

Bio 1B Lecture Learning Goals

Evolution

- (1) Describe how evolutionary theory, grounded in the principle of descent with modification, explains diverse observations in the natural world.
- (2) Explain how genomic variation among individuals arises when errors (mutations) occur during transmission of information from parent(s) to offspring.
- (3) Explain how an individual's phenotype develops as its genome is expressed in its local environment, and use this understanding to explain why phenotypic variation within and among populations is due to both genetic and environmental variation among individuals.
- (4) Describe how an individual organism's phenotype influences its ability to survive and reproduce in its environment and explain how differential reproductive contribution to future generations causes a population of those organisms to adapt to that environment.
- (5) Describe how chance events can cause evolutionary change in a population of organisms, and explain why this process does not produce adaptation.
- (6) Apply quantitative predictions about how evolutionary forces will affect the genetic and phenotypic characteristics of populations over generations.
- (7) Use evolutionary trees to illustrate, describe, and analyze the relationships among organisms that share a common ancestor.

Ecology

1. Apply concepts such as species, population, community, ecosystem, environment, and landscape
2. Identify the ecological and evolutionary factors that influence population dynamics and determine species' ranges / abundances across environments
3. Identify the biophysical processes that determine organisms' relationship to their environment and the flow of energy in ecosystems
4. Describe feedbacks between the earth / climate system, human activity, and natural systems

Organismal Diversity

1. Identify major groups in the plant and microbial world, and describe the key evolutionary innovations that distinguish their anatomies and life cycles and that have promoted their diversification
2. Recognize myriad connections between the biology of microbes, fungi, and plant life and the critical roles they play in the environment, in the economy, and in human health and culture
3. Explain mechanisms by which plants cope with and engineer the environments they experience by sensing and responding to changing physical and biotic conditions