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Chapter 3 Ecosystem Ecology

- Which of the following is a biotic factor?
A. Producers B. pH C. water D. humidity E. energy
- Which of the following best describes an ecosystem?
A. Populations interacting
B. All biotic factors interacting
C. Inter-species relationships
D. Intra-species relationships
E. All biotic and abiotic factors
- Choose the correct sequence for energy flow within an ecosystem
A. Herbivores → producers → carnivores → scavengers
B. Producers → herbivores → carnivores → scavengers
C. Producers → carnivores → herbivores → carnivores
D. Scavengers → producers → herbivores → carnivores
E. Carnivores → scavengers → producers → herbivores
- Which of the following are needed for photosynthesis?
A. Water, solar energy and carbon dioxide
B. Water, solar energy and glucose
C. Carbon dioxide, energy and glucose
D. Oxygen, water and energy
E. Oxygen and glucose
- Which of the following shows the complex interactions between species within an ecosystem?
A. Food chain B. Food web C. Food pyramid D. Energy pyramid E. Trophic level diagram
- Which of the following is the approximate efficiency of the energy transfer as energy flows through the food chain?
A. 1% B. 10% C. 25% D. 50% E. 90%
- A forest has a GPP of $3.8 \text{ kg C/m}^2/\text{year}$ and the rate of cellular respiration is $2.4 \text{ kg C/m}^2/\text{year}$. What is the NPP?
A. $6.2 \text{ kg C/m}^2/\text{year}$ B. $1.4 \text{ kg C/m}^2/\text{year}$ C. $1.0 \text{ kg C/m}^2/\text{year}$ D. $9.12 \text{ kg C/m}^2/\text{year}$ E. $1.58 \text{ kg C/m}^2/\text{year}$
- How is the majority of energy within an ecosystem lost?
A. Heat loss
B. Energy used to grow biomass
C. Cellular respiration
D. Cellular metabolism
E. Energy used to capture prey
- What law best relates to energy loss within an ecosystem?
A. First law of thermodynamics
B. Second law of thermodynamics
C. Third law of thermodynamics
D. Law of conservation of matter
E. Law of relativity
- Which of the following statements best describes the concept of GPP (Gross Primary Production)?
A. Total amount of energy available to primary consumers
B. Total amount of energy available from the sun
C. Total amount of solar energy that producers capture via photosynthesis
D. Total amount of energy available within an ecosystem
E. Total amount of cellular respiration conducted within an ecosystem

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11. Which of the following statements best describes the concept of NPP (Net Primary Production)
- A. Energy captured minus energy lost
 - B. Total amount of energy available for the sun
 - C. Total amount of energy produced from photosynthesis
 - D. Total amount of energy available within an ecosystem
 - E. Total amount of cellular respiration conducted within an ecosystem

12. Use Figure 3-2. Which ecosystem is the most productive?

- A. Tundra
- B. Tropical rainforest
- C. Coral reefs
- D. Swamps and marshes
- E. Desert scrub

13. Use Figure 3-2. How productive are tropical seasonal forests as compared to lakes and streams?

- A. 100% as productive
- B. 50% as productive
- C. 200% as productive
- D. 300% as productive
- E. 30% as productive

14. Use Figure 3-2. How would you describe the relationship between temperature of a continental ecosystem and net primary productivity based on the data provided?

- A. There is no clear relationship between temperature and productivity
- B. The warmer the ecosystem, the higher the productivity
- C. The colder the ecosystem, the higher the productivity
- D. Continental ecosystems are more productive than marine ecosystems
- E. The warmer the ecosystem, the lower the productivity

15. Use Figure 3-3. Looking at the ecological pyramid above, what would be the most likely number of joules to fill in X, Y and Z?

- A. X=100; Y=1000; Z=10,000
- B. X=1; Y=500; Z=10,000
- C. X=10,000; Y=500; Z=1
- D. X=50; Y=50,000; Z=500,000
- E. X=10,000; Y=1000; Z=10

16. Use Figure 3-3. What type of organism would you expect to find on the lowest level of the pyramid above?

- A. Gazelle
- B. Lion
- C. Vulture
- D. Giraffe
- E. Grasses

17. During what stage of the hydrologic cycle is water released to the atmosphere from plants?
- A. Evaporation
 - B. Transpiration
 - C. Precipitation
 - D. Infiltration
 - E. Condensation

18. Which stage of the hydrologic cycle can be the most direct cause of algal blooms?
- A. Evaporation
 - B. Precipitation
 - C. Transpiration
 - D. Infiltration
 - E. Runoff

19. Which of the following is considered to be the most important element in living organisms?
- A. Carbon
 - B. Hydrogen
 - C. Oxygen
 - D. Phosphorus
 - E. Nitrogen
20. What relatively recent development is greatly impacting the carbon cycle?
- A. Photosynthesis
 - B. Cellular Respiration
 - C. Formation of fossil fuels
 - D. Combustion of fossil fuels
 - E. Formation of carbonate rocks

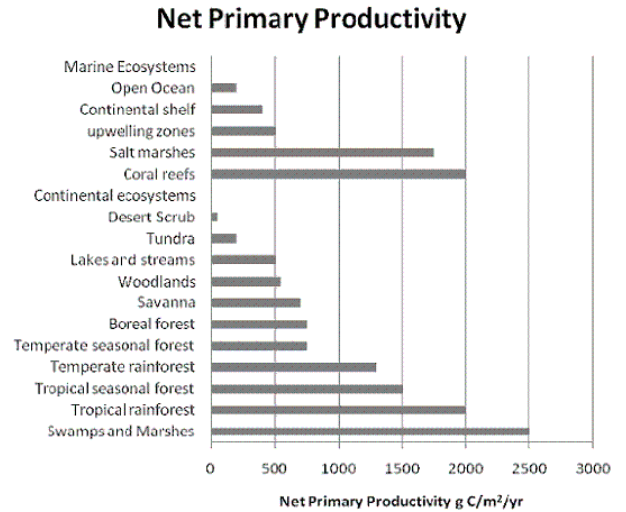


Figure 3-0

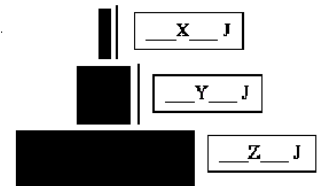


Figure 3-3

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21. What impact does deforestation have on the carbon cycle?
 - A. Increase in amount of CO₂ in the atmosphere
 - B. Decrease in the amount of CO₂ in the atmosphere
 - C. Increase in the amount of photosynthesis
 - D. Increase in the amount of cellular respiration performed by autotrophs
 - E. Deforestation has no impact on the carbon cycle
22. Which element is the most abundant in the atmosphere?
 - A. Oxygen
 - B. Nitrogen
 - C. Phosphorus
 - D. Sulfur
 - E. Hydrogen
23. What group of organisms is primarily responsible for the processes that occur in the nitrogen cycle?
 - A. Autotrophs
 - B. Heterotrophs
 - C. Bacteria
 - D. Detritivores
 - E. Scavengers
24. A scientist is observing a series of plants and measuring their growth with the addition of nutrients. She notices that the addition of nitrate has no effect on the growth while the addition of phosphorus shows significant growth. What conclusion can she draw about the nutrients in relation to this plant?
 - A. Phosphorus is a limiting nutrient
 - B. Nitrogen is a limiting nutrient
 - C. The plant does not require Nitrogen
 - D. The plant does not require Phosphorus
 - E. The plant had an excess of nutrients, limiting its growth
25. What is the major source of phosphorus on land?
 - A. Deposition from atmospheric phosphorus
 - B. Compounds that are formed by autotrophs during photosynthesis
 - C. Compounds released from the weathering of rocks
 - D. Compounds formed from bacterial conversion
 - E. Compounds dissolved in precipitation
26. The addition of a limiting nutrient to an ecosystem may lead to an algal bloom. What effect will this algal bloom have on the oxygen content of the water?
 - A. The algae bloom will cause the oxygen content in the water to increase overall
 - B. The algae bloom will cause the oxygen content in the water to decrease, leading to hypoxic conditions
 - C. The algae bloom will have no impact on the oxygen content of the water
 - D. The algae bloom will cause rapid fluctuations of oxygen in the water
 - E. The oxygen content will vary based on depth of the water
27. What impact have humans had on the phosphorus cycle?
 - I. Use of phosphorus containing fertilizers
 - II. Increased urbanization of forested areas
 - III. Increased use of phosphorus containing detergents
 - A. I only
 - B. II only
 - C. III only
 - D. I and II
 - E. I and III
28. What is a watershed?
 - A. Network of streams leading to a larger river
 - B. Network of rivers and bays that lead to the ocean
 - C. Reservoir of water stored underground
 - D. Area of land that drains to a water body
 - E. Extensive wetland system leading to a bay
29. What effect would clear cutting within a watershed have on the water quality of a river running through the watershed?
 - A. Decrease in nutrient concentration in the waters of the clear cut watershed
 - B. Increase in nutrient concentration in the waters of the clear cut watershed
 - C. Decrease in the amount of runoff entering the waters of the clear cut watershed
 - D. Increase in the biodiversity of the river
 - E. Clear cutting should not have an effect on the water quality of a river

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30. Which ecosystems are considered to be the most diverse?
A. Ecosystems experiencing high levels of disturbance
B. Ecosystems experiencing intermediate levels of disturbance
C. Ecosystems experiencing low levels of disturbance
D. Ecosystems experiencing no disturbance
E. Ecosystems that once had high levels of disturbance but have been stable for hundreds of years
31. Products obtained from nature that humans can use such as lumber, medicines and food crops are known as:
A. Ecological benefits B. Provisions C. Supplies D. Service values E. Intrinsically valuable
32. Which of the following has the biggest impact on the resilience of an ecosystem?
A. Amount of time the disturbance lasts
B. Amount of time the ecosystem has been established
C. Amount of predators present in the ecosystem
D. Amount of human intervention that is allowed
E. Amount of genetic biodiversity of the ecosystem
33. After a disturbance such as a forest fire, an ecosystem recovered very rapidly. This is an example of an ecosystem that has:
A. High resistance B. Low resistance C. High resilience D. Low resilience E. Equal resilience and resistance
34. In which step of the nitrogen cycle do plants absorb nitrogen compounds?
A. Nitrification B. Denitrification C. Assimilation D. Ammonification E. Nitrogen fixation
35. Water that moves across the surface of the land into streams and rivers is called:
A. Evaporation B. Precipitation C. Groundwater D. Transpiration E. Runoff