

# BIOLOGY, B.S. (SCIENCE)

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**Begin Campus:** Any Penn State Campus

**End Campus:** University Park

## Program Learning Outcomes

1. **KEY LITERACIES:** describe how heritable changes can lead to differences in populations over time that might result in speciation; trace energy/matter transformation, storage, and mobilization; explain how information is exchanged and stored; recognize how changes in biological structures can have varying effects on function; and/or describe the interactions and interconnections among systems across biological scales and over evolutionary time scales
2. **PROCESS OF SCIENCE:** apply the elements of the process of science such as posing questions, generating novel hypotheses based on the scientific literature; developing appropriate technical skills for research; designing/conducting experiments to test hypotheses in laboratory and/or field settings; summarizing/interpreting data; integrating/evaluating findings in the broader scientific field to construct new knowledge; and/or participating in the peer review/revision process
3. **SCIENTIFIC EVIDENCE EVALUATION:** discriminate among scientific claims presented in a variety of sources based on the strength of evidence; find appropriate published scientific literature; and/or analyze and critically evaluate data/conclusions from the scientific peer-reviewed literature
4. **QUANTITATIVE REASONING AND DATA SCIENCE:** apply basic quantitative competencies such as algebra, probability, statistics, unit conversions, and fundamental biological equations; organize, summarize, and interpret quantitative data; use modeling/simulation to approach problems from across various scales; and/or find and analyze large databases using statistical methods and/or other approaches
5. **INTERDISCIPLINARY THINKING:** integrate knowledge among biological subfields and between biology and other disciplines
6. **COLLABORATION AND COMMUNICATION:** engage with diverse communities and leverage the skills in the community to pose and solve biological questions; demonstrate the ability to work in teams to solve biological problems; and/or communicate in a variety of formal and informal ways in the discussion of biological research
7. **SCIENCE AND SOCIETY:** explore the impacts of scientific research on society and the environment and how society influences/relies on research to inform decision-making; evaluate the ethical implications of biological research; recognize ethical issues in a variety of settings; and/or describe how different perspectives and the resulting alternative approaches might be evaluated using ethical principles to identify a solution to an issue
8. **PROFESSIONAL EXPERIENCES:** communicate in a professional manner and learn/use professional behaviors in all aspects of college and career building activities, including participation in opportunities such as research, internships, cooperative education, teaching and tutoring, study abroad, and/or volunteer work