

# SCIENCE

## *An Introduction to Ecology*

### I. INDIVIDUAL AND POPULATION ECOLOGY 30%

- A. An Introduction to Ecology
  - 1. What Is Ecology?
  - 2. A History of Ecology
  - 3. The Ecological Hierarchy
  - 4. The Scientific Method
  
- B. Geographic Ecology: The Abiotic Environment
  - 1. Temperature and Climate
  - 2. Soils
  - 3. Water and Light
  - 4. Other Abiotic Factors: Wind, Salt, pH, Nutrients
  
- C. Geographic Ecology: Biomes
  - 1. Aquatic Environments
  - 2. Terrestrial Environments
  
- D. The Organism and Its Environment
  - 1. Range and Distribution
  - 2. Dispersal
  - 3. Limits to Dispersal
    - a. Physical and Chemical Limits
    - b. Biotic Limits
  - 4. Adaptation and Natural Selection
  
- E. Population Dynamics
  - 1. Spatial Relationships
  - 2. Temporal Change
    - a. Population Growth and Decline
    - b. Population Regulation and Balance
  
- F. Species Interactions

### II. COMMUNITY ECOLOGY 30%

- A. Biodiversity
  - 1. Types of Biodiversity
  - 2. Global Patterns of Biodiversity
  - 3. Causes of Biodiversity

- B. Interspecific Interactions
  - 1. Negative Species Interactions
    - a. Predation
    - b. Herbivory
    - c. Competition
    - d. Parasitism
    - e. Amensalism
  - 2. Positive Species Interactions
    - a. Mutualism
    - b. Commensalism
  
- C. Community Organization and Structure
  - 1. Trophic Cascades
  - 2. Food Webs
  - 3. Keystone Species
  
- D. Disturbances
  - 1. Types of Disturbances
  - 2. Measures of Disturbance
  - 3. Adaptations to Disturbance
  - 4. Stability and Resistance
  
- E. Succession
  - 1. Community Change
  - 2. Mechanisms of Succession
  - 3. Ecological Climax, Stability, and Alternative Stable States
  - 4. Gap Dynamics

### III. ECOSYSTEM, LANDSCAPE, AND GLOBAL ECOLOGY

40%

- A. Energy Cycling
  - 1. Primary Production
    - a. Photosynthesis
    - b. Chemosynthesis
  - 2. Secondary Production
  
- B. Nutrient Cycling
  - 1. Decomposition
  - 2. Biogeochemical Cycles
    - a. Nitrogen Cycle
    - b. Phosphorus Cycle
  
- C. Landscape Ecology
  - 1. Interconnected Ecosystems
  - 2. Pattern and Process
  - 3. Scale and Heterogeneity

4. Edge Dynamics
5. Habitat Fragmentation

D. Human Ecology

1. Human Population Growth
2. Endangered Species and Ecosystems
3. Threats to Biodiversity
  - a. Overkill
  - b. Habitat Fragmentation and Land Cover Change
  - c. Biotic Invasions
  - d. Pollution
  - e. Climate Change
4. Sustainability