

Request for Reassignment Proposal

Instructions: Complete the following form, ask your Dean to review and sign, and then submit it to the Office of Instruction.

1. **Term in which assignment would begin (semester, year):** Fall 2019

2. **Application Date (mm/dd/yyyy):** 09/18/2018

3. **Author(s):** Dani Behonick, Doug Hirzel

Overview

4. **Type of Request:**

- New request for reassignment
- Renewal of existing reassignment
- Augmentation to existing reassignment

5. **Position or Project Name:**

Identify a "one line" description of the type of assignment (faculty leadership, coordinator, research, etc.)

Anatomy Student Success Initiative - Faculty Researcher

6. **Amount of Reassignment**

Please report the amount of FTE you are requesting for each term and calculate the total annual FTE.

Calculations: 0.2 FTE (3 units) = 7.5 hrs/week or approximately 120 hrs/semester. Each additional unit (0.067 FTE) represents an additional 2.5 hrs/week

Fall (FTE) 0.2 FTE Spring (FTE) 0.2 FTE Total Annual (FTE) 0.4 FTE

7. **Duration of Reassignment**

How many semesters of reassigned time are being requested? When is the end date? *(Please note that if the request exceeds two years, a renewal RRP will be required.)*

2 semesters: Fall 2019 - Spring 2020, with an end date of June 1, 2020

8. **Commitment**

Upon completion of the reassignment term:

- The work is complete and no further investment of reassigned time will be required.
- The work will require an ongoing commitment of reassigned time or other staffing.

*Upon completion of this reassignment term, we expect that the specific work described below will be complete. However, the nature of this work is to establish an ongoing success initiative for anatomy students; such an initiative may require an ongoing commitment from the College of reassigned time or other staffing.

Justification

9. **Please list the core responsibilities to be performed and calculate the approximate number of hours per week required to perform each. (1 unit = 2.5 hours per week)**

Revised 9.15.17 - CK

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This proposal is requesting 3 units reassigned time per semester for a total of 2 semesters.

3 units reassigned time/semester * 2 semesters = 120 hours/semester * 2 semesters = 240 hours total
reassignment

please see below for approximate distribution of these hours across job duties

The Problem:

It is well-documented that the BIOL 250 Human Anatomy course presents a consistent and persistent stumbling block for Cañada College students (please see attached: 2012-2013 Annual Program Plan, especially pages 3, 8 and 12; 2013-2014 Annual Program Plan, especially pages 3, 7 and 12; 2014-2015 Annual Program Plan, especially page 11; and SLO analyses for BIOL 250 Human Anatomy Spring 2012, Spring 2015, Spring 2016). Faculty who teach this course report anecdotal evidence that students are severely underprepared both in terms of the Biology knowledge they bring from prerequisite courses, and their foundational skills as students/learners. This is borne out in the success and retention rates for the course (45% success, 55% retention) which are well below the 5-year averages for the department as a whole (66% success, 80% retention). Those students who do succeed in BIOL 250 go on to be quite successful in the subsequent course BIOL 260 (88% success, 93% retention). These data clearly demonstrate that BIOL 250 Human Anatomy is a gatekeeper course and a bottleneck for the pipeline of students desiring a career in various Allied Health fields or in Kinesiology.

Our Goal:

The mission of the Anatomy Student Success Initiative is to provide necessary additional support to BIOL 250 Human Anatomy students on the Cañada College campus, with the specific goal of increasing the retention and success of these students. Increased success and retention in this course will allow more students to continue in the Allied Health and kinesiology pathways, and to continue in their training to become health care providers.

Our Strategy:

Before we can address this issue and improve departmental/institutional support for these students, we must first conduct focussed inquiry research, at both the local and statewide levels, to determine what form this support should take. At the outset of this effort, the primary responsibilities of the Faculty Researcher of the Anatomy Student Success Initiative will be the following:

1. Complete a needs assessment of the current anatomy program, including
 - a survey of former BIOL 250 Human Anatomy students who withdrew before completing the course, to determine common factors that prevent persistence/retention in the course
 - a survey of former BIOL 250 Human Anatomy students who persisted in the course and did not complete with a "C" or better, to determine common factors that prevent success in the course
 - a survey of former BIOL 250 Human Anatomy students who completed the course with a "C" or better, to determine common factors that promote success in the course; in particular, we would like to survey students who succeeded in the course on their second or third attempt about what made the difference between their unsuccessful and successful attempts in the course (this may be supplemented with data on this student population mined from Data Dashboard)

This research will be completed using a focus group model. The Faculty Researcher will obtain contact information for students from these groups by working with Admissions and Records and the Science and Technology Division Office, and will contact these individuals to form focus groups. The Faculty Researcher will then conduct small group surveys within these focus groups to collect information from these students. **(100 hours)**

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2. Investigate current local parallel efforts for supporting student success and providing supplemental instruction to bring underprepared students up-to-speed (e.g. the newly-created Chemistry Jam, efforts in Math/English to comply with AB 705), in order to assess their adaptability/suitability to the needs of our specific student population (**50 hours**)
3. Investigate current statewide efforts/initiatives for supporting anatomy student success, to assess these for their adaptability/suitability to the needs of our specific student population (**50 hours**)

Following these research and analysis efforts, the Anatomy Student Success Initiative Faculty Researcher will then draft a proposal for an ongoing student support initiative for anatomy student success (**40 hours**), which will be presented to the College administration.

10. The following responsibilities are included as part of faculty workload and can be found [here](#). Please explain how the duties for which you are requesting reassigned time are different from those enumerated in Appendix D1.

The core responsibilities described in item 9 above lie firmly outside of the duties described in Appendix D1 of the faculty contract. While all faculty are required to “make necessary preparations for class instruction” and “evaluate student performance,” the needs assessment and research described above clearly go above and beyond standard faculty responsibility for a given course. The manner of data collection and analysis we envision involves an in-depth and very specific evaluation to identify challenges within our program as a whole, in the interest of better supporting student success throughout our anatomy courses on campus. This is a larger effort than any of the already significant duties described in Appendix D1, and aims to establish infrastructure to create an ongoing support system for Cañada anatomy students.

While we are aware that an office exists on campus that collects and works with College-related data (the Office of Planning, Research and Institutional Effectiveness, PRIE), we feel strongly that this position is most appropriately filled by a faculty member in this discipline, and specifically, a faculty member who is very familiar with this course and the student population. While there is some data that PRIE may have access to, we feel that the best responses and engagement from former students in this inquiry process -- especially former students who dropped or did not pass the course -- will come from the work of faculty. This is a place where leveraging the teacher-student relationship built in the classroom may be utilized to build focus groups and collect information to inform future practice and support.

11. Identify how the activities align with the college’s strategic plans and initiatives. (Please limit response to 250 words).

According to the finalized initiatives of the College’s Educational Master Plan (https://www.canadacollege.edu/emp/docs/Initiatives_051717.pdf), Goal 1 is “To provide educational and student services programs that help students meet their unique academic goals; minimize logistical and financial barriers to success; and highlight inclusivity diversity and equity.” The first strategic initiative listed to accomplish this goal is “Develop academic pathways and provide integrated support services that begin in high school, transition to college and complete with a certificate, degree and/or transfer.” The Anatomy Student Success Initiative looks to create and provide integrated support services for students in a specific Cañada course, BIOL 250 Human Anatomy. This is a core course, and as described previously is a roadblock, in several academic pathways, including the AS in Allied Health, the AA-T in Kinesiology, the Radiologic Technology Program (Cañada College), the Surgical Technology Program (Skyline College), the Respiratory Care Program (Skyline College), and all nursing, physical therapy, and occupational therapy programs.

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Assessment

12. Outcomes

List the outcomes that can be expected upon completion of the term of reassignment. *(Please limit response to 250 words)*

Upon completion of the term of reassignment, the faculty member(s) will have achieved the following outcomes:

- summarize factors that prevent student persistence/retention in BIOL 250 Human Anatomy at Cañada College, with supporting evidence
- summarize factors that prevent student success in BIOL 250 Human Anatomy at Cañada College, with supporting evidence
- summarize factors that promote student success in BIOL 250 Human Anatomy at Cañada College, with supporting evidence
- present a plan to the College administration for an ongoing student support initiative for anatomy student success, including timeline and staffing requirements

13. Accountability

Describe how the activities performed under this assignment will be recorded and reported.

The activities performed under this assignment will be recorded and reported via timesheet.

Administrative Use Only

Dean's Review:

- Fully support request
- Support with reservation
- Do not support (explanation required)

Explanation: [Click here to enter text.](#)

Dean Signature: Adam T Windham

VPI Action:

- Approve request as submitted
- Approve request but with less time than requested
- Deny request with recommendation to revise
- Deny request (explanation required)

Explanation: [Click here to enter text.](#)

VPI Signature: _____

Recommendation for alternate funding:

- Professional Development
- Grant/Categorical (specify)
- Overload hourly special project
- President's Innovation Fund
- Trustees Fund for Program Improvement
- Short-term hourly staff

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Stipend

Comments: [Click here to enter text.](#)

Approved Duration of Assignment: [Click here to enter text.](#) _____

Outcomes and reporting requirements: [Click here to enter text.](#)



ANNUAL PROGRAM PLAN & REVIEW (INSTRUCTIONAL) ASGC ADOPTED SPRING 2011

The purpose of this document is to collect information to be used by the college planning bodies IPC (Instruction Planning Council), APC (Administrative Planning Council), SSPC (Student Services Planning Council), Budget Planning Committee, and CPC (College Planning Council) and may be used for Program Improvement and Viability (PIV). Through this process, faculty have the opportunity to review the mission and vision of their department/program. Then, using multiple measures and inquiry, faculty will reflect on and evaluate their work for the purposes of improving student learning and program effectiveness. This reflection will identify steps and resources necessary to work towards the program vision including personnel, professional development, facilities, and equipment. *Faculty should use their judgment in selecting the appropriate level of detail when completing this document.*

The deadline for submission of the Annual Program Plan to the IPC is March 31. Complete this document in consultation with your Dean who will then submit a copy to IPC. Members of the IPC review the document and return their comments to the author for use in the next annual program plan.

Cañada College

Mission Statement

It is the mission of Cañada College to ensure that students from diverse backgrounds have the opportunity to achieve their educational goals by providing quality instruction in general, transfer, career, and basic skills education, and activities that foster students' personal development and academic success. Cañada College places a high priority on supportive faculty/staff/student teaching and learning relationships, responsive support services, and a co-curricular environment that contributes to personal growth and success for students. The College is committed to the students and the community to fulfill this mission.

Vision

Cañada College ensures student success through personalized, flexible, and innovative instruction. The College infuses essential skills and competencies throughout the curriculum and assesses student learning and institutional effectiveness to make continuous improvement. Cañada responds to the changing needs of the people it serves by being involved in and responsive to the community, developing new programs and partnerships and incorporating new technologies and methodologies into its programs and services.



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Document Map:

- 0) Key Findings
- 1) Planning group
- 2) Authors
- 3) Program
- 4) Responses to previous Annual Program Plan & Review (APP&R)
- 5) Curricular Offerings
- 6) Program Level Data
- 7) Action Plan
- 8) Resource Identification



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Department/Program Title: Biology & Health Sciences **Date submitted:** April 10, 2013

1 Key Findings:

While student success and retention rates remain high (5-year average of 69% and 83% respectively), our department has set a tentative goal to increase these to 72% success and 85% retention. Several of the following actions may help us achieve this goal:

- a BioJam or Anatomy boot-camp with incentives for student participation.
- an e-portfolio requirement of our students beginning fall 2013.
- offer more courses online or in hybrid format.
- get data on our students' success and retention according to *academic goal*, then we can better address ways of increasing success and retention.
- New courses:
 - HSCI 116 Women's Health - offered in Fall 2012
 - INTS 100 Sustainability: People, Planet, and Profits; created by faculty of several departments; planned offering in Fall 2013.

Requests of our department faculty for future professional development include:

- discipline-focused conferences
- spending compensated time in scientific labs at other institutions to learn current techniques and applications;
- release time to observe other colleagues teaching, here or elsewhere;
- workshops on specific topics of assessment or new teaching strategies, especially alternatives to traditional lecturing (e.g. Flipped Classroom method, inquiry/problem-based learning).

Our current laboratory facilities are insufficient to accommodate significant enrollment growth. A new building could include separate labs for anatomy and physiology, space for current equipment used in molecular and cell biology, as well as labs for student research projects. Environmental sciences are projected to provide more jobs in the future; we need to plan our curricula, faculty, and facilities need accordingly.

1. Planning Group (include PT& FT faculty, staff, stakeholders)

List of names and positions: Yancy Aquino (PT faculty), Danielle Behonick (FT faculty), Douglas Hirzel (FT faculty), Carol Rhodes (FT faculty), Nathan Staples (FT faculty), Barry Thomson (PT faculty), Paul Welles, Jr. (PT faculty)

2. Writing Team and Contact Person: Danielle Behonick, Douglas Hirzel, Carol Rhodes, Nathan Staples

3. Program Information



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A. Program Personnel

Identify all personnel (faculty, classified, volunteers, and student workers) in the program:

FT Faculty Danielle Behonick, Douglas Hirzel, Carol Rhodes, Nathan Staples

PT Faculty FTE Yancy Aquino (0.88), Lisa Bjerknes (0.72), Harold Borrero (0.2), Jett Chinn (0.52), Gary Ciambrone (0.2), Sara Cooper (0.4), Eugenia Lau (0.6), Robin Lise-Nielsen (0.26), Diego Nieto (0.36), Jenna Patton (0.64), James Smiley (0.2), Barry Thomson (0.65), Nicamer Tolentino (0.2), Tamas Torok (0.36), Justine Walsh (0.52), Paul Welles (0.36), Susan White (0.2), Malgorzata Wisniewska (0.2)

FT Classified Angela Gibson

PT Classified (hrs/wk) Gary Cheang (18 hours/week)

Volunteers n/a

Student Workers n/a

B. Program mission and vision

Include the purpose of the program, the ideals the program strives to attain, and whom the program serves. The program mission and vision must align with the college's mission and goals. (200 word limit)

MISSION:

The Biological Sciences Program provides well-supported, personal, interactive, and hands-on instruction in the life sciences that is accessible to a very diverse student population. We share our own enthusiasm for biology and use multi-faceted and rigorous approaches to education to help enhance or instill in students a driving curiosity that leads them to fully explore the wonders of the living world. With guidance, personalized instruction, and their own self-motivation and empowerment to learn, students will be prepared for professional programs and more advanced academic degrees in the biological, natural, and health sciences.

VISION:

The Biological Science Program incorporates current computer and laboratory technology and methods into our curriculum. We challenge our students to meet the expectations of a rigorous curriculum and ourselves, as faculty, to maintain high educational standards and to stay current in the biological sciences. To meet the challenges of a continually diversifying, and ever-growing student population, we continue to look forward and plan consistent evaluation and modifications to our curricula and provide continually



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updated equipment to meet the burgeoning employment demands of the community and students seeking degrees and employment in the biological, natural, and health sciences.

C. Expected Program Student Learning Outcomes

Tool: **TracDAT folders in the SLOAC sharepoint.** Click on the link below to access your folder and log in with your complete smccd e-mail account, ex:smithj@smccd.edu and password <http://sharepoint.smccd.edu/SiteDirectory/CANSLOAC>

- 1 Use the Scientific Method to investigate biological questions and critically evaluate and effectively communicate scientific data.

Assessments:

- BIOL 225 full lab write-up (C. fern lab)
- BIOL 230 full lab write-up (enzymology lab)
- BIOL 310 research paper on heart disease and diabetes
- BIOL 260 full lab write-up (electromyography lab)

- 2 Recognize and explain the evolutionary connections between biological structures and their function and between organisms and their environment.

Assessments:

- BIOL 225 essay questions on exams
- BIOL 230 essay and multiple choice questions on exams (structure/function of molecules and organelles)
- BIOL 250 exam essay question on relationship between epithelial structure and function

- 3 Critically evaluate biological information and examine its significance and impact on society and the environment.

Assessments:

- BIOL 225 persuasive essay
- BIOL 230 exam essay question
- BIOL 240 exam essay question

4. Response to Previous Annual Program Plan & Review

Tool: <http://sharepoint.smccd.edu/SiteDirectory/canio/ipc>

(log in with your complete smccd e-mail account, ex: smithj@smccd.edu and password)

Recommendations made regarding the 2012 Annual Program Plan & Review are addressed in the appropriate sections of this report.



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5. Curricular Offerings (*current state of curriculum and SLOAC*)

All curriculum and SLOAC updates must be completed when planning documents are due.

SLOAC = Student Learning Outcomes Assessment Cycle

Tools: **TracDAT folders in SLOAC** sharepoint

<http://sharepoint.smccd.edu/SiteDirectory/CANSLOAC>

Curriculum Committee <http://sharepoint.smccd.edu/SiteDirectory/cancurriculum/>

A. Attach the following TracDat and Curriculum data in the appendix:

- List courses, SLOs, assessment plans, and results and action plans (attach report from [TracDAT folders in SLOAC sharepoint](#)).
- An updated report was run and links are provided. SLOAC cycle completion has been very good and successful in our department. 10 of 11 courses have been actively assessed in the last two years.
[TracDAT folders in SLOAC sharepoint](#)
- List courses with COR's over 6 years old (attach documents from [Curriculum Committee](#))

None of our CORs are over 4 years old.

B. Identify Patterns of Curriculum Offerings

Guidelines: What is the planning group's 2-year curriculum cycle of course offerings by certificates and degrees? What is the ideal curriculum cycle? Discuss any issues.

Curriculum cycle:

- Students majoring in biology or health science can take every transfer-level major's course every semester. This enables maximum flexibility to accommodate students' schedules and allow completion of prerequisite courses.
- Students who want to take a GE biology or health science course will have at least one such course every semester.
- We are able to offer our courses at such a high frequency due to high demand.

COR updates:

- BIOL 250 Human Anatomy and BIOL 260 Human Physiology have been updated in order to comply with C-ID course descriptors. The most significant changes involved the addition of ENGL 100 and MATH 120 prerequisites. The other prerequisites for BIOL 260 are finally uniform across the district so that computerized prerequisite blocking can be enabled.



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New courses and updates since last Program Review:

- HSCI 116 Women's Health - As reported in last year's Program Review, this new course was first offered in Spring 2012 but was cancelled due to insufficient enrollment. It was then offered again in Fall 2012 with significantly more promotion/advertisement to students taking Biology courses (e.g. BIOL 250, BIOL 260) as well as the medical assisting program (e.g. MEDA 110) during the preceding semester. The course ran with a final headcount of 24 students and will be offered again in Fall 2013.
- BIOL 250 and 260 are being offered as a Learning Community this semester (Spring 2013). The goal is to allow students to complete both of these pre-nursing courses simultaneously in a single semester rather than sequentially over one year. This accelerates a student's ability to apply to nursing school or other allied health program. We attempted to offer this learning community in Fall 2012 but could not get sufficient enrollment and had to unlink the courses. We hypothesized that students were turned-off by the requirement to complete a P.A.T.H. application (which was used to verify the chemistry prerequisite). Despite eliminating the application for entry in Spring 2013, we continued to have limited enrollment - 13 students. Anecdotally, it appears that many students are unable to carve out such a large block from their schedules in order to take the two classes concurrently. The college allowed this small learning community to continue this semester and has scheduled it again for Fall 2013.
- An honors section of BIOL 250 was offered in 2012 and is being offered this semester (Spring 2013) as well. Enrollment in 2012 was initially strong, 26, but only 12 completed the course. This semester enrollment was only at 15. The designation of "honors" has dissuaded some prospective students who mistakenly believe they must have a certain GPA in order to enroll in the course. Additionally, some students are reluctant to take on extra work without a corresponding increase in the number of units. Adding an additional 1 unit of lab to the honors section (making it 5 units) might remedy this concern. College of Marin and Mission College both have 5 unit human anatomy courses that include extra emphasis on topics that are not normally covered extensively in a 4 unit course.
- BIOL 130 Honors was offered only in Spring 2013, and not offered in Fall 2012. Enrollment has been low (12-18 students) and, combined with typical attrition rates, does not reliably justify an exclusive Honors section. One solution would be to offer regular sections with Honors contracts as an option for interested students.
- A new course, INTS 100 Sustainability: People, Planet, and Profits, has been created by faculty of several departments. This 3-unit course is articulated with CSU for GE credit and may articulate directly with an Environmental Studies course at CSUEB. It was not offered Fall 2012 because of low enrollments. More recruiting effort this spring will hopefully allow it to be offered in the Fall 2013 term.



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6. Program Level Data

A. Data Packets and Analysis from the Office of Planning, Research & Student Success and any other relevant data.

Tool: http://www.canadacollege.edu/inside/research/programreview/info_packet/info_packet.html

Guidelines: The data is prepared by the Office of Planning, Research & Student Success and is to be attached to this document. Include the following:

- Describe trends in the measured parameters
- Reflect and analyze causes of trends.

Biology Department

- Our department shows an upward trend in course offerings (24 in 2010/11 as compared to 29 in 2011/12), section offerings (72 in 2010/11 as compared to 84 in 2011/12) and total course enrollments (2227 in 2010/11 as compared to 2433 in 2011/12). Although demand for Biology courses remains high and faculty in our programs strive to fill class sections, FTES (462.6 in 2010/11 as compared to 458.8 in 2011/12) and LOAD (685 in 2010/11 as compared to 606 in 2011/12) are decreasing while enrollments/section is up and sections are full. Possible reasons for these trends include: elimination of TBA hours; an increase in the number of part-time students in Biology courses (e.g. students completing prerequisite courses for nursing programs); and the fact that fewer double sections of some courses are currently being run. The reduction in double sections is occurring due to decreased demand and due to splitting of double sections in order to offer the anatomy-physiology learning community. It should also be noted that these declines in FTES and LOAD in our department mirror similar declines observed for the campus as a whole and so may instead reflect this campus-wide trend.
- While student success and retention rates remain high (5-year average of 69% and 83% respectively), our department has set a tentative goal to increase these to 72% success and 85% retention. Our goal for success aligns with the college's benchmark of 70% and its goal of 72%. One strategy that we are currently considering to help realize such improvements is creating a Biology Jam and/or Anatomy Bootcamp, done in the style of the highly successful Math Jam, Physics Jam and Word Jam programs currently offered.
- Our Student Enrollment Status continues to show an upward trend in all categories, with the greatest proportion of our students in the department being continuing students. This suggests that when students begin in our department, we keep them - this may be due to our campus now offering Organic Chemistry such that we no longer lose Biology majors to other campuses in the district.
- With respect to Student Goal Orientation, almost half of our students are transfer-bound. This is not surprising as the Biology department has few course offerings in the "educational development" category. As a sizeable proportion of our students are completing prerequisites for allied health



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programs, the members of the department are curious as to how these students are categorized in this classification system (as “Transfer” or “Career Development”?) and how this may impact the data.

- Student demographics with respect to ethnicity matches college-wide data except for Hispanic students. While Hispanic students made up 36% of the enrolled students college-wide in 2011/12, they comprised only 25% of the enrolled Biology students for the same time period. More data on these students (i.e. what biology courses they’re taking, whether they’re more likely to be part time or full time students) is required before the department can make recommendations regarding this observation.
- For student demographics with respect to gender and age, the department varies from college-wide trends in being disproportionately young - in 2011/12 more than half of our students (58%) were under 25 years old and 78% were under 30 years old (as compared to 45% under 25 years old and 61% under 30 years old campus-wide). This information is useful in future planning as such students might be more open to supplemental programs and learning opportunities like a BioJam program, and also may be more adept at technology usage within courses.
- For Student Educational Attainment level, the department is consistent with college-wide trends.
- The department found the graphic representation of the data included in the data packets difficult to parse due to lack of axis labeling, particularly on the graphs that incorporated the use of multiple simultaneous Y axes.

Health Science Department

- In 2011/12 our total enrollments (647 students) declined from 2010/11 (754 students). Average enrollment per section (32.8 students/section) also declined slightly as compared to 2010/11 (27 students/section). This may be the consequence of running 1 fewer HSCI course in Spring 2012, as Danielle Behonick was slated to teach a section of HSCI 116 (cancelled due to low enrollment), which took the place of a section of HSCI 100 (which generally fills with approximately 50 students) in the schedule. The department has also seen fluctuations in the number of concurrent enrollment classes taught at local high schools, which affects enrollment and headcount. FTES and LOAD showed a similar trend with both showing declines. These trends in FTES and LOAD from 2010/11 to 2011/12 are consistent with those seen for the college as a whole.
- In 2011/12, student success remained consistent with 2010/11 (83%) while retention (96%) had a modest increase from 2010/11 (94%). This suggests that students that begin Health Science courses stay in them, and many complete them successfully. These rates were higher than those observed for the college as a whole (70% success, 84% retention for 2011/12).
- Over the past 5 years, one of the greatest changes in the profile (enrollment status, goal, gender, age, ethnicity, educational level, etc.) of students attending our program is the loss of a number of concurrent enrollment programs. This has resulted in a shift in the makeup of Health Science students with respect to enrollment status, as a greater proportion of this group is now comprised of



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Continuing Students (58% in 2007/08 as compared to 73% in 2011/12). The proportion of First-time Students we serve has doubled (4% in 2007/08 as compared to 8% in 2011/12) and the proportion of Returning Students has increased slightly (11% in 2007/08 as compared to 12% in 2011/12). It is therefore not surprising that the goal orientation of students in Health Science courses has also shifted since 2007/08 to show greater amounts of students in the Transfer (42%) and Career Development (32%) tracks. We have also seen a dramatic shift in the Educational Attainment Level of our students since 2007/08. We now serve a greater proportion of students with a high school degree or equivalent (36% in 2007/08 as compared to 57% in 2011/12) and a smaller proportion of students with no high school degree (28% in 2007/08 as compared to 17% in 2011/12) or who are concurrently enrolled students (21% in 2007/08 as compared to 7% in 2011/12).

- The department has remained relatively consistent for the past 5 years with respect to the ethnic make-up of our student population. It is notable that our programs disproportionately attract Hispanic students, as the proportion of Hispanic students enrolled in Health Science courses in 2011/12 (46%) was greater than the proportion of Hispanic students enrolled at Cañada (35%) for that same time period. Females (73.2%) also continue to make up a greater proportion of students enrolled in Health Science as compared to males; this proportion is greater than the proportion they comprise of the college-wide student population (63.3%). The most notable change in age ranges served by Health Science courses is a decrease in the proportion of enrolled students who are 40+ years old (32% in 2007/08 as compared to 27% in 2011/12) and an increase in the proportion of enrolled students who are 20-24 years old (23% in 2007/08 as compared to 30% in 2011/12). All of these demographic data are useful to consider in planning for new course offerings in the Health Science department.

B. Analyze evidence of Program performance. Explain how other information may impact Program (examples are business and employment needs, new technology, new transfer requirements)

Tool: **TracDAT folders in SLOAC** sharepoint

<http://sharepoint.smccd.edu/SiteDirectory/CANSLOAC>

Guidelines:

- Explain how the assessment plan for Program Student Learning Outcomes (listed on #3c) measures quality and success of each Program.
- Summarize assessment results of Program Student Learning Outcomes.
- Describe and summarize other data that reveals Program performance.
- Explain how changes in community needs, technology, and transfer requirements could affect the Program.



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- We will assess our PLOs in April/May according to the plan listed in #3c. Upon receipt of the list of current graduates, our instructors will retrieve the appropriate assignments previously submitted by these students and compile them into a “portfolio”. We will evaluate the portfolios and assign each student a cumulative “GPA” of scores.
- We intend to implement an e-portfolio of all students in our courses beginning fall semester 2013.

C. Other Considerations

- There are predictions that the variety of jobs in environmental sciences and fields related to sustainability will expand substantially in the next decade. Many of these jobs require knowledge of biology, among other disciplines. See our comments on curriculum and faculty needs for environmental sciences.
- Transfer Model Curriculum (TMC) has been drafted for Biology and is in the final comment stages of adoption statewide. The value of these transfer degrees (i.e. guaranteed admission into a CSU) will likely drive more students to take our BIOL 225 and 230 courses. In other fields, Cañada’s AA-T in kinesiology requires students to take BIOL 250 and BIOL 260. Additionally, the college is currently applying for an AA-T in anthropology. This degree requires students to take BIOL 250. As students learn the value of AA-T degrees, it is anticipated that we will see increased demand for our biology courses driven by students coming from non-allied health programs. Coincidentally this is occurring at the same time as we are seeing a leveling off, or decreasing, of demand from allied health students.
- Growing popularity of online courses - Several of the biology courses are now offered online or in hybrid format. We continue to expand this option for more courses (see Section 5C).

7. Action Plan

Include details of planning as a result of reflection, analysis and interpretation of data.

Guidelines:

- Describe data and assessment results for Program Student Learning Outcomes. Analyze and reflect on assessment results for Program Student Learning Outcomes and other measures of Program performance.
- Analyze and reflect on other evidence described in previous sections. Identify the next steps, including any planned changes to curriculum or pedagogy.
- Identify questions that will serve as a focus of inquiry for next year.
- Determine the assessments; set the timeline for tabulating the data and analyzing results.
- Describe what you expect to learn from the assessment efforts.



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- We aim to investigate the possibility of creating a BioJam or Anatomy boot-camp and how to incentivize student participation.
- We aim to implement e-portfolio requirement of our students beginning fall 2013.
- As noted in earlier sections, if we can get data on our students' success and retention according to academic goal, then we can better address ways of increasing success and retention.
- Success of students in the sequence BIOL 230/225 will be examined after the term ends, and discussed in the Fall 2013 term.

8. Resource Identification

A. Faculty and Staff hiring requests

Guidelines:

- Explain clearly and with supporting data showing how hiring requests will serve Department/Division/College needs.
 - Include information from the most recent Comprehensive Program Review or Annual Program Plan, whichever was last year's document.
-
- At present we need a small increase in classified staff funding. We currently have one full time Laboratory Technician and a second who is at 49%. We would like to increase funding for the second position to 50%; this would allow the Technician to earn employee benefits. Doing so would likely reduce the high turnover rate for this crucial position. It would reduce the burden of training new part-time technicians and would ensure high quality and consistent support services for our faculty and students. Additionally, we foresee that at some time in the next six years we will need to expand this position to full-time in order to accommodate anticipated enrollment growth.
 - We request a FT Faculty position to lead development of environmental studies and conservation science courses and potentially, a new degree or certificate in this field. Many sectors of the economy are addressing sustainability by incorporating knowledge of biology, energy, and earth sciences. Conservation studies go beyond management of nature preserves, and we should prepare students to move into those positions. In addition, the GE courses taken by non-majors, BIOL 100 and BIOL 110, should include more curricula directed at increasing students' ability to analyze sustainability claims in popular media. The exact skills/expertise needed by this faculty position may be influenced by two factors: the contributions from Earth Sciences faculty member Susan Mahoney and her contributions toward creating interdisciplinary sustainability curricula, and work that is underway by Raj Lathigara in creating and finding funding for sustainability-related workforce degree and certificate programs. This faculty position would support both the Biological Sciences Program and the College's Global & Sustainable strategic direction.



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- Please note that these are preliminary staffing requests. Complete justification for these positions with accompanying data will be provided if and when the division decides to put these forward in the annual hiring prioritization process.

B. Professional Development needs

Guidelines:

- List faculty and staff professional development activities.
- Describe faculty and staff professional development plans for next year.
- Explain how professional development activities improved student learning outcomes.

Faculty need to stay current in their field by participating in discipline-focused conferences. In addition, the development of new pedagogical tools and curricula may involve: spending compensated time in scientific labs at other institutions to learn current techniques and applications; release time to observe other colleagues teaching, here or elsewhere; attending workshops on specific topics of assessment or new classroom technologies. All of these activities will contribute to better teaching, better achievement of Learning Outcomes, and fulfillment of the College Mission.

Some specific requests of our department faculty for future professional development include the following:

- training in writing more effective exam questions
- training on teaching methods that would serve as alternatives to traditional lecturing (e.g. Flipped Classroom method, inquiry/problem-based learning)

Full-time Faculty Professional Development Activities

Danielle Behonick (BIOL 250, BIOL 260, HSCI 100, HSCI 116)

October 19, 2012 - Attended Northern California Course Identification Numbering System (C-ID) Discipline Input Group (DIG) Meeting (<http://www.asccc.org/events/2012/10/c-id-dig-meeting-north>) to discuss and begin to establish a transfer model curriculum (TMC) for Health Science. The discussions at this meeting (which included creating 2 separate TMCs - one for “Health Science” and one for “Health Education”) have led me to consider whether there is sufficient demand on our campus to establish an A.S. in Health Education (in addition to the A.S. in Allied Health which we currently offer). The Health Science TMC is currently on hold at the state level; considerations about the creation of a this new degree are on hold until this moves forward.

November 14, 2012 - Participated in online webinar through CCC Confer on utilizing the Flipped Classroom model (<http://www.knewton.com/flipped-classroom/>). This has led me to incorporate more “hands-on learning time” in some of my classes rather than all lecturing, and may improve student learning outcomes (data from Spring 2013 has not yet been collected, so that remains to be seen).



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Doug Hirzel (BIOL)

I gave short presentations on PLO assessment and benchmarking performance metrics during January and March Flex days in Spring 2013. In winter/spring 2013 I completed a technical review of 9 anatomy “focus figure activities” for Pearson Education Inc.

Carol Rhodes (BIOL 130, BIOL 132, BIOL 225)

Compass Meeting - General Education: Context, Collaboration, and Competencies. Held at Canada College, March 8, 2013. Discussions of integrative learning across disciplines, role of eportfolios. Result: Along with the eportfolio pilot program at Canada, this has pushed me to begin assembling my own eportfolio, which should improve my understanding of what I will be asking my students to do.

Short Course, Univ of California Museum of Paleontology: Unraveling the Genome: What we've learned and why it matters. Held at UC Berkeley, Feb 23, 2013. I learned of current research and applications of genome sequencing and analysis.

NSF STEM Program Conference to share successful strategies with other STEM grantees, held in Arlington, VA in Oct, 2013. Discussions and networking with people from other NSF STEM Award institutions.

ePortfolio speaker, Dr David Hubert, presented details of how SLCC implemented eportfolios and the effects that have been measured so far. Held at Canada College and CSM, Nov 2 and Aug 15, 2013. These sessions provided a major impetus for Canada's pilot program with portfolios.

Nathan Staples (BIOL 230, BIOL 240, BIOL 260)

I received peer-advice and advice from Ricardo Flores in CIETL on how to use TURNITIN.com for my students to upload lab reports and research papers. I mostly trained myself once I had access (through the Web Access interface), using the help menus and tutorials on the turnitin website. It saves paper, automatically checks for plagiarism, and gives me more flexibility in grading and returning reports/papers to students.

Part-time Faculty Professional Development Activities

Malgorzata Wiesnewska (HSCI 100)

Spring 2013 - Ongoing Data Analysis course, Coursera

C. Classroom & Instructional Equipment requests

Guidelines:



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- List classroom & instructional equipment requested, including item description, suggested vendor, number of items, and total cost.
- Explain how it will serve Department/Program/Division/College needs.
- List the requests (item description, suggested vendor, number of items, and total cost).
- List special facilities and equipment that you currently use and require.

Item	Vendor/Catalog	Unit cost (\$)	No.	Total cost (\$)
Gooseneck lamps	Flinn Scientific (800 452 1261) cat#AP7547	24.55	8	196.40
GenAmp PCR system 9700, 96-well	LIFE TECHNOLOGIES: 800 955 6288 cat#4314879	8010.00	1	8010.00
Office jet 6700e all in one color printer	HP: 888 654 0054 cat# CN583A	139.00	1	139.00
Lung Model with Larynx, 5 Part	3B Scientific cat#VC243 http://www.a3bs.com	321	2	642.00
Skeleton hanger	McMaster-Carr cat#6692A61 http://www.mcmaster.com	19.99	1	19.99
Repair/replacement of broken transducers	Biopac.com 1 reflex hammer #SS36L \$245 2 pulse transducers #SS4LA, \$245 each costs listed for new items; repair/replacement likely less cost 1 airflow transducer #SS11LA, \$395	245	3	1130.00
Biopac software upgrade	Biopac.com	200 for first unit 150 for remaining	6	1053.38
AED trainer with remote (for CPR)	AEDsuperstore.com #PP-AEDT-101-R	170	2	340.00
mammalian skulls,	various carnivores and herbivores	30-200 ea.	10	1,100.00



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1 whole skeleton	http://www.boneroom.com/welcome.aspx?t=sP&p=checkout			
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D. Office of Planning, Research & Student Success requests

Guidelines:

- List data requests for the Office of Planning, Research & Student Success.

We request success/retention data for the biology and health sciences departments disaggregated by:

- race/ethnicity
- gender
- type of student (day vs. evening, full-time vs. part-time or number of units)
- educational background
- goal orientation (especially non-majors vs. majors vs. nursing prerequisite students)

- Explain how the requests will serve the Department/Program/Division/College needs.

Without disaggregation we are unable to set targeted meaningful strategies. This is primarily true for the need to disaggregate by goal orientation. We need to know whether to target our non-majors, majors, or allied health students. One-size-fits-all solutions will not work.

More detailed information about the success and retention of our hispanic students will help us to identify appropriate strategies to raise their participation and success in our programs.

E. Facilities requests

Guidelines:

- List facilities requests.
- Explain how the requests will serve the Department/Program/Division/College needs.

Maintenance Issues:

- Several ceiling lights are missing diffusers in 18-221 and 16-212, and all lights in 16-204. A maintenance request has been issued since Sept. 2010 but, as of this date, no action has yet been taken. The District chose to re-use old light fixtures during the bond renovation so many of our diffusers remain in poor condition or were poorly supported and had to be taken down for safety



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reasons. Unfortunately this disrepair gives our labs an air of neglect and does not reflect highly on the quality of instruction we offer.

- There is a recurring health and safety issue due to the infrequent cleaning of laboratory floors. The use of live microbiological cultures and potentially hazardous chemicals precipitates the need for an increased level of custodial service. The complete lack of regular, professional floor-cleaning in the labs and offices has become quite frustrating.

Modifications of lab space:

- Bldg. 16, lab room 204 (and possibly other labs) is severely lacking in counter space for all of the existing equipment, and there is little to no room left for storing student experiments and cultures. We are investigating installing new, permanent and earthquake-proof cabinets and/or shelving to replace the old free-standing cubbies for students' cultures and other experiments.

New Facilities:

New Science Building

(a new building is referenced in the 2011 Facilities Master Plan [SMCCCD Facilities Master Plan 2011](#) pages 2.18-2.23)

As was described in our comprehensive program review of 2010 and in our annual plans of 2011-12, our current laboratory facilities are insufficient to accommodate significant enrollment growth. We currently have three dedicated biology lab spaces (16-204, 212, and 18-221) in addition to shared use of the partially renovated basement lab in 16-G05. This is one lab fewer than we had prior to the renovations of buildings 16-18. Each of our dedicated biology labs is currently scheduled at or near capacity Monday-Saturday. With creative scheduling (that may or may not work for students' schedules), we have the potential to add only 1-2 course sections per lab space. However, our ability to do so further depends upon the specific course and the time needed for laboratory support staff to set-up and tear-down supplies and equipment. Given the many years needed to fund, plan and build new buildings, it appears that our near and long-term potential for growth is severely limited.

- The anatomy and physiology lab (18-221) needs to be dedicated to anatomy with a new space given to physiology. Students are more successful in anatomy courses if there are "open lab" times in which they can study the models and dissected specimens. This spring 2012 one section of physiology was relocated giving the opportunity for open lab and for use by the honors section of anatomy.
- The basement of building 16 (16-G05) is shared between physics, oceanography, earth science, and physiology. The room is small and accommodates only 24 students in a pedagogically reasonable fashion, although up to 30 can be squeezed in using less-than-ideal configurations. Sharing this space, or the anatomy lab with its use of cadavers, is less than ideal for physiology. Having a dedicated physiology lab would allow, for example, for the presence of exercise equipment (e.g. treadmills) that would facilitate student research experiments in human physiology.
- Scheduling courses in the microbiology and cell biology lab (16-204) is complicated by the requirement that time be given between subsequent class sessions for cell culture growth to occur and for students to enter the lab to monitor these experiments. More workspace (floor and



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countertop) is needed for equipment and incubators. In a new building we would envision labs with an adjoining room(s) dedicated to equipment such as incubators, flow hoods, centrifuges, a large incubated room for students' currently overflowing microbial cultures, and cold room storage.

- If a new building were available, we envision creating a dedicated microscopy center that would enable a variety of courses to use state-of-the-art scopes without the need to equip each and every lab with this expensive equipment.
- The National Science Foundation and other organizations are encouraging investment in undergraduate research and recommend providing research opportunities for students during the first two years of their college career. As our department considers developing honors courses and student research on our campus, we envision the need for having a modest research space. Some research equipment is simply not appropriate to place inside teaching labs and would be better situated in a dedicated research/equipment space. Student independent research projects would need to be separated from our classrooms to allow for flexible scheduling/use by students (while other courses are using the lab rooms) and to ensure integrity of the experimental data.

Most of the courses in our department are taught as double sections. Doing so requires lecture rooms with capacity of at least 60 students. There is a shortage of this sized lecture room on campus. Some of our classes could conceivably be taught as triple sections if larger lecture rooms were available.

The health sciences Phlebotomy program currently shares space with Medical Assisting in a temporary portable building (bldg 20). A permanent space closer to the core of the campus should be made available for both of these programs.

New Native Garden

A Native Garden area adjacent to Building 16 would serve multiple purposes. Three ecosystems will be included: chaparral, grassland, and oak woodland; all three take advantage of the topography and current plants. These ecosystems will permit current biology courses, especially BIOL 110 and BIOL 225, to incorporate field experiments into regular lab sections. Honors students could develop research projects with these areas conveniently available. The Anthropology Dept. will use the native plants to support its curriculum on native peoples in California.

We have a design plan, with details of plantings, that has been reviewed with District and Canada Facilities personnel. Design services were provided by a professional landscape designer with the assistance of the California Native Garden Foundation. This foundation could help with installation, including the coordination of volunteers recruited from the Canada community. Funds of approximately \$30-50K are needed to move forward. These funds would pay for irrigation systems (minimal, as these plants only need supplemental water to get established), soil amendments, and the plants themselves. One grant application was turned down; we continue to look for other funding opportunities.



The purpose of this document is to collect information to be used by the college planning bodies IPC (Instruction Planning Council), APC (Administrative Planning Council), SSPC (Student Services Planning Council), Budget Planning Committee, and CPC (College Planning Council) and may be used for Program Improvement and Viability (PIV). Through this process, faculty have the opportunity to review the mission and vision of their department/program. Then, using multiple measures and inquiry, faculty will reflect on and evaluate their work for the purposes of improving student learning and program effectiveness. This reflection will identify steps and resources necessary to work towards the program vision including personnel, professional development, facilities, and equipment. *Faculty should use their judgment in selecting the appropriate level of detail when completing this document.*

The deadline for submission of the Annual Program Plan to the IPC is March 31. Complete this document in consultation with your Dean who will then submit a copy to IPC. Members of the IPC review the document and return their comments to the author for use in the next annual program plan.

Cañada College

Mission Statement

It is the mission of Cañada College to ensure that students from diverse backgrounds have the opportunity to achieve their educational goals by providing quality instruction in general, transfer, career, and basic skills education, and activities that foster students' personal development and academic success. Cañada College places a high priority on supportive faculty/staff/student teaching and learning relationships, responsive support services, and a co-curricular environment that contributes to personal growth and success for students. The College is committed to the students and the community to fulfill this mission.

Vision

Cañada College ensures student success through personalized, flexible, and innovative instruction. The College infuses essential skills and competencies throughout the curriculum and assesses student learning and institutional effectiveness to make continuous improvement. Cañada responds to the changing needs of the people it serves by being involved in and responsive to the community, developing new programs and partnerships and incorporating new technologies and methodologies into its programs and services.



Document Map:

- 0) Key Findings
- 1) Planning group
- 2) Authors
- 3) Program
- 4) Responses to previous Annual Program Plan & Review (APP&R)
- 5) Curricular Offerings
- 6) Program Level Data
- 7) Action Plan
- 8) Resource Identification



Department/Program Title: Biology & Health Sciences **Date submitted:** March 31, 2014

1. Key Findings: describe overall strengths, challenges and action plans for program

The Biology and Health Science Program has a strong tradition of innovation. Over the years we have experimented with honors courses, learning communities, online and hybrid courses, and field study abroad. Each of these initiatives has had its own rewards but also its own challenges. This year we reluctantly concluded that we must discontinue our offerings in honors and learning communities due to persistent under-enrollment. We remain committed to providing creative learning opportunities and are keenly monitoring the development of GE Themes that might promote enrollment into our 100-level Biology and Health Science courses. We will also be investigating the potential for an Anatomy Academy to improve the success of our students in this gateway course. Finally, we are currently implementing an ePortfolio requirement for all of our 200- and 300-level courses. We are one of only a couple of programs in the college to implement this promising new method of assessment.

The biology program is experiencing a downward trend in enrollment from our peak in 2010/11 and 2011/12. This trend is a reversal of a multi-year expansion of enrollment during which we could not add sufficient sections to meet demand. We are gradually reducing the number of section offerings to match demand but have consequently experienced a decrease in Load. The enrollment decline occurs in both our majors courses as well as in the pre-allied health prerequisite courses. We attribute the decline to changes in the economic and employment atmosphere in our community. Hospitals have not experienced the expected number of nursing retirements due to the recent recession and stock market crash which adversely impacts the outlook for hiring of new nurses. As word spreads that new nursing graduates are failing to find work, demand for our courses diminishes. The reasons for a decline in biology majors courses is more elusive. However declining FTES is observed across the college and may be attributed to increased employment in our region. In this context, the biology and health science faculty will strategically focus on improving student success and equity, preparing our pedagogy and curricula for the time when the economy once again brings growth in enrollments.

1. Planning Group (include PT& FT faculty, staff, stakeholders)

List of names and positions: Danielle Behonick (FT faculty), Douglas Hirzel (FT faculty), Eugenia Lau (PT faculty), Cathy Lipe (FT faculty, STEM Center), Robin Lise-Nielson (PT faculty), Jenna Patton (PT faculty), Carol Rhodes (FT faculty), Nathan Staples (FT faculty), Barry Thomson (PT faculty), Justine Walsh (PT faculty), Paul Welles, Jr. (PT faculty)

2. Writing Team and Contact Person: Danielle Behonick, Douglas Hirzel, Carol Rhodes, Nathan Staples

3. Program Information



A. Program Personnel

Identify all personnel (faculty, classified, volunteers, and student workers) in the program:

FT Faculty Danielle Behonick, Douglas Hirzel, Carol Rhodes, Nathan Staples

PT Faculty FTE (Fall 2013/Spring 2014): Lisa Bjerknes (0.56/0.4), Harold Borrero (0.33/0.2), Jett Chinn (0.52/0.52), Gary Ciambrone (0.36/0.36), Sara Cooper (0.37/0.72), Jenny Fichmann (0.52/0.2), Jeanette Green (0.52/0.52), Eugenia Lau (0.2/0.2), Robin Lise-Nielsen (0.2/0.2), Diego Nieto (0.36/0.36), Jenna Patton (0.4/0.47), Barry Thomson (0.56/0.36), Tamas Torok (0.36/0.36), Justine Walsh (0.52/0.2), Paul Welles (0/0.36), Malgorzata Wisniewska (0.2/0)

FT Classified Angela Gibson

PT Classified (hrs/wk) Susan White (18 hours/week)

Volunteers n/a

Student Workers n/a

B. Program mission and vision

Include the purpose of the program, the ideals the program strives to attain, and whom the program serves. The program mission and vision must align with the college's mission and goals. (200 word limit)

MISSION:

The Biological Sciences Program provides well-supported, personalized, interactive, and hands-on instruction in the life sciences that is accessible to a very diverse student population. We share our own enthusiasm for biology and use multi-faceted and rigorous approaches to education to help enhance or instill in students a driving curiosity that leads them to fully explore the wonders of the living world. With guidance, personalized instruction, and their own self-motivation and empowerment to learn, students will be prepared for professional programs and more advanced academic degrees in the biological, natural, and health sciences.

VISION:

The Biological Science Program incorporates current computer and laboratory technology and methods into our curriculum. We challenge our students to meet the expectations of a rigorous curriculum and ourselves, as faculty, to maintain high educational standards and to stay current in the biological sciences. To meet the challenges of a continually diversifying, and ever-growing student population, we continue to look forward and plan consistent evaluation and modifications to our curricula and provide continually



updated methodologies and equipment to meet the burgeoning employment demands of the community and to prepare students seeking degrees and employment in the biological, natural, and health sciences.

C. Expected Program Student Learning Outcomes

Tool: **TracDAT folders in the SLOAC sharepoint.** Click on the link below to access your folder and log in with your complete smccd e-mail account, ex:smithj@smccd.edu and password <http://sharepoint.smccd.edu/SiteDirectory/CANSLOAC>

1. Use the Scientific Method to investigate biological questions and critically evaluate and effectively communicate scientific data.

Assessments:

- BIOL 225 full lab write-up (C. fern lab)
- BIOL 230 full lab write-up (enzymology lab)
- BIOL 310 research paper on heart disease and diabetes
- BIOL 260 full lab write-up (electromyography lab)

2. Recognize and explain the evolutionary connections between biological structures and their function and between organisms and their environment.

Assessments:

- BIOL 225 essay questions on exams
- BIOL 230 essay and multiple choice questions on exams (structure/function of molecules and organelles)
- BIOL 250 exam essay question on relationship between epithelial structure and function

3. Critically evaluate biological information and examine its significance and impact on society and the environment.

Assessments:

- BIOL 225 persuasive essay
- BIOL 230 exam essay question
- BIOL 240 exam essay question

4. Response to Previous Annual Program Plan & Review

Tool: <http://sharepoint.smccd.edu/SiteDirectory/canio/ipc>

(log in with your complete smccd e-mail account, ex: smithj@smccd.edu and password)

There were no recommendations for improvement in our 2013 Annual Program Plan.

5. Curricular Offerings (*current state of curriculum and SLOAC*)



All curriculum and SLOAC updates must be completed when planning documents are due.

SLOAC = Student Learning Outcomes Assessment Cycle

Tools: **TracDAT folders in SLOAC** sharepoint

<http://sharepoint.smccd.edu/SiteDirectory/CANSLOAC>

Curriculum Committee <http://sharepoint.smccd.edu/SiteDirectory/cancurriculum/>

A. Attach the following TracDat and Curriculum data in the appendix: describe status of course SLO assessments - do all courses have current assessment results? are all course SLOs being assess on a regular planned cycle? please give an example of how course SLO assessments have led to improvements

- List courses, SLOs, assessment plans, and results and action plans (See Sharepoint site with Tracdat Report of 3_3_14)
- SLO status: Among 11 BIOL courses, SLO results are posted for nearly all of the course SLOs. Five courses have no results posted for only one SLO; four courses have 3 or more SLOs with no results yet. All 11 courses need to restart the assessment cycle in order to assess all course SLOs within a 4-year period, and this is the fourth year for many of these courses. Among 9 HSCI courses, 6 courses (HSCI 104, 105, 430, 431, 480, 481) have no results posted for any SLOs. This is partly due to the irregular frequency with which these courses are held.
- SLO example: BIOL 132 microscope operation - The lab practical scores were low, so more emphasis was put on teaching and reviewing correct technique during several labs. Scores improved for the term this was implemented.
- List courses with COR's over 6 years old (attach documents from [Curriculum Committee](#))
None of our CORs are over 4 years old.

B. Identify Patterns of Curriculum Offerings

Guidelines: What is the planning group's 2-year curriculum cycle of course offerings by certificates and degrees? What is the ideal curriculum cycle? Discuss any issues.

Curriculum cycle:

- Students majoring in biology or health science can take every transfer-level major's course every semester. This enables maximum flexibility to accommodate students' schedules and allow completion of prerequisite courses.
- Students who want to take a GE biology or health science course will have at least one such course every semester.

COR updates:

- BIOL 250 Human Anatomy and BIOL 260 Human Physiology were updated during the 2012-2013 school year to comply with C-ID course descriptors. As of February 2, 2014



the C-ID descriptors for these courses have been revised to eliminate all prerequisites. The impact of this revision on our courses has yet to be determined.

- Computerized prerequisite blocking for BIOL 250 & BIOL 260 was enabled as of Fall 2013. While this change was made with the intention of boosting retention and/or success rates for students in these courses (by ensuring their successful completion of prerequisites) there has been little change observed in these rates for either course during the past 5 years. Since 2008-2009, the success rate for BIOL 250 has hovered around 60% (range 56-61%) while the retention rate had, until last year, remained above 70% (range 67-78%). Since 2008-2009, the success rate has remained at or above 80% (range 80-85%) while the retention rate has remained at or above 87% (range 87-91%).

New courses and updates since last Program Review:

- As reported in previous Annual Program Plans, HSCI 116 Women's Health Issues was first offered in Spring 2012 but was cancelled due to insufficient enrollment. It was then offered again in Fall 2012 with significantly more promotion/advertisement to students taking Biology courses (e.g. BIOL 250, BIOL 260) as well as the medical assisting program (e.g. MEDA 110) during the preceding semester. The course ran with a final headcount of 24 students. The course was then offered again in Fall 2013 but was cancelled due to insufficient enrollment. The course was then offered in Spring 2014 with the most promotion/advertisement thus far and is currently running with a headcount of 16 students.
- The BIOL 250-260 Learning Community, in which students concurrently enroll in both courses, failed to achieve sufficient enrollment in any of the three semesters it was offered (Fall 2012, Spring 2012, Fall 2013). Anecdotally, it appears that many students are unable to carve out such a large block from their schedules in order to take the two classes concurrently. We will no longer pursue this alternative schedule offering.
- Failures to achieve sufficient enrollment in honors sections of BIOL 130 and 250 have led the department to abandon efforts in these areas. Faculty will still make Honors Contracts available to interested students.
- INTS 180 (renumbered from INTS 100) was not offered Fall 2013 because of low enrollment. We should rethink the target student for this course, and either revise the curriculum or the recruitment effort.
- Although the District requires BIOL 225 as a prerequisite for BIOL 230, the professors at Cañada prefer students to take these courses in the opposite order. This is accomplished solely by emailing students who enroll in BIOL 225 to get a waiver signed and take BIOL 230 first. Counselors are reminded each term about this preference. Currently, about 50% of BIOL 225 students take BIOL 230 before enrolling in BIOL 225. With more communication to students earlier in their academic planning, this proportion may increase.

6. Program Level Data



A. Data Packets and Analysis from the Office of Planning, Research & Student Success and any other relevant data. Identify the semester data packet you are using and the specific Tables you are referring to in your report.

Tool: http://www.canadacollege.edu/inside/research/programreview/info_packet/info_packet.html

Guidelines: The data is prepared by the Office of Planning, Research & Student Success and is to be attached to this document. Include the following:

- Describe trends in the measured parameters
- Reflect and analyze causes of trends.

Biology Department

- Course enrollments, student headcounts, and section offerings all peaked in the 2011 calendar year and dropped by a few % to 11% in the 2012-2013 Academic year. From fall 2011 to fall 2012, student headcounts and total course enrollments dropped 11% (975 to 878, and 1121 to 1009 respectively). College-wide, enrollments and section offerings have remained more steady, and even continued to increase in Spring 2013, though only by about 1%. BIOL Departmental efficiency has shown a several % decline in WSCH in 2012-2013 since the the peak in the previous year (notably down 12.6%, from 5968 to 5297 from Spring 2012 to Spring 2013). Since 2010/2011 FTES has declined 7.5%-12% in fall and spring respectively, and Load has declined 27% from fall 2010 to fall 2012, and declined 29% from spring 2011 to spring 2013. This trend of decline in BIOL is apparently continuing in the current calendar year, especially in 200-level courses, probably due to a glut in the Allied Health/Nursing job markets (based on anecdotal evidence from former students). The Department of Biological Sciences needs to look more into the current job market trends for Biological Science-related careers to better predict enrollments and potential course offerings for Biology/Natural Sciences majors and explore offerings in more technically and environmentally-oriented courses. Average enrollment per section, though fewer sections are offered, has held fairly steady at about 24-25 per section in fall semesters and around 29 per section in the spring semesters.
- Student retention and success have maintained fairly consistent rates for the last 4 years: success has had slight increases since 2010 but has mostly held in the 66-69% range, while retention has held in the 79-82% range. These rates are 1-2% lower than the College as a whole. The Dept. of Biological Sciences has a short-term goal to raise success and retention rates in the next few years, beginning with being more attentive to individual student needs and more actively directing students to the many available campus resources (eg: WebSMART Early Alert, Learning Center, STEM Center, DRC) to improve their academic success.
- The last 4 years have shown a fairly consistent rise in Continuing Students (by 8 percentage points) in both fall and spring semesters, with spring having the highest %age continuing students with 74% in Spring 2013. These increases are met by corresponding decreases (near 7 %age points) in



first-time students, down to 10% in Spring 2013. These patterns of continuing student increases are similar but higher than the percentages of continuing students in the College as a whole, which had 69% continuing students in Spring 2013. The Science and Technology division is doing a better job of keeping our students, with more developed programs that include required chemistry/organic chemistry, math/calculus, and physics for our transferring BIOL students. Continued outreach is needed to keep more first-time, new students entering our programs.

- Student goal orientation shows an upward trend in Transfer-oriented students for the last four years, both College-wide and in the department. However, the total percentage of students planning to Transfer is much higher among BIOL students (up 15 %age points to 52% in Spring 2013) than the College-wide percentage (up 7 %age points to 19%). Students with goals in career (~25%) and educational development (~6%; holding near 26% college-wide) have held steady, while 4 year college students in our programs have dropped 11 %age points to 6%. The trend of more transfer-oriented students is consistent with our Program Mission and goals to prepare students and help them gain admission to 4 year Bachelor's, pre-professional, and/or graduate programs.
- Ethnic Demographic data reveal growth of Hispanic student population from 24% to 30% during the last 4 years (still 8 percentage points behind the College-wide data). Meanwhile, students identifying themselves as Filipino or Unknown dropped several %age points, likely due to a much greater %age (up 11-13 %age points!) identify themselves as Multi-Racial. Overall, the BIOL Program seems to represent well the overall demographic of the college, and is making progress in attracting the Hispanic students that make up a large percentage of the local community.
- The BIOL Program has held constant at about $\frac{2}{3}$ (67%) female population and $\frac{1}{3}$ (33%) male population for the last 4 years, which is about 5 %age points more female students (and fewer male students) than college-wide. With respect to age demographics, in the same time period BIOL has jumped 10%age points in 20-24 year old students to 46%, showing a surge in younger generation students, while the college has had a more moderate 5%age point increase to only 31%. The 18/19 year old group has also grown about 5%, further showing a surge in younger students taking BIOL courses. This is a trend represents a positive outlook for future enrollments of continuing students.
- Regarding the Educational Attainment background of enrolled students from 2008/2009 academic year to 2012/2014 academic year, students in the BIOL program and campus-wide have shown an increase of 6-9 %age points in the High School degree/equivalent category and several percentage point drops in the post secondary degree enrollees. High School degree attainees make up 65% to 68% of BIOL enrollees in 2012/2013, and ~59% campus-wide. This indicates that our programs and college are seeing more students fairly recently graduated from high school seeking entry into our Program(s). This is consistent with our noted increases in the 18-24 year old age categories, and decline in older student enrollments. Younger students are looking to our college and Program as avenues to their educational and career goals, and this again trends towards a very positive outlook for future enrollments Program- and Campus-wide. Continued outreach to the community, especially local high schools, will be necessary to keep our programs growing and to spread news of promising careers in the Biological and Natural Sciences, outside of the recently declining positions in Nursing and Allied Health.



Health Science Department

- According to data released by the Office of Planning, Research and Institutional Effectiveness, the Health Science department's Discipline Success rates were 100% for Summer 2012, 84% for Fall 2012 and 84% for Spring 2013. These all fall above the success rates of the Science and Technology Division for the same semesters (Summer 2012 - 72%, Fall 2012 - 65%, Spring 2013 - 68%). It is notable that during the Spring 2013 semester, disparities can be seen in the success rates of African American (57%) and Pacific Islander students (60%) in Health Science courses, as compared to the overall population of Health Science students. This is consistent with disparities observed for the Science and Technology Division, where a disparity in success rate can be observed for each racial/ethnic group except Asian and white for at least one of the semesters surveyed.
- In 2012/13 our total enrollment of students in the Health Science department (499 students) increased slightly from 2011/12 (471 students), but remained lower than enrollment for 2009/10 (557 students). As of Spring 2013, average enrollment per section had increased back to 29.0 students/section, which puts it in the middle of the range of values seen for this measure over the past 5 years (range 23.2 - 33.7 students/section). These fluctuations observed over the 5-year cycle relate to changes in the number of concurrent enrollment Health Science classes taught at local high schools, which affects enrollment and headcount. They also reflect the cancellation of HSCI 116 (due to low enrollment) for several subsequent semesters during the 2010-2013 period, which resulted in the running of 1 less HSCI course during the affected semesters, as well as decreases in enrollment seen at the College overall.
- FTES and LOAD in Health Science have shown consistent declines since Spring 2011. These trends in FTES and LOAD are consistent with those seen for the college as a whole.
- Over the past 5 years, one of the greatest changes in the profile (enrollment status, goal, gender, age, ethnicity, educational level, etc.) of students attending our program is the loss of a number of concurrent enrollment programs. This has resulted in a shift in the makeup of Health Science students with respect to enrollment status, as a greater proportion of this group is now comprised of Continuing Students (55% in Spring 2009 as compared to 74% in Spring 2013). The proportion of First-time Students we serve has decreased (12% in Spring 2009 as compared to 3% in Spring 2013) and the proportion of Returning Students has increased (8% in Spring 2009 as compared to 14% in Spring 2013). It is therefore not surprising that the goal orientation of students in Health Science courses has also shifted since Spring 2009 to show greater amounts of students in the Transfer (37%) and Career Development (36%) tracks. While the Educational Attainment Level of many of our students has remained relatively consistent since 2009 - we continue to serve a consistent proportion of students with a high school degree or equivalent (46% in Spring 2009 as



compared to 52% in Spring 2013) and students with no high school degree (12% for both time periods) - we have seen a dramatic decrease in the proportion of concurrently enrolled students in our department (26% in Spring 2009 as compared to 10% in Spring 2013).

- The department has remained relatively consistent for the past 5 years with respect to the ethnic makeup of our student population. The major notable difference in the composition of our student population is that more of our students identify as multi-racial as compared to 5 years ago (1% in Spring 2009 as compared to 12% in Spring 2013). This is consistent with the overall trend observed for the college during this time period (4% multi-racial students in Spring 2009 as compared to 11% multi-racial students in Spring 2013). It is also notable that our programs disproportionately attract Hispanic students, as the proportion of Hispanic students enrolled in Health Science courses in Spring 2013 (58%) was greater than the proportion of Hispanic students enrolled at Cañada (38%) for that same time period. Females (73% in Spring 2013) also continue to make up a greater proportion of students enrolled in Health Science as compared to males; this proportion is greater than the proportion they comprise of the college-wide student population (61% in Spring 2013). The age ranges served by Health Science courses remained consistent between 2009 and 2013 and was consistent with campus-wide trends.
- All of these demographic data are useful to consider in planning for new course offerings in the Health Science department.

B. Analyze evidence of Program performance. Explain how other information may impact Program (examples are business and employment needs, new technology, new transfer requirements)

Tool: **TracDAT folders in SLOAC** sharepoint

<http://sharepoint.smccd.edu/SiteDirectory/CANSLOAC>

Guidelines:

- Explain how the assessment plan for Program Student Learning Outcomes (listed on #3c) measures quality and success of each Program.
 - Summarize assessment results of Program Student Learning Outcomes.
 - Describe and summarize other data that reveals Program performance.
 - Explain how changes in community needs, technology, and transfer requirements could affect the Program.
- An essay assignment that addresses PLO 3 was assessed for 4 graduating students in Bio 225. Scores averaged 3.2 using a 4-point rubric. Suggested actions were to clarify assignment requirements and allow more time following the case study activity in class. Criteria met.
 - Other PLOs were not assessed, apparently due to not saving the student assignments until the list



of graduates could be obtained. Since this direct assessment includes only Program graduates, this issue will occur every term. Even if various assignments were preserved, there was no plan in place for establishing one rubric to apply to student work from different classes. The original plan for assessment seems to be unwieldy.

- Current efforts focus on requiring students to produce portfolios, including posting of assignments that demonstrate achievement of PLOs. Students in Bio 240, 225, 250, 260, and honors 250 are being required to prepare portfolios this term. Assessment of graduates' portfolios will be done by faculty in late May or August. The collected data from this initial effort may not accurately reflect PLO achievement, but it should be useful for improving the portfolio process.

C. Other Considerations

- The Curriculum Committee is currently examining possibilities of creating “GE Themes” that would provide focussed collections of GE courses. We will actively pursue possible inclusion of BIOL 100, HSCI 104 and HSCI 116 into such themes as doing so may increase enrollment into these courses.

7. Action Plan

Include details of planning as a result of reflection, analysis and interpretation of data.

Guidelines:

- Describe data and assessment results for Program Student Learning Outcomes. Analyze and reflect on assessment results for Program Student Learning Outcomes and other measures of Program performance.
 - Analyze and reflect on other evidence described in previous sections. Identify the next steps, including any planned changes to curriculum or pedagogy.
 - Identify questions that will serve as a focus of inquiry for next year.
 - Determine the assessments; set the timeline for tabulating the data and analyzing results.
 - Describe what you expect to learn from the assessment efforts.
- As described previously in #6B, the Department is phasing in the implementation of an ePortfolio requirement that will greatly facilitate PLO assessment. We will review the portfolios during fall 2014 semester and report our findings on our next annual plan.
 - The Department will create/update existing Biology “cheat sheets” to better assist Counseling staff in guiding students who are Biology majors in choosing their courses.
 - Several members of the department, under the leadership of Doug Hirzel, will apply for a Focused Inquiry Network (FIN) through CIETL to investigate the feasibility of creating an Anatomy Academy to better prepare students for BIOL 250. According to data released by the Office of Planning, Research and Institutional Effectiveness, there are disparities in the success rates for particular ethnic/racial groups in this course - in particular, African American and Hispanic students



- and the intent of such a preparatory program would be to help address these disparities.

8. Resource Identification

A. Faculty and Staff hiring requests

Guidelines:

- Explain clearly and with supporting data showing how hiring requests will serve Department/Division/College needs.
 - Include information from the most recent Comprehensive Program Review or Annual Program Plan, whichever was last year's document.
-
- Due to declining enrollments and reductions in the number of laboratory sections being offered, we are no longer requesting an increase in our Laboratory Technician from 49% to 50%.
 - It had been anticipated that a new ENVIS or sustainability program would be developed at the college. Since neither has yet occurred, we are no longer requesting a FT faculty position to support the biological courses within this interdisciplinary program.

B. Professional Development needs

Guidelines:

- List faculty and staff professional development activities.
- Describe faculty and staff professional development plans for next year.
- Explain how professional development activities improved student learning outcomes.

Some specific requests of our department faculty for college-wide professional development include the following:

- training in writing more effective exam questions
- training on teaching methods that would serve as alternatives to traditional lecturing (e.g. Flipped Classroom method, inquiry/problem-based learning)

Danielle Behonick (BIOL 250, BIOL 260, HSCI 100, HSCI 116)

Professional development activities 2013-2014

August 6, 2013 - TeamUp/Cengage Learning Webinar: [From Icebreakers to Topic Starters](#)

1 hour-long teleconference focusing on making lecture courses more interactive. This course inspired me to brainstorm more “Think/Pair/Share” activities which I have begun to use in my courses this year.

August 11, 2013 - Edcamp SF Bay, Hillsdale High School <http://www.edcampsfbay.org/>

A day-long “un-conference” focusing on current technologies and techniques in teaching, mostly for K-12



teachers. This increased my exposure to the Flipped Classroom model and made me begin thinking about additional use of technology in my courses. This conference convinced me that having an online presence as a professional educator is important and I have since joined the community of educators utilizing Twitter and the blogosphere as part of my teaching.

9/8/13 - 10/13/13 - Coursera Class offered by UCSF School of Nursing: Contraception: Choices, Culture and Consequences

A 5-week-long online course covering background on female reproductive anatomy and physiology as well as current practices and methods in birth control. I took this course to prepare for teaching HSCI 116 Women's Health Issues during the Spring 2014 semester. This course has influenced my choice of textbook for the course as well as how I will present the material on contraception.

Carol Rhodes (BIOL 130, BIOL 132, BIOL 225)

Professional development activities 2013-2014

June 2013 - Association of Biology Lab Educators Conference

As a result, I plan to add a section on mechanics to a skeletal lab and possibly add a DNA Barcode of Life lab to Bio 225.

Spring 2014 - Introduction to Bioinformatics, UCSC Extension; iPlant seminars

The ultimate goal is to improve my understanding of this expanding field and to incorporate a related activity into Bio 225.

Planned professional development activities

June 2014 - Association of Biology Lab Educators Conference, Genetics or Genomics conference not yet selected.

Nathan Staples (BIOL 230, BIOL 240, BIOL 260)

Professional development activities 2013-2014

January/February 2014 - E-portfolio training

I've participated in two workshops by CIETL and Jane Rice for developing and using E-Portfolios in the classroom for student PLO evaluations, and also spent many hours in March 2014 self-training to develop my own personal e-Portfolio. I now am well-experienced and ready to answer students' questions in developing and managing their own e-Portfolios as required for SLO and PLO evaluation. I've also had Jonathan MacSwain present to my students how to start building their e-Portfolio sites. The e-Portfolio is now a required part of my BIOL 260 and BIOL 230 courses.

Doug Hirzel (BIOL 250, BIOL 260, HSCI 432)

Professional development activities 2013-2014

January 2013 - I provided technical review services for 9 Focus Figure Activities within Pearson's MasteringA&P product.



April 2013 - Renewed certification as BLS Instructor with the American Heart Association so that I can continue to offer HSCI 432.

November 2013 - Academic Senate California Community Colleges Fall Plenary

March 2014 - League for Innovation in Community College, 2014 Innovations Conference

C. Classroom & Instructional Equipment requests

Guidelines:

- List classroom & instructional equipment requested, including item description, suggested vendor, number of items, and total cost.
- Explain how it will serve Department/Program/Division/College needs.
- List the requests (item description, suggested vendor, number of items, and total cost).
- List special facilities and equipment that you currently use and require.

<i>Item</i>	<i>Vendor/Catalog</i>	<i>Unit cost (\$)</i>	<i>No.</i>	<i>Total cost (\$)</i>
Human Smooth Muscle Slides	Carolina #313358	7.05	10	70.50
Human Skeletal Muscle Slides	Carolina #313316	6.75	10	67.50
Human Cardiac Muscle Slides	Carolina #313424	8.00	10	80.00
Human Sperm Smear Slides	Carolina #316590	8.50	5	42.50
Human Muscular arm model	Carolina #566713	357.00	1	357.00
Human ear model	Carolina #566966	175.00	2	350.00
Altay shoulder girdl with musculature	Carolina #566714	149.50	1	149.50
slide, fern leaf XS	Triarch A-214A-2	4.50	10	45.00
slide, snake skin	Triarch ZM1-24	3.60	10	36.00



Didactic Human skull - magnetic	shopanatomical.com #EZ-Z4708	374.25	1	374.25
Sarcomere Model	Denoyer.com #AP79	1004.00	1	1004.00
Human Skin model	Carolina, #567666	562.00	1	562.00
Human Eye model	Carolina, #566953	400.00	1	400.00
Human heart model	gtsimulators.com #G12	354.00	4	1416.00
Bone - sphenoid	Wardsci #823586	82.50	2	165.00
Bone - temporal	Wardsci #823584	63.50	2	127.00
Bone - maxilla	Wardsci #823585	95.95	2	191.90
Bone - humerus	Wardsci #823880	39.95	2	79.90
Bone - ulna	Wardsci #823882	17.95	2	35.90
Wheeled luggage	Costco - 29" hardside spinner (for transporting CPR supplies to classrooms)	130.00	1	130.00

With the exception of the final item in the table, all items are requested to support BIOL 132, 225, 250 and 260. Bone models are to augment existing specimens to ensure that there are sufficient specimens for each pair of students to study. Most other items are to replace existing aging models/slides that are losing educational value due to degradation. Some items are new to the lab courses. All items will provide enhanced learning opportunities for kinesthetic learners. For example, a recent study comparing the use of real human hearts, to plastic models, to virtual hearts showed that while students most enjoyed learning from real hearts, they learned better from plastic models. We need both real specimens and models to adequately teach our students.

D. Office of Planning, Research & Student Success requests

Guidelines:



- List data requests for the Office of Planning, Research & Student Success. include any requests you have for assistance in pursuing or writing grants

We request success/retention data for the biology and health sciences departments disaggregated by goal orientation: non-majors, majors, nursing prerequisite students. We expect that these data will be available in the new Data Dashboard.

- Explain how the requests will serve the Department/Program/Division/College needs.

Without disaggregation we are unable to set targeted meaningful strategies. This is primarily true for the need to disaggregate by goal orientation. We need to know whether to target our non-majors, majors, or allied health students. One-size-fits-all solutions will not work.

E. Facilities requests

Guidelines:

- List facilities requests.
- Explain how the requests will serve the Department/Program/Division/College needs.

Maintenance Issues: (These are unresolved since previous APPs)

- Several ceiling lights are missing diffusers in 18-221 and 16-212, and all lights in 16-204. A maintenance request has been issued since Sept. 2010 but, as of this date, no action has yet been taken. The District chose to re-use old light fixtures during the bond renovation so many of our diffusers remain in poor condition or were poorly supported and had to be taken down for safety reasons. Unfortunately this disrepair gives our labs an air of neglect and does not reflect highly on the quality of instruction we offer.
- There is a recurring health and safety issue due to the infrequent cleaning of laboratory floors. The use of live microbiological cultures and potentially hazardous chemicals precipitates the need for an increased level of custodial service. The complete lack of regular, professional floor-cleaning in the labs and offices has become quite frustrating.

New Facilities:

- The Department is currently working with District planners on the design of a new science building. Below are the needs identified by the department:
 - A dedicated physiology lab. New physiology lab includes space for exercise equipment (e.g. 3-6 treadmills) and Biopac data collection. Space for a small fridge/freezer in the physiology lab. We need to be able to schedule both morning and afternoon section of physiology lab. If this means we need two labs, then we need a second space as well which could be shared with other bio labs (e.g. 132). Ice machine needed near the physiology lab (same floor of building).



- 18-221 becomes a dedicated anatomy lab. We need to be able to schedule both morning and afternoon section of anatomy lab.
- New ceiling lights in 18-221 including lighting over cadaver area.
- More room in the labs. There is not enough space between benches for safe circulation of students, especially when carrying materials.
- Equipment room with large items like incubators, growth chamber for plants with controllable light and temp.
- An incubator ROOM for cultures – with lots of shelves on the walls and a UV light on a bench inside for keeping a semi-aseptic area. This would be for all of our 30-37 degree incubations for BIOL 240 and 230.
- Small lab where students could do independent study projects without having to schedule around classes using the lab rooms.
- Lots of spaces between student benches, plenty of cabinets for supplies, cubbies for microscopes and basic student supplies (like we have now), and plenty of flexible counter space for common supplies and smaller equipment (water baths, microcentrifuges, shakers, etc.). I'd also like the instructor benches to have plenty of drawers and shelves (maybe even compartmentalized drawers for various supplies and instruments).
- The building should not just have gas and air but DISTILLED WATER and VACUUM outlets as well built into its system
- Workbench level ventilation system for dissections (same setup as Skyline biology, at bench level not overhead)
- More cabinet and drawer space to free up counter space for students as well as equipment setup
- The three partitioned prep rooms work well with one of them having the autoclave and dishwasher and another as a dedicated clean room (we have two clean hoods, so a space large enough for the two).
- Separate stockroom with office space next door to the labs (same design as the present one works fine) that includes ventilated storage cabinets for the preserved specimens (same design as Skyline biology).
- Large lecture rooms for at least 65 students for double sections; one room that could hold triple sections: 95 students.

New Native Garden

A Native Garden area adjacent to Building 16 would serve multiple purposes. Three ecosystems will be included: chaparral, grassland, and oak woodland; all three take advantage of the topography and current plants. These ecosystems will permit current biology courses, especially BIOL 110 and BIOL 225, to incorporate field experiments into regular lab sections. Honors students could develop research projects with these areas conveniently available. The Anthropology Dept. will use the native plants to support its curriculum on native peoples in California.

We have a draft design plan, with details of plantings, that has been reviewed with District and Canada



Facilities personnel. Design services were provided by a professional landscape designer with the assistance of the California Native Garden Foundation. This foundation could help with installation, including the coordination of volunteers recruited from the Canada community. Funds of approximately \$30-50K are needed to move forward. These funds would pay for irrigation systems (minimal, as these plants only need supplemental water to get established), soil amendments, and the plants themselves. One grant application was turned down; we continue to look for other funding opportunities.



Program Review - Instructional Program Plan

Program Title Biological & Health Sciences

Lead Contact Person Doug Hirzel

Writing Team Dani Behonick, Carol Rhodes, Nathan Staples

Executive Summary

Please summarize your program's strengths, opportunities/challenges, and action plans. This information will be presented to the Board of Trustees. (1000 word limit)

[Click here to enter text.](#)

Program Context

1. Mission: Please identify how your program aligns with the college's mission by selecting the appropriate check box(es):

Career Technical Basic Skills Transfer Lifelong Learning

If your program has a mission statement, include it here.

MISSION STATEMENT: The Biological Sciences Program provides well-supported, personalized, interactive, and hands-on instruction in the life sciences that is accessible to a very diverse student population. We share our own enthusiasm for biology and use multi-faceted and rigorous approaches to education to help enhance or instill in students a driving curiosity that leads them to fully explore the wonders of the living world. With guidance, personalized instruction, and their own self-motivation and empowerment to learn, students will be prepared for professional programs and more advanced academic degrees in the biological, natural, and health sciences.

VISION: The Biological Science Program incorporates current computer and laboratory technology and methods into our curriculum. We challenge our students to meet the expectations of a rigorous curriculum and challenge ourselves, as faculty, to maintain high educational standards and to stay current in the biological sciences. To meet the challenges of a continually diversifying and ever-growing student population, we continue to look forward and plan consistent evaluation and modifications to our curricula. We provide continually updated methodologies and equipment to meet the burgeoning employment demands of the community and to prepare students seeking degrees and employment in the biological, natural, and health sciences.

2. Articulation: Describe how your program's articulation may be impacted by changes in curriculum and degree requirements at high schools and 4-year institutions. Describe your efforts to accommodate these changes.

- Transfer Model Curriculum (TMC) templates for Biology and Nutrition & Dietetics were released in early February 2015. Proposals to create these transfer degrees for our campus are currently in the Curriculum Approval Process and will be discussed/potentially approved at the March 13, 2015 Curriculum Committee meeting. Once these degrees are locally approved they will be submitted to the state for approval and implementation. Neither degree requires the creation of new courses and both may stimulate additional interest in our department from prospective students.
3. Community and Labor Needs: Describe how changes in community needs, employment needs, technology, licensing, or accreditation affect your program. CTE programs should identify the dates of their advisory group meetings.
- Our allied health core courses (Human Anatomy, Human Physiology, Microbiology, Nutrition) are experiencing a shift in their student populations away from pre-nursing to other allied health programs. In particular, an increase in kinesiology students has been noted in these courses as a result of our campus offering the AA-T in Kinesiology (BIOL 250 and BIOL 260 are Core Courses for this degree). As such, the full-time faculty that teach these courses (Prof. Hirzel and Prof. Behonick) plan to liaise with faculty in the Kinesiology Department as well as campus athletics coaches to discuss strategies for helping these students succeed (particularly those who are student-athletes).
 - Our department has explored the possibility of offering a biotechnology program and the demand for graduates of such a program. Our most recent conversations suggest that local biotech companies do not have a demand for Associate's Degree-level graduates and are primarily seeking employees with at least a Bachelor's degree. We are in continuing conversation with Jonathan Bissel of Community, Contract, and Continuing Education regarding biotech industry needs.

Looking Back

4. Curricular Changes: List any significant changes that have occurred in your program's curricular offerings, scheduling, or mode of delivery. Explain the rationale for these changes.
- In Fall 2014 we began offering BIOL 260 in the mornings and continue in Spring 2015. For the past several years we have offered this course in the afternoons only due to scheduling conflicts with BIOL 250 which shares a laboratory space. With the acquisition of 16-005 as a joint Biology/Geology laboratory space and with a declining number of sections, we took the opportunity to provide students with the morning course which frees students' afternoons for other courses or work.
 - We have developed online sections of BIOL 100 and 310. Enrollments in BIOL 310 were 31 and 37 for fall/spring. We plan on offering BIOL 100 online for the first time this summer.
 - The AS-T for Biology is currently in the Curriculum Approval process and will be submitted for approval by the state upon approval from the campus Curriculum Committee. The AS-T for Nutrition & Dietetics is currently in the Curriculum Approval process and will be submitted for approval by the state upon approval from the campus Curriculum Committee. The latter ADT is new to the college and the district. The degree did not require us to create any new courses so implementation is straightforward. We hope that this new degree will spark interest in students



who may wish to pursue transfer to a four-year nutrition program at a CSU (e.g. the B.S. in Nutritional Sciences at San Jose State University).

5. Progress Report: Provide your responses to all recommendations received on your last program review and report on progress made on previous action plans and toward your strategic goals.
Link: [2013-2014 Program Plan and Feedback forms](#)

Recommendation/Feedback: “The assessments for the SLOs for the 6 HSCI courses need to be assessed ASAP at the end of each semester the course is offered. Also, there are BIOL courses that also need to be assessed as there is no data for the past two plus years.”

Response: Please see comments for question 9 for details. For the Health Science department a major challenge in this area is the low number of full-time faculty. There is only one full-time faculty member in Health Science; she is shared with the Biology department and she has not been teaching HSCI courses consistently since 2012. The remainder of the courses are taught by part-time faculty, many of whom do not enter SLO data regularly. Similarly, the Biology courses for which SLO data is missing are those taught by rotating part-time faculty. We will work this year to hold all faculty accountable for doing SLOAC. We will also request a full-time faculty Biology position to take ownership of the curriculum and assessment of the introductory biology courses.

Recommendation/Feedback: “Cannot locate a plan for necessary curriculum development.”

Response: We are unsure what plan the reviewer refers to. We continuously update our curriculum as needed indicated either by internal analysis or C-ID/TMC.

Recommendation/Feedback: “Would recommend development of a Bio Tech major to increase enrollments in the discipline. Further, we should be connecting industry partners in Redwood City to the college in the development of this discipline.”

Response: Please see comments for question 3. Community & Labor Needs.

Recommendation/Feedback: Regarding Departmental Action Plans, “skeletal plan developed for Biology, need to develop action plan for Health Science. Need to strengthen action plan for next year’s goals.”

Response: We have addressed current action plans more thoroughly in this year’s document.

6. Impact of resource allocations: Describe the impact to-date that each new resource (staff, non-instructional assignment, equipment, facilities, research, funding) has had on your program and measures of student success.
- New laptops in general biology and cell labs are running new software without crashing. These laptops enabled a new lab in bioinformatics to be added to BIOL 225.
 - The acquisition of new models for the Human Biology and Human Anatomy labs has proved very helpful in ensuring students have the materials needed for study.



- The acquisition of additional laboratory space for Human Physiology (16-005, currently used as a joint Biology/Geology laboratory space) has been key in offering multiple sections of this course and at varying times. See comments for question 4 for more details.
- The acquisition of microscopes in the Human Anatomy and Physiology laboratory (18-221) due to the purchase of new microscopes for the General Biology laboratory has allowed histology lessons to be run in this space (in previous semesters, teachers had to find open time in the Microbiology or General Biology laboratories to teach these lessons). The acquisition of new muscle slides in last year's equipment request was highly advantageous as the muscle slides in the general Biology Department stocks are showing severe wear (i.e. tissue damaged, mounting medium dried-out).

Current State of the Program

Data packets link <http://www.canadacollege.edu/programreview/datapackets1314.php>

7. Connection & Entry:

- A. Observation: Describe trends in program and course enrollments, FTES, LOAD and Fill Rates. Cite quantitative data and specific tables from the data packets.

Biology

Enrollment in BIOL courses increased from 2151 in 2009/10 to 2433 in 2011/12. However, enrollments again steadily declined to just 2104 again in 2013/14 (Success and Retention 2009/10 through 2013/14 document, Tables: Course Success and Retention Annually, & By Semester). This same trend is still apparent when observing Student Characteristics 2009/10 through 2013/14 Biological Science document, Annual Unique Headcount table: unique head count rises from over 1672 in 2009/10 to through 1821 in 2011/12, but declining again down to 1602 by 2013/14.

These recent declines mirror trends in college-wide enrollments for the last two academic years (Cañada College Success and Retention 2009/10 through 2013/14 document, in the tables Course Success and Retention Annually and By Semester), presumably losing students to the rising job markets (see George Avalos's Nov. 2014 article, "Bay Area job market surges in October and the boom is likely to continue for two years," http://www.mercurynews.com/business/ci_26985531/bay-area-job-market-surges-october, and related articles from the San Jose Mercury News). Notice that the job trends and times of the declines and inclines almost exactly inversely correlates with the our Dept. and campus-wide enrollment patterns.

As with overall enrollment and headcounts, FTES, Load, and Fill Rates in BIOL have experienced declines during the last two academic years (Productivity 2008/09 through 2013/14 Biology document: Productivity By Year and By Semester tables) following several years of steady rise. FTES declined from a rise to 421 in 2010/11, down to 300 in 2013/14. Load declined from a peak of 691 in 2010/11 to 531 in 2013/14. Fill rates declined from a peak of 94% in 2010/11 down to 83% in 2013/14. Again, these recent declines mirror the trends in overall campus FTES, Load, and Fill Rates during the same years (Cañada College Productivity



2008/09 through 2013/14 document: Productivity By Year and By Semester tables). Declines in these categories might largely be attributed to rising job market opportunities in the Bay Area as noted above, reducing enrollments and to resulting reductions in BIOL sections, losing 12 sections from 2010/2011 to 2013/14 (Productivity 2008/09 through 2013/14 Biology document: Productivity By Year and By Semester tables).

Health Science

Enrollment in Health Science courses increased from the 2009-2010 academic year to the 2010-2011 academic year, but has declined steadily since the 2010-2011 academic year (Annual Unique Headcount of 563 in 2010-2011 as compared to 417 in 2013-2014; Annual Unique Headcount Table, Student Characteristics 2009/10 through 2013/14 Health Science document).

This decline mirrors that observed for the college overall, which also showed a decrease in Annual Unique Headcount since the 2010-2011 academic year (11,560 in 2010-2011 as compared to 11,178 in 2013-2014; Annual Unique Headcount Table, Student Characteristics 2009/10 through 2013/14 document). There are several additional factors which likely contributed to this trend including the loss of concurrent enrollment courses in this department during this time period (see “Currently K-12” group in Student Enrollment Status Table, Student Characteristics 2009/10 through 2013/14 Health Science document), as well as the cancellation (due to low enrollment) of HSCI 116 during the Spring 2012, Fall 2013 and Spring 2014 semesters (which resulted in the running of 1 less HSCI course during the affected semesters).

FTES and LOAD in Health Science have declined since the 2009-2010 academic year (FTES: 38.8 in 2009-2010 as compared to 21.64 in 2013-2014, LOAD: 601 in 2009-2010 as compared to 443 in 2013-2014; Productivity by Year Table, Productivity 2008/09 through 2013/14 Health Science document). This trend mirrors that observed for the College overall during this time period (FTES: 4615.26 in 2009-2010 as compared to 3736.49 in 2013-2014, LOAD: 606 in 2009-2010 as compared to 478 in 2013-2014; Productivity by Year Table, Productivity 2008/09 through 2013/14 document), although the specific fluctuations seen between the 2009-2010 and 2013-2014 academic years are different between the Health Science department and the College as a whole.

Fill rates for the Health Science department were higher than those observed for the College overall for all but 1 of the academic years assessed (2009-2010: HSCI 78.5%, Cañada 77.2%; 2010-2011: HSCI 94.7%, Cañada 86.0%; 2011-2012: HSCI 77.5%, Cañada 80.0%; 2012-2013: HSCI 80.4%, Cañada 77.0%; 2013-2014: HSCI 74.5%, Cañada 70.0%; Productivity by Year Table, Productivity 2008/09 through 2013/14 Health Science document, Productivity by Year Table, Productivity 2008/09 through 2013/14 document).

- B. Evaluation: What changes could be implemented, including changes to course scheduling (times/days/duration/delivery mode/number of sections), marketing, and articulation that may improve these trends?



Biology

Introduction of online sections of Bio 100 and Bio 310 may increase enrollment for these courses. The current initiative for GE Thematic Pathways may enable sections of these courses to have perspectives that would fit with chosen pathways, which might increase enrollment.

Aside from the GE Pathways efforts, special sections of these GE courses could be designed to appeal to students interested in particular approaches. For example, Prof Hirzel adapted Bio 100 curriculum around a theme of sustainability when he taught this course several years ago. This revision of curriculum would take concerted effort by an instructor dedicated to this course, and right now adjunct instructors rotate responsibility for this course.

Also, introducing more morning lectures and laboratories, begun in fall 2014 for BIOL 260 as mentioned earlier, will provide more scheduling opportunities for students and instructors.

Certainly, more active marketing and outreach at campus Majors Days and Club Days, as well as more direct communication with local high schools could help fill and expand our program offerings. Perhaps the college Marketing and Outreach staff could create suitable hard-copy materials for these events that promote biological sciences.

Other options include more online offerings for lecture courses, as has begun with BIOL 100 and BIOL 310, that could reach more students with restricted schedules. Enrollment in hybrid sections of BIOL 110 have been steady for several terms.

Health Science

The Health Science department has experienced trouble in successfully offering new courses. HSCI 116 Women's Health Issues, which was created in 2012, has thus far been offered during 6 semesters but has run successfully only twice. Despite initially perceived demand, transferability, general education fulfillment and the fact that the course is a selective for all degrees currently offered in the Biology department, it has failed to gain traction on this campus. A re-strategizing effort for this course and the Health Science department as a whole is currently being planned (see section 11).

While a TMC in Public Health Science is currently being considered at the state level, it is unclear whether such a degree could be offered on our campus. As currently structured, this transfer degree would require the creation of at least one new Health Science course (Introduction to Public Health) and it is unclear whether sufficient demand for such a course/degree exists at Cañada.

Additional considerations for increasing enrollment in Health Science include the following:

- creation of new courses tailored to more specific student populations (e.g. student-athletes, kinesiology students)
- development of online sections of regularly-offered HSCI courses (e.g. HSCI 100)
- packaging of HSCI courses into GE pathways currently in development to boost enrollment. this strategy is being considered specifically for HSCI 116, which may be particularly suited to GE pathways that focus on Diversity Studies or Gender & Sexuality.

8. Progress & Completion:

- A. Observation: Describe trends in student **success** and **retention** disaggregated by: **ethnicity, gender, age, enrollment status, day/evening**. Cite quantitative data and specific tables from the data packets.

Biology

Overall Success and Retention in our BIOL courses have fairly consistently been around 67% success and 81% retention, with recent dips in 2013/14 to 63% and 78% respectively (Success and Retention 2009/10 through 2013/14 Biological Science Department document: Annual Retention and Success table). Comparatively, campus-wide success has stayed consistently at about 70% Success and 84% Retention, a few points higher than in BIOL courses (Cañada College Success and Retention 2008/09 through 2013/14: Course Success and Retention Annually table).

The Retention and Success by Ethnicity table reveals that for the last 5 years among our greatest ethnic populations (White, Hispanic, Unknown, and Asian respectively and historically), 70-76% of white students are successful and 81-86% are retained, with dips of about 5 percentage points in the last year or two. “Unknown” students’ success and retention is close to that of White students. Hispanics have much lower success at 49-57% with recent rises, and retention at 73-78% with recent slight declines. Clearly, success and retention of our Hispanic students needs to be better addressed by providing as much support and preparation as possible before and during enrollment in BIOL courses. Asian students succeed in BIOL courses 73-84% (most commonly around 77% in the last 4 years), and Asian retention is 83-90% for the last 5 years, mostly in the high 80%. Asian students are a very successful and dedicated group. Filipino student success has fallen from 75% to 64% in the last three years, and their retention has fallen from 85% to 77% in the same time. Students who identify as coming from African American descent have had varied success between 41% and 56% for the last 5 years, and their retention varied between 63% last year and 79% in 2010/11. Native American student trends are difficult to pinpoint due to very low enrollments in BIOL (ranging from only 3-9 students per entire academic year).

The Retention and Success by Gender table shows that female student success has declined from 77% to 63% in recent years, and their retention rate Male student success consistently trails a few %age points behind female students, varying between 60% and 67% , and their retention rate has held consistently between 78% and 82%, trailing just behind female students. (Success and Retention 2009/10 through 2013/14 Biological Science Department document: Retention and Success by Gender table). These trends are consistent with overall student Success and Retention trends.

Enrollments in BIOL have been consistently about 67% female and 31% male for the last 5 years (Student Characteristics 2009/10 through 2013/14 Biological Science document: Student Gender, Age and Ethnicity tables). This trend of female predominance in the BIOL program (7 %age points higher than campus-wide) is even more pronounced than the national averages in recent years, as reported by Eddy et al. article in *Life Sciences Education* from May 2014, “Gender Gaps in Achievement and Participation in Multiple Introductory Biology Classrooms” (<http://www.lifescied.org/content/13/3/478.full>). Results in this study demonstrate the



continuing trends of female predominance in choosing biological/health majors in college (and also in class participation), consistently near 60% female in Life Science majors. This trend holds only for the Life Sciences, while other STEM majors are predominantly male.

The campus and BIOL program's predominant age group, 18-22 years, has had only a 54%-63% success rate in recent years, while the next two age groups, 23-28 and 29-39 (also high enrollment groups) succeed at a nearly 15-20 %age points higher rate (Success and Retention 2009/10 through 2013/14 Biological Science Department document: Retention and Success by Age table)! It seems apparent that the more recent high school graduates require much better guidance and preparation for college BIOL courses (see suggestions in Part C below). However, the retention rate among this young predominant age group is still good, from 76-80% retention, very close to the next two age groups.

Perhaps consistent with the struggles of our younger age groups mentioned above, First-Time Student enrollees have struggled with low success rates, 46-56%, but this has improved to about 65% success in the last two years (Success and Retention 2009/10 through 2013/14 Biological Science Department document: Retention and Success by Enrollment Status table). This might be attributed to better and more pro-active counseling services on campus, and better prerequisite checking across the District. Returning Students have also struggled with low-mid 60% in success, and so more counseling intervention is likely needed with these students as well. Both of these student groups also struggle college-wide (Cañada College Success and Retention 2008/09 through 2013/14: Retention and Success by Enrollment Status table). Retention rates of BIOL students in these two groups are decently comparable to other groups at 78-83%, including rises in the last 3 years.

Retention Rates have remained consistent between Day and Evening enrolled students, at 79-82% for the last 5 years. However, Success Rates have varied, showing notable declines from 77% to 60% in evening classes (Success and Retention 2009/10 through 2013/14 Biological Science Department document: Retention and Success by Day or Evening courses table). More active effort is needed to ensure that quality instruction and student support continue reach our large population of evening students!

Web Assisted Courses, such as BIOL 260 and some sections of BIOL 110 and 130 demonstrate great 70-84% success rates and 84-91% retention rates (Success and Retention 2009/10 through 2013/14 Biological Science Department document: Retention and Success by Distance Ed Description table), nearly 10 points higher than standard face-to-face only courses, but success declined significantly in the last 2 years. These combinations of face-to-face instruction and also extensive online activities are working very well for students, though the declines must be addressed. Standard non-online courses have roughly 65% success and 80% retention. Hybrid courses have had low success rates, 52-64% in the last two years, and Online success dropped majorly to 41% last year. Students struggle significantly more in these online and hybrid courses with less face-to-face contact, while students in simply web-enhanced courses are flourishing overall.

Health Science



Overall, the Health Science department has shown Success and Retention Rates that are consistently higher than those observed for the College as a whole since the Fall 2009 semester (Course Success and Retention by Semester table, [Success and Retention 2009/10 through 2013/14 Health Science Department](#) document; Course Success and Retention by Semester table, [Success and Retention 2009/10 through 2013/14](#) document).

Success rates for students in Health Science are consistently above 70% since the 2009-2010 academic year (notable exceptions occur in the Native American student population which has a consistently low headcount in the department, likely skewing the data for this group). For most of the groups surveyed, their Success Rate in Health Science was higher than that observed for the same group at the College overall. It is worthwhile to note that for most academic years reported, African American students had the lowest Success Rate in the department (Retention and Success by Ethnicity Table, [Success and Retention 2009/10 through 2013/14 Health Science Department](#) document; Course Success and Retention by Ethnicity table, [Success and Retention 2009/10 through 2013/14](#) document). While the Health Science department continually serves a higher proportion of female than male students, the students in this department displayed high Success Rates regardless of gender. Success Rates for all reported genders for all reported academic years remained above 70% (with the exception of students of Unreported Gender during 2009-2010 at 63%) and were higher than those reported for the College as a whole (Retention and Success by Gender Table, [Success and Retention 2009/10 through 2013/14 Health Science Department](#) document; Course Success and Retention by Gender table, [Success and Retention 2009/10 through 2013/14](#) document). Success Rates remained high for most students when disaggregated by age group; the notable exception was the “Under 18” group which reported the lowest success rates of all age groups for 3 of the 5 academic years reported (58% in 2009-2010, 70% in 2010-2011, 70% in 2011-2012; Retention and Success by Age Table, [Success and Retention 2009/10 through 2013/14 Health Science Department](#) document; Course Success and Retention by Age table, [Success and Retention 2009/10 through 2013/14](#) document). This same trend was apparent when the data was disaggregated by enrollment status, as those students in the “Currently K-12” group showed low Success Rates during these same semesters (57% in 2009-2010, 64% in 2010-2011, 63% in 2011-2012; Retention and Success by Enrollment Status Table, [Success and Retention 2009/10 through 2013/14 Health Science Department](#) document; Course Success and Retention by Enrollment Status table, [Success and Retention 2009/10 through 2013/14](#) document). Success Rates reported for day students have been consistently lower than those reported for evening students for all academic years reported (Retention and Success by Day or Evening Table, [Success and Retention 2009/10 through 2013/14 Health Science Department](#) document).

Retention rates for students in Health Science did not fall below 89% for any year reported for any ethnic group surveyed and were consistently higher than those reported for the College as a whole (Retention and Success by Ethnicity Table, [Success and Retention 2009/10 through 2013/14 Health Science Department](#) document; Course Success and Retention by Ethnicity table, [Success and Retention 2009/10 through 2013/14](#) document). Retention Rates for all reported genders for all reported academic years did not fall below 87% and were higher than those reported for the College as a whole (Retention and Success by Gender Table, [Success and Retention 2009/10 through 2013/14 Health Science Department](#) document; Course Success and

Retention by Gender table, Success and Retention 2009/10 through 2013/14 document). Retention Rates remained at or above 87% for all age groups reported for all academic years reported and were consistently higher than those reported for the College as a whole (Retention and Success by Age Table, Success and Retention 2009/10 through 2013/14 Health Science Department document; Course Success and Retention by Age table, Success and Retention 2009/10 through 2013/14 document). Retention Rates remained at or above 80% for all enrollment statuses reported for all academic years reported and were consistently higher than those reported for the College as a whole (Retention and Success by Enrollment Status Table, Success and Retention 2009/10 through 2013/14 Health Science Department document; Course Success and Retention by Enrollment Status table, Success and Retention 2009/10 through 2013/14 document). Retention Rates remained at or above 84% for both day and evening students for all academic years reported and were consistently higher than those reported for the College as a whole (Retention and Success by Day or Evening Table, Success and Retention 2009/10 through 2013/14 Health Science Department document).

- B. Observation: For online courses describe any significant differences in the success and retention of students who are taking online courses compared to face-to-face courses.

Biology

BIOL 310 Nutrition is the only Biology course taught completely online, although BIOL 100 will soon be offered as well. As mentioned earlier, success in purely online courses last year was very low, 41%, while retention was also lower than other courses, at 70%. More work must be done to monitor and perhaps intervene early to help students be more successful in online and hybrid courses.

Health Science

n/a - no HSCI courses are currently offered online.

- C. Evaluation: Based on these trends, what do you feel are significant factors or barriers influencing student success in your courses and program? What changes (e.g. in curriculum, pedagogy, scheduling, modality) could be implemented to improve these trends?

Biology

Student preparedness is a perpetual challenge in biology courses in general. The scientific terms can seem to be equivalent to learning a new language, and many of our students are already working on mastery of English. As previous data have shown, success in math is key to success on many other courses, including biology. We should continue to encourage students to take math and chemistry early and often, before diving into biology courses. Collaboration with instructors in these related courses could produce problems and case studies that involve biological aspects. The physics of motion apply to organisms as well as to blocks on ramps. Perhaps a FIN or other organized structure could provide the basis for these collaborations on modified curriculum.

Reading and interpreting a scientific text can be a challenge. Denise Hum (Math) is leading a group of faculty, including some biology faculty, in Reading Apprenticeship training



during this term and through the summer. Implementation should begin next fall in several courses.

The idea of an Anatomy Academy proposed last year will be revisited and evaluated thoroughly. Implementation may require grant funds - it's not clear yet what direction we may go. It is still debatable if and how such a program may be effective in improving success for Anatomy students.

For nonmajors, if course topics can be presented in a way that is most relevant to their current interests, then students may remain motivated to completion. This may take a major renovation of the curriculum, and require the dedication of FT faculty. The position proposal is appended.

Health Science

The most noteworthy trends in this dataset are the low Success Rates observed for Under 18/Currently K-12 students (see part a for details). This group comprises both the concurrent enrollment students who take HSCI courses at their high school campuses as part of an Early College program and Middle College students who take HSCI courses on campus. These data confirm what several instructors have observed anecdotally - that high school students enrolling in these courses are more likely to be underprepared for the demands and, as a result, not ultimately succeed in the course. Changes that have been implemented which may have contributed to the increase in this group's success in 2012-2013 and 2013-2014 include better advising/guidance by high school staff enrolling students in these courses.

As the data demonstrate, the Health Science department disproportionately enrolls female students in its classes. It is unclear why this is so and whether measures should be taken to increase the enrollment of male students.

Overall the Health Science department has higher success and retention rates than the college as a whole. This may be due, in part, to skewing from the First Aid courses which, like CPR, are effectively Pass/No Pass courses in which virtually all students learn to demonstrate the necessary skills to earn certification.

9. SLO Assessment:

<https://smccd.sharepoint.com/sites/can/CANSLOAC/default.aspx>

- A. Are all course SLOs being systematically assessed at least once/4 years? Describe the coordination of SLO assessment across sections and over time.

Biology

Among 11 regularly offered biology courses, most have regular assessments of their associated Course SLOs on record in Tracdat. Several of the courses are missing assessments for 1 or 2 SLOs (BIOL 110, 225, 230, 250, and 310). A few courses are missing assessments for 3 or more SLOs (BIOL 100, 103). In addition, some of the SLOs should be reassessed soon, per the



college policy of assessing all Course SLOs over a 4-year period. The expiration date has arrived for some SLO results, even though criteria were met in the last assessment.

There has not been good coordination among sections of each course, as far as assessments and collating results. Mostly, the FT faculty seem to complete assessments and reports. Some PT do likewise, but it is not as consistent across courses. Without any FT faculty to “lead the charge” in BIOL 100, very little assessment has been done at all. BIOL 110 has a few more results on record, but most of these were done several years ago and should be reassessed. Perhaps more specific assessment information and assistance in planning assessments needs to be provided to PT instructors at the beginning of each term. FT instructors could benefit from these discussions, as well.

Health Science

- The following HSCI courses are currently in the Cañada College catalog. The SLO assessment record for each is as follows:
 - HSCI 100 - 4 of SLOs for this course were assessed at least once in the last 4 years. 1 SLO has no record of ever being assessed.
 - HSCI 104 - no SLO assessment records in TracDat
 - HSCI 105 - no SLO assessment records in TracDat
 - HSCI 115 - 2 of the SLOs for this course were assessed once in the last 4 years. The remaining 5 SLOs currently listed for this course have no record of ever having been assessed. The Course Outline of Record for this course was updated in Spring 2015; the number of SLOs for this course was reduced to allow for more timely assessment.
 - HSCI 116 - 2 of the SLOs for this course were assessed once in the last 4 years. The remaining 3 SLOs currently listed for this course have no record of ever having been assessed. A major limitation is that this course has been offered successfully only twice (Fall 2012, Spring 2014) since its creation in 2011.
 - HSCI 430 - no SLO assessment records in TracDat
 - HSCI 432 - no SLO assessment records in TracDat
- A major limitation for SLO assessment and coordination in Health Science is the dearth of full-time faculty in this department. While Prof. Behonick is a full-time faculty member in Health Science she is shared between the Health Science and Biology departments and has not consistently taught Health Science courses since 2012 (from 2009-2012 she taught one HSCI course each semester). As a result, those responsible for Health Science courses (and the associated SLO assessments) are predominantly, if not all, part-time faculty, several of whom teach off-campus at concurrent enrollment sites each semester. The Health Science department has not yet developed a strategy for effectively coordinating the SLO assessment efforts of these part-time faculty (see section 11).

- B. Summarize the dialogue that has resulted from these assessments. What are some improvements in your courses that have been implemented through SLO assessment? How has student learning been improved by changes in teaching? Cite specific examples.

BIOL 130/132:

- BIOL 130 Human Biology is a prerequisite course for BIOL 250, and serves as a gatekeeper to boost student preparedness for Human Anatomy. So it is not too surprising that success rates are not as high as in other biology courses. However, in an attempt to foster better study habits, Prof. Rhodes has adopted a package of Mastery Learning modules that accompanies the textbook. The strategy is similar to that of Prof. Hirzel, in that students take frequent, low-stakes quizzes to practice retrieving information. These modules are adaptive, adjusting the choice of questions to focus on topics that each student is unsure about or selects the wrong answer. Results will be analyzed at the end of spring term.
- BIOL 132 Lab, which accompanies BIOL 130, faces the challenge of including students from up to 4 sections of BIOL 130, as well as those students who have taken BIOL 130 years before. The sequence of labs was rearranged to better align with most sections of BIOL 130. All BIOL 130 instructors are given the lab schedule in advance to allow them to adjust their syllabus accordingly. This seemed to work better for students in two Fall sections of BIOL 132. There are still some labs that include topics which students have not yet discussed in lecture (BIOL 130). It is impossible to align the labs with all sections of BIOL 132.

BIOL 225:

- A new lab using techniques of bioinformatics was incorporated into this majors class. While it does give students hands-on experience in finding and manipulating data from genomic and protein databases, if it were combined with some wet-lab aspect, the learning impact would be increased.

BIOL 230:

- For the last 4 years, students are more frequently required to develop their own questions/scientific inquiries in the Cell and Molecular Biology laboratory, and to plan and execute their own experiments. Progress has been made in the last 2-3 years as students are becoming more competent at this process faster. The formal laboratory reports now include a detailed reflection on the scientific process, and the entire assignment is submitted as part of their semesterly e-Portfolio. Since Fall 2013, students have weekly assignments (Pre-Laboratory writeups) writing their own hypotheses about scientific questions in the laboratory, and making predictions of outcomes. These weekly Pre-Labs and practice in developing hypotheses and thinking through predicted results have facilitated students' mindset of ownership of their own scientific investigations.
- Daily in-lecture Blue Book questions were begun in Fall 2014 to help more directly engage students in the classroom, encourage active participation and collaborative learning with classmates, and to help the instructor track student learning progress on a more consistent basis throughout the semester.

BIOL 250:

- One of the SLOs in BIOL 250 is that students will be able to relate an organ's structure to its function. Normally these are assessed through exam questions. However, in anticipation of using ePortfolios to assess PLOs (which share this learning outcome) Prof. Hirzel created three case study assignments that specifically address the structure/function learning outcome. In the first semester, students showed sequential improvement on these assignments over the course of the term. However, this result was not replicated during the subsequent semester. There are many factors that apparently affect the success of implementing such case studies. We continue to evaluate what strategy to employ to see improvement in this area.
- Overall success rates in this course are consistently suboptimal. Course success directly addresses the SLO in which students' identify and name anatomical structures. Among the factors that contribute to failure in the course are (a) students not mastering past material before beginning to learn new material, and (b) students not practicing identification drills frequently enough over the course of the week. In spring 2014, Prof. Hirzel created "gates" on his lecture quizzes that required students to pass the current quiz with a C or better before being allowed to begin a new unit of material. This strategy did not significantly impact course success rate. So in fall 2014, Prof. Hirzel moved from the aforementioned strategy which was more punitive in nature, to try an approach based on positive reinforcement and game theory. Modeling after how games create motivation to continuously practice to improve scores, he created three levels of quizzes, each with an increasing level of difficulty. Students were allowed to attempt each quiz until they reach mastery (or at least 70% score) and only then could they move to the next level of quiz. Although students did successfully complete all levels of quizzes, the impact of this strategy on overall course success was not significant.

HSCI 100:

- One of the SLOs for HSCI 100 is "Describe prevalent contemporary health concerns and problems, their characteristics and methods of care including (but not limited to) nutrition, mental health conditions, chronic illnesses and infectious diseases." This has been assessed by Prof. Behonick for multiple consecutive semesters using the Current Issue Project, in which students research a contemporary controversial health issue and present this during a class-wide poster session on the last day of lecture. This assessment has resulted in an ongoing refinement of this project and how it is scaffolded for/presented to the students in this course. This first involved creation of an explicit scaffolding process wherein students were forced to complete and submit sections of the project throughout the semester for feedback, and subsequently involved the incorporation of a library orientation/research skills lesson from the library staff into the course. The last assessment of this SLO occurred prior to the addition of library orientations to the course - this semester, this SLO will again be assessed to determine the impact of this on this SLO.
- The assessments for several SLOs in this course use embedded exam questions. It has been noted in several of these assessments that the ability of students in this course to correctly answer questions on the course material appears to be affected by the manner in which the question is asked. Several of the embedded questions required students to recall/understand the same course material, but were worded very differently. In



particular, questions that are phrased in the negative (e.g. “Which of the following is a reason why people don’t have access to health care?”) may lead to reduced student success due to reading comprehension issues rather than lack of informational recall. This will be taken into account when exam questions are composed for this course this semester.

10. PLO Assessment:

PLO Assessment link https://smccd.sharepoint.com/sites/can/prie/_layouts/15/start.aspx#/
Please see appended document (PLO1 SciMethod) for PLO assessment results.

A. Describe your program’s Program Learning Outcomes assessment plans and results of direct and indirect assessments.

Faculty assessed student work posted in eportfolios of graduates of Allied Health and of Interdisciplinary Studies with Emphasis in Natural Science Programs. The PLO assessment rubric is attached to this document along with a summary of the results (pages 18-20). Only the first PLO, involving application of the scientific method of inquiry, was scored. The number of student portfolios was small (2 and 5, respectively for each program). Such a small sample size makes it very difficult to confidently draw any conclusion about program effectiveness, so our conclusions are limited to evaluation of the process.

Alignment of Course SLO results with PLOs is readily done with Tracdat reports. Not as easy is interpretation of these reports. Improvements in assessment of Course SLOs might be beneficial. These reports still would include a lot of students who are not majors nearing completion of their degrees here, and the latter group is the population of most interest for program evaluation.

B. Summarize the major findings of your program’s PLO assessments. What are some improvements that have been, or can be, implemented as a result of PLO assessment?

The student portfolios provided a convenient way to conduct direct assessment of their work by multiple faculty. As was found in the Pilot Project conducted by CIETL, there was substantial variation among faculty in applying the rubric. We need to find a way to normalize our application of the rubric. In addition, students did not necessarily post their best or most appropriate work for the PLO to which it was linked. The process would work better if students regularly updated their portfolios each term with their best work and had more guidance about appropriate PLOs. Several students that assembled even a rudimentary portfolio commented that it was a useful exercise to do. One student posted outstanding work from a summer research internship. It would be nice to get permission to share these examples of portfolios with new students.

Alignment of Course SLO results to PLOs implies that most of our students are doing well on achieving the PLO expectations. The report that includes PLO alignment of SLO results from all courses required for a Biological Sciences degree (available at the link above) seems to indicate that our students need to do better in chemistry.

Looking Ahead

11. Strategic goal & action plans:

How will you address the opportunities for improvement that you identified above in Articulation, Community & Labor Needs, Connection & Entry, Progress & Completion and PLO Assessment? Identify timelines for implementation, responsible party, and resource requirements.

Action Plan	Timeline	Responsible party	Resources required
Biology Professional development - FT and PT faculty involved in Reading Apprentice program, across disciplines of science and math.	Spring 2015 and summer 2015 training. course modified Fall 2015	Carol Rhodes and other PT with Denise Hum (Math)	time for training and discussions with colleagues on incorporation into classes
Renovate Bio 100 to attract and benefit more non-majors; develop honors addendum	When new FT gets hired	New FT faculty	New FT faculty
Health Science Strategy Meeting	Currently being planned for Spring 2015 semester. New strategy re: course offerings, SLO assessment, overall departmental organization to be implemented beginning Fall 2015.	Dani Behonick, Doug Hirzel, Janet Stringer	n/a
Anatomy & Kinesiology faculty strategy meeting to identify strategies to improve success of student athletes and kinesiology majors	Meeting will occur during spring 2015 and into summer 2015; pilot interventions in 2015-16 if resources are available	Doug Hirzel, Dani Behonick, Coaches	Resources not needed for meeting but resources will likely be needed for any interventions
Use Data Dashboard to disaggregate student achievement data into majors/allied health/non-majors to more clearly identify existing gaps	Summer 2015; discussion of significance and plan possible interventions during 2015-16	Doug Hirzel	possible assistance from PRIE



Complete the Resource Request form to request instructional equipment, IT equipment, facilities, professional development, research, or funding (if needed) and submit with this form to your Division Dean.

Link to resource request form <http://www.canadacollege.edu/programreview/instruction-forms.php>

Program Learning Outcome Rubrics

PLO I Assessment:

o Use the Scientific Method to investigate biological questions and critically evaluate and effectively communicate scientific data.

Primary Element	Below Basic-0	Basic-1	Proficient-2	Advanced-3
Identification of hypothesis	Hypothesis is unclear and untestable.	Hypothesis is testable, with some supporting rationale	States a clear, testable hypothesis with supporting rationale.	States a clear, testable hypothesis with supporting rationale. Identifies the role of relevant concepts and how they inform the hypothesis.
Experimental design	Design missing key components (essential variables not considered, variables not identified/classified, method not documented completely/accurately).	Design is logical; essential variables considered but are not classified as dependent and independent. Documentation of method is incomplete.	Design is logical, with all variables identified and classified as dependent and independent. Documentation of method is mostly complete.	Design is logical, with all variables identified and classified as dependent and independent. Method is documented completely and accurately, making experiment easy to repeat.
Data presentation and summary	Data is not presented appropriately: results do not directly address hypothesis, tables/graphs are inaccurate or are constructed incorrectly.	Most data is presented appropriately: most of data (quantitative and qualitative) is summarized accurately, results pertain to hypothesis, tables/graphs are accurate and/or are constructed correctly.	Data is presented appropriately: all data (quantitative and qualitative) is summarized accurately, results directly address hypothesis, tables/graphs are accurate and/or are constructed correctly.	Data is presented appropriately and with statistical analysis: all data (quantitative and qualitative) is summarized accurately and statistical analysis is provided, results directly address hypothesis, tables/graphs are accurate and/or are constructed correctly.
Conclusion	Interpretation of results is illogical, inaccurate and/or does not address hypothesis.	Interpretation of results uses reasonable logic, provides some explanation of how	Interpretation of results is clear and logical, explains directly how results	Interpretation of results displays sophisticated logic and integrated use of evidence to support conclusion. Identifies

		results support or disprove hypothesis.	support or disprove hypothesis.	weaker evidence; creates further questions.
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PLO 2 Assessment:

- o Recognize and explain the evolutionary connections between biological structures and their function and between organisms and their environment.

Primary Element	Below Basic-0	Basic-1	Proficient-2	Advanced-3
Explain structure / function connection with cellular example	Explanation illogical, inaccurate and/or does not address question; example not suitable.	Explanation mostly logical and accurate with some minor errors; example suitable.	Explanation logical and accurate with no errors; example suitable.	Explanation logical, accurate and thorough with no errors; example suitable. Answer explicitly illustrates how example chosen is appropriate.
Explain structure / function connection with organismal example	Explanation illogical, inaccurate and/or does not address question; example not suitable.	Explanation mostly logical and accurate with some minor errors; example suitable.	Explanation logical and accurate with no errors; example suitable.	Explanation logical, accurate and thorough with no errors; example suitable. Answer explicitly illustrates how example chosen is appropriate.
Explain how evolutionary processes affect organisms and their environment	Explanation illogical, inaccurate and/or does not address question; example not suitable.	Explanation mostly logical and accurate with some minor errors; example suitable.	Explanation logical and accurate with no errors; example suitable.	Explanation logical, accurate and thorough with no errors; example suitable. Answer explicitly illustrates how example chosen is appropriate.



PLO 3 Assessment:

- o Critically evaluate biological information and examine its significance and impact on society and the environment.

Primary Element	Below Basic-0	Basic-1	Proficient-2	Advanced-3
Evaluate biological information	Evaluation is incomplete: does not discern reliability of information source, its logic, and/or evaluate supporting evidence.	Evaluation is mostly complete: analyzes credibility and logic of information, is not thorough/rigorous in review of supporting evidence.	Evaluation is complete: critically analyzes scientific information for its credibility, logic, and sufficiency of supporting evidence.	Evaluation is complete and clear justification is provided: critically analyzes scientific information for its credibility, logic, and sufficiency of supporting evidence; thoroughly explains why information is/is not reliable.
Interpret scientific information	Interpretation is inaccurate (interpretation does not match evidence) and/or incomplete (concepts not identified).	Interpretation is mostly accurate (interpretation matches most of evidence) and complete (all key concepts identified).	Interpretation is accurate (accurately interprets scientific reports) and complete (all key concepts identified).	Interpretation is accurate (accurately interprets scientific reports), complete (all key concepts identified) and clearly justified (link between key concepts and interpretation explicitly illustrated).
Identify impact of scientific information on society and environment	Connection between information and described impact is illogical and/or inaccurate.	Connection between information and described impact is logical and accurate; description of impact incomplete.	Connection between information and described impact is logical and accurate; description of impact complete.	Connection between information and described impact logical, accurate and creative; description of impact complete.

Cañada College BIOL 250: Human Anatomy
Spring 2012
Dani Behonick, Ph.D

Student Learning Outcome Assessment
SLO #3

Contents

Section 1: SLO #3 and Assessment Methods

Section 2: Description of Assessment for SLO #3

Section 3: Data Collected from Students

Section 4: Reflection and Recommendations

Section 1: SLO #3 and Assessment Methods

SLO 3. Explain how the shape and composition of anatomical structures determine their function

Assessment methods: [This SLO] will be assessed through scores on specific quiz and/or exam questions.

Section 2: Description of Assessment for SLO #3

Exam questions utilized to assess this SLO

- 1) The major function of stratified squamous epithelium is:
 - A. diffusion
 - B. absorption
 - C. filtration
 - D. protection

- 2) Which of the following correctly pairs the type of joint with its degree of mobility?
 - A. suture: amphiarthrosis
 - B. symphysis: diarthrosis
 - C. synovial: synarthrosis
 - D. synovial: amphiarthrosis
 - E. symphysis: amphiarthrosis

- 3) Which of the following provides the least resistance to diffusion?
 - A. simple columnar epithelium
 - B. simple cuboidal epithelium
 - C. simple squamous epithelium
 - D. stratified squamous epithelium

- 4) Simple squamous epithelia would not provide for which of the following functions?
 - A. protection from abrasion
 - B. diffusion
 - C. filtration
 - D. secretion

- 5) Most foreign substances in inspired air fail to reach the lungs because of the:
 - A) ciliated epithelium and mucus that line the respiratory passages
 - B) abundant blood supply to the nasal mucosa
 - C) porous structure of the nasal conchae
 - D) action of the epiglottis

SHORT ANSWER

- 6) Joints may be classified by function (i.e. – degree of mobility) or by structure. Describe the these 2 joint classification systems and discuss how they overlap – that is, are there certain functional classes of joints that generally have a particular structure? Why? Explain your reasoning.

- 7) Compare and contrast the (a) structure, (b) function and (c) location of simple squamous epithelium and stratified squamous epithelium.

- 8) a. The structures of the respiratory system are divided into 2 zones – the Conducting Zone and the Respiratory Zone. Discuss the structures included in each zone and how the zones are functionally distinct from each other. What happens in the Conducting Zone? What happens in the Respiratory Zone? Why is each important? (**4 points**)
 - b. The airways are lined with epithelium, however the type of epithelium found is

distinct in different parts of the respiratory system. If a molecule of oxygen is inhaled through the nose and eventually is exchanged into the blood at the alveolus, what are the types of epithelium that it will encounter in the respiratory system along its journey? What do these epithelia suggest about the functions of the regions of the respiratory system where they are found? **(6 points)**

- 9) The small intestine contains 3 distinctive structures: circular folds, villi and microvilli. Distinguish amongst these structures (i.e. explain how they are different from each other), explain the relationship between these structures and describe how they contribute to the overall functions of the small intestine.
- 10) Describe at least 3 major structural differences between an artery and a vein. Then, explain how these structural differences lead to functional differences between these blood vessel types.
- 11) The urethra in males is different from the urethra in females in terms of both structure and function. Describe these structural and functional differences and discuss one functional consequence of these differences.
- 12) Rugae are an anatomical structure which can be found in many locations in the human body. What are rugae and what is their function? Give 2 examples of locations in the human body where you can find rugae and describe why these locations have rugae.

Section 3: Data Collected from Students

<i>SLO Assessment Question</i>	<i># Students Answering Correctly</i>	<i>% of Class Answering Correctly</i>
1 (n = 60)	45	75%
2 (n = 60)	18	30%
3 (n = 60)	36	60%
4 (n = 60)	37	61.67%
5 (n = 51)	50	98.04%

Possible correct responses from all questions assessed = 291

Total correct responses from all questions assessed = 186

Total % questions answered correctly = 63.92%

For short answer questions used to assess this SLO (questions 6-12 above), average score and % of the class on each question was calculated.

<i>SLO Assessment Question</i>	<i>Class-wide average score</i>	<i>Class-wide average %</i>
6 (n = 18) [§]	4.67 points (10 points possible)	46.67%
7 (n = 41) [§]	7.84 points (10 points possible)	78.41%
8 (n = 25) [§]	6.68 points (10 points possible)	66.80%
9 (n = 16) [§]	7.10 points (10 points possible)	71.00%
10 (n = 23) [§]	6.30 points (10 points possible)	63.04%
11 (n = 35) [§]	7.99 points (10 points possible)	79.85%
12 (n = 28) [§]	8.02 points (10 points possible)	80.19%

[§] students had choice amongst several short answer questions on exam where these questions were given

Section 4: Reflection and Recommendations

The mark for meeting this SLO successfully is the ability of the class to answer these questions with $\geq 70\%$ success. That level is success is being met for only some of these questions. I believe there are a variety of factors at work.

The first examination of the semester for this course had serious logistical challenges. Students were presented with 60 multiple choice questions and told to choose 50 to answer; they were also given 6 short answer questions and told to choose 3 to answer. This was impossible for many students to complete in the time given and as such, much of the class did not finish the exam at all, or if they did it was not done comfortably/with careful thought. As SLO Questions 1-4 and 6-7 were administered on this examination, this issue may have affected students' apparent success level on these questions. Subsequent examinations were restructured to be more appropriate for the time allowed. The remaining questions used to assess this SLO were from the second and third examinations, where students were asked to answer fewer questions (40 multiple choice, 2 of the possible short answer questions given).

In general, these results are "a mixed bag." Student success varies widely, with students being successful on some questions and not successful on others for this SLO. I believe this reflects the "mixed bag" of experiences had by students in this course, and a significant challenge that comes with teaching this course in particular. Students enrolling in BIOL 250 need only to have taken an Introductory Biology course as a prerequisite; as the district does not have prerequisite blocking for this course, students are not held accountable for this. Even with this prerequisite requirement, however, the students enrolling in this course represent a wide spectrum in terms of academic preparedness, possession of study skills, and access to resources. There is a trend toward greater success in the questions given on exams later in the semester (Questions 5, 11, 12). A significant contributing factor to this trend is likely that many of the less successful, less prepared students had withdrawn from the class by the time this exam was administered; as such, this trend does not reflect an increase in student success but rather attrition of unsuccessful students from the data set.

This observation, along with my own experience teaching this course, points to a significant need to better prepare students entering anatomy. There are significant disparities in student success in this course, more so than I have observed in any other course I have taught. Anecdotally, I suspect students who have less access to resources, students who have taken fewer science classes and part-time students are less likely to be successful in this course. I would like to have data to support (or even disprove) that suspicion, so that we may then act to better serve these students.

Cañada College BIOL 250: Human Anatomy
Spring 2015
Dani Behonick, Ph.D

Student Learning Outcome Assessment
SLO #1

Contents

Section 1: SLO #1 and Assessment Methods

Section 2: Description of Assessment for SLO #1

Section 3: Data Collected from Students

Section 4: Reflection and Recommendations

Section 1: SLO #1 and Assessment Methods

SLO 1. Describe the gross and microscopic anatomical features of human organ systems.

Assessment methods: [This SLO will be assessed through scores on] specific exam questions in multiple choice or short essay format, or lab practical.

Section 2: Description of Assessment for SLO #1

Exam questions utilized to assess this SLO

MULTIPLE CHOICE

- 1) A needle would pierce the epidermal layers of the **forearm** in what order? (superficial to deep)
 - A) basale, spinosum, granulosum, corneum
 - B) basale, spinosum, granulosum, lucidum, corneum
 - C) granulosum, basale, spinosum, corneum
 - D) corneum, granulosum, spinosum, basale

- 2) A long bone that is fractured midshaft has damaged the:
 - A) articular cartilage
 - B) diaphysis
 - C) epiphyseal plate (growth plate)
 - D) epiphysis

- 3) Which of the following statements about bone is **TRUE**?
 - A) Spongy bone is arranged in osteons.
 - B) Volkmann's (perforating) canals connect osteocytes trapped in bone matrix.
 - C) Membrane bones (which form by intramembranous ossification) form directly from mesenchyme without being modeled in cartilage.
 - D) Osteoclasts reside within lacunae and are connected via canaliculi.
 - E) (pick this answer if all of the statements above are true)

- 4) The cartilage of the epiphyseal plates is organized into zones based upon the processes occurring in those regions. Identify the correct sequence of these processes, **from the epiphyseal end toward the diaphysis**.
 - A) hypertrophy/death — growth — resting — ossification
 - B) ossification — hypertrophy/death — growth — resting
 - C) resting — growth — hypertrophy/death — ossification
 - D) growth — hypertrophy/death — resting — ossification

- 5) Which of the following statements about the skin is **FALSE**?
 - A) Sebaceous glands open into hair follicles.
 - B) The stratum lucidum lies between the stratum granulosum and the stratum corneum of thick skin.
 - C) Dendritic cells reside in the stratum spinosum of the epidermis.
 - D) Mitosis primarily occurs in the stratum corneum of the epidermis.
 - E) (pick this answer if all of the statements above are true)

- 6) The covering of a fascicle within a nerve is the:
 - A. endoneurium
 - B. perineurium
 - C. epineurium

- 7) In the central nervous system (CNS), white matter is comprised of:
- A. groups of neuron cell bodies in the brain
 - B. groups of neuron cell bodies in the spinal cord
 - C. myelinated axons traveling together in the CNS
 - D. dendrites traveling together in the CNS
- 8) What two structures of the brain have an outer layer of gray matter (a cortex)?
- A. brainstem and thalamus
 - B. cerebrum and cerebellum
 - C. medulla oblongata and pons
 - D. epithalamus and hypothalamus
- 9) Cell bodies of the sensory neurons of the spinal nerves are located in:
- A. the anterior/ventral gray horn of the spinal cord
 - B. the posterior/dorsal gray horn of the spinal cord
 - C. the thalamus
 - D. the dorsal root ganglia external to the spinal cord
- 10) A myofibril:
- A. is a skeletal muscle cell
 - B. is a bundle of actin and myosin protein filaments organized into sarcomeres
 - C. is a group of muscle fascicles surrounded by perimysium
 - D. is a group of muscle cells innervated by the same motor neuron
- 11) A nerve plexus is formed by:
- A. interconnected dorsal and ventral rami of spinal nerves
 - B. interconnected dorsal rami of spinal nerves
 - C. interconnected ventral rami of spinal nerves
- 12) The inner endothelial layer that lines the heart is the:
- A. epicardium
 - B. pericardium
 - C. myocardium
 - D. endocardium
- 13) Which of the following statements is **FALSE**?
- A. Of the surrounding connective tissues of the muscle, the endomysium is the most superficial.
 - B. Fascicles are bundles of muscle fibers wrapped together within perimysium.
 - C. Within a fascicle, each muscle fiber is surrounded by the endomysium.
 - D. A muscle fascicle is a bundle of muscle cells.
- 14) The stomach is distinct from the other organs of the gastrointestinal (GI) tract because:
- A. it is the only part of the GI tract where peristalsis occurs
 - B. it is the only part of the GI tract that has an oblique layer of smooth muscle in addition to the circular and longitudinal layers of smooth muscle
 - C. it is the only part of the GI tract that has microvilli
 - D. it is the only part of the GI tract that sits in the thoracic cavity

- 15) Which of the following statements is **TRUE**?
- A. The stomach and transverse colon are retroperitoneal organs.
 - B. Circular folds are permanent structures found in the esophagus and stomach.
 - C. The large intestine (colon) is the main site of nutrient absorption in the gastrointestinal tract.
 - D. The muscularis externa is the layer of the gastrointestinal tract that is responsible for peristalsis and segmentation.
- 16) The smallest division of each lung that is visible to the naked eye is the:
- A. lobe
 - B. lobule
 - C. segment
- 17) Which of the following statements is **TRUE** regarding the nephron?
- A. The proximal convoluted tubule is made of cuboidal epithelial cells with microvilli.
 - B. The thin segment of the nephron loop (loop of Henle) is identical in structure to the proximal convoluted tubule, being made of cuboidal epithelial cells with microvilli.
 - C. The distal convoluted tubule is made of simple squamous epithelium.
 - D. The collecting duct is made of pseudostratified ciliated columnar epithelial cells.
- 18) Which of the following statements is **FALSE**?
- A. The colon (large intestine) does not have villi.
 - B. The cardiac region of the stomach is the region closest to the esophagus.
 - C. The parotid, sublingual and submandibular salivary glands produce saliva and release it continuously into the oral cavity, regardless of whether food is present.
 - D. Intrinsic muscles of the tongue change its shape while extrinsic muscles of the tongue change its position within the oral cavity.
- 19) The type of epithelium lining several structures of the urinary tract (including the ureters and the urinary bladder) that permits distension is:
- A. pseudostratified columnar epithelium
 - B. simple squamous epithelium
 - C. stratified squamous epithelium
 - D. transitional epithelium
- 20) The longest of the three parts of the male urethra is the:
- A. membranous urethra
 - B. prostatic urethra
 - C. spongy urethra

SHORT ANSWER

- 21) Describe 3 major structural differences between an artery and a vein. For each structural difference, explain how it contributes to a functional difference between these blood vessel types.

- 22) a. Efficient heart function requires properly functioning heart valves. Why is this true?
Explain the location of the 4 heart valves and how they contribute to heart function.
(10 points)
- b. Efficient heart function requires properly formed heart septa. Why is this true?
Explain the location of the heart septa and how they contribute to heart function.
(10 points)
- 23) a. The structures of the respiratory system are divided into 2 zones – the Conducting Zone and the Respiratory Zone. Discuss the structures included in each zone and how the zones are functionally distinct from each other. What happens in the Conducting Zone? What happens in the Respiratory Zone? **(4 points)**
- b. The airways are lined with epithelium, however the type of epithelium found is distinct in different parts of the respiratory system. If a molecule of oxygen is inhaled through the nose and eventually is exchanged into the blood at the alveolus, what are the types of epithelium that it will encounter in the respiratory system along its journey? What do these epithelia suggest about the functions of the regions of the respiratory system where they are found? **(6 points)**
- 24)) a. The structures of the digestive system are grouped into the organs of the gastrointestinal tract and the accessory digestive organs. Give 2 examples of organs of the gastrointestinal tract and 2 examples of accessory digestive organs, and then describe how these 2 groups of organs are distinct from each other. How does each group contribute to the overall function of the digestive system? **(4 points)**
- b. The gastrointestinal (GI) tract is lined with epithelium, however the type of epithelium found is distinct in different parts of the GI tract. If a bolus of food is swallowed and travels through the entire GI tract (assume at least some components of the food are indigestible and will be defecated), what are the types of epithelium that it will encounter along its journey? What do these epithelia suggest about the functions of the regions of the GI tract where they are found? **(6 points)**
- 25) a. The urethra in males is different from the urethra in females in terms of both structure and function. Describe one structural difference and one functional difference between the male urethra and the female urethra. **(4 points)**
- b. The nephrons of the kidneys are epithelial structures in which the epithelium varies throughout the structure. As filtrate is formed in the glomerular capsule and travels through the nephron tubule to eventually drain into the minor calyx, what are the types of epithelium it will encounter in the nephron along its journey? What do these epithelia suggest about the functions of the regions of the nephron where they are found? **(6 points)**

Section 3: Data Collected from Students

<i>SLO Assessment Question</i>	<i># Students Answering Correctly</i>	<i>% of Class Answering Correctly</i>
1 (n = 58)	50	86.21%
2 (n = 58)	50	86.21%
3 (n = 58)	24	41.38%
4 (n = 58)	17	29.31%
5 (n = 58)	33	56.90%
6 (n = 58)	33	56.90%
7 (n = 58)	38	65.52%
8 (n = 58)	50	86.21%
9 (n = 58)	20	34.48%
10 (n = 58)	35	60.34%
11 (n = 58)	34	58.62%
12 (n = 58)	38	65.52%
13 (n = 58)	33	56.90%
14 (n = 47)	36	76.60%
15 (n = 47)	37	78.72%
16 (n = 47)	32	68.09%
17 (n = 47)	18	38.30%
18 (n = 47)	19	40.43%
19 (n = 47)	35	74.46%
20 (n = 47)	41	87.23%

Possible correct responses from all questions assessed = 1083

Total correct responses from all questions assessed = 673

Total % questions answered correctly = 62.14%

For short answer questions used to assess this SLO (questions 21-25 above), average score, and average % of the class, as well as the class-wide range of raw scores was calculated for each question.

<i>SLO Assessment Question</i>	<i>Class-wide average score</i>	<i>Class-wide average %</i>	<i>Class-wide raw score range</i>
21 (n = 11) [§]	8.82 points (20 points possible)	44.10%	0 – 17.5 points
22 (n = 19) [§]	16.26 points (20 points possible)	81.32%	12 – 20 points
23 (n = 18) [§]	6.46 points (10 points possible)	64.58%	0.75 – 9.5 points
24 (n = 21) [§]	6.12 points (10 points possible)	61.20%	2.5 – 9.5 points
25 (n = 12) [§]	6.27 points (10 points possible)	62.71%	3.5 – 10 points

[§] students had choice amongst several short answer questions on exam where these questions were given

Total class-wide average % for short-answer questions used to assess this SLO = 62.76%

Section 4: Reflection and Recommendations

The mark for meeting this SLO successfully is the ability of the class to answer these multiple choice questions with $\geq 70\%$ success, or for 70% of the class to earn at least 70% on short answer questions.. That level of success is being met for only some of these questions (multiple choice 1, 2, 8, 14, 15, 19, 20; short answer 22). I believe there are a variety of factors at work.

In general, these results are “a mixed bag.” Student success varies widely, with students being successful on some questions and not successful on others for this SLO. I believe this reflects the “mixed bag” of experiences had by students in this course, and a significant challenge that comes with teaching this course in particular. Students enrolling in BIOL 250 need only to have taken an Introductory Biology course as a prerequisite; as the district does not have prerequisite blocking for this course, students are not held accountable for this. Even with this prerequisite requirement, however, the students enrolling in this course represent a wide spectrum in terms of academic preparedness, possession of study skills, and access to resources. There is a trend toward greater success in the questions given on exams later in the semester (e.g. multiple choice questions 14, 15, 19, 20). A significant contributing factor to this trend is likely that many of the less successful, less prepared students had withdrawn from the class by the time this exam was administered; as such, this trend does not reflect an increase in student success but rather attrition of unsuccessful students from the data set.

As stated in previous SLO analyses for this course:

“This observation, along with my own experience teaching this course, points to a significant need to better prepare students entering anatomy. There are significant disparities in student success in this course, more so than I have observed in any other course I have taught. Anecdotally, I suspect students who have less access to resources, students who have taken fewer science classes and part-time students are less likely to be successful in this course.”

In the coming semester I plan to submit a formal data request to the Office of (PRIE) so that we can have success/retention data on this course disaggregated by the following factors:

- prerequisite course taken (e.g. BIOL 100 vs. BIOL 110 vs. BIOL 130 vs. other)
- full-time vs. part-time student
- ethnic/racial background of student
- age of student
- educational background of student (e.g. students who already have undergraduate degrees vs. those who do not)

Cañada College BIOL 250: Human Anatomy
Spring 2016
Dani Behonick, Ph.D

Student Learning Outcome Assessment

Contents

Section 1: SLO and Assessment Methods

Section 2: Description of Assessment

Section 3: Data Collected from Students

Section 4: Reflection and Recommendations

Section 1: SLO and Assessment Methods

SLO. Explain how the shape and composition of cells, tissues and organs determine their function.

Assessment methods: [This SLO] will be assessed through scores on specific quiz and/or exam questions.

Section 2: Description of Assessment

Exam questions utilized to assess this SLO

MULTIPLE CHOICE

- 1) Which of the following correctly pairs the type of joint with its degree of mobility?
 - A) suture: amphiarthrosis
 - B) symphysis: diarthrosis
 - C) synovial joint: synarthrosis
 - D) synovial joint: amphiarthrosis
 - E) symphysis: amphiarthrosis

- 2) Cartilaginous joints:
 - A) are freely moveable joints (diarthroses)
 - B) are generally hinge joints
 - C) are seen in the sutures of the skull
 - D) may contain hyaline cartilage or fibrocartilage

- 3) The major function of stratified squamous epithelium is:
 - A) diffusion
 - B) absorption
 - C) filtration
 - D) protection from abrasion

- 4) The type of epithelium lining several structures of the urinary tract (including the ureters and the urinary bladder) that permits distension of these structures is:
 - A. pseudostratified columnar epithelium
 - B. simple squamous epithelium
 - C. stratified squamous epithelium
 - D. transitional epithelium

SHORT ANSWER

- 5) You are reading your anatomy book for fun (it could happen). You read about 3 locations in the human body that have epithelial tissues. In the first location there is simple squamous epithelium, in the second location there is transitional epithelium, in the third location there is stratified squamous epithelium.
 - a. Describe the structural differences between these 3 types of epithelial tissues. **(5 points)**

 - b. Describe the function(s) you expect each type of epithelium to perform. Explain your reasoning based on your answer for part (a). **(5 points)**

- 6) Connective tissue is often found covering organs of the human body.
- What type of connective tissue generally serves this function? What structural features allow this type of connective tissue to perform this function? **(5 points)**
 - Describe 2 other types of connective tissue and explain why these would be less suited to this function than the type of connective tissue you described in part (a). **(5 points)**
- 7) Describe 3 major structural differences between an artery and a vein. For each structural difference, explain how it contributes to a functional difference between these blood vessel types.
- 8) a. The structures of the respiratory system are divided into 2 zones – the Conducting Zone and the Respiratory Zone. Discuss the structures included in each zone and how the zones are functionally distinct from each other (i.e., what happens in the Conducting Zone? what happens in the Respiratory Zone?) **(4 points)**
- The airways are lined with epithelium, however the type of epithelium found in the mucosa is distinct in different parts of the respiratory system. If a molecule of oxygen is inhaled through the nose and eventually is exchanged into the blood at the alveolus, what are the types of epithelium that it will pass in the respiratory system along its journey? What do these epithelia suggest about the functions of the regions of the respiratory system where they are found? **(6 points)**
- 9)) a. The structures of the digestive system are grouped into the organs of the gastrointestinal tract and the accessory digestive organs. Give 2 examples of organs of the gastrointestinal tract and 2 examples of accessory digestive organs, and then describe how these 2 groups of organs are distinct from each other. How does each group contribute to the overall function of the digestive system? **(4 points)**
- The gastrointestinal (GI) tract is lined with epithelium, however the type of epithelium found in the mucosa is distinct in different parts of the GI tract. If a bolus of food is swallowed and travels through the entire GI tract (assume at least some components of the food are indigestible and will be defecated), what are the types of epithelium that it will pass along its journey? What do these epithelia suggest about the functions of the regions of the GI tract where they are found? **(6 points)**
- 10) a. The urethra in males is different from the urethra in females in terms of both structure and function. Describe one structural difference and one functional difference between the male urethra and the female urethra. **(4 points)**
- The nephrons of the kidneys are epithelial structures in which the epithelium varies throughout the structure. As filtrate is formed in the glomerular capsule and travels through the nephron tubule to eventually drain into the minor calyx, what are the types of epithelium it will

pass in the nephron along its journey? What do these epithelia suggest about the functions of the regions of the nephron where they are found? **(6 points)**

- 11) Rugae are an anatomical structure that can be found in several locations in the human body. What are rugae and what is their function? Give 2 examples of locations in the human body where you can find rugae and describe how rugae contribute to the specific function of each of these organs.

Section 3: Data Collected from Students

<i>SLO Assessment Question</i>	<i># Students Answering Correctly</i>	<i>% of Class Answering Correctly</i>
1 (n = 53)	27	50.94%
2 (n = 53)	30	56.60%
3 (n = 53)	36	67.92%
4 (n = 40)	24	60%

Possible correct responses from all questions assessed = 199

Total correct responses from all questions assessed = 117

Total % questions answered correctly = 58.79%

For short answer questions used to assess this SLO (questions 5-11 above), average score and % of the class on each question was calculated.

<i>SLO Assessment Question</i>	<i>Class-wide average score</i>	<i>Class-wide average %</i>
5 (n = 39) [§]	7.23 points (10 points possible)	72.31%
6 (n = 6) [§]	4.54 points (10 points possible)	45.42%
7 (n = 23) [§]	5.68 points (10 points possible)	56.82%
8 (n = 6) [§]	6.95 points (10 points possible)	69.58%
9 (n = 24) [§]	6.16 points (10 points possible)	61.56%
10 (n = 20) [§]	5.79 points (10 points possible)	57.92%
11 (n = 27) [§]	7.00 points (10 points possible)	70.00%

[§] students had choice amongst several short answer questions on exam where these questions were given

Section 4: Reflection and Recommendations

The mark for meeting this SLO successfully is the ability of the class to answer these questions with $\geq 70\%$ success. That level of success is being met for only two of these questions. I believe there are a variety of factors at work.

Multiple choice questions 1-3 and short answer questions 5 and 6, above, which were used to assess this SLO, were given on the first exam of the semester. Short answer question 7 was given on the second exam of the semester while multiple choice question 4 and short answer questions 8-11 were given on the final exam of the semester. As the semester progressed, students who were making less academic progress in the class (and as such, tended to score lower on lecture examinations) dropped the course and as a result, students who had stronger performances were more represented later in the semester. This does not appear to have had an impact as the 2 questions for which students met this SLO were given on the first and last exam, respectively.

Student outcomes for this course continue to be a mixed bag, and student success continues to vary widely. The fact that the criteria set for success for this SLO was not met for most questions in this assessment points to an increased need for support and resources for students in this course.