Careers in the Biological Sciences

Looking for a job in biology? See who's hiring in our classified ads.

Pursuing a career in biology can be immensely rewarding and exciting. Studying biology teaches us to ask questions, make observations, evaluate evidence, and solve problems. Biologists learn how living things work, how they interact with one another, and how they evolve. They may study the evolution, natural history, and conservation of plants and animals; investigate the interactions of living organisms with light, the environment, or each other; or have careers in pharmaceuticals, biotechnology, or medical research. Their work increases our understanding about the natural world in which we live and helps us address issues of personal well being and worldwide concern, such as environmental degradation, threats to human health, and maintaining viable and abundant food supplies.

Frequently Asked Questions about Careers in Biology

• What do biologists do?
• How can I prepare for a career in biology?
• Where are the best college and university biology programs?
• What is the job outlook for the future?
• What are the salaries for biologists?
• Where can I find more information about people who have become biologists?
• Where can I find more information and job postings for biology-related careers?

What do biologists do?

In general, there are several career paths you can follow as a biologist, including:

Research: Research biologists study the natural world, using the latest scientific tools and techniques in both laboratory settings and the natural environment, to understand how living systems work. Many work in exotic locations around the world, and what they discover increases our understanding of biology and may be put to practical use to find solutions to specific problems. Learn more about how biological research helps to inform societal issues on the AIBS Website actionbioscience.org. Learn more about the wide variety of research interests by visiting the websites of AIBS Member Societies and Organizations.

Health care: Biologists may develop public health campaigns to defeat illnesses such as tuberculosis, AIDS, cancer, and heart disease. Others work to prevent the spread of rare, deadly diseases, such as the now infamous Ebola virus. Veterinarians tend to sick and injured animals, and doctors, dentists, nurses, and other health care professionals maintain the general health and well being of their patients. Many of these careers require additional education and training past undergraduate college, but these positions are usually in high demand both in the US and abroad. Additionally, biologists in the health care field can choose to work for organizations like the Peace Corps and Doctors Without Borders, which help bring much-needed health care services to less developed and/or war-impacted regions.
Environmental management and conservation: Biologists in management and conservation careers are interested in solving environmental problems and conserving the natural world for future generations. Park rangers protect state and national parks, help preserve their natural resources, and educate the general public. Zoo and aquarium biologists carry out endangered species recovery programs and serve as a vital education conduit to the general public. In addition, management and conservation biologists often work with members of a community such as landowners and special interest groups to develop and implement management plans. Other potential employment opportunities may exist with state/federal natural resource agencies, not-for-profit conservation organizations, private ecological consulting firms, or wildlife rehabilitation centers.

Education: Life science educators enjoy working with people and encouraging them to learn new things, whether in a classroom, a research lab, the field, or a museum. You can gain insight into what biology education professionals are working toward and achieving by visiting the AIBS Education Programs Office, where you will find updates on institutional reform efforts, information on new and exciting ways of teaching biological concepts, and novel resources for biology classroom education. You can also learn about how biology professionals are connecting with each other to advance the public understanding of science by visiting the COPUS website.

- **Colleges and universities:** Professors and lecturers teach introductory and advanced biology courses. They may also mentor students with projects and direct research programs. Many biology faculty at colleges and universities engage in their own research and serve as reviewers or editors for scientific journal publications, members of working groups and advisory boards, and as part of research collaborations with scientists from other institutions.
- **Primary and secondary schools:** Teaching younger students requires a general knowledge of science and skill at working with different kinds of learners. High school teachers often specialize in biology and teach other courses of personal interest. There is a high demand for educators that are trained in biological sciences and have strong backgrounds in K-12 education, classroom management, and primary/secondary school administration.
- **Science museums, zoos, aquariums, parks, and nature centers:** Educators in these settings may design exhibits and educational programs, in addition to teaching special classes or leading tours and nature hikes. Often, these professionals serve as an organization’s “front line” and are responsible for communicating complex biological information to the public, writing grant proposals to fund new programs and exhibits, and working with community partners to leverage resources and gain exposure on local and national levels.
- **Other directions in biological careers:** There are many careers for biologists who want to combine their scientific training with interests in other fields. Here are some examples:
  - **Biotechnology:** Biologists apply scientific principles to develop and enhance products, tools, and technological advances in fields such as agriculture, food science, and medicine. Scientists in this field may work in genetic engineering, pharmaceutical development, or medical technologies (such as nanomedicine), or as a lab technician or technologist. You can learn more about biotechnology opportunities and issues by visiting actionbioscience.org Biotechnology and reading new articles, particularly those sponsored by the partnership between AIBS and the Northwest Association for Biomedical Research (NWABR).
  - **Forensic science:** Forensic biologists work with police departments and other law enforcement agencies using scientific methods to discover and process evidence that can be used to solve crimes. Biologists in forensic science often choose a specialty, such as forensic odontology, forensic anthropology, crime scene examination, or—with additional education and training—medical examiner.
Politics and policy: Science advisors work with lawmakers to create new legislation on topics such as biomedical research and environmental protection. Their input is essential, ensuring that decisions are based upon solid science. Professional biologists can serve as policy advocates for scientific organizations or non-profits, political advisors at the state or national level, or even as a representative serving on a political committee or working group. You can learn more about the interface between biology and politics by visiting the AIBS Public Policy Office, where you can find information on current legislative initiatives and how to advocate for science and research policy, as well as sign up to receive AIBS Action Alerts to help express your opinions on biology issues to political decisionmakers. You can also visit actionbioscience.org Science Policy for detailed information about scientific collections, science education, and more.

Business and industry: Biologists work with drug companies and providers of scientific products and services to research and test new products. They may also work in sales, marketing, and public relations positions.

Economics: Trained professionals work with the government and other organizations to study and address the economic impacts of biological issues, such as species extinctions, forest protection, and environmental pollution. Biologists may also study the impacts of socio-economics on humans, environmental economics (an economic analysis of the environment with a focus on preserving natural capital), or ecological economics (the study of how human economies and natural ecosystems are linked in time and space).

Mathematics: Biologists in fields such as bioinformatics and computational biology apply mathematical techniques to solve biological problems, such as modeling ecosystem processes and gene sequencing. Mathematical and theoretical biology are two recent scientific fields that use mathematical representations and tools to both understand and model biological processes in other research areas, including cell biology, biotechnology, and ecosystem dynamics.

Science writing and communication: Journalists and writers with a science background inform the general public about relevant and emerging biological issues. Biologists with excellent writing and communication skills can be employed by high-profile journals—such as Nature and Science—as well as online magazines and science blogs or print/media networks (e.g., Discovery and National Geographic).

Art: All of the illustrations in your biology textbook, as well as in newspaper and magazine science articles, were created by talented artists with a thorough understanding of biology. Individuals in this field may be employed by magazines and journals (e.g., Scientific American), museums and aquaria, hospitals and medical training centers, or even state and local government agencies.

How can I prepare for a career in biology?
If you are interested in becoming a biologist, there are some things you can do along the way to prepare yourself.

In high school

- Take courses in math and science. Biologists need a solid understanding of math, chemistry, physics, and of course biology. Taking these courses in high
school will provide you with an excellent background and allow you to explore the wide range of what scientists do for a living.

- **Talk to biologists.** If you are interested in a health care career, visit doctors or veterinarians and ask for a moment to speak with them about their careers and education. If you are interested in outdoor work, talk to park rangers, land managers, and other professionals in your area.
- **Explore your college options.** Deciding where to attend college and what to study can be a daunting task. Research schools of interest, both on the internet and—if possible—through arranged campus visits and tours. Talk to your high school guidance counselor, as well as to admissions counselors, faculty, and current students at these schools. There are excellent programs at a wide range of institutions, from large research universities to small liberal arts and community colleges.
- **Have fun!** While academics are important, remember to get out and enjoy yourself as well. Participate in any extracurricular activities of interest: a school club, a science fair, a sports team, or volunteer work. You'll learn teamwork and commitment while developing leadership and social skills, making you stand out not only as a future biologist but also as an individual.

**In college**

- **Talk to your advisor.** Your faculty advisor or guidance counselor is a great source of information for advice on classes to take, career path options, and job opportunities.
- **Consider how long you want to be in school.** For some biology jobs, a two-year college degree is sufficient. But most life science careers require at least a bachelor’s degree and often an advanced degree, such as a master’s degree. Research jobs typically require a doctorate, which may take five or six years of intense and demanding training.
- **Ask your professors about part-time jobs.** Many professors hire student assistants to help with library, field, and laboratory research. Not only will you earn some money and experience, but you’ll also develop a professional relationship with someone who can give you career advice and write letters of recommendation.
- **Find summer internships.** Internships are a great way to learn about a career, make contacts, and gain experience in biology. Some internships may provide opportunities to do an original research project—a very rewarding experience that will show you how science works and get you thinking about graduate school.

**Where are the best college and university biology programs?**

There are many universities with strong biology programs. There is no "best" college to study biology. If you are considering a biology degree, search for a school that fits your needs, budget, and lifestyle. Large research universities offer broad course work, a variety of specialized concentrations, and many opportunities for independent research. However, there is often strong competition for such opportunities at these institutions, as well as larger class/lab sizes with less individualized attention. Smaller colleges allow for small class sizes, individualized instruction, and frequent interaction with professors. At the same time, smaller schools may have less diverse course offerings and fewer opportunities for financially supported research. In general, there are several key elements that make up a solid biology program at a college or university:

**Faculty diversity and experience**

- Most faculty members hold PhD degrees and have active, productive research programs, or are connected to research programs at a nearby institution.
- The faculty is an accurate representation of the diversity of biological disciplines: botanists, evolutionary biologists, zoologists, biochemists, cell biologists, ecologists, physiologists, taxonomists, and so on. Either the biology program
contains faculty members in diverse fields, or the university has several individual departments that complement each other.

Commitment to undergraduate education

- Courses are taught by faculty members, not graduate students.
- The institution has an active faculty advisor program and an active career advising/career development program.
- The curriculum includes a variety of courses that provide a strong background in the natural and social sciences, humanities, and writing, while still allowing students to pursue their individual interests.
- Well-equipped libraries with Internet access to biology journals, and easily accessible computer labs for student use.

Research opportunities for undergraduates

- Faculty welcome students into their research groups as part-time workers, interns, and research assistants.
- Opportunities are available for undergraduates to pursue independent research projects.
- There are programs and centers that suit a student's particular interest; for example, a field station to study ecology, a state-of-the-art genetics lab, or a marine station to study marine biology.

What is the job outlook for the future?

While there will always be a need for bright, energetic, and educated individuals with a strong understanding of biology, opportunities vary depending on the status of local and national economies. For current job outlook information, check the Occupational Outlook Handbook, published every two years by the US Bureau of Labor Statistics. This online handbook is searchable by occupation group (including Life, Physical, and Social Science) and includes information on median pay, job outlook, minimum required education, and more.

Job growth is expected in a number of areas, biotechnology and molecular biology in particular. Business leaders have begun to address the issue of creating more science and technology jobs in the United States to prevent them from being exported. For more information, take a look at the report (in PDF format) Tapping America's Potential: Gaining Momentum, Losing Ground, a 2008 progress report following the initial 2005 report, Tapping America's Potential: The Education for Innovation Challenge. You may also want to read Engage to Excel: Producing One Million Additional College Graduates with Degrees in Science, Technology, Engineering, and Mathematics, a report presented by the President's Council of Advisors on Science and Technology (PCAST). Susan Musante, AIBS Education Programs Manager, wrote an Eye on Education column in the July 2012 issue of Bioscience that speaks to the report's findings in the context of the importance of two-year colleges.

Also, the number of openings in federal government agencies charged with managing natural resources, such as the Interior and Agriculture Departments and the Environmental Protection Agency, is expected to grow; see the report (in PDF format) Federal Natural Resources Agencies Confront an Aging Workforce and Challenges to Their Future Roles. These openings will become available as many senior-level biologists and life scientists retire in the coming years.

What are the salaries for biologists?

The National Association of Colleges and Employers 2012 Salary Survey reported a median starting salary of $38,300 for graduates with a bachelor's degree in the biological/life sciences, up from $37,900 in 2011. Data from the 2012 Bureau of Labor Statistics Occupational Outlook Handbook show that 2010 median starting salaries for positions in the life sciences ranges from $33,000 (Food Science Technician or Forest Conservation Technician with an Associate's degree) to $55,000 (Forensic Scientist or Zoologist/Wildlife Biologist with a Bachelor's degree) to upwards of $70,000 (Biochemists
and Biophysicists with Doctoral degrees). Keep in mind that salaries may vary greatly depending on geographic location, job type, and the experience and education required for entry-level positions.

Higher salaries are often found in private research companies and government agencies, where you may have more job security, advancement opportunities, and independence in your work. While jobs in nonprofit groups or academic institutions may have lower salaries, many biologists find great personal reward in working for an organization that is affecting change and has an emphasis on teamwork and collaboration.

**Where can I find more information about people who have become biologists?**

If you think there's one type of person who becomes a biologist, think again. All kinds of people with diverse talents are drawn to careers in biology, for many reasons. Get to know a few and you'll see. Here are links to profiles of biologists in a variety of fields who come from a wide range of backgrounds:

- Profiles of Ecologists—Ecological Society of America
- Botanical Society of America Careers page
- Profiles of Marine biologists and careers in Marine Science—NOAA Sea Grant
- National Geographic's Emerging Explorers
- Profiles of Canadian scientists
- Profiles of Biologists from Arizona State University's "Ask a Biologist" Program
- Becoming a Biomedical Scientist: Video profiles from the Howard Hughes Medical Institute
- SACNAS Biography Project: Profiles of Latin American and Native American Scientists
- Profiles of Minority Environmental Professionals—Multicultural Environmental Leadership Development Initiative (MELDI), University of Michigan
- The Faces of Science: Profiles of African Americans in the Sciences
- American Physical Society (APS): Profiles of Women in Science

**Where can I find more information and job postings for biology-related careers?**

The AIBS monthly journal *BioScience* has often published articles relevant to biology careers. Here are some examples:

- Life Sciences Graduates Face Daunting Labor Market
- Women Face More Hurdles in Science Careers, Survey Shows
- Community Colleges Giving Students a Framework for STEM Careers
- Employment Preferences and Salary Expectations of Students in Science and Engineering
- Dramatic Improvements and Persistent Challenges for Women Ecologists
- Make Your Science Matter (review of *Escape from the Ivory Tower*)

AIBS member societies and organizations are an excellent place to start looking for jobs, graduate school opportunities, and other career-related resources. Other web resources are listed below.

[Links to AIBS Member Societies and Organizations Web Sites](www.aibs.org)
General career development and job hunting sites

- AAAS Science Careers Page
- Conservation Job Board
- Environmental Jobs and Careers
- Environmental Career Opportunities
- National Academy of Sciences career planning guide
- National Institutes of Health, Office of Science Education — Career Exploration (Journeys, Careers, and Interviews)
- Howard Hughes Medical Institute (HHMI) Careers
- AccessExcellence — Biotechnology Careers (profiles, guides, and exploration)
- The Scientist Magazine — Science careers search engine

Internship listings

- Environmental Careers Organization — short- and long-term positions in the environmental field
- Rochester Institute of Technology — biology and biotechnology internship listings (current as of April each year)
- Kalamazoo College — undergraduate research opportunities listing
- Columbia University’s list of Summer Internships in Biology from around the world (updated as of 2010)
- Journal of Young Investigators Summer Research Programs list

Research Experiences for Undergraduates (REU) programs

- National Science Foundation’s (NSF’s) REU page
- Harvard Forest Summer Research Program
- Cary Institute of Ecosystem Studies REU Program Organization for Tropical Studies REU for North American Students
- REU Sites/Programs in the Biological Sciences
- REU Sites/Programs in the Ocean Sciences