crucial for optimal functioning of these costly instruments. Our current funding level allows yearly cleaning on a rotating basis, with repair of only a few microscopes at a time. This is not sufficient to maintain the functionality of over 300 instruments that are in routine use throughout every semester and intersession. We also need funding for calibration of micropipettors, keeping 72 instruments for measuring small volumes in good working order. At the moment, we rotate the repair and calibration from year to year – micropipettors one year, and the spectrophotometers another year, and some microscopes another year, and other scopes, still another year. And then back again. Much of the time, what this amounts to is that students are using equipment that is barely functional.

A current need involves maintenance of the department greenhouse and adjacent yard, both located behind the Center for Environmental and Urban Studies on Pearl Street. Greenhouse repairs include replacing missing air-conditioning unit panels and broken glass panes while yard maintenance would involve tree-trimming and fence repair. There is currently no regular maintenance schedule that includes the greenhouse facility and yard. The potting shed and office facilities are also in need of repair, with the sink and toilet clogged, and other non-functional equipment.

Additional office, classroom and laboratory space in the new Math and Science Complex should come as a relief to the our heavily burdened portion of the Science Building. We have reached capacity in all three categories, and we are now seeing

the effects of that, with the pressures from DSPS. While some course enrollment has been declining with recent campus wide trends, the laboratory courses are filled to capacity with high demand for them.

When the new Math/Science Complex is completed, we will need to remodel/redesign a few of our current laboratory spaces to complement the functionality of the new facility and accommodate the expanding needs of students in the Life Science department. For example, a new Nutrition laboratory, as mentioned above.

Science Building:

1) The problems with the Science Building temperature control and ventilation systems are a perennial problem that persist across years and years of Program Review requests. In the past, we have made the argument that this faulty ventilation system leads to exposure to dangerous levels of chemicals used to preserve specimens for those working directly in the Anatomy Laboratories. More recently, we're experiencing times when the ventilation is strained to the point that the neighboring General Biology lab (225) are filled with these dangerous fumes, and the faculty feel forced to evacuate to get their students to a safe location. This is not only a disruption to the learning environment, but an exposure to hazardous fumes for which students do not willfully enroll in lab courses.

2) The temperature control issue could take up a whole page of describing, but suffice it to say that it is a disaster, and needs to be fixed.

3) building cleanliness is a perennial problem, including the floors and bathrooms and all of the requisite supplies. We run out of toilet paper and paper towels for days on end, and we have gone quite literally for months without our bathrooms being cleaned. When it comes to the carpets in the offices wing, they are filthy for years at a time. The levelor blinds are caked with a decade of particulate build-up. It's revolting and is arguably a health risk. No one should have to work in conditions like this.

3. If applicable, list additional human resources (staffing, professional development, staff training) needed to support the program as it currently exists. [This information will be reviewed and considered in institutional planning processes but does not supplant the need to request resources through established channels and processes].

In courses across the Life Sciences disciplines, adjunct faculty teach a high percentage of the weekly teaching hours, impacting Allied Health, General Education Biology, Majors' Biology, and Nutrition.

Percent of Weekly Teaching Hours Covered by Full-Time Faculty
(Percentages less than 75% included)

Discipline	Course	20183 WTH	20183 % FT WTH	20191 WTH	20191 % FT WTH
Allied Health	Anatomy 1	99	30	111	43
	Physiology 3	48	44	54	39
General Education Biology	Biology 2	36	42	30	40
	Biology 3	123	39	120	35
	Biology 9	27	22	24	25
	Biology 15	-	-	12	12.5

	Biology 15N	6	0	6	0
	Botany 1	24	63	15	0
	Zoology 5	27	56	27	56
Majors' Biology	Biology 21	24	25	18	0
Nutrition	Nutrition 1	45	47.5	42	14.3
	Nutrition 4	6	0	6	50
	Nutrition 7	-	-	6	50
	Nutrition 8	5	0	5	0

In addition, recent departures since the last 6-year Program Review and expected retirements and leaves contribute to hiring needs distributed across multiple disciplines within the department, as indicated in the following table.

Discipline	Faculty Member	Courses Taught	Retirement, Leave or Reduced Workload	Retirement Date Anticipated
Allied Health	Maria Dell	Anatomy 1 & 2	Retired 12/2017	
	Lucy Kluckhohn-Jones	Microbiology 1	Retired 12/2017	
	Mary Lynne Stephanou	Anatomy 1 Physiology 3	Retired 6/2017	
	Kay Azuma	Anatomy 1 Physiology 3	Reduced Workload F2015	Spring 2019
	Al Buchanan	Microbiology 1		Spring 2022
	Paul Wissmann	Anatomy 1 Physiology 3		Spring 2022
General Education Biology	Maria Dell	Biology 2	Retired 12/2017	
	Walt Sakai	Biology 3	Retired Spring 2014	
	Ed Tarvyd	Biology 15	Deceased Fall 2015	
	Dawn Vaughn	Biology 3	Unpaid leave Dec 2017	Resigned Dec 2018
	Kay Azuma	Biology 2 Botany 1	Reduced Workload started in Fall 2015	Spring 2019
	Thomas Chen	Biology 3	Reduced Workload starts in F2018; sabbatical Sp2019	Spring 2020
	Ellen Baker	Biology 3 Botany 1		Spring 2021
Majors' Biology	Dawn Vaughn	Biology 21	Leave as of 12/2017	
	Mary Colavito	Biology 21 Biology 22	Banked Leave for 2018-2019	Spring 2019
	Thomas Chen	Biology 21	Reduced Workload starts in Fall 2018	Spring 2020
	Ellen Baker	Biology 23		Spring 2021
Nutrition	Cynthia Gonzalez	Nutrition 1 Nutrition 3 Nutrition 7		Spring 2020

We were fortunate to receive two full-time faculty in General Biology-Environmental Science that joined the department in Fall 2016. One of these professors also contributed to Majors' Biology but left in December 2017 due to family relocation. Two instructors in Anatomy/Physiology joined the faculty in Fall 2018. All three of these new faculty have been exceptional additions to our team. For the next hiring cycle, we have hired a Majors' Biology/General Education Biology to join us in the Fall of 2019. This recent addition will bring our percent Full-Time faculty teaching Biology 21 up to 33% in Fall 2019. In the next hiring cycle, we are requesting 11 full time faculty to bring the department up to having 75% of our sections taught by full time faculty, as is listed as a commitment by several governing entities at the college. Responding to curricular changes at transfer institutions has been an essential, continuing role for faculty teaching these courses. In addition, the design of laboratory experiments to encourage the development of data analysis skills is key to preparing students for upper division biology study. A team of dedicated faculty members is needed to design and implement updated lab exercises that illustrate key course concepts and foster scientific reasoning. Further, there is a tremendous need for full-time faculty to develop rapport and foster the personal relationships with students, if we are going to be serious about closing the racialized equity gap.

Technical staff are indispensable for maintaining our robust laboratory program. For the past three years, the number has fluctuated between 3 and 5. While we had vacancies, our dedicated group of three technicians carried the load for four to five staff members to ensure that the laboratory materials were adequately prepared for the students. Between October 2017 and February 2018 we were fully staffed, but that didn't work out during the probationary period. In November 2018, we hired a replacement, and we are back up to 5 technicians. Because the department needs have grown and shifted toward more laboratory-based classes, and because of the need for added technical assistance to accommodate requests from DSPS, there is a demonstrated need for a sixth technician to support our laboratory instructional program.

Increased staffing is also needed at the departmental administrative level. We currently have one administrative assistant who serves the department half time, devoting the other half of her time to the Physical Sciences Department. The duties of this position continue to expand, most recently including processing of increasing numbers of prerequisite waivers. Both departments experience a lack of functionality due to the heavy burden placed upon the one Administrative Assistant. We believe that when we hire a full time Administrative Assistant for the department, we will experience a significant increase in the efficiency of day-to-day departmental needs.

Student Support Services:

The department needs more support from the college for more reliable proctoring for both make-up exams as well as for students with disabilities. The hours of the proctoring room do not accommodate evening classes or later times on Fridays or the weekends. Additionally, with the increased number of students requesting accommodations in every discipline, our faculty are stretched too thin. In fact, beyond the argument of increasing student success, and promoting equity, the faculty are being asked to take on more without relief of any other duties. Most of our faculty refuse to make use of the proctor because photos of identifiable versions of our exams that we sent to the proctor have ended up online. We need a proctoring system upon which we can rely.

Additionally, the department is seeking more Supplemental Instruction (SI) support from the college. We would like to build on the success of SIs in Biology 2, 3, and 21 to support students in the Allied Health disciplines. Having SI Leaders in Anatomy, Physiology and Microbiology would enhance student success in these essential prerequisites for the SMC Nursing Program.

For our online faculty, it has become increasingly important that we have some sort of online proctoring tool, such as

“Respondus Monitor” or “Proctorio.com”, to stem the tide of cheating in online courses. In this semester, a faculty member had 35 out of 45 students submit plagiarized work on an online exam. With a program like one of the above, this cheating would be stopped entirely.

Regarding professional development, additional faculty training is needed to address "student emergencies" including both physical health as well as mental health scenarios. We also need more training in lock-down scenarios. Faculty also need training with plans to better address the needs of students with learning disabilities, or simply those lacking the skills required for success in college courses. Another identified need is continued support for professional development courses such as @One training. Finally, and probably most importantly, we need to continue our training and conversations about how to bring equitable practices into the classroom.

G2. Future Planning and Recommendations

The following items are intended to help programs identify, track, and document unit planning and actions and to assist the institution in broad planning efforts.

1. Projecting toward the future, what trends could potentially impact the program? What changes does the program anticipate in 5 years; 10 years? Where does the program want to be? How is the program planning for these changes?

Over the next 5-10 year period, the Life Sciences Department will need to address the following areas:

- * Keeping up with an ever-changing, advancing, and evolving field of Biological Sciences - We plan to accomplish this through continued individual education and professional development of faculty, encouraging faculty to develop new courses as they become necessary/relevant, and hiring new faculty in the necessary areas of expertise.
- * Keeping up with the trend of emphasis on training for primary research - We plan to accomplish this through continued emphasis on research in our majors courses, creation of independent research opportunities, involvement with the SMC STEM program, and research-based collaborations with our colleagues from 4-year institutions.
- * Revitalizing of the Life Sciences Department field programs - In this area, faculty with specific field experience will be encouraged to develop (or revitalize already existing) field studies in natural history and environmental science.
- * Keeping up with the ever increasing demand for Allied Health programs - The Life Sciences Department has a very strong pre-health program. Our limiting factors are access to facilities (adequate laboratories), equipment (e.g. anatomy models), and additional full-time faculty.

2. If applicable, list additional capital resources (facilities, technology, equipment) that will be needed to support proposed changes. [This information will be reviewed and considered in institutional planning processes but does not supplant the need to request resources through established channels and processes].

Technological needs in Life Sciences are ever changing and are somewhat unpredictable in the long-term. However, the faculty have requested permanent microphones and voice amplification equipment for every classroom. Flexible funding would allow faculty developing new programs to access the necessary equipment.

We do however realize the need for expanded facilities (i.e. modernized, expanded/updated laboratory and lecture spaces),

new visual teaching tools (e.g. anatomy models), and state-of-the-art laboratory and field research equipment. To adequately support visualization of anatomical features, we need 18 torso models, 18 reproductive organ models, 18 endocrine models and multiple plasticized (preserved) human sections and organs. Four torso models have recently been ordered with a generous allocation of block grant funding, and we recognize that full acquisition of the needed models will take additional time. Equipment to implement DNA sequencing and DNA splicing are also important to enhance and update the current molecular biology curriculum. We are currently working on replacing our sea water tables in the Marine Biology Lab, and we look forward to making the system a more substantial and longer lived one with greater stability of water conditions, and greater flexibility in tank configuration.

3. If applicable, list additional human resources (staffing, professional development, staff training) that will be needed to support proposed changes. [This information will be reviewed and considered in institutional planning processes but does not supplant the need to request resources through established channels and processes].

Staffing - multiple new full-time faculty are needed to address our needs expressed in section G1, question 3, as well as to replace the large number of expected retirees over the next few years. Staff help is also needed both at the departmental administrative and technical levels.

4. If applicable, note particular challenges the program faces including those relating to categorical funding, budget, and staffing.

Please see section G1, questions 1-3.

5. Summarize any conclusions and long term recommendations for the program resulting from the self evaluation process.

Long term recommendations for the program include:

- * Continue to work toward reducing the participation and achievement gaps observed amongst underrepresented minorities.
- * Continue to work on helping students lacking necessary language skills succeed in biological sciences
- * Continually update curriculum with an eye for potential development into new areas/fields

6. Please use this field to share any information the program feels is not covered under any other questions.

N/A

Please comment on the effectiveness of the Program Review process in focusing program planning.

- 1) As a newcomer, it would be great to have information on where to find certain kinds of information - ILOs and Core Competencies. Just a link or some kind of instruction that makes it more clear.
- 2) I think I just don't like interacting with Curricunet, but it was very confusing to keep track of what part I was working on, and where I should put what. Let's see if I've done it correctly!
- 3) Honestly, it's discouraging because it feels like a ridiculous waste of time. How to improve? Not sure. Maybe when I feel more comfortable with it.
- 4) Thank you for reading.

Executive Summary

These fields to be filled out by the Program Review committee. Reports will be sent to the program and will be available on-line to populate relevant fields in the annual report and the next 6 year report.

Narrative
Program Evaluation
Commendations
Recommendations for Program Strengthening
Recommendations for Institutional Support
Attached Files