

# Advanced Ecological Principles

Ecology · Answer Key · 20 Questions

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**1. What term describes the total amount of energy stored as biomass by producers in an ecosystem after accounting for the energy used in cellular respiration?**

- A) Gross primary productivity
- B) Net primary productivity**
- C) Standing crop
- D) Secondary productivity

**2. In the process of biological magnification, which type of substance is most likely to increase in concentration as it moves up successive trophic levels?**

- A) Water-soluble proteins
- B) Fat-soluble synthetic toxins**
- C) Atmospheric nitrogen
- D) Decomposed organic matter

**3. Which biogeochemical cycle relies heavily on the process of nitrogen fixation performed by specialized bacteria in root nodules?**

- A) Carbon cycle
- B) Phosphorus cycle
- C) Nitrogen cycle**
- D) Sulfur cycle

**4. What is the ecological term for the functional role an organism occupies within its habitat, including its resource use and interactions?**

- A) Niche**
- B) Biome
- C) Commensalism
- D) Population

**5. Which type of survivorship curve is typically exhibited by organisms that produce large numbers of offspring with low parental investment and high early mortality?**

- A) Type I
- B) Type II
- C) Type III**
- D) Type IV

**6. What defines the carrying capacity of an ecosystem for a particular species?**

- A) The maximum birth rate of the species
- B) The total energy available in the biosphere
- C) The maximum population size an environment can sustain**
- D) The minimum amount of space required for migration

**7. During ecological succession, what are the first organisms to colonize a previously barren environment known as?**

- A) Climax community species
- B) Pioneer species**
- C) Secondary consumers
- D) Endemic species

**8. Which law of thermodynamics explains why only about 10% of energy is transferred between trophic levels?**

- A) First Law
- B) Second Law**
- C) Third Law
- D) Zeroth Law

**9. What is the primary factor that distinguishes a biome from a general ecosystem?**

- A) The specific types of human infrastructure present
- B) The regional climate patterns and dominant vegetation**
- C) The total number of individual organisms
- D) The speed of nutrient cycling

**10. Which interaction describes a relationship where one organism benefits while the other is neither harmed nor helped?**

- A) Mutualism
- B) Commensalism**
- C) Parasitism
- D) Amensalism

**11. In a food web, which organisms are responsible for returning nutrients to the soil by breaking down organic matter?**

- A) Primary producers
- B) Apex predators
- C) Detritivores and saprotrophs**
- D) Tertiary consumers

12. What is the definition of a keystone species in an ecological community?

- A) The species with the highest population density
- B) A species that has a disproportionately large effect on its environment**
- C) The species that occupies the highest trophic level
- D) The species that is most resistant to chemical pollution

13. Which gas is removed from the atmosphere during the process of photosynthesis and contributes to the greenhouse effect?

- A) Oxygen
- B) Nitrogen
- C) Carbon dioxide**
- D) Argon

14. What defines 'allopatric speciation' in the context of ecological isolation?

- A) Speciation occurring within the same geographical area
- B) Speciation resulting from physical geographic isolation**
- C) Speciation driven by behavioral changes only
- D) Speciation without genetic mutation

15. Which factor is considered an 'abiotic' component of a pond ecosystem?

- A) The species of algae present
- B) The pH level of the water**
- C) The population of predatory fish
- D) The density of aquatic insects

16. What phenomenon occurs when phosphorus and nitrogen runoff cause excessive algal growth in aquatic systems?

- A) Bioaccumulation
- B) Eutrophication**
- C) Biomagnification
- D) Carbon sequestration

17. In population dynamics, what does a 'J-shaped' curve represent?

- A) Logistic growth
- B) Exponential growth**
- C) Stable population equilibrium
- D) Extinction trend

**18. What is the name for the specific layer of the Earth that supports all life?**

- A) Atmosphere
- B) Lithosphere
- C) Biosphere**
- D) Hydrosphere

**19. Which ecological concept explains why two species competing for the exact same limited resource cannot coexist indefinitely?**

- A) Competitive exclusion principle**
- B) Resource partitioning
- C) Character displacement
- D) Mutualistic exclusion

**20. What describes the process where a community changes over time after a disturbance like a forest fire?**

- A) Primary succession
- B) Secondary succession**
- C) Climax stability
- D) Population density-dependence