

# Program Learning Outcomes

## Evolution, Ecology and Biodiversity

### **Evolution**

1. Describe the fundamental processes that cause or prevent adaptive evolution, speciation and extinction
2. Describe the basic methods that are used to reconstruct the evolutionary histories of, and relationships among, groups of organisms
3. Based on evolutionary theory, predict how differences in population size, natural selection and gene flow will affect genetic variation and future adaptability of populations
4. Apply knowledge of evolution to the solution of problems facing the human population and to the preservation of biodiversity
5. Exemplify problems in human society that are caused by a misunderstanding of the scientific process generally, and of evolution specifically

### **Ecology**

1. Describe the processes involved in population growth and regulation and how these can be applied to the management of natural populations
2. Describe the fundamental processes that promote species coexistence and lead to the maintenance of species diversity
3. Apply and integrate knowledge of species' biology, interactions among species, and environmental variation to predict the structure and functioning of ecosystems
4. Based on ecological theory, predict the potential consequences of specific human activities including harvesting, pollution, and climate change on species' abundances and distributions, and ecosystem processes
5. Apply foundational knowledge in ecology to understand and predict the consequences for humans of changes in ecological communities

### **Biodiversity**

1. Describe global patterns of species diversity and methods used to assess biodiversity
2. Describe and interpret the morphological and ecological diversity of a group of organisms in a phylogenetic framework
3. Describe the processes that increase or decrease biodiversity at both evolutionary and ecological time scales

### **Synthesis**

1. Apply quantitative models and data to the solution of problems in genetics, evolution and ecology
2. Integrate fundamental principles of evolution and ecology to solve problems of interest to human societies