

2017-2018 Program Review for Biology-- Annual Review Note: We tried using the PDF form but it would not save the final drafts.

Prepared and submitted by Ralph Robinson, Brian Gillespie, Jaya Shaw, and Andrew Miller

Section A. Program data

At WCC during the 2016-17 year Biology FTEF for Biology and Ecology increased slightly to 7.27. Our productivity WSCH/FTEF was 986 in F2F classes (650 in DE). Ecology was 1035 in F2F (710 DE). These numbers represent about a 10% decrease from the 15-16 year. On the Clearlake campus WSCH/FTEF was 744 which is slightly lower than the year before (775). Our active students enrollments increased from 1080 to 1,317 (Biology 1,047 F2F; 130 DE; Ecology 69 F2F, 71 DE). Almost all of our sections fill with the following success rates for the last year:

Woodland and Clearlake: Biology 73% in F2F classes and 75% in DE; Ecology 73% in F2F and 81% DE.

At the Colusa Center, Biology 24 was offered F2F in spring with 13 students--a fill rate of 32% and success rate of 62%. WSCH/FTEF was 390. Biology 10L (which usually has one section) was not offered last year.

Our student demographics are fairly stable at 68% female and 32% male for WCC and 73% and 27% for LCC. Our student age distribution has remained stable over the last year as well. We have noticed a drop in Asian students from 24% to 22% and a corresponding increase in Hispanic students from 42% to 44%. Other ethnicities have remained the same. Student head count increased from 684 to 782 at WCC and remained pretty much the same at LCC (81 to 82). Our EOPS students increased from 54 to 83; DSPS from 29 to 33; CalWORKs 6 to 13; Students with Bog fee waiver 515 to 535.

Section B – SLO Assessment Overview

Program SLOs:

The Biology Department currently has three program Student Learning Outcomes (pSLOs) that directly support intuitional Student Learning Outcomes (I-SLOs). pSLO1 is Critical Thinking - Identify and apply the steps of the scientific method in order to design and conduct laboratory or field experiments, collect and analyze results, and solve problems in the biological sciences (aligns with I-SLO Critical Thinking). pSLO2 is Scientific Awareness - Identify and apply the central concepts, hypotheses, and theories that comprise the major areas of the biological sciences, including cell and organism structure and function, evolution, and ecology (aligns with I-SLO Scientific Awareness). pSLO3 is Communication - Communicate biological information in oral and/or written form (scientific lab reports, oral presentations, posters, research proposals, etc.), using appropriate oral and written presentation formats, proper scientific terminology, and appropriate use of data to support conclusions (aligns with I-SLO Communication).

The department hasn't previously utilized a formal process of assessing program SLOs. For purposes of this program review individual course SLOs assessments from the 2016-17 academic

year were examined, and cSLOs that corresponded to one or more pSLO were selected. Each cSLO was rated as having or not having met criteria for success. The number of cSLOs that supported a particular pSLO was calculated and compared to the number of cSLOs that did not support the pSLO. In summary, 7 out of 8 cSLOs that corresponded to pSLO1 Critical Thinking met the criteria for success. 7 out of 8 cSLOs that corresponded to pSLO 2 Scientific Awareness met the criteria for success. 4 out of 4 cSLOs that corresponded to pSLO3 Communication met the criteria for success. Overall the department shows strong and consistent support for its program SLOs.

Course	cSLO	Critical Thinking - Identify and apply the steps of the scientific method in order to design and conduct laboratory or field experiments, collect and analyze results, and solve problems in the biological sciences (aligns with I-SLO Critical Thinking)	Scientific Awareness - Identify and apply the central concepts, hypotheses, and theories that comprise the major areas of the biological sciences, including cell and organism structure and function, evolution, and ecology (aligns with I-SLO Scientific Awareness)	Communication - Communicate biological information in oral and/or written form (scientific lab reports, oral presentations, posters, research proposals, etc.), using appropriate oral and written presentation formats, proper scientific terminology, and appropriate use of data to support conclusions (aligns with I-SLO Communication)
Biol 1	1. Describe and correctly apply the scientific method by designing and carrying out controlled experiments, including formulating hypotheses, collecting and analyzing data, proposing conclusions, and communicating them in proper scientific format.	Criterion Met		Criterion Met
	4. Describe and correctly apply the theory of evolution by natural selection, to explain adaptation, biological unity, and diversity.		Criterion Met	

Biol 2	1. Describe and correctly apply the scientific method by designing and carrying out controlled experiments, including formulating hypotheses, collecting and analyzing data, proposing conclusions, and communicating them in proper scientific format.	Criterion Met		Criterion Met
Biol 3	1. Describe and correctly apply the scientific method by designing and carrying out controlled experiments, including formulating hypotheses, collecting and analyzing data, proposing conclusions, and communicating them in proper scientific format.	Criterion Met		Criterion Met
Biol 4	1. Identify and describe details of cell, tissue, organ, and system anatomy.		Criterion Met	
Biol 5	2. Apply knowledge of physiological mechanisms to the understanding of specific homeostatic imbalances.		Criterion Met	
Biol 6	1. Apply the scientific method in determining the identity of a bacterial unknown that may be the causative agent of disease. This will include determining appropriate tests, collecting, analyzing test results; and finally formulating and presenting a presumptive identification.	Criterion Met		
	3. Research the scientific literature and appropriate websites for information on a specific infectious disease. This will culminate in a fifteen minute presentation to inform the class about this disease.			Criterion Met
Biol 10L	2. Given a genetics problem explain and apply the principles of transmission and molecular genetics.	Criterion Not Met	Criterion Not Met	
Biol 15	1. Describe and correctly apply the scientific method by designing and carrying out controlled experiments, including formulating hypotheses, collecting and analyzing data, and proposing conclusions.	Criterion Met		

	3. Given a genetics problem, explain and apply the principles of transmission and molecular genetics.	Criterion Met	Criterion Met	
	5. Describe and correctly apply the theory of evolution by natural selection, to explain adaptation, biological unity, and diversity.		Criterion Met	
Biol 24	3. Describe and identify interrelationships between humans and their environment in the context of balance and disease throughout the ecosystem.	Criterion Met	Criterion Met	
Biol 25	1. Scientific Awareness: Students will be able to demonstrate the relationship between the process of meiosis and the formation of specific gametes.		Criterion Met	

Course SLOs:

All courses offered by the department have at least one course student learning outcome, and most courses have between three and five. cSLOs are assessed each semester, with at least one SLO assessed per course section. The only exception is Biology 12 (Marine Biology) which has not been offered since TracDat was implemented to record SLO assessments. All cSLOs are current and matching in TracDat and Curicunet Meta.

Section C. Curriculum Overview

Degree status. Our Associate in Science in Biology for Transfer (AS-T) Degree is now approved and available for students who wish to transfer to a California State University. A Pre-Health Occupations degree is in development. Our other degree for Ecology has not been developed further but is still planned. Courses are currently in place to offer the Pre-Health major but new courses, specifically with a lab, need to be developed for Ecology. The Biology/Ecology program at Woodland offers students a range of courses that meet General Education, Majors requirements, and Pre-Allied Health Occupation Majors requirements. All courses (except for Bio 30) currently offered are transferable to UC/CSU campuses, and we offer the full range of courses to meet nursing school prerequisites. At this time there is no option to major in Biology, Ecology, or Pre-Health Occupations, but we have begun discussions towards designing degrees in each of the 3 areas. A transfer degree has been developed but is waiting final approval.

General Education/Non-Majors

Biol 10L- General Biology (4 units)

Ecol 10- Environment: Concepts and Issues (3 units)

Ecol 12- Marine Ecology (3 units)

Biol 24- Human Biology (3 units)

Biol 25-Human Genetics (3 units)
Biol 30- Emerging Infections (3 units)

Majors' Transfer Sequence (prerequisites outside department)

Biol 1- Principles of Biology (5 units) prerequisites are Math 52 and Chem 1A
Biol 2- General Zoology (4 units) prerequisite is Math 52
Biol 3- General Botany (4 units) prerequisite is Math 52

Pre-Allied Health Majors' Sequence

Biol 15-Bioscience (5 units)
Biol 4- Human Anatomy (5 units)
Biol 5- Human Physiology (5 units)
Biol 6 – Microbiology (5 units)

Nutrition 10 (3 units) for general education credit is also covered with 5 sections per year at WCC. An Associate in Science in Nutrition for Transfer (AS-T) degree is available in this area.

The Biology/Ecology program offers a comprehensive set of courses to meet the demands of the community and the college: We offer the Biol 15, 4, 5 and 6 series for Pre-Allied Health majors, the Biol 1, 2, and 3 series for Biology transfer majors, and Biol 10L, 25,& Ecol 10 for non-majors who are exploring an interest in the sciences, or who need to fulfill their natural science GE requirement. Biol 12 (marine biology) was deactivated last year, but we hope to offer it again after making curriculum modifications. A course for non-majors, Biol 30 Emerging Infections, has been offered once but the GE and transfer credit was denied and the course will not be offered until transfer credit is approved. Bio 30 is the exact same course that is offered at other local campuses (UCD) so it should be approved for transfer credit. Most courses in the program are articulated with the majority of CSU/UC campuses.

Areas for Improvement:

We currently do not have a Biology or Ecology major, although the AS-T transfer degree has been approved. For the Ecology AS, new laboratory courses will need to be designed and implemented in order to offer these degrees.

We are currently not offering enough sections of courses to meet student demand, in particular for students in the Biol 15, 4, 5, and 6 sequence for allied health.

Another area is that our students lack the 'cultural' aspects necessary to quickly assimilate into a 4-yr biology program, after transfer. Biology students at UCD and other 4-year schools are expected to conduct research before graduation. Because of the high cost of training time and skill development in undergraduate students, professors expect students working in their labs to commit to working for 2-3 years, minimum. Most students begin working in research labs by the middle of their first year. Clearly, our students must 'hit the ground running' if they are to succeed in their undergraduate program. To that effect, they must be prepared and educated with the range of opportunities before they arrive at the 4-yr institution. We now have a full-time faculty member (Brian) who is making strong progress in introducing research projects to the

students taking the majors courses (Bio 1, 2, &3). This should help them to a large extent when applying to programs and making the transition to a four-year university.

Section D. Scheduling Overview

We try to schedule our courses for maximum flexibility for students so they can complete their requirements in a reasonable time frame. The allied health sequence of Bio 15, 4, 5, & 6 have multiple sections on different days and a mix of day/evening/weekend offerings. Due to lower demand, Biology 1, 2, & 3 must be completed in a proscribed manner. Overall, students do not have scheduling conflicts.

General Education/Non-Majors

Biol 10L- General Biology (4 units), with lab.

Yr	Sections	Fill Rate	% Success rate
12-13	2	104	50
13-14	2	110	53
14-15	4	103	69
15-16	5	83	60
16-17	5	95	56

Ecol 10- Environment: Concepts and Issues (3 units) (DE)

12-13	2 (2)	na
13-14	2(2)	na
14-15	2(2)	ma
15-16	2(2)	86 (79)
16-17	2(2)	80 (88)

Ecol 12- Marine Ecology (3 units) not offered

Biol 24 Human Biology (3 units) all DE (LCC) {Colusa F2F}

12-13	0	0	
13-14	0	0	
14-15	0	0	
15-16	2	83	54
16-17	3(1)	72(40){32}	78{62}

Biol 25-Human Genetics (3 units) all DE

12-13	2	62	65
13-14	2	72	51
14-15	2	72	64
15-16	2	82	69
16-17	2	72	72

Biol 30 Emerging Infections (3 units)

12-13	0	0	
13-14	0	0	
14-15	1	35	85
15-16	0	0	
16-17	0	0	

Majors' Transfer Sequence

Biol 1- Principles of Biology (5 units)

12-13	4	98	66
13-14	4	95	73
14-15	4	94	58
15-16	6	89	60
16-17	6	84	60

Biol 2- General Zoology (4 units)

12-13	1	95	87
13-14	1	79	63
14-15	1	87	73
15-16	1	75	67
16-17	1	71	82

Biol 3- General Botany (4 units)

12-13	1	100	88
13-14	1	83	95
14-15	1	108	88
15-16	1	100	96
16-17	1	96	78

Pre-Allied Health Majors' Sequence

Biol 15-Bioscience (5 units)

12-13	7	89	50
13-14	7	86	63
14-15	8	92	69
15-16	9 (3)	85(72)	60 (75)
16-17	9(2)	82(89)	56 (na)

Biol 4- Human Anatomy (5 units) (LCC)

12-13	7	110	83
13-14	7	106	79
14-15	7	113	80
15-16	7 (2)	120 (93)	82 (69)
16-17	7 (1)	107 (54)	81 (84)

Biol 5- Human Physiology (5 units) (LCC)

12-13	5	106	87
13-14	6	99	82
14-15	6	104	85
15-16	5 (1)	113 (79)	84
16-17	5 (1)	110 (112)	84

Biol 6 – Microbiology (5 units) (LCC)

12-13	5	74	86
13-14	4	92	91
14-15	4	97	84
15-16	5 (1)	101 (95)	79 (78)
16-17	5	96	81

Section E. Technology, Equipment, and Facilities:

Technology Resources:

Equipment:

1. For Human Physiology (Bio 5), lab, the BIOPACK System software and hardware are more than 10 years old. Two of the MP 35 hardware are completely out of work. The software is old and does not work properly. The new and upgraded BIOPAC system needs to run several physiology labs. To get up to date and accurate physiological data we must purchase upgraded and new BIOPACK System, which is standard for BIOL 5 course requirement.

Budgetary impact: \$ 15000 -\$20000 Priority high Contact person: Jaya Shaw

2. Classroom Response System (Clickers) will be used in the biology classrooms for to increase students' attendance, participation, and to monitor the instant understanding level of the material presented to the students. To achieve the above goal and ultimately augment the active learning in the classroom, the biology department needs 50 Clickers.

Budgetary impact: \$2000 Priority medium Contact person: Jaya Shaw

3. For Human Anatomy (BIOL 4) lab, the torso models are essential part of teaching body structure before we take the students to identify the same structure in human cadaver. We have three torso models for six tables in the lab. So 3 more torso models needs to be purchased so that each table will have one torso for use during the lab.

Budgetary impact: \$ 12000 Priority high Contact person: Jaya Shaw

4. Water baths for labs. At the current time we must move water baths from one lab to another for labs requiring temperature controlled water baths. Not only is the inconvenient, it introduces a safety hazard when using baths in the microbiology labs where they may get contaminated and then "contaminating" other rooms. Mainly for this reason each lab should have adequate water baths for the whole semester.

Budgetary impact: 4 X \$1000 Priority high Contact person: Ralph Robinson

5. Micropipettes. Micropipettes are needed in most biology lab procedures these days. We simply do not have enough of them. We need 12 each (2-20ul), (5-50ul), (20-200 ul) and (100-1000 ul).

Budgetary impact: \$ 8500 Priority high Contact person: Ralph Robinson

Facilities:

6. New lab benches for room 625. Room 625 was not designed for “wet” labs. It has high benches and electrical outlets on the floor. These benches are uncomfortable for students to work on and the outlets present a significant safety hazard if liquids are spilled into the outlets in the floor. New lower benches should be installed with outlets at bench height.

Budgetary impact: Unknown

7. Gas line plumbing for room 629. Currently room 629 is used to teach microbiology and does not have gas lines at the lab benches. This is a significant safety hazard since the students must crowd around the Bunsen burners on the side benches. The chances of lab coats and student’s hair catching on fire is increased significantly.

Budgetary impact: Unknown

Cadaver lab is complete and up running.

Section F – Academic Support Services and Library Resources

As a science program the biology department has a natural affinity with the Math, Engineering, and Science Achievement (MESA) program. Many of its students are active participants in MESA which offers tutoring, academic and career counseling, and a social outlet for members with overlapping interests. Generally, students who participate in MESA show higher academic achievement over peers who are not involved.

The new Supplemental Instruction (SI) program has shown itself to be beneficial to biology students. Last year SI provided support for Biology 4 (Human Anatomy) and Biology 5 (Human Physiology). This year SI support for both of those classes has continued and support for Biology 1 (Principles of Biology) has been added. Following national trends, students participating in SI demonstrate an increase in GPA of 0.4 (nearly half a letter grade) over non-SI participants. The department encourages increasing the number of classes supported by SI, however most of its sections are taught by part-time staff who may not have time to meet with SI-leaders outside of scheduled hours.

The department does not have any formal requirements for its students to use library resources, but many of its classes assign research projects where library resources (printed volumes, library

databases, etc.) are of a great benefit. Some of our courses take advantage of seminars offered by the librarian on how to use library resources.

One campus resource the department looks forward to utilizing is the forthcoming Makerspace. The tools and materials that will be available in the Makerspace will support independent student research projects that are now an aspect of the Biology major's sequence of courses (Bios 1, 2, and 3).

Like any academic program, students in the department benefit from the services offered through the Student Success Center and the Library, but participation in their associated programs, although highly encouraged, is not mandatory. Instructors are encouraged to offer incentives for student participation. Outside of increasing the number of courses supported by SI, the department does not see the need for any additional support services beyond the ones being offered.

Academic Support Services:-Lake

The Biology program at the Lake County Campus continues to encourage students to use all available student support services. Our students regularly use services from DSPS and tutoring from the learning center. The library maintains copies of every text book for students to use if they are not able to purchase textbooks. Further, open copyright textbooks are being explored to implement in all Biology classes. To date, we have offered free lecture texts for Anatomy and Physiology Courses. We are seeking to include free laboratory texts in the future as well.

Section G – Staffing and Professional Development

The program currently has four full time faculty members, three at WCC and one at LCC. Two of the full-time Biology instructors at WCC have terminal degrees in the field (Ph.D. or M.D.), and numerous years of teaching experience. The third has a Master's degree with several years teaching experience. At LCC the new full time faculty member (Andrew Miller) has completed his first year successfully, and continues to make improvements in the quality of instruction at that campus. There are currently five adjunct faculty teaching courses at WCC, one at LCC, and one at CCC. The majority of the part-time faculty hold Ph.D. degrees. The full time faculty participate in numerous campus committees and are involved in community outreach as well. These include:

- executive member of NAFCA (Nepalis and Friends Cultural Association), California Chapter
- volunteers at Davis Communicare Health Center Clinic.
- Yolo County Foster and Kinship Education, foster parent
- Kinders Go to College, presenter
- trick or Treat for UNICEF, fundraising
- Yolo County Food Bank, fundraising
- Jail inmate advocacy during pregnancy and childbirth

Strengths:

The WCC full-time faculty is dedicated to providing rigorous, constructive, and dynamic

instruction, incorporating skills updated through training, collaboration, and workshops. The faculty members regularly modernize and improve lecture and lab activities, integrating best practices in pedagogy and recent developments in biology. Each faculty member supports the college outside of the program through active participation and leadership roles on campus committees and support of student activities.

Areas for Improvement:

Based on high demand for courses, difficulty finding and maintaining qualified adjuncts, and the lack of a coordinator and a division dean, there is a strong need for more full-time faculty and a coordinator position. Many courses continue to fill within hours of the opening of registration. On the first day of classes it is also clear we are not meeting the student demand. One of the challenges in offering additional courses is the turnover of adjunct faculty due to a lack of coordination and support in the department and low pay compared to other districts. The full-time faculty has had to handle recruitment, training, and mentoring of new adjunct faculty, and without a coordinator or division dean, this requires a significant amount of time and effort. Training on safety and lab procedures/equipment alone can take several hours each week for each course. The lack of an appropriately qualified designated liaison between the lab technician and the adjunct instructors has resulted in numerous cancelled labs because several different sections of different courses needed to be coordinated in terms of materials to be ordered and prepared. The staffing level for our department is inadequate compared to similar programs at similar colleges where there would typically be a coordinator/program chair in addition to a division dean. The program success requires the designation of a coordinator position to effectively recruit, train, and coordinate adjunct faculty as well as train and supervise the lab technician. The program will also require the hiring of two additional full-time faculty members. One is for the non-major's/general education classes General Biology (Biol 10L) and Bioscience (Biol 15), which are currently taught only by adjuncts and have only minimal coordination by a full-time faculty member. An additional faculty for Anatomy and Physiology (Biol 4&5) is needed to allow for expansion of enrollment in these high-demand classes.

Currently, the Lake County Campus offers all of the key Biology courses for students preparing to enter the allied health profession. Therefore, we maintain laboratory sections for Cadaver Anatomy, Human Physiology, Microbiology, and Bioscience. Currently, there is only 1 full-time professor at the Lake County Campus teaching all of these courses, preparing laboratory experiments, maintaining lab equipment, and all around managing the Cadaver, Physiology, and Microbiology laboratory. At both the Yuba College campus and Woodland campus, there is a full-time staff member who oversees these responsibilities so the professors can better fulfil their responsibilities. A part-time or preferably full-time laboratory assistant is needed at the Lake County Campus to allow the instructors to work more efficiently on their responsibilities. Moreover, the Lake County Campus Biology program should have a staff laboratory assistant to maintain parity of workload between Biology Professors at the Lake County Campus and the other campuses in the district.

The Lake County Campus Biology Program rapidly growing. This growth can be attributed to natural growth and interest in the Allied Health Profession and the introduction of a middle

college agreement with a local high school and the Lake County Campus. As a result, we are adding sections of Biology courses and we anticipate adding significantly more courses in the future. This is primarily because the high school associated with the middle college is a medical magnet school and most students there are looking to enter the medical field in some capacity. As of the 2017-2018 academic school year, the middle college's first cohort is approximately 50 students, and they project a similar number of new students per cohort each year in the future. We anticipate the first cohort will be taking Biology courses in 2019. Therefore in 2019 we will be adding more sections and as such we will require more instructors to teach Biology courses. Given this near future need, the Biology Department should consider hiring another full-time Biology professor at the Lake County Campus.

Future Direction:

WCC has a critical and immediate need for a coordinator as well as two new full-time faculty members. The biology classroom experience has been continually deteriorating due to these insufficiencies. The current full-time faculty members, due to lack of support, are already dedicating an inappropriate amount of time and effort in attempts to alleviate the problems. Furthermore, the anticipated growth in the biology program at the Lake County Campus places a high priority on adding an instructional assistant to support the laboratory portions of classes, and a second full-time instructor.

Professional Development:

All members of the department, both full-and part time, participate in professional growth activities as a part of their contractual obligations (FLEX). The following is a summary of the professional growth activities of the full time staff during the 2016-2017 academic year.

Andrew Miller (LCC): During the 2016-2017 academic year, Professor Andrew Miller fulfilled all Flex hour requirements via professional development and community service. Some examples of professional development included training on beginner and intermediate Canvas tools, course development, student learning outcome assessments, and student communication tools. In addition to Flex development, Professor Miller also attended a 3-day training on best practices for running and maintaining a Human Cadaver Lab. Examples of community service included presentations for prospective students on campus, science presentations at a local elementary school, and field trips to local medical clinics with students who are seeking more experience in the medical field.

Ralph Robinson (WCC): Dr. Robinson attends seminars for the UC Davis Microbiology Department and Friday seminars on teaching, is a Member of the American Society of Microbiology, and has made several elementary school microscope presentations (and other cool stuff) in Davis. Dr. Robinson has also been an "informal" advisor to the Yolo County Department of Public Health this last six months. It is amazing since last Spring there have been an outbreak of botulism poisoning in Walnut Grove (10 cases, 1 death), a huge outbreak of Norovirus in Woodland and Davis elementary schools resulting in several school closures, and several cases of West Nile Virus in September.

Brian Gillespie (WCC): Professor Gillespie assisted in department program review, updated the curriculum for Biology 1 to include chemistry prerequisite, developed a laboratory manual for Biology 1 in conjunction with Adjunct Faculty Dr. Sonia Santa Ana, developed additional laboratory manuals for Biology 3 and for Biology 10L. He also completed EEO training, and Curricunet Meta training.

Jaya Shah (WCC): Dr. Shah completed flex hours obligation by participating in several committee (SLO committee, Academic Senate, Diversity committee and College Council) as well as served as a member of Tenure and hiring committee. He also attended a 3-day training on best practices for running and maintaining a Human Cadaver Lab, attended “Entering Student Success Institute”, Redesigning the Entering Student Pathway, November 6 – 8, 2016. He is currently serving as General Secretary of NAFCA, Nepalis and Friends Cultural Association, and is a member of the Davis Odd Fellows Lodge.

Professional Development:-Lake

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Section H. Industry Trends and Program Data Analysis:

Occupational Projections for Yolo County and greater Sacramento Region Source:
[http://www.labormarketinfo.edd.ca.gov/file/indproj/sacr\\$_highlights.pdf](http://www.labormarketinfo.edd.ca.gov/file/indproj/sacr$_highlights.pdf).

The Biological Sciences Program at Woodland Community College provides instructions for programs in nursing, allied health, life sciences, pharmacy, dentistry, as well transfer to transfer to 4-year University, which primarily prepares students to labor force as Healthcare Practitioners and Technical Occupations. In the Yolo county and greater Sacramento region, labor market data projects that Ambulatory health care will add 14,400 more HTPO jobs. The median annual income in 2016 for these jobs is approximately \$69,341. At both Woodland Community College and the Lake County Campus,

Many students are seeking jobs that require relatively fewer years of education (Associate Degree Programs) primarily as Registered Nurses, Registered Dental Hygienists and Radiologic Technologists. Registered Nursing jobs are projected to increase by 21.5% (\$71,999 median annual salary), Registered Dental Hygienists jobs are projected to increase by 10% (\$85,623), and Radiologic Technologists jobs are projected to increase by 14.3% (\$65,729).

The health care industry is a significant and growing part of California's economy. Health care related occupations from pediatricians to nurses to home health aides represent over seven percent of California's total employment. Increasing employment opportunities in health care over the next several years will be due in part to the state's aging population. Reference: http://www.labormarketinfo.edd.ca.gov/health_care_in_california.html

Industry Trends and Program Data Analysis:-Lake

Occupational Projections for Northern CA Coast (Del Norte, Humbolt, Lake, and Mendocino Counties)

Source: <http://www.labormarketinfo.edd.ca.gov/county/lake.html#OCCDATA>

These data are the most recent as of 10/1/2017 and include projections from 2014 – 2024.

The Biological Sciences Program at the Lake County Campus primarily prepares students to labor force as Healthcare Practitioners and Technical Occupations (HPTO). In the Northern CA Coast region (Del Norte, Humbolt, Lake, and Mendocino Counties), labor market data projects an increase in total HPTO jobs from 5,370 in 2014 to 6,236 in 2024 or a 16.6% increase. The median annual income in 2016 for these jobs is \$69,341. At the Lake County Campus many students are seeking jobs that require relatively fewer years of education (Associate Degree Programs) primarily as Registered Nurses, Registered Dental Hygienists and Radiologic Technologists. Registered Nursing jobs are projected to increase by 21.5% (\$71,999 median annual salary), Registered Dental Hygienists jobs are projected to increase by 10% (\$85,623), and Radiologic Technologists jobs are projected to increase by 14.3% (\$65,729).

In addition to the aforementioned associate degree programs, the Biological Sciences program at the Lake County Campus also prepares to students to transfer to 4-year Universities where they can leverage their coursework towards pre-requisites for Dental, Medical, Physician Assistant, Optometry, Physical Therapy, Nurse Practitioner, Respiratory Therapy, Occupational Therapy, Pharmacy, and other health professional programs. These jobs are high paying, in demand, and will likely remain in high demand given the unprecedented wave of "baby boomer" generation adults reaching 65 years of age (Colby et al, 2014).

References

Colby, S. L., & Ortman, J. M. (2014). The baby boom cohort in the United States: 2012 to 2060. *Population estimates and projections*, 1-16.

Recommendations: (Same as in section E above)

Equipment:

1. For Human Physiology (Bio 5), lab, the BIOPACK System software and hardware are more than 10 years old. Two of the MP 35 hardware are completely out of work. The software is old and does not work properly. The new and upgraded BIOPAC system needs to run several

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3. For Human Anatomy (BIOL 4) lab, the torso models are essential part of teaching body structure before we take the students to identify the same structure in human cadaver. We have three torso models for six tables in the lab. So 3 more torso models needs to be purchased so that each table will have one torso for use during the lab.

Budgetary impact: \$ 12000 Priority high Contact person: Jaya Shaw

4. Water baths for labs. At the current time we must move water baths from one lab to another for labs requiring temperature controlled water baths. Not only is the inconvenient, it introduces a safety hazard when using baths in the microbiology labs where they may get contaminated and then "contaminating" other rooms. Mainly for this reason each lab should have adequate water baths for the whole semester.

Budgetary impact: 4 X \$1000 Priority high Contact person: Ralph Robinson

5. Micropipettes. Micropipettes are needed in most biology lab procedures these days. We simply do not have enough of them. We need 12 each (2-20ul), (5-50ul), (20-200 ul) and (100-1000 ul).

Budgetary impact: \$ 8500 Priority high Contact person: Ralph Robinson

Facilities:

6. New lab benches for room 625. Room 625 was not designed for "wet" labs. It has high benches and electrical outlets on the floor. These benches are uncomfortable for students to work on and the outlets present a significant safety hazard if liquids are spilled into the outlets in the floor. New lower benches should be installed with outlets at bench height.

Budgetary impact: Unknown

7. Gas line plumbing for room 629. Currently room 629 is used to teach microbiology and does not have gas lines at the lab benches. This is a significant safety hazard since the students must

crowd around the Bunsen burners on the side benches. The chances of lab coats and student's hair catching on fire is increased significantly.

Budgetary impact: Unknown