Mission Statement: The mission of the Saddleback College Department of Biological Sciences is to provide our students with a comprehensive, integrative, and balanced learning experience in the biological sciences that leads to success in the attainment of academic degrees and career technical certificates, transfer to four-year institutions, improvement of basic skills, and a life of continued learning and informed participation in a democratic society.

2018
SECTION I: SUMMARY REPORT

A. List all degrees, certificates, and occupational skills awards offered by the program:
Associate in Science in Biology for Transfer Degree (Biology AST degree)
Biology Associate in Science Degree (Biology AS degree)

B. What are the most important contributions of the program to the college?:
The Biological Sciences Program at Saddleback College serves three distinct student populations.
Biology Majors
The biology major courses (Bio3 and Bio4 series) serve students who will transfer to four-year institutions to complete a bachelor’s degree in one of the biological sciences. Many of these students will eventually matriculate to medical, dental, and optometry schools, etc. We are proud to offer these students many opportunities for various research and conference opportunities:
Saddleback/IVC Honors symposium, Honor Transfer Council of California symposium presentations, UCI research in the Madou Laboratory, Summer Undergraduate Research Fellowship at Chapman University complete prerequisite requirements while working and taking
The Biology 4 series offers our larger post-baccalaureate students and other biology majors students who do not need a heavy research intensive 3A/3B courses an opportunity to meet graduate and transfer school requirements.

Health Career
These courses (Bio 11, 12, and 15) serves students preparing for nursing or allied health programs, such as, dental hygiene, physical therapy, pharmacy, physician’s assistant, laboratory science, and nutritional science. We are proud to offer three common prerequisites for these students: Microbiology (Bio15), Human Anatomy (Bio11) and Human Physiology (Bio12).

General Education
Many of our biology courses serve the students who are interested in taking a one-semester general biology course with or without a lab. All lab and lecture courses in this program satisfy IGETC Area 5B transfer requirements. Also included in this program is a rich array of field courses that enhance the learning experience of our students. Unlike courses offered at major four-year universities, the Department of Biological Sciences offers relatively small class sizes. For example, the biology majors’ courses offered at UCI, UCLA, and UCSD are large lectures with over 300 students per section (sometimes exceeding 700). Laboratory sections in these courses (if available) are taught by graduate students, not the lecturing faculty member. In our department, the enrollment is 28 students per section. Furthermore, the same faculty member generally teaches both the laboratory and lecture portions of the course. The smaller class sizes allow faculty members to interact with the students and focus on their individual learning needs.
The Department of Biological Sciences takes pride in having state-of-the-art equipment available to the students. Unique to Saddleback College is that biology students get hands-on experience during the laboratory sessions with research grade equipment. Examples of this equipment include UV-VIS spectrophotometers, spectrophotometers, data loggers (real-time oxygen and carbon dioxide measurement system, pH probes, etc.), bomb calorimeter, vapor pressure osmometer, mobile respirometer system, microscopes (fluorescent and visible light), real-time PCR and PCR thermal cyclers, ultracentrifuges, laminar flow hoods, fume hoods, micro-electrode puller, large-format poster printer, electrocardiographs, and physiological data acquisition and analysis systems, just to name a few!

C.1 Since the last PR, how have SLO results been used to make changes to the program?: The SLO from our Bio3 series,
“Students will demonstrate practical knowledge of the scientific method through experimental design” has led to students designing experiments, completing them and then giving poster presentations. Scientists from other schools (e.g. CSUF/Chapman) regularly attend these presentations. Relationships with these schools have led to the generation of increased research opportunities and research presentation experience at outside conferences. Since Fall 2017, 18 Bio 3A/Bio 3B students have given 6 oral presentations and 7 poster presentations at research conferences after completing their courses at Saddleback. They have participated in 6 different research conferences, five of which being devoted to undergraduate research across California and one of which being a nationwide professional conference of the American Association for the Advancement of Sciences (AAAS). Three students have authored publications.

Below, you can find the detailed list of presentations and student names:

IVC/SC Undergraduate Research Symposium – November 2017
Student: Khalid Yasseen
Oral presentation title: Antibacterial activity of cinnamon oil and its synergy with vancomycin against Enterococcus faecalis
Student: Khalid Yasseen (Best abstract award)
Oral presentation title: Antibacterial activity of cinnamon oil and its synergy with antibiotics against Pseudomonas aeruginosa
Students: Hanna Brooks and Sophia Quasem (Outstanding abstract award)
Poster title: The effect of simulated acid rain on mung beans (Vigna radiate) growth and development.

Honors Transfer Council of California (HTCC) conference, UC Irvine - April 2018
Students: Noah Husband, Brett Schiller, Michelle Tran, Jalal Saghaeidehkordi, Vesta Farahman, Ali Ajaj.
Poster title: A Likely Independent Origin of Extensive Placentotrophy in the Southern Africa Clade of the Skink Genus Trachylepis
Student: Khalid Yasseen (Outstanding abstract award)
Oral presentation title: Antibacterial activity of cinnamon oil and its synergy with vancomycin against Enterococcus faecalis

Students: Oren G. Wellner and Anza R. Spinelli.
Oral presentation title: Adhesion of Staphylococcus epidermidis on virgin polyethylene and polyvinyl chloride media.

Students: Hanna Brooks, Steven Corrales, Sophie Quasem, Dalia Villamil
Oral presentation title: The Inhibition Effect of Coconut Oil, Monolaurin, and Vancomycin on Staphylococcus aureus

Bay Honors Symposium, UC Berkeley - May 2018
Student: Khalid Yasseen
Oral presentation title: Antibacterial activity of cinnamon oil and its synergy with vancomycin against Enterococcus faecalis.

AAAS Pacific Division Conference, June 2018
Students: Noah Husband, Brett Schiller, Michelle Tran, Jalal Saghaeidehkordi, Vesta Farahman, Ali Ajaj. (all but the last were Bio 3B students)
Poster title: A Likely Independent Origin of Extensive Placentotrophy in the Southern Africa Clade of the Skink Genus Trachylepis

IVC/SC Undergraduate Research Symposium – November 2018
Students: Brett A. Schiller, Noah Husband, Sydney Davis, Anna Groehnert, Israel Ocampo
Poster Title: The Evolution of Placentotrophy in the Southern Africa Clade of the Skink Genus Trachylepis

Students: Noah Husband, Brett Schiller, Israel Ocampo, Anna Groehnert, Sydney Davis
Poster Title: Life-history characteristics of Trachylepis striata, a placental skink

Southern California Conferences for Undergraduate Research (SCCUR), Pasadena City College – November 2018
Students: Brett A. Schiller, Noah Husband, Sydney Davis, Anna Groehnert, Israel Ocampo
Poster Title: The Evolution of Placentotrophy in the Southern Africa Clade of the Skink Genus Trachylepis

Students: Noah Husband, Brett Schiller, Israel Ocampo, Anna Groehnert, Sydney Davis
Poster Title: Life-history characteristics of Trachylepis striata, a placental skink
Student publications

Online field guide:

Published conference abstracts:


As for the Health Careers students, we have used our SLO results to generate updated lab manuals. To give one example based on the SLO for BIO 11 (Human Anatomy), “Predict the movement of a joint based on the joint classification and identify the components of the integumentary system”, we have generated an updated anatomy lab unit to reflect the need for students to review the structural and functional classifications of joints. We first assessed this SLO in Fall 2013 and only 65.2% were able to correctly identify the classification of the joints. We intend to re-assess this SLO in the next year.

Joints- Functional Classifications (based on amount of movement allowed). Define and give an example.

Synarthrotic:
- Example:

Amphiarthrotic:
- Example

Diarthrotic:
- Example

In Microbiology (Bio 15), students were having difficulty recalling the reason why certain bacteria are more difficult to kill with particular antibiotics and disinfectants than others. This concept goes along with the SLO, “Students demonstrate conceptual understanding regarding bacterial cell structures and antimicrobial therapy.” This SLO was recently assessed in January 2018 with only 55% of the students passing the question. These concepts are introduced in lectures early in the semester, and students often forget them by the end of the term. To reinforce the importance of these concepts, we have included two additional questions to their final lecture study guides, which they complete at the end of the semester.

1. What specific cell wall structure makes Pseudomonas so difficult to disinfect and treat with antibiotics? Explain and provide a labeled sketch to illustrate your answer.
2. What unique cell wall structure makes Mycobacterium so difficult to disinfect and treat with antibiotics? Explain and provide a labeled sketch to illustrate your answer.

Additionally, we now review these important concepts using PowerPoint slides in lecture and lab exercises at three additional (later) time points of the semester.

When addressing the General Education students, Biology 20 lab materials have been updated to allow more students to practice concepts. Specifically, the SLO “Students completing Biology 20 will be able to evaluate basic biological concepts” was assessed in the Spring of 2017. A study guide and extra practice problems were generated that focused on energy metabolism as previous assessments showed students had difficulty with this concept. As a result, 76% of the students passed 7 embedded questions on the final exam that addressed metabolic processes.

C.2 What has been the impact of those changes on the program?: The greatest impact on our program has been the development of honors courses for the bio major students. The opportunity to design and carry out an experiment is not always something a bio major student wants to do as many are taking our BIO3 series as prerequisites for Physician Assistant school. With the development of BIO 3AH and 3BH, which were first offered the 2017-2018 academic year, we have expanded the opportunity for students to pursue experimental design and testing with the expectation that the students present in outside venues (e.g. Honors Transfer Council of California held at UC Irvine).

D.1 Did the program achieve its objectives from the last PR?: In our 2015 Program Review, the department identified five objectives. Some progress was made in each of these areas.

Objective 1: Maintain or increase, as determined by the department, our current level of state-of-the-art and basic laboratory equipment.

Progress: Since moving into the new science building our budget has been tight but we are still able to maintain and increase our current laboratory equipment. Please see the list of resources we received since the last PR under Section II.

Objective 2: Faculty: Hire one new faculty position within the next fiscal year. We will seek an instructor to teach anatomy,
physiology and majors’ biology.

Progress: In Spring 2016 the Biology Department searched and hired Dr. Katherine Shaw into our department, increasing the total faculty to ten. However, Dr. Jane Horlings retired Spring of 2018, reducing our total faculty back to nine. The department has filed the paperwork for the faculty hiring prioritization process to seek a replacement faculty for Dr. Horlings.

Objective 3: Increase the diversity of course offerings in the Biological Sciences Department

Progress: The Biology Department has diversified its course offerings through 2 means: creating new courses and providing alternative modes of instruction. New courses include honors courses for Bio3A and 3B and the addition of a new biology course series for Biology Majors written for the new Biology AST degree. Courses that have been changed to provide alternative modes of instruction ranging from face-to-face, 50% hybrid to 100% online include: Microbiology (Bio 15), Human Anatomy (bio 11), Genetics (Bio 22; offered Face-to-Face in summer 2018), and Pathophysiology (Bio112).

Objective 4: Add one section of BIO 3C (Molecular Biology and Biochemistry)

Progress: Although BIO 3C has been offered for both Fall and Spring semesters, low enrollments have forced BIO 3C sections to be canceled. Most recently, BIO 3C was canceled for the Fall 2018 semester. This was due to students enrolling in Organic Chemistry (Chem 12B) in Chemistry’s off sequence semester where Chemistry did not examine how changing their course day and time offerings would impact other departments. Since then, discussions with the chemistry department have occurred and we hope that future cancellations of BIO 3C will not happen. Also, discussions center on offering two sections of BIO 3A and one section of BIO 3AH to increase more students that would then move on to BIO 3B, and subsequently, BIO 3C.

Objective 5: Develop a Marketing Plan for the Biological Sciences at Saddleback College

Progress: While our outreach has improved through: 1) increased participation of biology students in research programs at neighboring institutions (e.g., UCI, CSUF, Chapman); 2) the development of the new Bio AST degree; and 3) the development of new brochures, we have still not developed a marketing program per se.

D.2 What has been the impact of those achievements on the program?: Between the hiring of Prof. Shaw and the opening of the new science building, the biology department has been able to expand the offerings of most courses. This is due not only from the hiring of Dr. Shaw, as well as a new part-time lab tech, but also having more lecture and lab room availability in the new science building.

E. List the top three objectives for the coming three years: 1) Foster student success by continuing to offer quality instruction with state-of-the-art equipment.

2) Ensure that the faculty staffing within the program is adequate to continue offering a diverse range of courses.

3) To continue our increase in student completions. This may be done by creating a biology certificate.