**FOOTHILL COLLEGE**
**Program Planning and Review**
(650) 949-7240 | http://www.foothill.edu/staff/irs/

**Program: Biology**

* Please note that sections IV and X have changed from the 09-10 version. All programs are required to update these sections and may roll other sections forward if updates are not necessary.

**Table of Contents**

| I. Department/Program Mission | |
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| 1. State the department name and everyone who participated in creating the comprehensive program plan. | Biology Department Faculty and Staff:<br>John Atkins, Kathleen Duncan, Amelia Edwards, Karen Erickson, Carolyn Holcroft, Joanne Lopez, Martin Melia, Gillian Schultz, Lisa Schultheis |
| 2. State the program's mission. If you don't have one, create one. | A. Prepare students for a successful career in the biological sciences, including students planning to transfer to a four-year school.<br>B. Prepare students to be savvy consumers of scientific information, and provide a general education in the life sciences.<br>C. Provide students with the background knowledge and critical thinking skills required to understand important issues such as environmental science, climate change, evolution, disease prevention and basic nutrition.<br>D. Support programs in allied health by providing an education in biological principles including anatomy, physiology, microbiology, nutrition and pharmacology. |
| 3. Explain how the program/department mission is aligned with the college mission? | The college mission is: *A well-educated population being essential to sustaining and enhancing a democratic society, Foothill College commits itself to providing access to outstanding educational opportunities for all of our students. Whether through basic skills, career preparation, lifelong learning, or transfer, the members of the Foothill College community are dedicated to the achievement of learning and to the success of our students. We affirm that our unwavering dedication to this mission is critical to the prosperity of our community, our state, our nation, and the global community to which all people are members.*<br>The department mission is perfectly aligned with the college mission of basic skills* (supported by items A, B, C), career |

| I. Department/Program Mission | |
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| | preparation (supported by items A, D), lifelong learning (supported by items B, C), and transfer (supported by items A, B, C, D). **While our courses are not specifically designed to address teaching basic skills in math and English, the lack of preparation seen (especially in general education students) requires a significant amount of time spent in office hours, some lecture, and teaching remedial math and English skills.* |

## II. Department and Program Description & Data

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| 1. What are your hours of operation? | Our offices open at: 7:30 a.m. BHS Division/no department office<br>Closed for Lunch: No ☒ or Yes ☐ If yes, when:<br>Our offices closed at: 4:00 p.m. | | | |
| 2. What types of classes do you offer, at what locations, and at what times? | Times offered:<br>☒ Morning (6AM-12PM)<br>☒ Afternoon (12PM-4PM)<br>☒ Evening (4PM-10PM) | Locations offered:<br>☒ FH Main Campus<br>☐ Middlefield<br>☐ Off campus | Types Offered:<br>☒ In Person<br>☐ Hybrid<br>☒ Distance | Status Offered:<br>☒ Credit<br>☐ Non-credit |

3. List current positions and descriptions for all personnel in your area on the chart below (include position titles only, not individual names).

| **Faculty Positions by Discipline** | **Full-time Headcount** | **Part-time Headcount** | **Brief Description of duties** |
|---|---|---|---|
| Instructor/Biology | 8 | 19 | Classroom teaching, and other contractual obligations as outlined in the *FA Agreement*. One FT faculty member also serves as Department Chair with 0.25 reassigned time per year. One-two FT faculty members are shared between biology and biotechnology departments. |
| **Management and Classified Positions** | **Full-time Headcount** | **Part-time Headcount** | **Brief Description of duties** |
| Laboratory Technician | 1 | 0 | Oversee all aspects of lab preparation, ordering, facilities management; carry out lab set-ups for Building 8700 (approximately 25 lab sections per quarter), order supplies and equipment, run lab-related errands, submit work orders and |

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| | | | other special requests, as required for Buildings 8700 and 5100; other special projects as time and abilities permit |
| Laboratory Technician | 0 | 0.4 | Prepare media, cultures, and other supplies for Microbiology (12 sections per quarter); set up labs for other courses scheduled in Building 5100 (10-15 sections); oversee Building 5100 organization. This position, minimally, should be increased to 0.50 (20 hours/week) to support the increase in micro sections from 2009-10. |
| **Student Worker Positions** | **Hours per Week** | **Months per Year** | **Brief Description of duties** |

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| 4. Given the data, describe the trends in enrollment, FTES, and Average Class size. What are the implications for your department? | The data show that from 2004-2009 our FTES averaged 690 and WSCH averaged 31,064. Growth over the five-year period is approximately 10%. Most of the biology courses are lecture with associated labs. Class size in labs is dictated by both safety and pedagogy. Labs are set at either 24 or 32 students each. Lectures are associated with either 2, 3, or 4 lab sections, with corresponding increases to lecture loads. This was not the case during the entire five-year period, where the practice was to increase lecture sizes with no increase in load. |
| 5. Student Achievement: Given the data, describe the trends in overall success rates, retention rates, and degrees and certificates awarded. What are the implications for your department? | Student achievement (success and retention) remains high (77.7% and 91%, respectively). A small percentage of students finish the requirements for the A.S. degree, as most biology students either transfer to a 4-year college to pursue a B.S. degree or enter and complete an allied health program certificate. |

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| 6. Student Equity: Given the data, describe the trends with respect to underrepresented students. How will your program address the needs/challenges indicated by the data? | Compared with college data, the biology department student numbers and success rates are approximately the same. The one group that shows a decreased success rate, however, are the Hispanic students. College and department-wide, Hispanic students make up approximately 11% of the student population. The success rate in biology for these students is 68% (vs. 75% college-wide). The department feels that all students, regardless of demographic status, need access to increased help in the form of biology tutors, open lab hours, etc… The biology department has worked to establish these, but ongoing funding problems have forced cancellation. In 2009-10, the department created a Student Success Handbook that addresses aspects of studying biology that may increase student success in all groups. Another possible option is to develop a course in study methods that would serve all biology students. |
| 7. Given the data, discuss how the FTEF trends and FTEF/FTES ratio will impact your program. Include any need for increasing or reducing your program faculty. What are the implications for your department? | The data show that from 2004-2009 our FTEF averaged 41.5. Growth is approximately 26%. The growth in FTEF was higher than the growth in FTES because during this time, class size was adjusted to either 2 or 4 lab sections per lecture, which required the use of more instructors to cover the schedule. In the past, 3 labs were scheduled with one lecture with no increase in lecture load. The department and the administration agreed to this more reasonable workload, even knowing there would result a loss in productivity (which went from a high of 895 in 04-05 to a, still high of 695 in 08-09). Relative to the college (571), the department productivity is still high (695). |
| 8. Given the data for distance learning, describe the trends related to success, retention, and student satisfaction. Discuss solutions to ensure that rates match or exceed those of comparable traditional format courses. | The DE trends for biology are encouraging. We have added two additional online sections each of the past two years and enrollment has increased proportionally, potentially indicating good student satisfaction. Additionally, there are small but significant increases in both retention and success over the last three academic years. When compared with |

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| | traditional face-to-face offerings, the retention and success rates are lower, but not alarmingly so. For example, in 2008-2009 the DE retention rate was 82% while the face-to-face format had a rate of 92%.<br>Our goal is to continue to foster increases in retention and success in our DE courses. It has been well established that the skills needed for successful online teaching differ significantly in many ways from those skills used in a face-to-face setting. Consequently, we assert that the best strategy to meet this goal is to facilitate and strongly encourage opportunities for faculty to attend workshops, conferences and/or formal courses concerning online pedagogy. | |
| 9. Optional: Provide any additional data relevant to your program. (Indicate the source of the data). | | |
| 10. Are you seeing trends that are not reflected in the data cited above? If yes, please explain. | | |

| Summary of Planning Goals & Action Plans | | | | |
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| 11. Identify 3-6 operational goals and link them to one or more college strategic initiatives or to your operations. | | | | |
| **Department Operational Goals** | **College Strategic Initiatives** | | | |
| Identify 3-6 operational goals | Building a Community of Scholars | Putting Access into Action | Promoting a Collaborative Decision-making Environment | Operations Planning |
| Increase lab support personnel to levels adequate to provide a safe and functional learning environment. | ☐ | ☐ | ☐ | ☐ |
| Staff a Biology Study Center with appropriate faculty, tutors, and materials to provide a dedicated time and space for studying, and getting extra help, in biology. | ☐ | ☐ | ☐ | ☐ |
| Hire FT Biology faculty to balance FT/PT ratio | ☐ | ☐ | ☐ | ☐ |

| 12. What is your plan for accomplishing your goals? | | |
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| **Department Operational Goals** | **Activities** | |
| Lab Support Personnel | | |
| Biology Study Center | | |
| FT Biology Faculty | | |

13. Are additional resources needed to accomplish your department operational goals? If yes, identify the resource, as well as the purpose and rationale for each resource.

| Identified Resource | Purpose | If requesting funding, provide a rationale of how each request **supports one or more college strategic initiative and/or supports student learning.** |
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| Laboratory Technician Support (minimum 1.5FT – 1FT + 2 PT) | To provide safe and functional learning environment in biology laboratory courses. | The Biology Department operates its lab classes in two different buildings on campus (5100 and 8700). Outside of lab preps for instructional purposes, the lab technicians are responsible for the safe operation of the lab space and, as such, we should have at least two people for two different buildings. |
| Dedicated Biology Study Center with staffed open | To provide students a dedicated time and space with support for studying biology. | Learning biology is a time intensive and often frustrating process for many students. Having a space |

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| lab hours. Stocked with microscopes, anatomical models, prepared slides and other study materials as appropriate. | | where the students can go and work together with course materials and support (tutors/part time instructors) should help retention and increase understanding.<br>Tactile learning experiences are an important learning style both for many of our students and for this subject matter. Combined with collaborative learning which allows the use of speaking with multiple individuals, students should be better prepared to pass exams and retain their knowledge for success in future courses and jobs. | |
| FT Biology Faculty | Balance FT/PT ratio. | | |

| III. Curriculum | |
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| *Curriculum Overview* | |
| 1. How does your curriculum address the needs of diverse learners? | There is diversity in course offerings with classes for both majors and non-majors in a variety of subfields of biology. Courses are delivered using diverse teaching techniques that include lecture, writing, group discussion, online enhancement, full online delivery, laboratory activities and field trips. Lecture presentations utilize current technology allowing visual, auditory and verbal presentation of information. Faculty work closely with the campus disability resource center to provide appropriate accommodations to ensure equal access for all. |
| 2. How does your curriculum respond to changing community, student, and employer needs? | We increase section offerings when courses become impacted due to increased demand and fluctuations within the local and national job market.<br>We are increasing our offerings in Environmental Biology, recognizing a need for people to have a greater understanding of the global environmental problems.<br>We respond to changes in public interest by developing additional general education courses, e.g. human genetics, basic nutrition. |
| 3. How does your curriculum support the needs of other certificates or majors? | A variety of our courses satisfy the Foothill GE/Natural Sciences requirements (BIOL9/9L, 10, 13, 14, 15, 41) and the Foothill GE/Lifelong Learning requirements (BIOL8, 9, 45), thereby supporting students in AA, AS and transfer pathways. Many of our courses are requirements for the allied health programs (BIOL10, 40ABC, 41, 45, 46). |
| 4. Do your courses for the major align with transfer institutions? | Yes. |

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| 5. Do your courses have appropriate and necessary prerequisites? Identify any challenges and plans to address the challenges. | Yes.<br>Challenges include: 1) safety concerns that arise from a lack of verbal English skills, 2) student success concerns that arise from poor preparation in math, reading and writing. Current difficulties in setting prerequisites for our courses have prevented us from adding appropriate, and enforceable, prerequisites in English and math. | |
| 6. Review the attached curriculum report for currency. What is your plan to address the deficiencies? (Consider: Title V, course deactivation, updated prerequisites, cross-listed courses, measuring student learning outcomes, curriculum sheets, certificates and degrees). | Our department is not aware of any deficiencies at this time. However, we do feel there is a need to develop new courses that reflect the changing interests of society. The department supports and encourages new curriculum development and in the near future would like to carve out some time to write these new courses. Recently, we have addressed some deficiencies by restoring two courses to the schedule (Biol9/9L "Environmental Biology" and Biol15 "California Ecology/Natural History"). We have an established track record of producing strong course outlines and maintaining updated curriculum. The department has worked diligently, particularly over the past two years, to ensure the curriculum offered is updated and relevant, with an eye to ensure diversity of course offerings. The department recently examined courses and removed from the schedule those that are no longer in demand. Faculty routinely review curriculum for prerequisite and advisory requirements, content revision, and compliance with Title V guidelines. Our curriculum sheet is updated annually to reflect requirements for the A.S. Degree. The Biology Department does not offer certificates. | |
| 7. Does your program offer distance education courses? | BIOL8 – Basic Nutrition<br>BIOL17 – Biotechnology and Society<br>BIOL45 – Introduction to Human Nutrition | |

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| 8. If you offer distance education courses, list one or two short examples of how your distance education courses provide for effective interaction between students and faculty. | Courses utilize a wide variety of mechanisms to allow for regular and effective contact between the instructor and the students, as outlined in the "Regular and Effective Contact" form submitted for each class. Such mechanisms include announcements, timely feedback on submitted assignments, e-mail, private message system, participation in online discussion forums, live online chat, and telephone contact. In BIOL8, for example, students are required to contribute to an online discussion about a current nutrition topic each week, which is moderated appropriately by the instructor. In BIOL17, for example, students are required to write weekly reflective assignments describing their opinions on current biotech topics that the instructor responds to individually. In BIOL45, students submit weekly assignments analyzing their own dietary intake and the instructor responds individually to each student. | |
| 9. If you offer distance education courses, list one or two short examples of how your distance education courses provide for effective interaction among students. | In all online courses, students participate in weekly online discussions about current course topics and are required not only to formulate and post their own analysis of the topic, but also to respond to at LEAST one of their classmates' postings. In addition, students are strongly encouraged to participate in the online "study" forums in which they have the opportunity to collaborate with each other to answer review questions in preparation for the exams | |
| *College Skills (Pre-collegiate) Overview (Data Available Fall 2009-filling out this section is optional)* | | |
| 10. What college skills should a student have before entering your program? | Successful biology students enter the program with collegiate-level, NOT pre-collegiate level, skills. At minimum, biology students must read and write English (ENGL1A, ESL26) and perform intermediate algebra tasks (MATH105). | |

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| 11. Given the data, comment on the effectiveness of the assessment and placement of college skills students into your program. (For MATH, ENGL and ESL only). | Anecdotally (no data available), the department feels students aren't prepared in English and math, therefore the assessment and placement procedures are not currently achieving their goal. A first step is to open a dialog with counselors and students, stressing that success in biology courses requires completion of college level math and English first.<br>Our students tell us that there is limited availability for college English and math courses. We have two suggestions to address this: 1) offer more sections; 2) change the registration priority for college-level English and math so entering students, rather than continuing students, have first priority to enroll in these classes. | |
| 12. In what ways are you addressing the needs of the college skills students in your program? | For some courses, prerequisites/advisories are in place for English and math proficiency. Our courses require the use of college level English and math. Therefore, students not properly prepared are advised to seek extra help and enroll in appropriate English and math courses. | |
| 13. How are faculty in your program collaborating with other disciplines and services to meet the needs of college skills students? | Our department faculty continue to have ongoing, informal conversations with faculty in the math, English, and chemistry departments. Faculty are encouraged to complete "early alert" forms for appropriate students. | |
| *Program Mapping* | | |
| 14. If applicable, identify any sequence of courses that are part of your program. List in the order that they should be taken by students. | BIOL1A, 1B, 1C<br>BIOL1A, 1D<br>BIOL40A, 40B, 40C | |
| 15. For your courses that are part of a sequence – are the student learning outcomes well aligned with the next course in the sequence? Please work with the college researcher to answer this question - once your sequence of courses is identified. | Yes, there is SLO alignment.<br>Question is unclear - Why would the college researcher be the one to work with on this? The faculty are responsible for the curriculum (which includes the SLOs). | |
| 16. If applicable, describe any capstone course, signature assignment (project, service learning, portfolio), or exam that demonstrates knowledge, skills, and abilities, indicating successful program completion? | The department is currently working on specific assessments to address the deep learning that program students should attain upon completion of a Biology degree. | |

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| *Course Scheduling & Consistency* | |
| 17. Given available data, describe the trends in the scheduling of morning, afternoon, and evening classes, as well as Friday, Weekend, and distance education classes. Comment on the feasibility of offering classes at non-standard times. | Currently we schedule courses throughout the day (8:00 am to 10:30 pm) and Mon thru Sat. We also schedule some distance learning options each quarter.<br>We consistently find that 8:00 am courses are difficult to fill for most of our GE level courses. There are most likely several reasons for this – transportation, family obligations, to name a few. It would be worth investigating the reasons for this at a college-level to develop a schedule plan that more closely meets the needs of our students. |
| 18. Are required courses scheduled in appropriate sequence to permit students to complete the program in the prescribed length of time? If yes, describe the rationale upon which the sequence is based. If no, what is the plan to change the scheduling pattern? What are the barriers that prohibit implementation of the changes? Explain. | Yes. The sequence is based on the content requirements of the courses. Every effort is made to schedule sequence courses in a similar manner from quarter to quarter. This also includes, when applicable, coordination with other departments (such as Chemistry). |
| 19. How does the department determine that classes are taught consistently with the course outline of record? | All instructors have access to the COR. Faculty, full- and part-time, are evaluated as outlined in Articles 6, 6A, 7 and Appendix J1 of the *FA Agreement*. |
| **Summary of Planning Goals and Action Plans** | |
| 20. What are your goals with respect to curriculum and how will those goals be measured? | 1) Develop new courses in a variety of subject areas: environmental biology, natural history, developmental biology, microbiology for poets, disease prevention, and botany.<br>2) Develop more online offerings: human genetics, molecular genetics, lecture portion of most of the general education courses. |

21. Are additional resources needed to accomplish your curriculum goals? If yes, identify the resource, as well as the purpose and rationale for each resource.

| Identified Resource | Purpose | If requesting funding, provide a rationale for how each request **supports one or more college strategic initiative and/or supports student learning.** |
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| Develop support courses | Improve student success and retention. Create a community of students that share a commitment to learning and foster a continuing collaborative approach to mastering material in the life sciences. | The nature of these courses will result in low-enrolled, stand-alone offerings that require college support. A potential benefit of these courses is the opportunity to reach underrepresented groups and provide them with a support network and an environment that fosters deeper learning. | |
| Dedicated Biology Study Center with staffed open lab hours. Stocked with microscopes, anatomical models, prepared slides and other study materials as appropriate. | To provide students a dedicated time and space with support for studying biology. | Learning biology is a time intensive and often frustrating process for many students. Having a space where the students can go and work together with course materials and support (tutors/part time instructors) should help retention and increase understanding.<br>Tactile learning experiences are an important learning style both for many of our students and for this subject matter. Combined with collaborative learning which allows the use of speaking with multiple individuals, students should be better prepared to pass exams and retain their knowledge for success in future courses and jobs. | |
| Tools and instruments for measuring environmental variables (for example, GPS system, soil chemistry kits, water chemistry kits, heat sensor, electrical usage meter) | As we build our Environmental Biology offerings to include lab experiences, we will need to purchase equipment for collecting and recording data. Many of these instruments could also be used in other courses such as BIOL1C (Evolution, Systematics & Ecology) and Biology 15 (California Ecology/Natural History). | These materials will provide students with authentic research experiences and real world data that can illustrate ecological principles and global environmental problems at a local level.<br>The tactile learning experiences and collaborative learning advantages listed above, also apply here. | |

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| Small Greenhouse | To provide a place for students in a variety of biology classes to conduct experiments using plants. This would also allow us to maintain a small teaching collection of plants which are used in a number of courses (BIOL1C, 9, 10, 15). | Research in pedagogy demonstrates that hands on, interactive learning activities and exposure to research in undergraduate institutions helps students to better understand the process of science and appreciate the complexities of carrying out scientific research.<br>The tactile learning experiences and collaborative learning advantages listed above, also apply here. | |
| Outdoor Classroom | This outdoor space would provide areas to conduct experiments, see the major adaptations in the evolution of plants and compare and contrast different ecological habitats. This campus outdoor space could be used to enhance courses currently being taught and to develop new courses centered around field experiences without the requirement of addressing transportation needs. | This space would allow the Biology Department to modify our curriculum to move towards a more problem-based learning model.<br>The pedagogical arguments presented above, apply equally well to this resource and allow us to apply this pedagogy to the broader issues of community and ecosystem level topics.<br>The tactile learning experiences and collaborative learning advantages listed above, also apply here. | |

# IV. Learning Outcomes

*Student Learning Outcome and Program Learning Outcomes Assessment*

1. Be sure and complete your **course-level student learning outcomes** assessment for each course through the C3MS system.
2. **Program Learning Outcomes** in this section will be updated annually and posted on the Learning Outcomes webpage.

• **Intended Program Outcome 1**: *What will the student think, feel, know or be able to do as a result of this educational experience.*
Upon successful completion of the Biol majors sequence (Biol1ABC), students can/will be able to use the scientific method to formulate questions, design experiments to test hypotheses, interpret experimental results to draw conclusions, communicate results both orally and in writing, and critically evaluate the use of the scientific method from published sources.

| This Program Learning Outcome meets the Core College Mission of: | Basic Skills ☐ | Transfer X | Workforce ☐ |
|---|---|---|---|
| Relationship to Institutional Learning Outcomes<br>• *Communication*<br>• *Computation*<br>• *Critical Thinking* | Means of Assessment/Criteria for Success<br>*What are the criteria for success? What tools will be used to establish and measure success?* | Summary of Data: October 2011<br>*Summarize the findings. How close were the results to the criteria for success?* | Use of Results: October 2011<br>*What do the data tell us about our process? What, if anything, do we need to do to our program or department to improve? What resources are necessary?* |

• **Intended Program Outcome 2**: *What will the student think, feel, know or be able to do as a result of this educational experience.*
Upon successful completion of the Biol majors sequence (Biol1ABC), students can/will be able to apply evolutionary theory at the molecular, cellular, organismal and population levels to explain the unity and diversity of living things.

| This Program Learning Outcome meets the Core College Mission of: | Basic Skills ☐ | Transfer X | Workforce ☐ |
|---|---|---|---|
| Relationship to Institutional Learning Outcomes<br>• *Communication*<br>• *Critical Thinking* | Means of Assessment/Criteria for Success<br>*What are the criteria for success? What tools will be used to establish and measure success?* | Summary of Data: October 2011<br>*Summarize the findings. How close were the results to the criteria for success?* | Use of Results: October 2011<br>*What do the data tell us about our process? What, if anything, do we need to do to our program or department to improve? What resources are necessary?* |

| V. Departmental Engagement | | | |
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| 1. What standing committees, if any, does your department maintain? What are the committee charges and membership? | | None | |
| 2. What interdepartmental collaboration beyond college skills has your department been involved in during the past 4 years? | | Spring 2009 – collaborated with PSME (Physical Sciences, Math and Engineering) to host "STEM" day to expose high school students to potential educational paths in math and science at Foothill College.<br>Collaboration with Chemistry to ensure compatible class-scheduling. | |
| 3. What has your department done since its last program review to establish connections with schools, institutions, organizations, businesses, and corporations in the community? | | Placed students in internships at the Carnegie Institute of Plant Biology, and at Stanford, the latter in collaboration with PSME. | |
| 4. In what ways if any, are you or have you worked with area high schools to align curriculum from the high school to your course? | | | |
| 5. In what ways if any, are you working with CSUs, UCs, private, or out-of-state institutions to align courses and develop articulation agreements? | | Regularly consult campus Articulation Officer (Bernie Day) when updating and designing courses.<br>Met with faculty at SJSU to discuss changes to their biology core and ensure continued articulation. | |
| **Summary of Planning Goals and Action Plans** | | | |
| 6. What are your goals with respect to departmental engagement and how will those goals be measured? | | 1) Develop learning communities such as a pairing between BIOL10 and English, and BIOL9 and algebra. | |
| 7. Are additional resources needed to accomplish departmental engagement goals? If yes, identify the resource, as well as the purpose and rationale for each resource. | | | |
| Identified Resource | Purpose | If requesting funding, provide a rationale for how each request **supports one or more college strategic initiative and/or supports student learning.** | |
| Stipend/reassigned time | Learning Community Development | Learning communities involving biology would allow students to apply college skills (math and English) to real life situations in science. | |

| VI. Professional Development | | |
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| 1. List a sampling of professional development activities that faculty and staff have engaged in during the last two years. | | Professional growth, achievement, and development are outlined in the *FA Agreement*. All faculty in the Biology Department participate in these activities as required. Staff members also participate in growth activities. |
| 2. What opportunities does your department take to share professional development experiences with colleagues? | | These experiences can be shared during weekly department meetings. |
| 3. In what ways have faculty shared, discussed, and used professional development activities to improve program effectiveness? | | Faculty have implemented new teaching strategies – such as the use of case studies, active learning, and collaborative activities – in their courses. |
| 4. In what ways have staff shared, discussed, and used professional development activities to improve program effectiveness? What professional development needs do you have in the coming years? | | EDU-Graphics website developed and maintained by staff member. Use of website by faculty to display high quality photographs of lab-related materials and equipment. |
| 5. Are there unmet or upcoming professional development needs among faculty in this program? If yes, then please explain a proposed plan of action for addressing this need and any necessary resources. | | Increased funding for attending educational conferences. In addition, funding to cover other professional activities such as publishing. E.g. peer-reviewed journals require authors to cover a portion of the costs (e.g. $30 per page). Currently, funds at Foothill are only available for conferences. |
| **Summary of Planning Goals and Action Plans** | | |
| 6. What are your goals with respect to professional development and how will those goals be measured? | | |
| 7. Are additional resources needed to accomplish professional development goals? If yes, identify the resource, as well as the purpose and rationale for each resource. | | |
| Identified Resource | Purpose | If requesting funding, provide a rationale for how each request **supports one or more college strategic initiative and/or supports student learning.** |
| On campus professional development opportunities | To expose and train faculty to different teaching and delivery methods. | |
| Administrative support of cross linked/hybrid | To provide students with courses that integrate two or more | New courses are traditionally low-enrolled. If faculty are expected to create new curriculum, administration can support |

| VI. Professional Development | | | |
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| courses. | disciplines (such as math and environmental science) | the faculty and students by not canceling low-enrolled classes when they are first offered. | |

| VII. Support Services | | |
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| *Support Services* | | |
| Consider the support services needed by your program when reflecting over the following questions | | Comments or explanations of barriers and solutions. |
| 1. Is there adequate clerical or administrative support for this program? | Yes \| No | Technical support is woefully insufficient. The Laboratory Technician for Building 5100 is only 0.4 FT, leading to potentially unsafe conditions and misuse of facilities. Instructors in 5100 receive too little support when no tech is available to help with last-minute issues. Building 8700 has only one FT Laboratory Technician, where two are needed. Laboratory courses are scheduled from 9:00 a.m. to 10:30 p.m. – two FT technicians (or one FT and two PT) would allow coverage during all classroom hours. |
| 2. Are there sufficient college and departmental computer labs available to support this program? | Yes \| No | |
| 3. Are the library and media resources provided by the college sufficient to support up-to-date program instruction? | Yes \| No | |
| 4. Are adequate services provided in compliance with program needs for meeting health and safety guidelines? | Yes \| No | Inadequate coverage by laboratory support personnel could lead to possible health and safety issues (i.e. no back-up for teachers in case of medical emergency; no continuous coverage to ensure that chemicals are being used and disposed of according to current laws, etc.) |
| 5. Are the custodial services to this program in compliance with program needs for meeting health and safety guidelines? | Yes \| No | |
| 6. Are accommodations for students with disabilities adequate, including alternative media, testing, and tutorial? | Yes \| No | |

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| 7. Are general tutorial services adequate? | Yes \| No | There are not enough tutors for biology. The tutors in various programs are not always adequately prepared for all the courses they tutor – quality control is inconsistent on this campus. There is no central location that contains the laboratory materials needed for effective tutoring. |
| 8. Are academic counseling and advising services available and/or adequate to support students enrolled in the program? | Yes \| No | Students arrive in our courses ill prepared in English and math. This lack of preparation is limiting their success and retention in our courses. |
| 9. Do students have access to and can they effectively use appropriate information resources? | Yes \| No | Access is available, but effective use is lacking. Students need better instruction and training on the availability and use of campus information resources. |
| 10. Specifically related to distance learning, do you have appropriate faculty support services and/or effective training for faculty teaching online? | Yes \| No | Training is available but not required resulting in inconsistent quality of instruction. We feel training should be required. |
| *Marketing & Outreach* | | |
| 11. What impact do you feel the college catalog, class schedule, and online schedule of classes have on marketing your program? Does the marketing accurately reflect your program, requirements, and services available? | The materials listed are accurate.<br>We do not have any data upon which to base an opinion. | |
| 12. What impact does the college or departmental website have on marketing your program? | The materials are accurate. | |
| 13. Is there any additional assistance from marketing that would benefit your program? If yes, explain. | Marketing does not have a direct benefit on the biology program and has never been directly involved with program. | |
| 14. If you were to collaborate with the Outreach staff, what activities would be beneficial in reaching new students? | Unknown | |
| *Programs, clubs, organizations, and special activities for students* | | |
| 15. List the clubs that are designed specifically for students in this program. Describe their significant accomplishments. | | |
| 16. List any awards, honors, scholarships, or other notable accomplishments of students in this program. | | |
| **Summary of Planning Goals and Action Plans** | | |

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| 17. What are your goals with respect to support services and how will those goals be measured? | | 1) Hire adequate laboratory support personnel in order to provide a safe and functional learning environment in the biology laboratory courses.<br>2) Provide maintenance to laboratory equipment, in a timely manner, in order to continue to teach biology laboratory courses. | |
| 18. Are additional resources needed to accomplish your support services goals? If yes, identify the resource, as well as the purpose and rationale for each resource. | | | |
| Identified Resource | Purpose | If requesting funding, provide a rationale for how each request **supports one or more college strategic initiative and/or supports student learning.** | |
| Laboratory Technician Support (minimum 1.5FT – 1FT + 2 PT) | To provide safe and functional learning environment in biology laboratory courses. | The Biology Department operates its lab classes in two different buildings on campus (5100 and 8700). Outside of lab preps for instructional purposes, the lab technicians are responsible for the safe operation of the lab space and, as such, we should have at least two people for two different buildings. | |
| Equipment Maintenance Fund | To ensure continued instruction in biology laboratory courses. | One outcome of teaching laboratory classes is that the equipment will break and/or wear down. Without a fund for repair and maintenance of equipment, student use of same will be impaired – leading to a reduction in the quality of learning. | |

| VIII. Career and Technical Education Programs | | |
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| *Response to Labor Market Demand* | | |
| 1. How does your program meet labor market demand? Cite specific examples and sources. | | |
| 2. Given the number of enrollments projected for the program and necessary to support the program, are there enough openings locally to permit placement of the expected number of graduates? | | |
| 3. Has the job market been: declining slowly? steady? growing slowly? growing rapidly? newly emerging? | | |
| 4. What is the average starting salary a student can expect to make after completing a certificate or degree? | | |
| 5. What is the projected average percentage of salary increase in 2 years? 4 years? | | |
| *Response to Program Credibility/Viability* | | |
| 6. If advanced degrees are typically needed for career advancement, will the courses required for this program transfer towards completion of the requirements for those degrees? | | |
| 7. If yes, are the courses in your program aligned and/or articulated with the four-year institutions. | | |
| 8. Will this preparation permit students to stay current in their field? Does the program teach basic principles and theory, as well as applications? Is it current? Is it of sufficient rigor to assure the capacity to continue to follow the literature and learn new techniques? Is it of sufficient generality to allow for later shifts in career? | | |

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| 9. Does this preparation provide a significant secondary expertise to primary careers? If yes, explain the purpose of the training – is it designed primarily or in part to meet the needs of those already employed for upward mobility, entrepreneurship, or other career upgrade? | | |
| 10. Describe any pre-collegiate or noncredit pathways that exist to direct students into the program? | | |
| 11. How does this program prepare students for competitive employment? | | |
| *Advisory Board* | | |
| 12. List your advisory board members. The list of advisory board members should include their job titles as well as their affiliations, and an accompanying explanation should make clear that the professionals on this committee represent those within the industry who would hire graduates of a proposed CTE program. | | |
| 13. List the dates and number of members attending of your most recent advisory board meetings. | | |
| 14. What have been the major outcomes of your advisory board meetings? Of those outcomes, which have been acted upon, and what is your plan of action with regard to other outcomes discussed? | | |
| *Program Accreditation* | | |
| 15. Is this program subject to approval by specialized state, regional, or national accrediting agencies? | | |
| 16. What is the program's accreditation status? | | |
| 17. Indicate recommendations of the most recent accreditation evaluation of the program and corrective actions taken or planned. Most recent accreditation report and all additional pertinent documentation and explanations should be available on site for consultant review. | | |
| 18. Provide a brief analysis of student performance on licensure or board exams on first attempt. | | |

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| 19. What indicators does your program use to determine success of our students after completion? | | | |
| 20. Does your program survey employers for satisfaction of our students who have earned a degree/certificate? Provide brief analysis of employer satisfaction. | | | |
| 21. Does the department's analysis of labor market demand, advisory board recommendations, and accreditation status (if applicable) reflect the data? | | | |
| 22. Have any/all issues been identified in the program plan and are they adequately addressed with appropriate action plans? Explain. | | | |
| **Summary of Planning Goals and Action Plans** | | | |
| 23. What are your 4-year goals based on areas identified in the Career and Technical Education section of the program plan and how will those goals be measured? | | | |
| 24. Are additional resources needed to accomplish career and technical education goals? If yes, identify the resource, as well as the purpose and rationale for each resource. | | | |
| Identified Resource | Purpose | If requesting funding, provide a rationale for how each request **supports one or more college strategic initiative and/or supports student learning.** | |
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| IX. Resource Planning: Personnel, Technology, Facilities, and Budget | |
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| *Faculty* | |
| 1. How does your PT/FT ratio impact the program? | Negatively – we need additional full time faculty. We are scheduling classes in 10-11 with ~14 FTEF. We have 8 FT faculty. The rest of the schedule is covered by 19 PT faculty. |
| 2. What staffing needs do you anticipate over the next four years. (Consider: retirements, PDL, reassigned time, turnover, growth or reduction of the program) | Currently, 4 of the 8 FT faculty members are 25-50% reassigned, due to other campus duties (department chair and program director duties; academic senate, SLO coordinator and curriculum committee duties – which are significant and need to have reassigned time; FA-related duties). If these faculty continue with their other duties, outside of the FT/PT ratio, we will need more FT faculty. |
| *Classified Staff* | |
| 3. What staffing needs do you anticipate over the next four years. (Consider: retirements, PDL, reassigned time, turnover, growth or reduction of the program) | 1) increase PT Lab Tech position to FT for 5100, OR<br>2) hire second PT Lab Tech position to cover 5100/8700 during evenings/weekends<br>3) minimally increase PT Lab Tech position from 0.4 to 0.5 (for 5100 building) |
| *Technology and Equipment* | |
| 4. Are the existing equipment and supplies adequate for meeting the needs of the instructional program? | We need to complete the updating of microscopes in the biology laboratories. Some labs do not have enough working microscopes. Inventory needs:<br>8707 (Biotech) = 24<br>8708 (Cell Bio) = 20<br>8709 (General Bio) = 14<br>8710 (A&P) = 0<br>8711 (Organismal Bio) = 0<br>5105 (Micro)= 0<br>5106 (A&P) = 4<br>5101 (Human and Evolution) = 32<br>plus 1 per lab room for the teacher = 8<br>Total = 102 |

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| 5. Do you have adequate resources to support ADA needs in your physical and/or online courses and classrooms? | No, while we have some tactile materials for blind students, we need additional materials. | |
| 6. Is the technology used in your distance education courses appropriate to the nature and objectives of your courses? Please explain how it is appropriate or what changes are underway to make it appropriate. Explain. | Yes. File sizes are reasonable, quickly downloadable even for students with dial-up connections. We use the online course management system ETUDES-NG. | |
| *Technology & Equipment Definitions* | | |
| • **Non-instructional Equipment and Supplies:** includes equipment for "office use" that is non-instructional and that is not used in a lab or classroom – it includes non-programmatic equipment for individual instructors and staff, such as a desktop computer for office use. Desktop technology (computers, printers, scanners, faxes) and software requests are processed through your Dean or Director. | | |
| • **Instructional Equipment and Supplies:** includes technology, software, and supplies used in courses or labs, including occupational program equipment. Instructional program equipment requests are prioritized by the department and then by the Dean or Director. | | |
| • **Durable Equipment and Furniture:** includes non-instructional, non-technology equipment (chairs, tables, filing cabinets, vehicles, etc.) necessary to improve the operational functioning of the program/department. | | |
| • **Note:** It is recommended that divisions perform and maintain an inventory of all their technology and equipment. | | |
| *Facilities* | | |
| 7. Are your facilities accessible to students with disabilities? | Yes, in the new buildings (8700)<br>Our older laboratory classrooms (5100) are in significant need of upgrading. | |
| 8. List needs for upgrades for existing spaces | Building 5100 needs a new set of lab stools.<br>Building 5100 has undergone planning for a complete remodel and is in progress to undergo design (2010) and construction (2012) – pending contributions, as promised, by the state. Needs and improvements were outlined during the planning phase. | |

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| 9. List any new spaces that are needed | 1) A dedicated study center for students enrolled in biology courses. Should accommodate laboratory equipment, such as microscopes, and computer equipment.<br>2) A small greenhouse to provide a place for students in a variety of biology classes to conduct experiments using plants. This would also allow us to maintain a small teaching collection of plants which are used in a number of courses (BIOL1C, 9, 10, 15).<br>3) An outdoor classroom to provide areas to conduct experiments, see the major adaptations in the evolution of plants and compare and contrast different ecological habitats. This campus outdoor space could be used to enhance courses currently being taught and to develop new courses centered around field experiences without the requirement of addressing transportation needs. | |
| 10. Identify any long-term maintenance needs. | Maintenance of laboratory equipment is desperately required, at least yearly, would prefer quarterly. Many of our microscopes can no longer be used due to lack of maintenance and are in danger of incurring permanent damage. It is a waste of resources not to protect an investment of over $100,000.00.<br>Maintenance is also needed for physiology kits, spectrophotometers, micropipettes, etc. This is listed under "VII. Support Services" as well. | |
| 11. Are available general use facilities, such as classrooms, laboratories, and faculty office/work space adequate to support the program? Please explain. | Yes. District response to work orders has been outstanding. | |
| 12. Are work orders, repairs, and support from district maintenance adequate and timely? Please explain. | Yes. | |
| *Budget* | | |

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| 13. Are the A-budget and B-budget allocations sufficient to meet student needs in your department? | Absolutely not. The Biology B-budget was reduced by 50% in 09-10 ($18,000). In 08-09, the department spent $71,000 (from a combination of funds – B-budget, lottery, etc.). The B-budget amount of that total was $33,000. This year (10-11), the B-budget was returned to 08-09 levels ($37,000), however, lottery funds do not bring the total amount to what is typically spent in an academic year. Additionally, an ongoing problem is that the inflation rate for scientific education supplies is well above the national inflation rate. | |
| 14. Describe areas where your budget may be inadequate to fulfill program goals and mission. | Biology laboratory courses require consumable materials that must be purchased each quarter. We do not have enough in the B-budget to cover these regular costs. Additionally, repair or replacement of broken equipment is necessary. New curriculum requires new materials. We cannot offer new courses, change existing courses, or serve more students without an increase in the B-budget. | |
| 15. Are there ways to use existing funds differently within your department to meet changing needs? | We are always working on ways to better use funding without affecting learning outcomes, but there is a limit to what we can cut and still provide a quality learning experience. We will not resort to demonstration, simulated, or artificial laboratory experiences. | |
| **Summary of Planning Goals and Action Plans** | | |
| 16. What are your goals with respect to resource planning and how will those goals be measured? | Have adequate funds to:<br>1) supply laboratory courses with necessary materials to meet curriculum needs.<br>2) supply laboratory courses with functional equipment to meet curriculum needs.<br>3) develop new laboratory courses, or change existing laboratory courses, to meet new curriculum needs.<br>4) increase faculty and staff to provide safe and functional learning environment.<br>5) provide dedicated Biology Student Learning Center to increase success and retention. | |

| 17. Are additional resources needed to accomplish your resource planning goals? If yes, identify the resource, as well as the purpose and rationale for each resource. | | | |
|---|---|---|---|
| Identified Resource | Purpose | If requesting funding, provide a rationale for how each request **supports one or more college strategic initiative and/or supports student learning.** | |
| B-budget increase | Purchase supplies, maintain and repair equipment, purchase new equipment. | Support biology laboratory curriculum. | |
| FT Biology Faculty | Balance FT/PT ratio. | | |
| Laboratory Technician Support (minimum 1.5FT – 1FT + 2 PT) | To provide safe and functional learning environment in biology laboratory courses. | The Biology Department operates its lab classes in two different buildings on campus (5100 and 8700). Outside of lab preps for instructional purposes, the lab technicians are responsible for the safe operation of the lab space and, as such, we should have at least two people for two different buildings. | |
| Dedicated Biology Study Center with staffed open lab hours. Stocked with microscopes, anatomical models, prepared slides and other study materials as appropriate. | To provide students a dedicated time and space with support for studying biology. | Learning biology is a time intensive and often frustrating process for many students. Having a space where the students can go and work together with course materials and support (tutors/part time instructors) should help retention and increase understanding.<br>Tactile learning experiences are an important learning style both for many of our students and for this subject matter. Combined with collaborative learning which allows the use of speaking with multiple individuals, students should be better prepared to pass exams and retain their knowledge for success in future courses and jobs. | |
| Microscopes | Required for lab curriculum. | Support biology laboratory curriculum. | |
| Equipment Maintenance Fund | To ensure continued instruction in biology laboratory courses. | One outcome of teaching laboratory classes is that the equipment will break and/or wear down. Without a fund for repair and maintenance of equipment, student use of same will be impaired – leading to a reduction in the quality of learning. | |

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| Tools and instruments for measuring environmental variables (for example, GPS system, soil chemistry kits, water chemistry kits, heat sensor, electrical usage meter) | As we build our Environmental Biology offerings to include lab experiences, we will need to purchase equipment for collecting and recording data. Many of these instruments could also be used in other courses such as BIOL1C (Evolution, Systematics & Ecology) and Biology 15 (California Ecology/Natural History). | These materials will provide students with authentic research experiences and real world data that can illustrate ecological principles and global environmental problems at a local level.<br>The tactile learning experiences and collaborative learning advantages listed above, also apply here. | |
| Small Greenhouse | To provide a place for students in a variety of biology classes to conduct experiments using plants. This would also allow us to maintain a small teaching collection of plants which are used in a number of courses (BIOL1C, 9, 10, 15). | Research in pedagogy demonstrates that hands on, interactive learning activities and exposure to research in undergraduate institutions helps students to better understand the process of science and appreciate the complexities of carrying out scientific research.<br>The tactile learning experiences and collaborative learning advantages listed above, also apply here. | |
| Outdoor Classroom | This outdoor space would provide areas to conduct experiments, see the major adaptations in the evolution of plants and compare and contrast different ecological habitats. This campus outdoor space could be used to enhance courses currently being taught and to develop new courses centered around field experiences without the requirement of addressing transportation needs. | This space would allow the Biology Department to modify our curriculum to move towards a more problem-based learning model.<br>The pedagogical arguments presented above, apply equally well to this resource and allow us to apply this pedagogy to the broader issues of community and ecosystem level topics.<br>The tactile learning experiences and collaborative learning advantages listed above, also apply here. | |

## X. Final Summary of Goals, Commitments to Action, and Resource Requests

1. Upon review of this program plan, provide a comprehensive summary of goals met or in progress and resources awarded from the previous program plan.

| Goal /Purpose - Met or In Progress | Resource(s) Awarded | Related Learning Outcomes | Related Strategic Initiative or Core Mission |
|---|---|---|---|
| B budget restoration | $15,000 additional to original $18,000 allocation | Supports entire mission of the biology department (allows us to teach our curriculum) | Transfer, workforce |
| | | | |

2. Upon review of this program plan, provide a summary of current or continuing goals and resources needed.

Note: If you are requesting resources this year, these items have to be included in your current program review. If you want the college to understand your full range of need, list every current and upcoming resource need in this section.

| Goal/Purpose – Current or Continuing | Resource(s) Requested (Costs need to be included) | Related Learning Outcomes | Related Strategic Initiative or Core Mission |
|---|---|---|---|
| B budget augmentation – 10/11 allotment was $37,000 plus $16,000 lottery. This is still below the $71,000 spent in 08/09 to support our classes; additionally, does not account for maintenance and repair needs of laboratory equipment and any new equipment necessary for new curriculum | $20,000 minimum | Supports entire mission of the biology department (allows us to teach our curriculum) | Transfer, workforce, lifelong learning |
| Purchase 102 microscopes (in 09/10: 0 were purchased) | $225,000 | Supports entire mission of the biology department (allows us to teach our | Transfer, workforce |

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| | | curriculum); currently we are still short the required total number of microscopes per lab room (see IX.4 for breakdown of lab room and # of microscopes needed) | |
| Dedicated Biology Study Center with staffed open lab hours. Stocked with microscopes, anatomical models, prepared slides and other study materials as appropriate. | Unknown – depending on hours of operation and load assigned to instructors needed to staff the center. Cost of supplies and study materials may be covered by lottery funds? | Supports entire mission of the biology department by providing students a dedicated time and space with support for studying biology | Transfer, workforce, lifelong learning |
| FT Biology Faculty | Unknown – cost of FT hire would depend on salary rate | Supports entire mission of the biology department and balances FT/PT ratio | Transfer, workforce, lifelong learning |
| Laboratory Technician Support (minimum 1.5FT – 1FT + 2 PT) | Unknown – cost of PT hire would depend on hourly rate | Supports entire mission of the biology department by providing a safe and functional learning environment in biology laboratory courses. | Transfer, workforce |
| Purchase tools and instruments for measuring environmental variables (for example, GPS system, soil chemistry kits, water chemistry kits, heat sensor, electrical usage meter) | $20,000 | PLO #1: students can/will be able to use the scientific method to formulate questions, design experiments to test hypotheses, interpret experimental results to draw conclusions, communicate results both orally and in writing, and critically evaluate the use of the scientific method from | Transfer |

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| | | published sources. | |
| reassigned time for division curriculum reviewer to ensure title V compliance | 5% reassignment | Division-wide – support of curriculum | All |
| Small Greenhouse | | PLO #1: students can/will be able to use the scientific method to formulate questions, design experiments to test hypotheses, interpret experimental results to draw conclusions, communicate results both orally and in writing, and critically evaluate the use of the scientific method from published sources. | Transfer |
| Outdoor Classroom | $500,000 – $1,000,000 (looking for Foundation funds, grants, or other opportunities to support this; would be a community space as well) | PLO #1: students can/will be able to use the scientific method to formulate questions, design experiments to test hypotheses, interpret experimental results to draw conclusions, communicate results both orally and in writing, and critically evaluate the use of the scientific method from published sources. | Transfer, lifelong learning |
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| *Supervising Administrator Signature* | *Completion Date* **11/24/10** |