University of Massachusetts Amherst

BIOLOGY

THE FIELD

Biology is the science of life. The vast scope of its subject matter makes biology an extremely diverse field of study. This diversity stems not only from the tremendous variety of life forms with which we share our planet, but also from the multiple levels of organization available for biological investigation. Given an organism, a biologist might choose to investigate how it behaves, how it fits into its ecosystem, the mechanisms by which its genes shape its appearance, what its ancestors were like, how its cells divide, how it grows and develops, or how it derives energy from nourishment. Biological inquiry encompasses perspectives from the planetary to the submicroscopic.

The wide array of biological perspectives is reflected in the many subdisciplines of the field. Genetics, anatomy, physiology, ecology, ethology, botany, neurobiology, systematics, molecular biology, developmental biology, paleontology, and cell biology are just a few of the multitude of specializations that, taken together, compose biology. Given the plethora of approaches that coexist under the biological umbrella, a casual observer might believe that biology is an intellectually fragmented and diffuse endeavor. Fortunately, biology, in all of its glorious diversity, is unified by a few grand ideas. In particular, the theory of evolution provides a conceptual framework that draws together the far-flung threads of biological thought.

Like other scientists, biologists use the scientific method to develop explanations for the patterns and processes that they observe in the natural world. The practice of biology thus involves both systematic observation, often aided by sophisticated instruments, and experimentation. Biologists may work in laboratories or in the field; some of the best biological research combines data gathered in both settings.

A minor in biology is available.

Biology students may pursue secondary education certification in conjunction with the major. See the education major sheet, website or the Guide to Undergraduate Programs (umass.edu/education; umass.edu/ug_programguide) for more information.

THE MAJOR

The biology major is open to all students with an interest in the field. The course requirements for the major emphasize fundamental scientific concepts while allowing students to tailor a program to their own interests. All majors are required to complete a core sequence that includes basic math (with options in calculus, statistics, and computer science), physical sciences (physics and chemistry), and introductory biology. The elective portion of the degree is more flexible and includes courses in genetics, molecular and cellular biology, development, physiology, evolution, and ecology.

ADDITIONAL INFORMATION

The laboratory component of some biology courses requires the examination and/or dissection of animals. For a description of the use of animals in a particular course, contact the course instructor or the Biology Undergraduate Office.

HONORS

Students interested in graduating with departmental honors should contact the biology department honors coordinator for more information.

STUDY ABROAD

Majors are encouraged to spend one or two semesters studying abroad. Students should contact the International Programs Office (413-545-2710, umass.edu/ipo) and work closely with their academic advisor to choose appropriate courses in preparation.

CAREER OPPORTUNITIES

For many biology majors, undergraduate studies are preliminary to the pursuit of an advanced degree that will lead to a career as a physician, veterinarian, academic, or scientist. A graduate degree is not, however, required to pursue a career related to biology. A bachelor's degree in biology can lead to employment in the large and growing biotechnology, health care, or pharmaceutical industries. Additionally, biology majors are well prepared for careers as secondary school science teachers. Certain government agencies, including the National Park Service and the Environmental Protection Agency, also regularly hire biology graduates, as do private environmental and conservation organizations. Employers of all types recognize that a person with a science degree is likely to be comfortable with logical, quantitative thinking.

COLLEGE OF NATURAL SCIENCES

The College of Natural Sciences unites the life, environmental, and physical sciences on campus. Students in the college take advantage of a range of inquiry-based classroom and laboratory experiences, hands-on undergraduate research opportunities, multidisciplinary and cross-departmental education and research initiatives, and a variety of science student organizations. Majors in the college also help students develop strong written and oral communication skills, as well as leadership and problem-solving abilities.

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