



University of California, Santa Barbara  
Program Learning Outcomes

**B.S. in Ecology and Evolution**

*Students graduating with a B.S. in Ecology and Evolution should be able to:*

1. Apply the processes and methods of scientific inquiry, including the search and retrieval of scientific information, the formulation of scientific hypotheses, the design and conduct of experiments, and the analysis and interpretation of data.
2. Use the fundamental tools and knowledge of mathematics and the physical sciences needed for studying and understanding biological phenomena.
3. Understand fundamental concepts concerning the properties, structures and functions of biological molecules, metabolic pathways and bioenergetics.
4. Describe the structure and function of cells as the fundamental units of life and as the building blocks of multicellular organisms.
5. Explain the processes underlying development, cellular differentiation, and reproduction in complex eukaryotes.
6. Explain the principles of inheritance from molecular mechanisms to population level consequences.
7. Describe the principles and mechanisms of evolution at the molecular, micro and macro levels, and the role of evolution as the central unifying concept in biology.
8. Recognize the scope of biological diversity and the phylogenetic relationships among major groups of organisms.
9. Discuss the interactions between organisms and their environments, and the consequences of these interactions in natural populations, communities, and ecosystems.
10. Evaluate scientific hypotheses describing the evolutionary processes that have led to the modern traits of plants, animals, and other organisms.
11. Be able to explain how changes in the environment can alter species interactions and lead to ecosystem change.

*Laboratory Skills:*

12. Implement a laboratory experiment, including understanding experimental design, entering data into a lab notebook, analysis of the data, and drawing conclusions based on the data.