Module 15: Darwin and Evolution

Comprehension & Critical Thinking Questions

Part 1: Core Concepts

1. **Darwin's Theory**
    - Define natural selection.
    - What is "descent with modification"?
    - Does an individual evolve, or does a population evolve?
2. **Requirements for Natural Selection**
    - Explain why heritable variation, competition, and differential survival are necessary for evolution.
3. **Fitness**
    - In evolutionary biology, what does "fitness" mean? (Reproductive success)

Part 2: Application

1. **Anatomical Evidence**
    - Differentiate homologous structures (common ancestry) from analogous structures (convergent evolution).
    - What is a vestigial structure? Provide a human example.
2. **Molecular Evidence**
    - All life uses DNA and the same genetic code. How does this support common ancestry?
    - If human hemoglobin is more similar to chimpanzee hemoglobin than dog hemoglobin, what does this imply?

Part 3: Analysis & Evaluation

1. **Natural Selection in Action**
    - **Scenario**: A farmer sprays pesticide. 99% of insects die. Next year, only 50% die.
    - Did the insects "learn" resistance? Explain using natural selection.
2. **Artificial Selection**
    - Humans bred wolves into diverse dog breeds. How is artificial selection similar to and different from natural selection?