Mission Statement

The mission of the Department of Biology of the University of Northern Iowa is to provide quality teaching, research, and community service.

The Biology Department faculty consists of members whose research and teaching span the breadth of the biological sciences. It is essential to our mission that the department provide educational opportunities at all levels of biological organization from the molecular and cellular through the organismal to the population, community, and the ecosystem. Developmental, evolutionary, systematic, ecological and physiological perspectives span these levels of organization.

To educate our students broadly we offer biology degree programs at both the undergraduate and graduate levels. Our majors include: general biology, biology teaching, biotechnology, and natural history interpretation. The general biology major encompasses three emphases. These are an environmental emphasis, a biomedically-related emphasis, and a biological resources emphasis. At the undergraduate level our majors lead to Bachelor of Arts and Bachelor of Science degrees; at the graduate level, the Master of Arts is offered. Student research and independent learning opportunities are offered at both the graduate and undergraduate levels. The latter provides hands-on experience and is integral to the problem solving skills and critical thinking we seek to develop in students.

Our curricular mission is to provide our students with both a broad foundation in the biological sciences and expertise in a specialized area of interest. We seek also to provide general education classes for non-majors, enabling them to become informed citizens as well as health related service courses. Our graduate program is designed to foster close cooperation between faculty and graduate students in the development of highly individualized programs tailored to the needs and objectives of individual scholars. In this and all endeavors of the department the value of interdisciplinary initiatives is recognized.

Within its curricular diversity the department maintains four research foci to strengthen the educational partnership between teaching and research: the biotic environment, including laboratory and field research; physiology; development; and science and environmental education. To support the research and teaching missions the department has available biological preserves, the Martin L. Grant Herbarium, a fluorescence and electron microscope facility, greenhouses, and a controlled environment facility. The department encourages faculty to seek external funding to support research and to improve teaching.
Vision:

- To be a department which blends its concern for students with dedication to effective teaching of modern concepts and skills.
- To be a department which recognizes the compelling role of research in captivating students, teaching them critical thinking and problem solving, preparing them for future careers and in providing a close mentor:student relationship which can have life-long impacts on students and faculty.
- To be a department comprised of scientists who value both their contribution to the scientific community and their ability to convey to students the excitement of research.

Environmental Trends:

The Biology Department currently has 22 tenure-track faculty and four instructors. We have 500-550 majors, 15 graduate students, and a large role in the general education program. All together this past year we taught 4622 students, applied for $1.2 million dollars and were awarded $115,381 in extra-departmental funds.

We are a department dedicated to our students. It is our goal to offer a sustainable, high-quality learning environment to our students. Our success in this has been recognized by our students and we are growing each year. However, this very growth has threatened to undermine the quality of educational experience which we can offer. This threat is exacerbated by the minute increases in Supplies and Services budget which have accompanied this growth, and by the significant loss of space which has occurred during the past decade. The establishment of the Environmental Science program, reassignment of the greenhouse classroom to University Facilities, establishment of the Electron Microscope facility, relocation of the CNS Dean’s Office, establishment of Iowa Waste Reduction Center, and reassignment of space to Chemistry have cost the Biology Department 8,548 sq. ft. of space, about 18% of the total space previously allocated to Biology. Also, as expectations for faculty to be active in research and experiential learning have increased, more teaching space within the department has been reallocated to develop modest research space for each faculty member.

Significant Developments in Recent Departmental History

The present state of the Biology Department has been determined to a considerable extent by dramatic change in enrollments over the past decade. While all majors have experienced some growth, there have been overwhelming increases in the number of biomedical majors. The latter has experienced an increase of almost 600% since 1985 (Table 1). Over the past five years, the increase in biomedical majors is the third highest for the entire University, with only Elementary Education and Criminology experiencing greater proportional growth.

Despite an overall increase of approximately 250 Biology majors (a doubling) during the past five years faculty numbers have been relatively static from 1975 through
1990 (Table 2) and some loss of FTE available for teaching has been observed as faculty have moved into administrative ranks or entered into phased retirement.

It is important to point out that the stress imposed by dramatic growth in student number, is exacerbated by the increased demands for research and scholarly activity expected from faculty in recent years. Undergraduate research experiences are of paramount importance in graduating competitive students in the biological sciences, but this activity is also extremely time-consuming and not without cost.

Table 1. Enrollment trends in Supplies and Services Budget and Biology majors over the past decade.

<table>
<thead>
<tr>
<th>Year</th>
<th>Budget</th>
<th>Undergraduate Majors</th>
<th>Graduate Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>$54,278</td>
<td>46</td>
<td>34</td>
</tr>
<tr>
<td>1986</td>
<td>$54,094</td>
<td>70</td>
<td>36</td>
</tr>
<tr>
<td>1987</td>
<td>$54,094</td>
<td>78</td>
<td>25</td>
</tr>
<tr>
<td>1988</td>
<td>$54,494</td>
<td>78</td>
<td>30</td>
</tr>
<tr>
<td>1989</td>
<td>$56,129</td>
<td>92</td>
<td>52</td>
</tr>
<tr>
<td>1990</td>
<td>$60,000</td>
<td>124</td>
<td>40</td>
</tr>
<tr>
<td>1991</td>
<td>$60,600</td>
<td>160</td>
<td>95</td>
</tr>
<tr>
<td>1992</td>
<td>$65,518</td>
<td>217</td>
<td>72</td>
</tr>
<tr>
<td>1993</td>
<td>$67,484</td>
<td>244</td>
<td>78</td>
</tr>
<tr>
<td>1994</td>
<td>$69,677</td>
<td>266</td>
<td>99</td>
</tr>
</tbody>
</table>

% Change 128 578 291 50 92 --- 113 138 324 122

*data provided by Registrar’s Office
Table 2: Changes in faculty FTE in the Biology Department over the past two decades.

<table>
<thead>
<tr>
<th>Program</th>
<th>1975</th>
<th>1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>17.5</td>
<td>21.5</td>
</tr>
<tr>
<td>Science Education</td>
<td>2.0</td>
<td>2.5</td>
</tr>
<tr>
<td>Environmental Science</td>
<td>0</td>
<td>1.5</td>
</tr>
<tr>
<td>Administrative</td>
<td>0.5</td>
<td>2.0</td>
</tr>
<tr>
<td>Biology</td>
<td>15.5</td>
<td>15.5</td>
</tr>
</tbody>
</table>

A further stress contributing to our problem is the relatively small increase in Supplies and Services Budget which has accompanied our growth in students (Fig. 1). The number of dollars per student has decreased continuously during the past decade (Fig. 2). It is additionally important to note that the general education teaching responsibilities of Biology faculty have also increased significantly and have an even more acute impact on the ratio of budget to total students.

The growth in students has increased the impact and pressure on antiquated equipment which we have not been able to systematically replace. Some specific laboratories have been recently upgraded by ILI grant funds, but we are still generally dependent on 23 year old equipment.
Overall Goal:
- To create the best possible learning environment for students and faculty in the area of biology. To entice all members of the Biology Department at the University of Northern Iowa -faculty, staff, and students- to join in actively creating and sustaining a positive, supportive environment where we facilitate learning.

Specific Goals:
Goal 1. To contribute to the scientific literacy of the university and to the surrounding community.

Rationale: Many of the problems of the future will require scientific and technological solutions. Our must be prepared to understand proposed solutions and to evaluate the ethical and political implications of new technologies or scientific advances. In providing our students with liberal education in the sciences, we seek to increase the biological literacy of the public.

Implementation: The Department of Biology offers two general education classes presently organized to fit the Sphere 1 and Sphere 2 approach used by the College of Natural Sciences. These classes educate students about the biological world and the influence of man on the environment (Energy and Life) and about genetics and the impacts of biotechnology on their lives. Bioethical dilemmas are discussed in both.

Assessment: The major impediment to meeting our goal is the size of classes which often preclude or limit discussion and interaction among students and teachers. We are currently concerned about this issue but unsure how to limit class sizes without producing undue stress on availability of classes for students.

We will develop an auxiliary questionnaire for students which will query them about the efficacy of the classes in reaching our stated goals. We will attempt to query the students in one section of class for each instructor each year. Student responses will be reviewed by the Department Head and the Outcomes Assessment Committee annually and shared with General Education instructors regularly. Any suggestions made by students or viewed as needed can then be implemented by the various instructors.
Goal 2. To ensure that biology majors are exposed to the breadth of biology and develop a firm foundation in the biological concepts and processes of scientific inquiry which underlie our discipline. This will allow them to understand how their area of concentration fits into Biology.

Rationale: Biology is extremely broad and encompasses many techniques and theories which are rapidly transferred between disciplines. Students with training in one area may later pursue another. It is critical that all students majoring in Biology receive a broad foundation in the field as a whole, resisting the tendency to become overly specialized.

Implementation

Maintain our identity as a biology department, avoiding overemphasis of any area

Implement our new majors, which include a good rotation through the major areas of biology. Make sure all categories are offered at suitable intervals and in appropriate combinations.

Include experiential learning to make sure that all students have a certain basic level of knowledge, including the use of common instruments and techniques (such as microscopy) and what organisms and types of biological investigations are like.

Assessment
Survey graduating students and past graduates (under the new system) to determine whether they believe they achieved a broad enough view of biology and sufficient understanding to allow normal deviation between anticipated and actual career plans.

Goal 3. To ensure that undergraduate develop enough depth in a chosen area of biology to have a sense of competence and be knowledgeable in a specialized area of biology.

Rationale: Given the breadth of the field, in depth knowledge can only be acquired through specialization. Employers seek students who display the mastery and authority in a particular area; such an individual should be capable of developing similar mastery of additional areas as needed. The mastery of advanced skills and techniques is a critical component in preparing students for the future.

Implementation

Offer high level specialized courses which include both generally held traditional knowledge and selected new knowledge, so that students will have both a solid grounding in the specialized area and awareness of least some of the areas of greatest current interest.
Include experiential learning (laboratory) wherever feasible for these courses, so that students who will continue in the field have experience with techniques commonly used, and so that they increase their retention of, and belief in, the general principles of the area.

Encourage funding initiatives by faculty

Assessment:

Students will be asked in exit and alumni interviews about whether they believe that they were adequately prepared in their area of specialty, and for the demands of their chosen career.

Goal 4: To offer biology students the personal attention in classes or in experiential learning situations to promote the highest quality education possible.

Rationale: Quality in education involves both personal contacts with teachers and mentors, and experiential learning designed to stimulate an inquisitive mind and critical thinking. Exploration in the laboratory or field is at the heart of science and is an essential component of an excellent program.

Implementation

- Increase faculty to student ratio, control student numbers to ensure we are doing them a service by having them in the department.

Make Chemistry I and II co-requisites of Biology I and II, respectively. If students are not prepared for Chemistry I, they can spend the semester taking the Principles of Chemistry course and a general education biology course, neither of which would count on the major. If they still want to go into biology, it only holds them up one semester, and they would have a better start on the majors' sequence. We can even make Biology I and II a little harder.

Do not allow grades of C- or less (or even C or less) in a prerequisite course to count as adequate preparation for the following course. Students would need to repeat the prerequisite course.

Establish a minimum GPA for acceptance into a biology major

- Maintain or reduce course offerings for undergraduates to conserve departmental resources

- Provide greater opportunities for students to engage in written communication focused on critical thinking skills

- Increase undergraduate student research opportunities and support for them and the labs they work in
Integrate experiential learning into more classes

Assessment:
Students will be queried after graduation to determine whether they are satisfied with the quality and availability of personal attention and experiential learning opportunities.

Goal 5: To provide each student with competent and helpful advising which allows efficient progress toward a degree, acquaints each with the range of possible career areas within biology, and gives each a clear idea of what is required to be competitive in either the job market or professional/graduate schools.

Rationale: As a department, we are responsible not only for teaching students, but also for assisting them in making appropriate curricular and career choices.

Implementation

Offer two course in careers in biology, one to biomedical students and one to the other students, each year. (A student could only get credit for one, but might still take both if needed.)

Prepare handout sheets summarizing important information for the advising of students in specific areas where we have a number of students (pre-MD, pre-PT, pre-vet, pre-dentistry), giving the students what they need to know about preparation and fallback positions.

Have a central departmental repository for faculty and students to check out materials relating to careers and tests such as the MCAT, the DAT and the GRE. This may include CD-rom disks on computers. If this is too much for the office, do it through the reserve section of the library.

Track our students in a uniform manner, and make this information (without names) available to students, alumni and faculty.

Fund the tracking by means of donations from alumni and companies, where they would give money and things to the department so the department could divert a little to the tracking effort. (Companies are not going to pay for our paperwork.)

Better organization of the students as a group

Begin a pre-med advising group to make our students more competitive

Offer faculty seminars on career options so that we will be better able to advise students

Assessment
Query students about the advising and career guidance they received at UNI.
Through exit interviews and subsequent queries, track both the number applying and those admitted to professional and graduate schools.

Goal 6: To offer Biology graduate students advanced education in specialized areas in order to increase their knowledge, skills, and preparedness for careers in the biological sciences.

Rationale: Students with graduate training in the sciences are more competitive and have more career options. In addition, the graduate program strengthens the department by creating an environment which facilitates and supports undergraduate research. Working with graduate students is a key component of faculty development.

Implementation

Thesis students will acquire proficiency in independent learning of advanced topics, laboratory and field techniques, and oral and written communication skills through designing, conducting, analyzing, and presenting the results of scientific research.

Nonthesis students will acquire greater depth, breadth and integration of knowledge in a greater number of advanced courses that emphasize the same skills but do not demand the research necessary for a thesis.

Equipment
Encourage and reward participating faculty.
Encourage and reward faculty getting assistantships

Assessment:
Graduates and alumni will be polled about the preparation they received during their graduate school program.

Goal 7: Encourage faculty to teach effectively, explore new ways to present material, and adjust teaching styles to the needs of students.

Rationale: We value excellence in teaching as the defining feature of a quality education. Teaching comprises not only lecture and laboratory exercises, but also exploratory and research opportunities for students. New teaching strategies must evolve to meet the changing needs of new student populations.

Implementation

Identify good teaching; acknowledge and reward it, even if the faculty member does it every time.
Give the lower teaching loads to faculty members who are developing new techniques (e.g. multimedia presentations), as well as new courses, for teaching.

Encourage and reward faculty members who write grant proposals associated with improving teaching.

When assessing faculty teaching load, include student numbers, elaborateness of preparation, number of courses taught, and how broad the range of subject areas is.

Encourage faculty members to develop general education courses that will be popular, but which still lie in the areas of expertise of the faculty members, rather than assigning courses which are totally outside the field of the faculty members. This could be done in groups of faculty members, so that several could teach a particular course.

Assessment
A faculty questionnaire will ask faculty to track changes made in response to student comments and the success or failure of those changes.

**Goal 8: Encourage faculty to remain active in their scientific disciplines and to contribute to its body of scientific knowledge.**

**Rationale:** Science is not a static field, but rather is a dynamic process by which we discover the unknown, synthesize our knowledge and share it with others. Faculty can only stay engaged if they continue to participate in this process.

**Implementation**

*Encourage and reward faculty for attending at least one meeting a year and for sharing what they learned with other faculty members.*

*Encourage and reward faculty for doing research, on their own, and/or with students (undergraduate and graduate). Explicitly include directing student research as part of the teaching load.*

*Encourage and reward faculty for writing proposals to fund research, for themselves and for students.*

*Encourage and reward faculty for editorships of major journals and other major professional services. Brag about these people to others.*

**Assessment**
This information is contained in Faculty Activity reports and can be tracked annually from this.

**Goal 9: Increase the efficiency, effectiveness and quality of all we do as part of our mission within UNI.**
Rationale: As a department we are committed to excellence and strive always to improve. It is critical that we address any and all factors which limit our success or keep us from attaining the quality of program which we seek.

Implementation

Remind administrators at every possible opportunity of the plan to expand McCollum Hall.

Remind administrators at every possible opportunity of our need to get the faculty together.

Hit the administrators over the head at every possible opportunity with their failure to provide adequately for the students and faculty of this very successful department.

Assessment

Goal 10: Value and foster an attitude of respect and appreciation for all students and faculty members, regardless of their goals, areas of specialization, or location.

Rationale: The department as a whole prospers when all members feel appreciated and able to express concerns, opinions or counsel for the department. An atmosphere of openness and acceptance is necessary to take the fullest advantage of our most valuable resources, i.e. our faculty, staff, and students.

Implementation

Improve the overall involvement of individual faculty so that all are involved (meaning that some are presently over involved and some are under involved)

Continue inter-faculty communication at the level of the previous year and improve it. Ensure that the opinions of all faculty are accepted and valued and that no faculty member limits expression of ideas by other faculty members.

Assessment

Goal 10: Develop a reward system which considers all contributions of faculty, recognizes that each faculty member has diverse strengths, does not make each person accountable to a single model of success, and rewards faculty for contributing to departmental goals.

Rationale: Versatility (successful teaching, research and service) must be demonstrated during the probationary period of faculty. After tenure, however, tailoring of assignments to meet the strengths and interests of faculty
makes the most efficient and effective use of our resources. Also, we can not continue to improve if our reward system does not encourage the contributions which we want from our faculty or reward them equally for successfully completing the tasks to which they are assigned.

Encouraging faculty means doing things at several levels. Faculty members should be rewarded once for trying, proportional to the size of the task, which might be developing a new course, writing a proposal, or setting out on a new line of research. They should be rewarded again for "winning," such as obtaining a grant, being a good teacher or getting a paper published, proportional to the size and level of the accomplishment. They should be rewarded every time, not just the first time they do something. Habitual achievers should be habitually rewarded.

Service should be taken seriously, as it takes a lot of time from other tasks that are rewarded. The number and type of jobs that have to be done should be put down on paper so people know what their fair share is. (In a twenty-five year career on a twenty-two person faculty, how many years should a person serve on the CNS Senate? In the PAC Subcommittee? People who shirk should be assigned easily assessable tasks to carry their share of the load and lighten the load for others.

Faculty workload should include both classroom teaching hours and those devoted to experiential learning, special problems, undergraduate and graduate student advising, etc. Individual faculty should be able to elect to spend greater or lesser proportions of their time engaged in these different pursuits and be rewarded for what they do. Those who contribute heavily in some semesters/years should be able to 'earn' some release time in other semesters.
General:
- To be as good as we can be
- Maintain our identity as a biology department - do not overemphasize any area (e.g. molecular), keep ecological, organismic, population, etc. This will impact replacements e.g. Nixon
- To work together in a collegial manner - i.e. to be working in a cooperative atmosphere where people showed respect for one another.
- We need standing committees for Graduate studies & Programs, undergraduate curriculum and education in general, PAC, Facilities Services (greenhouse, herbarium, collections, etc.
- We want to produce high quality students in an intellectually stimulating and pleasantly productive environment.
- To enable the development and growth of biological literacy with a curriculum focused on biological concepts and processes of scientific inquiry
- Enhanced computer technology and support staff

Teaching:
- Eliminate waiting lists for classes
- Deal with our enrollment numbers - cap
- Better organization of students as a group
- Reduce size of gen. ed. lectures
- Upgrade equipment for laboratories & teaching
- Maintain or reduce diversity of class offerings for undergraduates
- Double the department budget or cut the number of majors in half.
- Add more faculty
- Make the department a hidden gem by making it difficult to enroll in some of the emphases, limit enrollment of community college transfers without specific articulation agreements
- Don’t over-publicize heavy enrollment, quietly bring it down
- Try to rotate course loads so that every faculty member gets a reduced load every 2.5 years or so
- More integration of plant sciences into GBI and GBII, four weeks is not enough. There is a general need to integrate the plant biology offerings into something more cohesive.
- Greater opportunities for students to engage in written communication focused on critical thinking skills

Research:
- Increase undergraduate student research opportunities and support for them and the labs they will work in
- Increase the number of grants (funding) in the department.
- Increase research collaboration with other Iowa universities to make available use of expensive equipment that we don’t own.
- Update journals received in library
- Increase lab space

Advising:
- Increase the number of pre-med students accepted in medical schools, provide greater direction during the application process.
- Produce graduates with a general education in biology as well as preparation within their chosen area of interest, profession, or job-related endeavor
- Increase/improve level of undergraduate advising
- Institute a yearly seminar/workshop course for TA’s in science in the CNS to support them in their teaching assignments.
- Begin a pre-med advising group to make our students more competitive
Atmosphere:
- Improve the overall involvement of individual faculty so that all are involved (meaning some are currently underinvolved and some are overinvolved!)
- Continue inter-faculty communication at the level of the previous year and possibly improve it.
- Find a creative response to our space problem

Facilities:
- New binocular microscopes for the anatomy lab
- Upgrade our equipment

Graduate Program:
- Increase graduate stipends
- Raise level of faculty mentoring with graduate students.
- Improve graduate student guidance with a new handbook
- Increase scholarly interaction between faculty and graduate students
- Increase funding for graduate research, scholarships: I think this means that we get more outside grants.
Questionnaire for General Education Classes

Class Name ______________________________
Section number __________________________
Instructor _______________________________

1. To what extent did this class acquaint you with new technologies or scientific advances which will be important in your future lives?

Very little __________________________________ very Much

1  2  3  4  5  6  7  8

2. To what extent has this class increased your understanding of the political and ethical implications of new technologies and scientific advances?

Very little __________________________________ very Much

1  2  3  4  5  6  7  8

3. Are there subjects relevant to the general topics of this class which you thought were:

   a) not covered

   b) covered in too little detail

   a) covered in too much detail?

4. Do you have suggestions to improve the value of this class to students?
Questionnaire for Graduates of Biology Majors at UNI

1. How well did your biology major expose you to the breadth of biology?

Not well ____________________________ Quite well
1  2  3  4  5  6  7  8

2. Do you believe that your major provided you with a firm foundation in the biological concepts and processes of scientific inquiry which underlie our discipline?

Not really ____________________________ Definitely
1  2  3  4  5  6  7  8

3. Did your major provide you with depth and mastery of your chosen specialty area of biology?

Not really ____________________________ Definitely
1  2  3  4  5  6  7  8

4. Did you receive the personal attention inside and outside of classes which you needed?

Not really ____________________________ Definitely
1  2  3  4  5  6  7  8

5. Did you have the access to undergraduate research or other experiential learning situations that you needed?

Not really ____________________________ Definitely
1  2  3  4  5  6  7  8

6. To what extent did you seek assistance from your advisor?

Never ____________________________ Frequently
1  2  3  4  5  6  7  8

7. Was your advisor able to provide you with competent and helpful advising?

Not really ____________________________ Definitely
1  2  3  4  5  6  7  8
8. Did the advising you received:
   a. allow you to make efficient progress toward your degree?
      Not really _______________________________________ Definitely
      1  2  3  4  5  6  7  8

   b. acquaint you with the range of possible career areas within biology?
      Not really _______________________________________ Definitely
      1  2  3  4  5  6  7  8

   c. give you a clear idea of what was required or demanded by the job market or professional/graduate schools?
      Not really _______________________________________ Definitely
      1  2  3  4  5  6  7  8
Graduate Student Questionnaire

1. Did your Master’s degree provide you with sufficient depth and mastery of your chosen specialty area of biology?

   Not really ________________________________________ Definitely

   1  2  3  4  5  6  7  8

2. Did you seek and receive competent and helpful advising toward your degree?

   Not really ________________________________________ Definitely

   1  2  3  4  5  6  7  8

3. Did you find that you had the appropriate knowledge skills and preparedness for your chosen career path?

   Not really ________________________________________ Definitely

   1  2  3  4  5  6  7  8

4. What career have you pursued or will you pursue now?

5. Do you have any suggestions to make the Master’s programs at UNI better?
Faculty Questionnaire

1. Based on assessments and student comments about your class, did you make any changes in your content or approach this teaching cycle? Please describe.

2. How effective were any changes you made during the previous cycle? What worked, what didn’t?

3. Do you have any suggestions for how the faculty or department as a whole could help you improve your teaching?