Chaffey College
Program Review Report

Program Review Title: Biology
Program Code: 401 - BIOLOGY
Review Type: Instructional
Type: SLO's

Overview of Chaffey College Program:
Describe the program mission as it relates to the college mission:

The Biology Program provides a comprehensive lower division curriculum that serves the transfer mission of the college for general education offerings, for students majoring in biology, biochemistry and various pre-professional course sequences (dentistry, medicine, pharmacy, etc.) and as prerequisites for many associate degree and vocational programs at Chaffey College and at other institutions. The courses offered by the Biology Department fulfill the diverse instructional needs of all Chaffey College students ranging from remedial to university level studies in biology.

Responses to Prior Year PSR
Prior Year's Recommendations and recommendation

Commendations 1. Realizing need for assessment tool to measure outcome of SLO.

Recommendations 1. Readers recommendation for a more succinct self study went unheeded. Please keep this in mind as redundancy and commentaries have become part of your program study. (faculty advising) 2. As a final response to Program's concern about being in close proximity to one HS program --the Chino complex will house many of the HS programs. 3. Realize the reputation of Chaffey College Biology program support the fact that Biology transfer students will seek out classes offered wherever they may be. "Build it and they will come."

Program Changes

State how program/service addressed these recommendations

Item 1. Our entries in this new template are far more compact than ever before.

Items 2 and 3. We have nothing to add to this discussion.

New Activities and Outcomes

1. General Education
   1. Identify 3-5 learning outcome for each program in this discipline(add one at a time):
      Identify questions that can be addressed scientifically and be able to identify basic components of the scientific method.

      Provide an assessment statement for one outcome for each program articulating the following (means of assessment, population to be assessed, point of assessment, and criteria for assessment):
      We have developed a bank of test questions to be given to students in General Education courses at the end of the term. The questions assess whether students can correctly identify basic components of scientific method, such as hypothesis, isolated variable, control group, as well as identification of questions that are testable and questions that are not.
What were the results of the assessment for the outcome. If no data has yet been collected, please describe the plans for assessment:
These questions will be administered to students in General Education courses at the end of Fall semester, 2007.

2. Effectively communicate unifying theories and concepts in biology in an evolutionary context.

3. Demonstrate the ability to comprehend current events related to biology.

4. Experience the excitement inherent in science.

5. Develop skills as independent lifelong learners.

Requests

56000 - Capital Equipment

Category: 56000
Item Desc: Construction of New Greenhouse
Price: $15,000
Quantity: 1
Installation: $5000
Total: $20000

Previous Recommended: YES - Number of times: 1
Remarks

The original plans for the Science Complex included a greenhouse. That facility was later designated as an “add alternate” and was not built because the planned site was rededicated as a fire lane. Our need for a greenhouse remains. We propose to construct one in the space immediately east of the new aviary.

The following justification will suffice for three of our capital requests: Refurbishment of the old greenhouse, construction of an additional new greenhouse, construction of a new lath house all perform related, overlapping functions in support of the same activities. The following statement is intended to serve as non-redundant justification of all three.

Fully functional greenhouses/lath houses are essential components of a successful biology program. Showing students the wide variety of plants from different ecosystems is essential to plant biology; we cannot do this without a way to grow them. We have not had a functional greenhouse in the memory of anyone now in the Biology faculty, to the detriment of our existing programs. We cannot possibly establish a Biotechnology program without the ability to grow and maintain the organisms used in the teaching of
Both the existing greenhouse and lathhouse are full to capacity with specimens of value to our programs. We are currently forced to grow our specimens for classroom use in the herbarium in Beeks Lab. The herbarium houses an historic collection of dried plant material from the local region. These specimens could be destroyed if insect or fungal pests were to enter the room on living specimens. Greenhouses and lath houses are the proper facilities for growing plants for use in traditional lab exercises as well as molecular and developmental biology experiments. They would benefit students in the following ways:

- Access to large numbers of living plants from diverse ecosystems and climates will benefit students in Biol 1, Biol 2, Biol 3, Biol 10, and Biol 52.
- Student research projects involving living plants could be conducted in an appropriate facility that does not risk the loss of other teaching resources, such as herbarium specimens.
- Projects involving molecular technologies in Biol 5 and Biol 50.
- Students in both the majors program as well as general education courses will gain greater appreciation for and understanding of the central role of plants in biology through access to a greater variety of specimens.
- Native plants could be cultivated for addition to the landscaping around the Science Complex.
- Support for development of a Biotechnology program.

This rich potential supports General Education SLOs 1, 2, 4, and 5 (pp. 1-2) as well as the Majors SLOs 1, 3, 4, 5, and 6 (p.8).

If these requests are not funded we will continue as we have for decades, unable to incorporate diverse living plants into our curriculum in any effective way, and growing small numbers of specimens in a space not designed for that purpose.

**56000 - Capital Equipment**

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<thead>
<tr>
<th>Category:</th>
<th>56000</th>
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<tbody>
<tr>
<td>Item Desc:</td>
<td>Renovation of old greenhouse</td>
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<tr>
<td>Price:</td>
<td>$5000</td>
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<tr>
<td>Quantity:</td>
<td>1</td>
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<tr>
<td>Installation:</td>
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<tr>
<td>Total:</td>
<td>$5000</td>
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<tr>
<td>Previous Recommended:</td>
<td>NO</td>
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<tr>
<td>Remarks:</td>
<td>The biology Department has received $5000 from the Associated Students for the repair and refurbishment of the existing greenhouse. That</td>
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structure is very old, small, dilapidated, lacking functional electricity, heating and cooling. It does not function as a greenhouse, and is currently being used to store plants. Construction activity cut the existing power lines. Maintenance and Operations Dept. is currently assessing the cost of restoring water and electrical service to the structure. Once repaired, it will still be filled to capacity with stored plants. Outcome statement for this project is the same as for the New Greenhouse above. SLO support is identical to that for the proposed new greenhouse above.

56000 - Capital Equipment
Category: 56000
Item Desc: Construction of new lath house.
Price: $2000
Quantity: 1
Installation: Total: $2000
Previous Recommended: NO
Remarks
The existing lath house is used to capacity for maintenance and storage of plant specimens that have instructional value to the department and to the campus at large. We propose construction of an additional lath house directly east of the old greenhouse.

Outcome statement is the same as that for the New Greenhouse above.

SLO support is identical to that for the proposed new greenhouse above.

56000 - Capital Equipment
Category: 56000
Item Desc: Laptop computers for the Molecular Biology lab, BL 101
Price: $1650
Quantity: 12
Installation: Total: $19800
Previous Recommended: NO
Remarks
We understand that PSR does not fund computer equipment. We do require the support of the PSR process when we submit this request to IT for funding.

Internet access is fundamental to the teaching of modern cellular biology to all audiences. Courses taught in BL101 emphasize cellular and molecular topics including biotechnology. Students require Internet access in the classroom for access to current events related to biology (GE SLO #3), access to scientific literature and databases (Majors SLO #2), for direct exposure to real science (GE SLO #4), and to develop skills as lifelong learners (SLO in all three programs).
Laptop units are portable, and could easily support diverse needs in other rooms as needed.

Without computing equipment in this room we cannot adequately teach cellular/molecular topics, particularly biotechnology. These topics are the dedicated function of the room. Biotechnology database site navigation and data extraction are complex skills require hands-on instruction of students. It is not possible for students to acquire these skills by passively watching the instructor or another student navigate the database.

If we do not equip the room with enough computers, we will have to continue moving the class to the computers in the Biology Dept. library in ZH 131. This is inappropriate because it usurps a room intended for other uses. It is an inadequate solution because ZH 131 is too small to accommodate an entire class, and is physically far away from the laboratory, its materials, and the context of the assignments. It makes no sense to construct a modern cell/molecular biology laboratory and then fail to equip it with essential resources.

56000 - Capital Equipment

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<tr>
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<tr>
<td>Item Desc:</td>
<td>Desktop computers for Botany lab/Herbarium: BL 114/115</td>
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<tr>
<td>Price:</td>
<td>$1250</td>
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<tr>
<td>Quantity:</td>
<td>2</td>
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<tr>
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</tr>
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<td>Previous Recommended:</td>
<td>YES - Number of times: 1</td>
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<tr>
<td>Remarks</td>
<td>We understand that PSR does not fund computer equipment. We do require the support of the PSR process when we submit this request to IT for funding.</td>
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Laboratory work in the courses taught in BL 114 (Biol 2, 3, 52) commonly calls for ready access to the Internet. Ongoing projects conducted in BL 116 (the Herbarium) likewise frequently demand access to documents, data and images available on the Internet. Activities like this support GE SLOs # 3, 4, 5 and Majors’ SLOs # 2, 3, 4, and 6. Completion of laboratory assignments is substantially impeded if the student has to leave the room in search of a computer with Internet access.

56000 - Capital Equipment

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<tbody>
<tr>
<td>Item Desc:</td>
<td>Scanner for computer in the Botany Lab: BL 114</td>
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<tr>
<td>Price:</td>
<td>$250</td>
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<td>Quantity:</td>
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Laboratory assignments in Biol 2 and 3 commonly call for assembly of materials and images into documents for class presentations. We are not aware of scanners anywhere on campus for students use. This limits the types of activities that are possible in lab courses. Availability of a scanner supports GE SLOs # 3, 4, and 5 and Majors SLOs #1 and 5.

2. Allied Health Preparation

1. Identify 3-5 learning outcome for each program in this discipline(add one at a time):
   Achieve level of comprehension of human biology, health and disease that prepares them for success in allied health programs.

   Provide an assessment statement for one outcome for each program articulating the following (means of assessment, population to be assessed, point of assessment, and criteria for assessment):
   Biol 20, 22, 23, 23L are prerequisites to the ADN program. Some students take all four of these courses at Chaffey. Others are granted equivalency for similar courses taken elsewhere. Our question is whether students who take these courses at Chaffey perform better, the same, or worse than students who take them elsewhere. Institutional Research can provide us with GPA data on students completing the ADN program who have taken none, one, two, three, or all four of these courses at Chaffey.

   What were the results of the assessment for the outcome. If no data has yet been collected, please describe the plans for assessment:
   We will submit a request to Institutional Research for this information by the end of Fall semester 2007.

2. Acquire a mechanistic understanding of biological processes.

3. Acquire skills in scientific method and problem solving.


5. Develop skills as independent lifelong learners.

Requests

51000 - Faculty Request
Category: 51000
Title: Fulltime Faculty, Biology
Priority: 1
FTE: 1
Previous Recommended: NO

Total: $250
Previous Recommended: NO
Remarks
We understand that PSR does not fund computer equipment. We do require the support of the PSR process when we submit this request to IT for funding.
Employee Status: New

Overload: No

Remarks

Percent of sections taught by full-time instructors slid from 54% in Fall 2006 to 51% in Spring 2007, and the adjunct roster is growing every term. Our best estimate of the staffing of our offerings for Spring 2008 is approximately 48% full-time and 52% adjunct/overload. While our % full-time staff is declining at an alarming rate, FTES in Biology is averaging 1.6% growth per year since 2002, while the student population of Chaffey overall has not changed appreciably. We are teaching more students with a lower percentage of full-time faculty every year. We can schedule more sections of Anatomy and Physiology than ever before in the new facilities. The limiting resource is now a shortage of qualified adjunct staff. If we are to deliver on the promise of the new Science Complex, we must hire enough full-time faculty to staff the offerings.

56000 - Capital Equipment

Category: 56000

Item Desc: Disarticulated Half Skeletons

Price: $300

Quantity: 11

Installation: Total: $3300

Previous Recommended: No

Remarks

Students require access to skeletal materials outside scheduled hours in our Anatomy lab courses (Biol 20, Biol 424L) if they are to master the skeletal anatomy presented in these courses. These durable plastic specimens are intended for checkout so that students can take them home overnight. These materials support Allied Health/Pre-Professional SLOs # 1, 2, and 5.

56000 - Capital Equipment

Category: 56000

Item Desc: Medical Professional Grade Disarticulated Skeleton

Price: $1200

Quantity: 3

Installation: Total: $3600

Previous Recommended: No

Remarks

The rationale for these is similar to that for the Half Skeletons described above. These higher quality specimens are intended for use in the lab during scheduled hours as well as during open lab hours when students come in for supervised tutoring in course content in these dedicated facilities. We are scheduling more sections of Anatomy than ever before, serving more students than ever before. The demand for these materials is starting to exceed the existing resources. As for the previous item these materials support Allied Health/Pre-Professional SLOs # 1, 2, and 5.
Health/Pre-Professional SLOs # 1, 2, and 5.

3. Majors

1. **Identify 3-5 learning outcome for each program in this discipline (add one at a time):**
   
   1. Acquire skills in scientific thinking, scientific communication, problem solving and experimental methodology.

   **Provide an assessment statement for one outcome for each program articulating the following (means of assessment, population to be assessed, point of assessment, and criteria for assessment):**
   
   The assessment of this SLO will be conducted through class projects and/or laboratory reports. It is the discretion of the instructor to select an assignment appropriate for assessment.

   The population to be assessed are the students enrolled in our majors courses (Biology 50, 52, 55, 56 and 63).

   The assessment will take place as part of the coursework and grades for these assignments will be collected from all instructors of these courses.

   The criteria for this assessment are whether or not the students complete these assignments with a grade of a C or better.

   **What were the results of the assessment for the outcome. If no data has yet been collected, please describe the plans for assessment:**
   
   We will collect data from instructors of all Majors courses by the end of Fall semester, 2007.

2. 2. Develop skills in the use of scientific literature.

3. 3. Develop an understanding of structural and functional relationships at levels of organization ranging from molecules to the Biosphere (as appropriate to the course).

4. 4. Possess a familiarity with biological diversity and the necessity of its conservation.

5. 5. Demonstrate the ability to apply evolutionary theory as the unifying theory in Biological Science.

6. 6. Develop skills as independent lifelong learners.

4. Miscellaneous: Global support of all programs in the discipline

**Requests**

52000 - Classified Requests

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<tr>
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<tr>
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<tr>
<td>Employee Status:</td>
<td>New</td>
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<tr>
<td>Remarks:</td>
<td>This request is a joint request with Physical</td>
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Science, Earth Science/Geology, Astronomy, Chemistry, Geography and Biology. Many of our outreach activities are supported either on the stamina of faculty members whose time is in great demand, or by classified staff who are asked to do organizational work in addition to their normal heavy workloads. Examples are the ISIS program, Robotics Camp, Summer Science Academy. The Natural History Museum in the Classroom program that has been very successful and in great demand in the local K-12 districts for many years is currently dormant precisely because no one in the department at present has time available to keep it running. If we are to continue fulfilling the community outreach portion of Chaffey’s mission it is essential that the District provide support staff whose specific duty it is to organize and coordinate the variety of outreach activities that make Chaffey College a highly visible and valued resource in the local communities. Our involvement in outreach activities is described in the appended supplemental information.

56000 - Capital Equipment
Category: 56000
Item Desc: Photocopier for Zimmermann Hall central area. Capable of 50 copies per minute, sheet feed, collation, stapling, double side, image magnification/shrinking.
Price: $7,000
Quantity: 1
Installation: Total: $7000
Previous Recommended: NO
Remarks
The photocopier in the hallway of Zimmermann hall is heavily used for small and short notice jobs to complement our extensive use of the services of the Lithography Dept. It is used daily in support of the curriculum and shared governance activities of the entire Biology Department, as well as Chemistry, Anthropology, Geography, some members of the Math and Geology Departments. The machine is old, on its last legs. It breaks, it jams. Some of its functions don’t work at all. The service rep has a hard time repairing it; sometimes it is difficult to get parts. It must be replaced.

If this equipment is not replaced, the old one will soon fail altogether, partially crippling nearly every aspect of the operations of all those departments.

56000 - Capital Equipment
Category: 56000
Item Desc: Network printer in the south side of Beeks Lab.
Price: $1200
Quantity: 1
Installation: Total: $1200
We understand that PSR does not fund computer equipment. We do require the support of the PSR process when we submit this request to IT for funding.

Laboratory activities frequently require the printing of data, downloaded material, and images. At present, no printer is available on the entire south side of Beeks Lab, to the great inconvenience of anyone working, teaching or learning in BL 114, 101, or the Herbarium. Laboratory activities supporting General Education SLOs 3, 4, and 5 as well as Majors SLOs 1, 2, and 6 are greatly facilitated by the ability to print materials generated in those rooms.

Eppendorf pipettes

- Category: 56000
- Item Desc: Eppendorf pipettes
- Price: $200
- Quantity: 12
- Installation: Total: $2400
- Previous Recommended: NO

Modern molecular technology requires the delivery of tiny, accurately measured quantities of liquids. The Eppendorf mechanical pipette is the tool of choice. We currently have enough to equip one lab. Need for the devices has increased to the point that we experience conflicts, with two labs calling for them simultaneously. They support the same goals as the electrophoresis equipment described below, and exactly the same assortment of SLOs.

Triple Beam Balances

- Category: 56000
- Item Desc: Triple Beam Balances
- Price: $250
- Quantity: 12
- Installation: Total: $2400
- Previous Recommended: NO

The ability to weigh materials is fundamental to the teaching of nearly all kinds of science. The new Science Complex has three more labs than the old facility. We do not have enough balances to equip them all. Triple beam balances are sturdy, simple, and inexpensive. We need enough to give students ready access when a lab exercise calls for them. This equipment is part of the infrastructure supporting SLOs in all three of our Program areas.

Top loading electronic balances

- Category: 56000
- Item Desc: Top loading electronic balances
- Price: $250
When higher precision is called for, triple beam balances are insufficient tools for weighing materials. Top loading electronic balances should be available in any lab that needs them. We do not currently have enough to go around. As for the triple beam balance request this equipment is part of the infrastructure supporting SLOs in all three of our Program areas.

56000 - Capital Equipment
Category: 56000
Item Desc: Electrophoresis station
Price: $2500
Quantity: 2
Installation: Total: $5000
Previous Recommended: NO
Remarks
Each of these stations contains a DC power supply, four complete chamber assemblies, micropipettes and some startup supplies, sufficient for four student groups to function. Increasing numbers of instructors are incorporating modern molecular technology into lab courses in all three of our Program areas. Electrophoresis is a mainstay of modern molecular technology. Our power supplies and chambers are in high demand. We don't have enough to go around to our various labs. They are potentially useful (at least) in Biol 1, 5, 22, 23L, 50. Gen. Ed. SLO #4, Allied Health/Pre-Professional SLOs #1, 2, 3 and Majors’ SLOs #1 and 3 are supported by this technology.

56000 - Capital Equipment
Category: 56000
Item Desc: Spectronic 20D+ Colorimeters
Price: $2000
Quantity: 6
Installation: Total: $12000
Previous Recommended: NO
Remarks
The Spec 20 colorimeter is a workhorse in many areas of lab science, supporting study of enzymes, cell growth, metabolism, photosynthesis, molecular properties of pigments, etc. Our existing machines are heavily used, wearing out, and getting more use in the new facilities than ever before. We require more machines to support courses in all three of our Program areas. Allied Health/Pre Professional SLOs 2 and 3 are supported, as well as Majors’ SLOs 1 and 3.
Item Desc: Aquaria
Price: $500
Quantity: 2
Installation: NO
Total: $1000
Remarks
We have assembled an ecologically rich aquarium in the Microbiology lab. It has been such an attractive success in sparking student curiosity and interest that we want to build more. We applied for and won a grant from the Student Government to build more. We have a goal to enrich the learning environment in more of our labs in this same way. We therefore request funding to build two more of these self contained ecosystems in addition to those currently under way. They support Gen. Ed. SLOs # 2, 4, 5, Allied Health SLOs # 1, 2, 3, 4, 5, and Majors’ SLOs # 1, 3, 4, 5, 6.

56000 - Capital Equipment
Category: 56000
Item Desc: Waterbaths
Price: $700
Quantity: 2
Installation: NO
Total: $1400
Remarks
Temperature control is fundamental to any kind of metabolic, chemical, or cellular study. We have too few waterbaths, some are older than any faculty now at Chaffey, and some are beyond repair. With three new labs to equip, we have fallen short of the need for water baths and are thus unable to run basic labs in any of our three Program areas. This equipment is part of the infrastructure supporting SLOs in all three of our Program areas.

Previous Activities and Outcomes

1. Activity: Occupy the new Science Complex and provide appropriate technical support for the courses in Biology by hiring an additional Instructional Assistant IV, Life Science. The existing 1.0 FTE fulfills diverse needs encompassing preparation of lab materials, ordering of equipment and supplies, maintenance of equipment, and maintenance of outdoor facilities. One person cannot do all this now. We will soon move into the new Science Complex which has three more labs than our existing facility, intended to accommodate substantial growth in section offerings. We estimate that proper maintenance of our existing outdoor facilities and the addition of new landscaping and an aviary in the Science Complex will consume approximately 300 hours of the Instructional Assistant’s time in the coming year.

Outcome: Adequate support of increased numbers of labs, maintenance and development of outdoor facilities including a brand new aviary and an expected growth in numbers of sections offered, particularly in the pre-Allied Health courses.

Partially
No funding was provided. We are supporting the new facilities on the efforts of one Instructional Assistant IV and student workers. It remains to be seen whether this
arrangement can serve our needs when all of our new facilities are fully functional.

2. **Activity:** We continually look for factors that may affect student success in our courses and actively seek to validate and install prerequisites that adequately prepare students for courses. Prerequisites are in place for many of our courses with high attrition. We actively enforce them, and carefully screen all petitions for equivalency.

Outcome: The desired outcome is to maximize student success. To want less is to abdicate our mission. To seat students in courses they are doomed to fail impairs their intellectual growth. The most desirable outcome is to accurately place students in programs and courses that provide the foundations of knowledge and skills required to move them forward towards their goals. Secondarily, we want to use the department's resources most efficiently by filling our sections with students who have high probability of success.

*Partially*

Subjectively speaking, success rates seem to be higher in courses with the prerequisites in place. Empirical data are not yet available on the newer ones.

3. **Activity:** The list above includes essentially all the SLOs from all three of our missions: Gen. Ed., Allied Health prep., and the Biology Major. The various outdoor teaching resources: Nature Preserve, three ponds (soon to add a fourth one in the new aviary), the hillsides to the north and south of the current LS building, greenhouse, lath house support eleven of them. The others are supported by indoor resources, including the LS department library, the specimen collections, all the labs in the new Science complex, three of which are growth facilities not present in our current quarters. This daunting array of resources must be organized and maintained as functional teaching facilities. Toward this end, the Biology Department must develop a plan which delegates the planning and care of all these areas to faculty and staff members with appropriate interest, knowledge and skill to maintain them and develop them into effective teaching tools.

Outcome: The desired outcome of this delegation is that each of our resources and facilities is attended by one primary faculty designee who sees to its maintenance, planning and development in collaboration with interested colleagues. The delegation of these tasks should, as well as possible, suit the interests and skill sets of the proprietors. The workload should be fairly distributed among all parties.

*Partially*

More of these tasks are now delegated to more of the department faculty than ever before.

4. **Activity:** We continue to explore ways to use E Reserve to our students' advantage. Posting of packets, sample exams, PowerPoint notes, and lab data, are examples of powerful ways to make materials universally available to students.

Outcome: Improved access to resources that promote student success. More convenient way to supply course packets than paper packets in the bookstore. Reduced demand for photocopies on department equipment or Litho. Reduced institutional overhead cost.

*Fully*

Most of us, including a lot of adjunct faculty, now have materials on E Reserve. Students are making heavy use of the resource.

5. **Activity:** We continue to operate our open lab hours. 20-25 hours per week of faculty time is a typical level of funding for Certificated staffing of the hours. Some of the labs are open and available to students for many more hours than that.

Outcome: Access to the labs, the materials, and faculty are all essential to the students’ learning activities in all lab courses. Some courses absolutely require that students come to open lab time to complete their work and learn the course content.
Partially
Open labs are operating in the new buildings now. Login of students is now possible at
the computer station in every lab.

We are now exploring ways to collaborate with the Success Center to improve the
effectiveness of the open lab learning process.

6. Activity: During the past three years, Diana Cosand was the Chaffey College project
director for a USDA grant, whose purpose was to encourage recruitment and retention of
Hispanic students into areas of study related to conservation biology and natural
resources. Under the grant, Ms. Cosand has taught a two-week field class in Lassen
National Park, which otherwise would not have been funded. (BIOL-92LB Special Topics
Lab: Lassen National Park Field Trip). The course was taught successfully three times in
the summers of 2004, 2005, and 2006. In Summer 2008, Ms. Cosand is planning to
teach a similar field course on Sierra Nevada Natural History, which will be a one-week
field course taught entirely in the California Sierra.

Outcome: Students will gain knowledge and experience in Field Biology, specifically the
Natural History of the Sierra Nevada. They will gain an appreciation for the value of this
enormous, complex ecosystem.

Partially
The desired outcome was achieved for the Southern Cascade Range ecosystem by a
successful summer field course to Lassen National Park.

In 2009-10, Professor Cosand is planning to teach a similar field course on Sierra
Nevada Natural History, which will be a one-week field course taught entirely in the
California Sierra. She is exploring the possibility of a tropical field course in Costa Rica or
Hawaii.

7. Activity: The Biology Dept. and Programs in Allied Health continue to schedule meetings
as needed, at least annually to discuss curriculum issues of concern to our mutual
students. This practice has expanded from the original required meeting with ADN staff
to periodic meetings or collaborations with VN, CNA, DA, RT and Pharm Tech.

Outcome: Coordination of our programs with other departments is essential. We want to
maintain all of our curriculum at a level that is current and prepares our students for
excellence in their future professional training. Some of our courses are prerequisites to
other programs at Chaffey as well as other institutions. The career objectives of our
students are highly diverse. The courses we offer must prepare them for whatever goals
they might pursue. These dialogues are an essential part of our job, which is to see that
our courses fulfill the needs of the students wherever they might go from here.

Fully
The dialogue continues. Biologists and AH faculty collaborate well whenever the need
arises. We have recently had occasion to collaborate with BUSOT regarding applicability
of Biol 30 (Medical Terminology) and Biol 424 (Anatomy/Physiology) to courses in their
programs. We have a revision of the Biol 30 COR underway as a result of those
conversations.

8. Activity: We continue to explore possibilities for students interested in careers in
teaching. This includes the Copernicus project as well as possible involvement in a
project being developed by Dave Polcyn in the Biology Department at CSUSB. Our
students have been participating in the Copernicus internships and benefiting from them.
We are also encouraging our students to participate in Research Experiences for
Undergraduates program at UCR and other institutions. Emily Avila served as an
evaluator of the REU program at UC Riverside in the summer of 2006.

Outcome: Enrichment opportunities for our students in Research labs and other kinds of
career-related experiences. Improved articulation of our courses with transfer institutions
and with state credentialing requirements. For example, Biol 3 (Calif. Natural History) does not currently satisfy a science requirement for a K-6 teaching credential. But it should. This is exactly the kind of science that an elementary teacher can actually teach with no budget.

**Partially**

Several students from the Biology Department participated in Copernicus internships in the summer of 2007.

Emily Avila served again as an evaluator of the REU program in summer 2007.

9. **Activity:** We have written Student Learning Outcomes for all three of our major curriculum areas: General Education, Allied Health prerequisites, Biology Major. We now need to develop appropriate assessment tools for all three sets of SLOs. This process will involve internal discussions as well as consultation with Institutional Research as we frame appropriate testable questions about our SLOs.

**Outcome:** Assessment tools that answer the relevant questions using empirical methods that are practical and unbiased.

**Partially**

Empirical assessments are planned for some of our SLOs now. This is a work in progress.

10. **Activity:** Members of the biology department are available to the community as a resource for a range of biological information. For example, recently field representatives from the local offices of State Senator Dutton and Governor Schwarzenegger participated in one of our Biology 1 field trips to Day Canyon. For another example, the Biology Department maintains an alliance with Maintenance and Operations and with Rancho Cucamonga FireSafe Council to create fire safe zones that exceed state regulations around the Campus Nature Preserve.

**Outcome:** The department hopes to nurture the trust of the public as a cheerful source of reliable information.

**Partially**

Department faculty have worked with Maintenance and Operations to establish and maintain a fire safe zone around the Nature Preserve.

11. **Activity:** Our involvement in the construction of the Science Complex continues. We have been on several tours of the construction site, serving as users’ eyes on the project as the facilities near completion. We are now actively planning and preparing for the move.

**Outcome:** Functional facilities. A smooth, orderly move with minimum disruption of departmental activities and courses.

**Partially**

The move occurred without excessive disruption of instruction. The Science Complex is fully occupied now. The facilities are a work in progress. Our involvement continues.

12. **Activity:** When asked, we will continue to provide user input into the planning and construction of the Chino campus. The Tree Committee is collaborating in the development of the landscaping plans for the Chino campus.

**Outcome:** A new campus equipped with labs and outdoor resources that support the curriculum in Biology for the present and into the foreseeable future.

**Partially**

We have done some work on FF&E lists for the Biology lab at Chino. The Tree Committee continues its involvement in the development of the outdoor facilities.

Outcome: Preparation of the massive quantities of bacteriological media required, particularly in Biol 23L, Microbiology Lab, and periodically also in many other laboratory courses.

**Fully**
The new pipettor is in place and in use.


Outcome: We need a backup for the big autoclave and additional sterilizer capacity for the expected increase in demand for sterile materials when we occupy the new Science Complex. We are looking forward to increased course offerings, including more courses that require sterile materials. The autoclave is required to prepare such materials.

**Fully**
Up and running.

15. Activity: Purchase an ice machine for the prep room in Beeks Lab.

Outcome: Adequate supplies of ice for many sorts of lab activities in modern cell biology, gene technology, and enzyme kinetics. We hope to greatly increase the number and variety of modern techniques we teach in our lab courses. To do so, we require ready access to plentiful quantities of ice.

**Fully**
In place and functioning.

16. Activity: We are involved in the planning of the landscaping for the new Science Complex.

Outcome: The intent is to include attractive organisms that do well in this climate that also function as useful specimens for our laboratory curriculum.

**Partially**
Plantings mostly finished. The Tree Committee is actively involved. Some failed plantings need replacement. The Beeks Memorial Grove is worth the walk to see it.

This project will be a work in progress that is never fully achieved.

17. Activity: Incorporate a digital Single Lens Reflex camera setup into laboratory courses in Botany, Environmental Biology, Core Biology, and the Herbarium.

Outcome: The new camera setup will allow faculty and students to photograph California plants and animals in the field to use in course materials for Botany (Bio 52), Environmental Biology (Bio 3), Field Botany (Bio 4), and Core Biology (Bio 50), and others. Students then can access recent, local images of plants and animals, allowing them to experience the excitement inherent in science and understand related current events. The images will be available in digital form on computers and CDs from the laboratory and Ereserve, for incorporation into presentations. This will develop skills in the use of scientific literature, in scientific communication and as lifelong learners. Having a digital camera in the Herbarium will eventually allow us to digitize the herbarium, making images of herbarium specimens available online to other colleges and universities.

**Not at all**
Not funded.

18. Activity: Supplemental Instruction has been added to one section of biology 22.
Outcome: We will not know the significance of supplemental instruction on student success in a biology course until the completion of the fall semester. Preliminary reports are that attendance at this SI group is huge. Popularity does not necessarily equal effectiveness, but this is a promising sign.

Partially
We have SI sections of Biol 10 (Elements of Biology), Biol 20 (Human Anatomy), Biol 22 (Human Physiology) and Biol 50 (Core Biology). Students who participate in SI are performing substantially better than those who do not. It is hard to tell how much of their success is attributable to SI, because many of the same students also access the Success Centers and other support services. At this time it is impossible to tell whether the SI students are a self-selected group. We are also exploring the use of Directed Learning Activities and other resources in the Success Centers.


Outcome: The new computers will allow Core Biology (Bio 50) students to produce and analyze experimental data sets and do statistics on their data, thereby developing problem solving and experimental methodology skills. Students in Core Biology (Bio 50), Botany (Bio 52) Environmental Biology (Bio 3) and Field Botany (Bio 4) can access CDs, diagrams, scientific papers, and computer animations that will allow them to understand biology at all levels of organization. All students could access the Chaffey College Library Databases while in lab. Students could use the computers to ask and answer their own scientific questions, developing skills as lifelong learners. Having a desktop computer in the Herbarium will allow Botany (Bio 52) and Field Botany (Bio 4) students to have computer access to systematic and taxonomic databases, and computer based plant keys at universities all over the world, and will eventually allow us to make herbarium information available online to other colleges and universities.

Partially
The laptop computers are in place and in use. The desktops were not funded. We will pursue this request again this year.

20. Activity: We continue our involvement in the Faculty Advisors group, and the new faculty are interested in participating. We also have considerable interest in the department in mentoring Biology Majors. We have also been in productive conversations with faculty from CSUSB, Cal Poly, Pomona, and UCR regarding transfer, and undergraduate research opportunities.

Outcome: Full involvement of Department faculty in advising and mentoring students.

Partially
The future and structure of the Faculty Advisors' group is changing. We intend to continue our involvement.

21. Activity: The Biology Dept. maintains a small library of reference books and paper periodicals as a resource that supports courses in all of our programs: vocational, transfer, majors, general education. Despite increasing use of online sources, we have found that the paper journals are indispensable for teaching students how to recognize, read, and evaluate peer reviewed scientific literature. Online sources frequently omit figures, offer abstracts only, and delete articles from the database very rapidly. Access to the paper periodicals adds a dimension to the nature and intent of the scientific literature that is not seen in the hit list of a search engine.

Outcome: Students have ready access to reference books and periodicals that support their course assignments. Students learn how to use and critically read the Biological literature.

Partially
Excellent new home in Zimmermann Hall. Space and funding of acquisitions still limiting.
22. Activity: The biology department would like to establish collaboration with the genomics institute at the University of California Riverside to be able to utilize their equipment and facilities to enhance our courses. Some of the genomics institute resources require a small fee for consumables ranging from around $3.00 to just over $100.00.

Outcome: We would like to be able to send student samples from research experiments and various lab activities to the genomics institute for analysis and results. Taking students over to tour the facilities to learn more about the available resources and equipment is another goal of this collaboration.

Partially
Faculty and students from the Biology Dept. had a field trip to UC Riverside in February, 2007 to see the labs. A relationship was established at that time that can provide access to the genomics resources at any time we have occasion to need them.

23. Activity: The biology department is exploring the development of courses and possibly a program to prepare students for careers in biotechnology.

Outcome: Biotech courses and/or certificate programs would be developed that are comparable to those in nearby community colleges based on feedback from local companies seeking individuals trained in the biotech field.

Partially
Biology faculty are working with the curriculum committee to establish a biotechnology program using state funding. We have obtained copies of the biotechnology program at San Bernardino Valley College and are currently working to get an updated analysis of our local job market in this field.

24. Activity: Update and maintenance of Biology Department website. The task was undertaken by faculty, with the support of student assistants, during the summer of 2006. The set of pages is nearly ready to publish online, and a second set will be published soon afterward. Continued support by students or other staff members with knowledge of publishing on the web will be necessary to keep our pages updated.

Outcome: The improved website will provide the community with access to information about our programs, faculty, courses, facilities, articulation, transfer and advising resources, and outreach activities.

Partially
The website will always be a work in progress. It is far better than before. The students who did the original work are gone. Its maintenance has been assigned to Jim Chandler in the M&S Dean's office.

25. Activity: In the past year, we worked with the Biology Faculty at Cal Poly Pomona to update our articulation agreements for the Biology Majors program. We have also had conversations with Biology Faculty at CSUSB and UCR that reinforce our agreements. Conversations with UCR have also addressed difficulties with the articulation of Chemistry 75 (Organic Chemistry), which have been remedied, and the Physics 30 series, which remain unresolved.

Outcome: Articulation agreements with transfer institutions that give our students appropriate credit for all of their work at Chaffey, and provide a smooth transition into the programs at receiving institutions.

Partially
Cal Poly Pomona has extensively revised their Biology majors' curriculum. We have worked with Chaffey's articulation officer and Cal Poly's counterpart and achieved a satisfactory articulation agreement for our transfer students in the Biology major.

Articulation of the Physics 30 sequence at UC Riverside is still a problem. A solution
seems at this time to be outside our control.

26. **Activity:** Beth Child has been speaking to groups of students in the local K-12 schools on topics related to careers in science, descriptions of the kind of work that goes on in modern science labs, the uses of scientific research in the modern world, etc.

**Outcome:** Children in the local community, and their teachers become more aware of career possibilities in science. Children's interest in science is stimulated by first-hand contact with a career scientist.

**Partially**
Requests for this kind of outreach come sporadically. No visits have been done in Fall 2007.

27. **Activity:** We have a need to grow and maintain a diverse collection of plants. Most General Education Biology courses, and Majors' courses including Core, Botany and Population Biology must have the ability to grow plants for lab experiments and to provide students with first hand experience with representative species from the plant kingdom. Many of these organisms require environmental conditions that can only be provided in a greenhouse.

**Outcome:** Students in most of our General Education courses, and in Biology Majors' courses including Biol 50 (Core Biology), Biol 52 (Botany) and Biol 63 (Population Biology) will have access to many varieties of plants that cannot be grown outside of a greenhouse in our climate. Students in these courses will be able to grow plants for real experiments with real plants. This outcome supports our goal of providing students with the opportunity to accomplish more than cookbook science that requires little critical thinking.

**Partially**
The old greenhouse is in need of extensive repairs. The nature and extent of the needed repairs was evaluated in Spring 2007. The ASCC granted a gift to the Biology department to cover some of the renovation costs. We are now waiting for a cost analysis on the repairs.

### Awards Data

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**Comments:** It is very rare for a Biology major to complete an Associate Degree. Their goals are nearly always at the Baccalaureate level or beyond. Completion of the Associate degree would generally delay transfer.

### Budget

**If any unexpended funds in last years budget, please briefly explain why these funds were not spent.**

Yes

52432-100 Student worker Instructional: Occupation of the new Science Complex will require substantially more student help than ever before because of larger facilities and increased numbers of sections offered. Since not all of the facilities are operational (e.g. aviary, greenhouses, herbarium), and the numbers of sections offered will be increased gradually, not all of the demand for student workers had materialized by the end of the 2007 fiscal year. We are in the process of hiring several new student workers now.

54300-100 Instructional Supplies: We had a little bit of money left at the end of last year partly as a result of delayed delivery of some orders. Our best estimate of orders submitted leaves only $1300 left

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in this account at the end of the year. Increased section offerings in the current year are consuming supply money at the fastest pace in our history. It is doubtful we will have anything left at the end of the current year.

**Were any additional funds requested (VTEA, other grants, etc.)? If so, please list source of additional funds and amount received.**

No

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