

Module 15: Darwin and Evolution

Keys to Success & Study Guide

Learning Objectives

By the end of this module, you should be able to:

1. **Describe** the key components of Darwin's theory of natural selection.
2. **Contrast** homologous and analogous structures as evidence for evolution.
3. **Explain** how fossil and molecular evidence supports common descent.
4. **Apply** the concept of biological fitness to evolutionary scenarios.

Key Terminology Checklist

Define these terms in your own words to ensure mastery.

- [] **Adaptation:** A heritable trait that increases an organism's fitness in a specific environment.
- [] **Biogeography:** The study of the geographic distribution of species.
- [] **Transitional Fossil:** A fossil showing intermediate characteristics between ancestral and descendant groups.
- [] **Convergent Evolution:** Independent evolution of similar traits in unrelated species due to similar selective pressures.
- [] **Industrial Melanism:** The increase in dark-colored (melanic) morphs in polluted environments.

Concept Check

1. What is Evolution?

- **Question:** What is the biological definition of evolution?
- **Key Answer:** Change in allele frequencies in a population over time. Individuals do not evolve; populations evolve over generations.

2. Natural Selection Requirements

- **Question:** What conditions are required for natural selection?
- **Key Answer:** (1) Heritable variation, (2) Overproduction of offspring, (3) Differential survival and reproduction based on traits.

3. Evidence: Comparative Anatomy

- **Question:** What are homologous structures?
- **Key Answer:** Structures with similar underlying anatomy derived from a common ancestor, despite different functions (e.g., human arm, whale flipper, bat wing).