

Questions to Guide Faculty "Conversations"

In 2008, the American Association for the Advancement of Science, with support from the National Science Foundation, sponsored a series of conversations with faculty, administrators, students, biological sciences professional societies and other stakeholders including the Howard Hughes Medical Institute and the National Institutes of Health on the future of undergraduate biology education. The following questions were used to guide these conversations.

What should be the main goals of the 21st century undergraduate life science curriculum, and how do these goals translate into desired outcomes?

1. Outcome Goals for Biology Graduates
 - a. What professional and technical knowledge should be expected of graduates in the life sciences? What are the "core" concepts in our discipline?
 - b. What other skills and knowledge will be required for graduates in the life sciences, given their likely career choices and societal needs (e.g., critical thinking skills, leadership skills, public policy, civic engagement, global understanding)?
 - c. How do we attract and engage the broadest range of talent to the life sciences?
 - d. How can formal education be better integrated with informal and lifelong learning by life science graduates?
2. Outcome Goals for General Education in the Life Sciences for all Students
 - a. Given the personal and societal challenges that students will face in the future, what knowledge and skills from the life sciences are important for all college graduates?
 - b. How can we best ensure that graduates from our colleges, universities and community colleges are prepared to be lifelong learners in the life sciences?

How do we design a curriculum to achieve these goals, and what is the best way to deliver that curriculum?

3. Curricula, Laboratories, Pedagogy, and Learning Technologies
 - a. What experiences can we provide to best prepare students for their future working environment?
 - b. What can we do to help students who are underprepared?
 - c. Given the explosion of information in the life sciences, how can we construct a curriculum that balances depth within one's subdiscipline with the need for breadth and integration?
 - d. How do we balance disciplinary depth with the increasingly interdisciplinary nature of the problems confronting life scientists?
 - e. How can we best incorporate active learning strategies (and other "best practices") into the life sciences curriculum at all levels and for all students?
 - f. What is the role of undergraduate research, internships, and service learning in the life science curriculum?
 - g. Given the rapidity of change in the life sciences, how do we keep the curriculum current?
 - h. How do we best integrate into the life sciences curriculum the basic knowledge and tools that students need from other disciplines (e.g., math, chemistry, physics, earth sciences, etc.)?

- i. How can we best gather and evaluate evidence on what works and what doesn't work?

How do we best prepare our faculty and structure our departments and institutions to achieve these goals?

4. Faculty, Departments, and Institutions

- a. How do we better prepare current and future faculty for their role as teachers, guides, and mentors? How do we build a culture that values continued improvement in teaching and learning?
- b. How do we overcome the barriers to departmental and institutional evolution and change? What strategies are effective in breaking down disciplinary "silos"?
- c. Do we need to change and can we change the faculty reward and tenure system?
- d. How can we best handle the special challenges facing community colleges and their faculty? What can we do to aid students in the transition from two-year to four-year programs?
- e. What needs to be done to modernize laboratory and classroom facilities to take advantage of new learning and research technologies and best pedagogical practices?

5. External Influences and Constraints on Education in the Life Sciences

- a. How can life science education adapt to and engage an increasingly diverse student population?
- b. How can undergraduate life science education keep pace with the changes in higher education (e.g., changes in student life, increasing costs of education, decreased funding for higher education, increased demand for accountability, etc.)?