

Ecosystems

1. A(n) _____ cycle is a cyclic path that involves both biological and chemical processes of an ecosystem.
2. A(n) _____ is a permeable underground layer of rock, sand, and gravel saturated with groundwater.
3. The upper, unconfined portion of the groundwater constitutes the water _____, which flows into streams and is partly accessible to plants.
4. The balance between _____ and respiration is altered by the combustion of fossil fuels.
5. _____ becomes available to organisms almost entirely through the metabolic activities of a few genera of bacteria.
6. Heterotrophs must obtain organic molecules that have been synthesized by _____.
7. Net _____ productivity is defined as the total amount of energy fixed per unit of time minus the amount of energy expended by the metabolic activities of the photosynthetic organisms in the community.
8. Secondary consumers such as _____ and the parasites of animals, feed on the herbivores.
9. Only about _____% of the sunlight falling on the plant leaves is captured by photosynthesis.
10. Except for nitrogen, _____ is the element most likely to be present in amounts so small as to limit the growth of plants.
11. Photosynthesis fixes about
 - A. 0.1% of the CO₂ present in the atmosphere
 - B. 1% of the CO₂ present in the atmosphere
 - C. 10% of the CO₂ present in the atmosphere
 - D. 20% of the CO₂ present in the atmosphere
 - E. almost 100% of the CO₂ present in the atmosphere
12. Which of the following gases in the atmosphere appears to be changing the global climates?
 - A. ozone
 - B. water vapor
 - C. carbon dioxide
 - D. hydrogen
 - E. oxygen

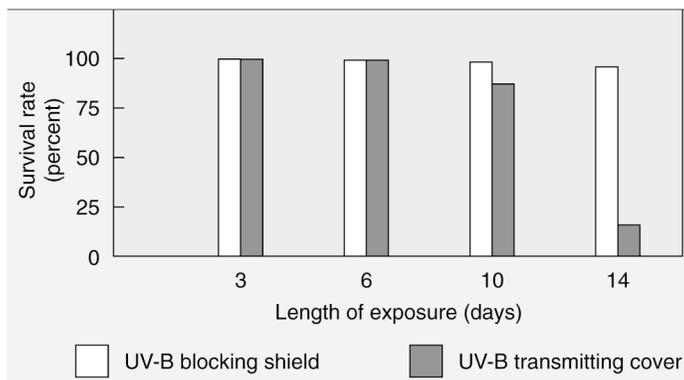
13. Which of the following feed directly on the green plants?
- A. primary producers
 - B. primary consumers
 - C. secondary consumers
 - D. secondary producers
 - E. decomposers
14. Organisms that break down organic matter are called
- A. detritivores
 - B. omnivores
 - C. herbivores
 - D. carnivores
15. All of the following are true about ecosystems except
- A. they contain both living and nonliving components
 - B. there is a transfer of energy through the system and it is lost
 - C. there is a cycling of nutrients through the system again and again
 - D. the ultimate source of energy is the sun for nearly all known ecosystems
 - E. they represent the lowest level of biological organization that is known
16. All of the following undergo biogeochemical cycles except
- A. carbon
 - B. energy
 - C. nitrogen
 - D. sulfur
 - E. water
17. The fraction of the Earth's surface covered by oceans is about
- A. 1/10
 - B. 1/4
 - C. 1/3
 - D. 1/2
 - E. 3/4
18. The upper, unconfined portion of the groundwater constitutes the
- A. aquifer
 - B. spring water
 - C. surface pool
 - D. water table
 - E. liquid water

19. Over tropical rainforest areas, approximately 90% of the water that reaches the atmosphere comes from
- A. animal metabolism
 - B. animal perspiration
 - C. plant transpiration
 - D. plant absorption
 - E. plant metabolism
20. World wide, the amount of atmospheric carbon dioxide fixed into organic compounds annually, in metric tons, is about
- A. 10 million
 - B. 70 million
 - C. 10 billion
 - D. 70 billion
 - E. 10 thousand
21. The carbon cycle is based on carbon dioxide. CO_2 makes up about
- A. 30% of the atmosphere
 - B. 3% of the atmosphere
 - C. 0.3% of the atmosphere
 - D. 0.03% of the atmosphere
 - E. 0.003% of the atmosphere
22. In global terms, the production of CO_2 by respiration and its fixation by photosynthesis are balanced, but the balance has been shifted towards accumulation of CO_2 by the increase in consumption of
- A. meat products
 - B. vegetable products
 - C. fossil fuels
 - D. all types of foods
 - E. all of the above
23. Even though nitrogen constitutes 78% of the Earth's atmosphere, the amount available for living things nearly all comes from
- A. a few groups of nitrogen-fixing bacteria
 - B. the breakdown of minerals
 - C. a few genera of detritivores
 - D. the breakdown of dead plants
 - E. nitrogen-containing fertilizers

24. Living organisms depend on nutrient cycling. This includes the processes of
- A. respiration
 - B. photosynthesis
 - C. decomposition
 - D. feeding
 - E. all of the above
25. With almost no exceptions, the nitrogen fixers are
- A. beans
 - B. green plants
 - C. insects
 - D. mammals
 - E. prokaryotes
26. The form of nitrogen most likely to be absorbed from the soil by plants is
- A. nitrogenous wastes
 - B. nucleic acids
 - C. nitrogen gas
 - D. nitrous oxide gas
 - E. nitrite/nitrate ions
27. Which of the following biogeochemical cycles contain a mineral component?
- A. phosphorus
 - B. carbon
 - C. nitrogen
 - D. oxygen
 - E. water
28. The scarcity of which two elements limits plant growth?
- A. oxygen, nitrogen
 - B. nitrogen, phosphorus
 - C. oxygen, phosphorus
 - D. carbon, nitrogen
 - E. carbon, phosphorus
29. Experimental studies with watersheds, such as the one of Hubbard Brook show that trees and shrubs in an undisturbed ecosystem will help in
- A. losing nutrients
 - B. retaining the nutrients
 - C. secondary productivity
 - D. being used as fire wood
 - E. reducing the pollution

30. Which of the following contain species that are autotrophs?
- A. bacteria
 - B. protista
 - C. plants
 - D. fungi
 - E. a, b, and c
31. Energy enters the ecosystem mainly by the process of
- A. biosynthesis
 - B. nutrition
 - C. biogeochemical weathering
 - D. photosynthesis
 - E. metabolism
32. The net weight of all of the organisms living in an ecosystem is its
- A. productivity
 - B. biomass
 - C. vital force
 - D. photosynthesis minus metabolism
 - E. combined output of metabolism and photosynthesis
33. In an ecosystem, the amount of organic matter produced in a given time that is available for heterotrophs is known as
- A. daily yield
 - B. gross productivity
 - C. net primary productivity
 - D. effective vitality
 - E. net yield
34. The primary consumers are
- A. autotrophs
 - B. carnivores
 - C. decomposers
 - D. detritivores
 - E. herbivores
35. The organisms that live on the refuse of an ecosystem are called
- A. autotrophs
 - B. carnivores
 - C. denitrifiers
 - D. detritivores
 - E. herbivores

36. A good average value for the amount of organic matter that reaches the next trophic level is about
- 20%
 - 10%
 - 5%
 - 2%
 - 1%
37. The rate of production of new biomass by heterotrophs is called
- secondary productivity
 - primary productivity
 - consumer productivity
 - gross productivity
 - net productivity
38. Factors that limit community productivity include
- nitrogen-fixing bacteria
 - sunlight received
 - number of autotrophs
 - a and c
 - a, b, and c
39. Which statement is the best explanation of the graph?



- The length of the UV-B exposure was not critical to survival rates in the survival of the organisms exposed.
- The fewer days of exposure to the UV-B resulted in the lowest survival rates of the organisms exposed.
- The greater the days of exposure to the UV-B resulted in the highest survival rates of the organisms exposed.
- The greater the days of exposure to the UV-B resulted in lower survival rates of the organisms exposed.
- Male organisms tended to survive longer than females when exposed to the same levels of UV-B.

40. In an ecosystem, which statement reflects the relationship with energy and nutrients?
- A. Energy cycles and nutrients also cycle in a balanced ecosystem.
 - B. Energy flows and nutrients cycle in an ecosystem.
 - C. Energy cycles and nutrients flow in an ecosystem.
 - D. Energy flows and nutrients flow through an ecosystem.
 - E. In an unbalanced ecosystem, nutrients are stored in energy cycles.
41. Which of the following choices best describes the relationship that exists between photosynthesis and cellular respiration?
- A. Photosynthesis captures and stores carbon from the atmosphere. Cellular respiration releases carbon back into the atmosphere.
 - B. Photosynthesis captures and stores carbon from the atmosphere as does cellular respiration.
 - C. Photosynthesis releases carbon into the atmosphere. Cellular respiration captures and stores carbon from the atmosphere.
 - D. Photosynthesis releases carbon into the atmosphere as does cellular respiration.
42. During the 1960s a group of scientists in the northeastern United States conducted an experiment at Hubbard Brook, New Hampshire. A 38-acre watershed was completely deforested and the runoff (water flow) monitored for several years. It was compared to an adjacent watershed that was left untouched. The scientists collected data during those years and found that
- A. there was no difference in the amount of runoff from the two areas
 - B. there was a difference but it was not significant, and there was less nitrogen in the runoff from Hubbard Brook than at the control site
 - C. there was a tremendous increase in the total amount of runoff but the nitrogen levels were fairly constant in both areas
 - D. there was a tremendous increase in the amount of runoff and the nitrogen levels in the runoff were huge compared with the control
 - E. there was a tremendous increase in the amount of runoff but the vegetation was able to reestablish itself very quickly and the runoff soon returned to its normal level

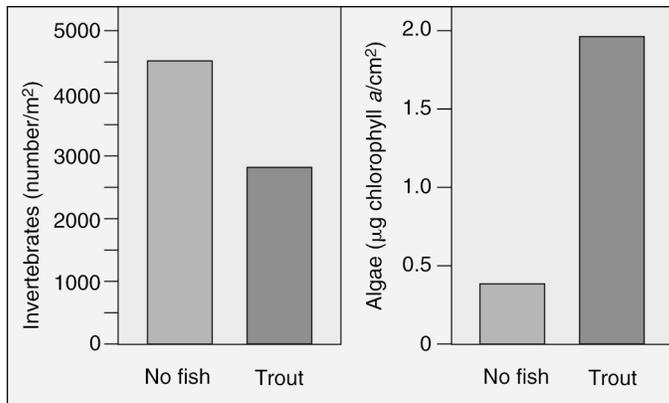
Use the following information to answer questions 43-45.

Grass—Cricket—Garden Spider—Blue Jay—Red-Tailed Hawk

43. Which one of the links in the food chain does the cricket represent?
- A. producer
 - B. primary producer
 - C. primary consumer
 - D. secondary consumer
 - E. tertiary consumer

44. Which one of the links is the producer?
- A. grass
 - B. cricket
 - C. garden spider
 - D. blue jay
 - E. red-tailed hawk
45. Which one of the links in the food chain does the garden spider represent?
- A. producer
 - B. primary producer
 - C. primary consumer
 - D. secondary consumer
 - E. tertiary consumer
46. A Viceroy caterpillar feeds on a leaf. If a day's feeding activities gains the caterpillar a total of 1000 calories and 50% is lost in its feces and 33% of the energy is used to provide energy through cellular respiration, how many calories of the original intake are available for caterpillar biomass?
- A. 830 calories
 - B. 670 calories
 - C. 500 calories
 - D. 330 calories
 - E. 170 calories
47. Which of the following terms could be used by you as you explain to your teacher your understanding of the total amount of organic matter produced in a community in a given time that is available for heterotroph consumption?
- A. primary productivity
 - B. secondary productivity
 - C. primary production
 - D. net primary production
 - E. net secondary production

48. Which statement is a correct interpretation of the graph about trout, invertebrates, and algae?



- A. If trout are present in a system, alga production is low and invertebrate population levels are also low.
- B. If trout are present in a system, alga production is high and invertebrate population levels are also high.
- C. If trout are present in a system, alga production is high and invertebrate population levels are low.
- D. Trout do not seem to affect the alga production; only the invertebrate populations are affected.
- E. Trout do affect the alga production but not the invertebrate populations.
49. Match each of the following.
- | | |
|---|---------------------------------|
| _____ A. Cyclic paths involving both biological and chemical processes. Begin with chemicals being incorporated into the bodies of organisms from nonliving reservoirs such as atmosphere or the waters of oceans or rivers or rocks. | 1. ecological pyramid of energy |
| _____ B. A latitudinal increase in the number of species; ranges from the Arctic, increasing toward equatorial tropical areas | 2. ecosystem |
| _____ C. Organisms are interrelated; energy transfers through the various trophic levels; there is a low number of herbivores, which are supported by much larger numbers of photosynthesizers. | 3. species diversity cline |
| _____ D. All of the organisms that live in a place, together with the physical characteristics of the place; they interact with each other in a dynamic fashion. | 4. food web/food chain |
| _____ E. Organisms that feed on one another; include producers, consumers, detritivores; the length and complexity of the chain of these organisms vary. | 5. biogeochemical cycles |

Answer Key

No. on Test	Correct Answer
1	Biogeochemical
2	Aquifer
3	Table
4	Photosynthesis
5	Nitrogen
6	Autotrophs
7	Primary
8	Carnivores
9	1
10	Phosphorus
11	C
12	C
13	B
14	A
15	E
16	B
17	E
18	D
19	C
20	D
21	D
22	C
23	A
24	E
25	E
26	E
27	A
28	B
29	B
30	E
31	D
32	B
33	C
34	E

35	D
36	B
37	A
38	E
39	D
40	B
41	A
42	D
43	C
44	A
45	D
46	E
47	D
48	C
49	1-C, 2-D, 3-B, 4-E, 5-A