# BIOLOGY

## What can I do with this major?

### AREAS

#### RESEARCH AND DEVELOPMENT
- Basic
- Applied
- Quality Control
- Administration
- Grant Writing

#### ORGANISMAL BIOLOGY

### EMPLOYERS

- Industry and laboratories:
  - Pharmaceutical
  - Healthcare
  - Agriculture production
  - Food processing and safety
  - Environmental
- Private research institutions
- Public health departments
- State and federal government:
  - National Science Foundation
  - National Institutes of Health
  - Food and Drug Administration
  - Environmental Protection Agency
  - Department of Agriculture
  - Armed Services
  - Department of Homeland Security
- State and local government laboratories/agencies
- Colleges and universities

### STRATEGIES

- Learn to set up, operate, maintain laboratory instruments and equipment, and monitor experiments.
- Select courses with laboratory components.
- Seek research experience with professors.
- Gain related experience through part-time jobs, internships, or volunteering.
- Complete a certificate training program, usually one year, to learn specialized laboratory techniques.
- Take a course in grant writing.
- A Bachelor's degree in biology qualifies one for laboratory technician or research assistant positions.
- Earn master's degree for better positions, advancement opportunities, more responsibility and higher pay.
- Obtain Ph.D. to direct research projects and lead research teams.
- Maintain a high grade point average and secure strong faculty recommendations to gain admittance into graduate school.

### ORGANISMAL BIOLOGY

#### Some Areas of Specialization
- Botany and Plant sciences
- Ecology and Wildlife
- Marine and Aquatic
- Systematic (Taxonomy)
- Zoology
- Entomology
- Genetics
- Microbiology
  - Bacteria, algae, fungi, molds, yeasts, viruses, protozoa

- Colleges and universities, especially colleges of agriculture and veterinary medicine
- Veterinary hospitals
- State and federal government:
  - Departments of Agriculture, Interior, and Health
- Independent laboratories:
  - Food production
  - Textiles
  - Chemical
  - Pharmaceutical
  - Forestry products

- Seek related experience through coursework, part-time jobs, internships or volunteering.
- Conduct research or assist in research including the collection of information and samples of water, soil, plants, animals, etc.
- Join student chapters of professional organizations related to your area of interest.
- Obtain a Ph.D. for teaching and advanced research and management positions.
**ORGANISMAL BIOLOGY CONTINUED**

- Zoos and aquariums
- Fish hatcheries
- Wildlife preserves and parks
- Conservation agencies
- Botanical gardens and arboretums
- Museums
- Agricultural experiment stations
- Inspection agencies and control boards
- National and international environmental organizations
- Private recreation organizations

**BIOMEDICAL SCIENCES**

**Some Areas of Specialization:**
- Biophysics
- Biochemistry
- Cellular and Molecular Biology
- Cytology
- Genetics
- Immunology
- Pathology
- Pharmacology
- Physiology
- Virology

- Colleges and universities
- Professional schools including colleges of pharmacy, dentistry, medicine, veterinary medicine, and agriculture
- Federal laboratories and regulatory agencies:
  - National Institutes of Health
  - Food and Drug Administration
- State and local public health departments
- Clinics and hospitals
- Private research foundations
- Independent laboratories
- Pharmaceutical companies

- Gain laboratory experience through coursework and/or research projects with professors.
- Learn to set up, operate, maintain laboratory instruments and equipment, and monitor experiments.
- Seek internships, part-time employment and volunteer opportunities in the biomedical field.
- Join student chapters of professional organizations related to your area of interest.
- Take courses in area(s) of specialization and/or consider an advanced degree.
- Obtain a Ph.D. for teaching and advanced research and management positions.

**HEALTHCARE**

- Medicine
- Dentistry
- Optometry
- Podiatry
- Pharmacy
- Veterinary Medicine
- Allied Health
  - Occupational Therapy
  - Physical Therapy
- Medical Technology
- Nuclear Medicine

- Hospitals
- Medical centers and clinics
- Nursing homes
- Private practice
- Armed services
- Government agencies

- Plan on attending medical school or other related graduate program.
- Maintain an outstanding grade point average, particularly in the sciences.
- Secure strong faculty recommendations.
- Meet with a pre-health advisor periodically.
- Join related student organizations, and demonstrate leadership abilities.
- Seek experiences in hospital or healthcare settings through volunteering, shadowing, part-time positions, or internships.
### HEALTHCARE CONTINUED

Develop a back up plan in case medical/graduate school admission is denied. Consider alternative but related careers such as physician assistants. Research all of the various fields within medicine to determine career goals.

### BIOINFORMATICS

<table>
<thead>
<tr>
<th>Area</th>
<th>Colleges and universities</th>
<th>Independent laboratories:</th>
<th>Federal laboratories and regulatory agencies:</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Organic and agricultural chemicals</td>
<td>National Institutes of Health</td>
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<tr>
<td></td>
<td></td>
<td>Drug and pharmaceutical</td>
<td>Food and Drug Administration</td>
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<td>Medical device and equipment</td>
<td>Environmental Protection Agency</td>
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<td></td>
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<td>Research, testing, medical</td>
<td>Department of Agriculture</td>
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<td>National Biological Information Infrastructure</td>
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</tbody>
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Develop multiple areas of specialization through coursework, minors, double-majors in molecular biology, mathematics, statistics, computer science, or machine learning.

Develop strong programming and database management skills; fluency in several programming languages is helpful.

Learn biological software systems.

Complete an internship in area of interest.

Seek master's degree for increased advancement opportunities.

### EDUCATION

<table>
<thead>
<tr>
<th>Teaching</th>
<th>Universities and colleges</th>
<th>Medical and other professional schools</th>
<th>Public and private schools, K-12</th>
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</thead>
<tbody>
<tr>
<td>Elementary</td>
<td></td>
<td></td>
<td>Museums</td>
</tr>
<tr>
<td>Secondary</td>
<td></td>
<td></td>
<td>Zoos</td>
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<tr>
<td>Post-Secondary</td>
<td></td>
<td></td>
<td>Nature centers and parks</td>
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</tbody>
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Gain experience working with students through tutoring, part-time employment, or volunteering.

Learn to work well with all types of people.

Develop excellent interpersonal and public speaking skills.

Certification is required for K-12 school teachers and varies by state.

Master's degrees may be sufficient for teaching at community or two-year institutions.

Ph.D. is needed for teaching opportunities at colleges and universities.
### COMMUNICATION

#### Areas
- Technical Writing
- Editing
- Illustrating
- Photography

#### Employers
- Publishing companies including scientific magazines, professional journals, periodicals, textbooks, and online publishers
- Newspapers
- Educational and scientific software companies
- Zoological and environmental societies
- Medical, dental and veterinary colleges
- Research centers
- Federal government agencies
- Related nonprofit organizations
- Museums

#### Strategies
- Acquire thorough knowledge of photographic procedures and technology.
- Take specific courses in biological, medical, and ophthalmic photography; courses in illustration and printing are also helpful.
- Develop strong writing skills and command of the English language.
- Take advanced courses in technical writing or journalism classes or consider a minor in either.
- Join professional associations like the National Association of Science Writers.
- Seek related volunteer or paid experiences with student/local publications to increase marketability.
- Obtain an advanced degree in scientific journalism.

### LEGISLATION/LAW

#### Areas
- Lobbying
- Regulatory Affairs
- Science Policy
- Patent Law
- Environmental Law

#### Employers
- Federal and state government
- Law firms
- Large corporations

#### Strategies
- Develop excellent communication and interpersonal skills.
- Maintain current knowledge of industry-specific laws and policies.
- Acquire internships in federal or state government.
- Take courses in history, political science and/or legal studies.
- Acquire a Ph.D. for advanced positions.
- Earn a J.D. degree to practice law.

### BUSINESS/INDUSTRY

#### Areas
- Technical and Pharmaceutical Sales
- Management
- Consulting
- Marketing

#### Employers
- Manufacturing companies including:
  - Pharmaceuticals
  - Animal pharmaceuticals
  - Laboratory equipment
  - Medical supplies and prostheses
- Marketing firms
- Consulting firms

#### Strategies
- Develop excellent communication and interpersonal skills.
- Demonstrate a high energy level.
- Take courses in anatomy, pharmacology, and chemistry.
- Obtain sales experience and/or a business minor.
- Join related student associations and hold leadership positions.
- Consider an MBA or Professional Science Master's for advanced management and consulting opportunities.
GENERAL INFORMATION

• A Bachelor's degree will qualify one for work as a laboratory assistant, technician, technologist, or research assistant in education, industry, government, museums, parks, and gardens.

• An undergraduate degree can also be used for nontechnical work in writing, illustration, sales, photography, and legislation.

• Master's degrees allow for more opportunities in research and administration. Some community colleges will hire Master's level teachers.

• Doctoral degrees are necessary for advanced research and administrative positions, university teaching, and independent research.

• An advanced degree provides the opportunity to specialize in fields of interest.

• The biological sciences are good preparation for a career in healthcare such as medicine, dentistry, and veterinary science, but professional degrees and licenses are also necessary to practice in these fields.

• Learn laboratory procedures and become familiar with equipment.

• Obtain summer, part-time, volunteer, co-op, or internship experience to test the fields of interest and gain valuable experience. Take independent research classes if possible.

• Participate in summer research institutes. Submit research to local poster competitions or research symposiums.

• Develop strong analytical, computer, mathematics, and communications skills.

• Join professional associations and community organizations to stay abreast of current issues in the field and to develop networking contacts.

• Read scientific journals related to your area of interest.

• Maintain a high grade point average to improve chances of graduate and professional school admission.

• Become familiar with the specific entrance exam for graduate or professional schools in your area of interest.

• Secure strong relationships and personal recommendations from professors and/or employers.

• Consider completing a post doctoral experience after graduate school.

• Learn federal, state, and local government job application process. The federal government is the largest employer of biologists.

• Gain experience with grant writing and fundraising techniques. Often research must be funded in this manner.