

Ecology

Modified True/False

Indicate whether the sentence or statement is true or false. If false, change the identified word or phrase to make the sentence or statement true.

- _____ 1. The number of species in an area is a measure of biodiversity. _____
- _____ 2. A species that is brought to a place where it never lived is considered a(n) native species.

Multiple Choice

Identify the letter of the choice that best completes the statement or answers the question.

- _____ 3. Nitrogen is released to the abiotic parts of the biosphere from the processes of death and _____.
a. decay by bacteria
b. infiltration of groundwater
c. runoff
d. lightning in storm clouds
- _____ 4. Carbon dioxide in the atmosphere enters the biotic parts of the biosphere through _____.
a. burning of forests
b. photosynthesis
c. combustion of fossil fuels
d. all of these
- _____ 5. Some birds are known as honey guides because they may be followed by humans to wild beehives. When the humans take honey from the hives, the birds are able to feast on the honey and bees, too. This type of relationship can best be described as _____.
a. parasitism
b. commensalism
c. mutualism
d. symbiosis
- _____ 6. Cougars are predators that often eat weakened or diseased animals. This is a description of the _____ of cougars.
a. habitat
b. community
c. niche
d. none of these
- _____ 7. An ecologist who studies how several species in an area interact among each other and with the abiotic parts of the environment is interested in the biological organization level called a(n) _____.
a. organism
b. population
c. community
d. ecosystem
- _____ 8. An ecologist who studies how several species in an area interact is interested in the biological organization called a(n) _____.
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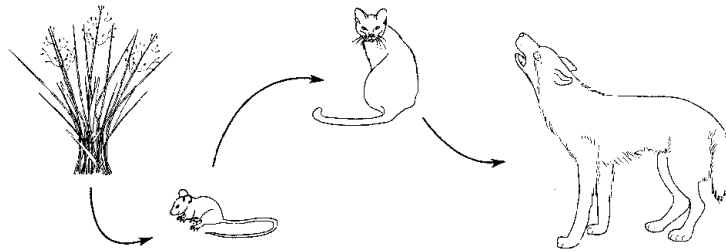


Figure 2-1

- ___ 9. Referring to Figure 2-1, suppose 10 000 units of energy are available at the level of the grasses. What is the total number of energy units lost by the time energy reaches the coyote?
- a. 90 units
b. 990 units
c. 9900 units
d. 9990 units
- ___ 10. Referring to Figure 2-1, as matter and energy move from grasses to coyotes, the amount of available energy
- a. increases
b. decreases
c. decreases then increases
d. increases or decreases but population size remains the same
- ___ 11. Referring to Figure 2-1, the relationship between cats and mice could best be described as ____.
- a. predator-prey
b. scavenger-carrion
c. parasite-host
d. consumer-producer
- ___ 12. Referring to Figure 2-1, the coyotes would be considered ____.
- a. herbivores
b. third-order consumers
c. second-order consumers
d. decomposers
- ___ 13. Referring to Figure 2-1, energy flows from ____.
- a. coyotes to grasses
b. cats to mice
c. mice to cats
d. coyotes to cats

___ 14. In the energy pyramid shown in Figure 2-7, which level has the smallest number of organisms?

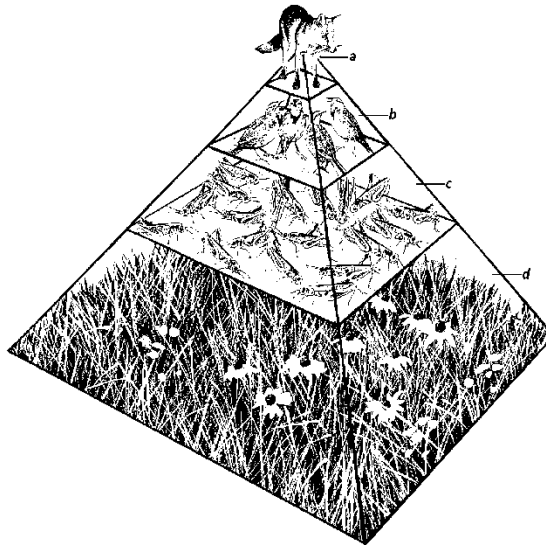


Figure 2-7

- a. fox
- b. birds
- c. grasshoppers
- d. grass

15. Which organism shown in the pyramid shown in Figure 2-7 receives the highest percentage of energy from the sun?

- a. fox
- b. birds
- c. grasshoppers
- d. grass

___ 16. The flea shown in Figure 2-12 is involved in which type of symbiosis?

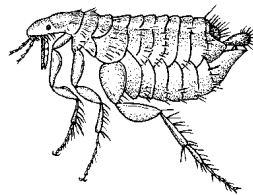


Figure 2-12

- a. mutualism
- b. commensalism
- c. parasitism
- d. predatorism

___ 17. The stable ecosystem that develops due to succession _____.

- a. is called a niche
- b. is always a forest
- c. is called a climax community
- d. never changes

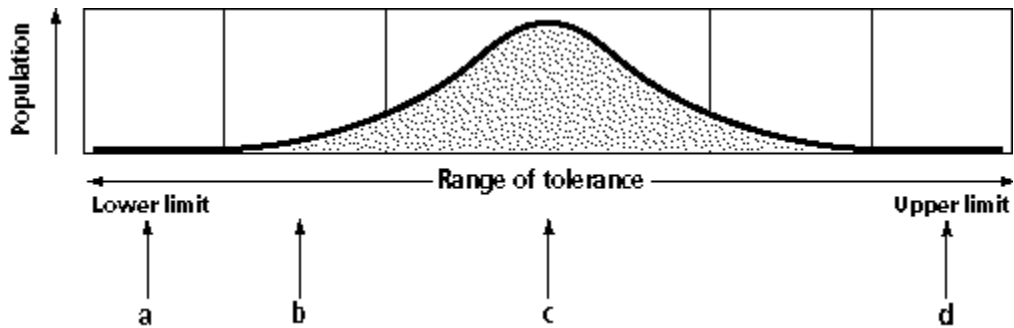


Figure 3-3

- ___ 18. In Figure 3-3, where will you be most likely to find the greatest diversity?
- | | |
|------|------|
| a. A | c. C |
| b. B | d. D |
- ___ 19. In Figure 3-3, which section would have a lack of organisms due to an overabundance of resources?
- | | |
|------|------|
| a. A | c. C |
| b. B | d. D |
- ___ 20. In Figure 3-3, which section would account for a lower number of organisms near the bottom of a pond due to a short supply of oxygen and sunlight?
- | | |
|------|------|
| a. A | c. C |
| b. B | d. D |
- ___ 21. Exponential growth of a population is represented by $dN/dt =$
- | | |
|-----------|-----------------|
| a. rN/K | c. $rN (K-N)/K$ |
| b. rN | d. $rN (K + N)$ |

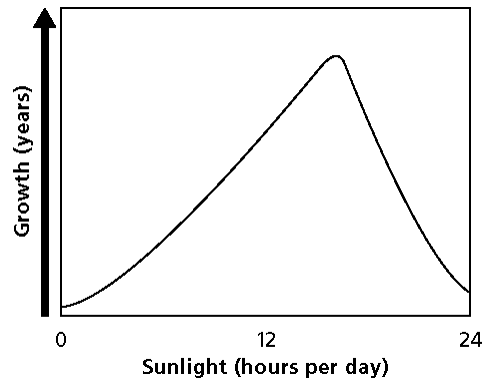


Figure 3-6

- ___ 22. Look at the graph in Figure 3-6. What does this graph tell us about this species of plant?
- too much sunlight can hurt them
 - they thrive in a lot of sun
 - heat is damaging to them
 - they need plenty of water
- ___ 23. Look at the graph in Figure 3-6. Approximately how many hours of sunlight should these plants receive each day in order to make them grow at their optimum level?
- 4
 - 12
 - 16
 - 20
- ___ 24. What would be the best time of the year to plant the organism described in Figure 3-6?
- winter
 - spring
 - summer
 - fall
- ___ 25. The effect of movement of people between counties has _____ effect on total world population.
- a damaging
 - little
 - a great
 - no
- ___ 26. Organisms that employ a strategy of slow reproduction usually require an environment that _____.
- is stable
 - fluctuates from year to year
 - has cold days
 - has 24-hour growing periods

- ____ 27. A population that grows until it reaches its carrying capacity usually has the shape of an ____.
- a. I
 - b. J
 - c. S
 - d. M
- ____ 28. Density-independent factors are limiting factors whose effects are ____.
- a. confined to the habitat of the population
 - b. determined by the degree of competition for resources
 - c. not influenced by population densities
 - d. determined by the difference between birthrate and population density
- ____ 29. For a particular species, the carrying capacity is the maximum number of individual organisms that ____.
- a. the species could reach in a given time period if all the offspring survive and reproduce
 - b. could be supported by a given environment indefinitely
 - c. are in their post-reproductive years
 - d. could be supported by any environment over a period of one year
- ____ 30. Unrestricted populations of organism's experience ____.
- a. exponential growth
 - b. linear growth
 - c. fertility
 - d. biotic growth
- ____ 31. The major threat to biodiversity is ____.
- a. habitat fragmentation
 - b. habitat loss
 - c. habitat degradation
 - d. exotic species

- ___ 32. The major focus of conservation biology is ____.
- to prevent cruelty to animals
 - to keep animals in zoos for people to see
 - protect species from extinction
 - stop hunting
- ___ 33. Acid rain changes the pH of soil, killing some trees. This is an example of ____.
- habitat fragmentation
 - global warming problems
 - habitat degradation
 - exotic species

Table 5-1 shows the population sizes for 5 different species in four different areas.

Area	Species U	Species V	Species W	Species X	Species Y	Species Z
A	3	7	2	2	2	4
B	0	6	8	0	6	6
C	0	0	2	0	0	2
D	4	3	11	1	6	0

Table 5-1

- ___ 34. From Table 5-1, which species has the highest average population size?
- Species W
 - Species X
 - Species Y
 - Species Z
- ___ 35. If the four areas in Table 5-1 were the only places in the world to find these organisms, which species most likely faces the greatest chance of extinction?
- Species U
 - Species X
 - Species Y
 - Species Z
- ___ 36. Which area in Table 5-1 has the greatest biodiversity?
- Area A
 - Area B
 - Area C
 - Area D

- ___ 37. If all four areas in Table 5-1 had identical climate and geology, which one would probably have the smallest area?
- a. Area A
 - b. Area B
 - c. Area C
 - d. Area D

- ___ 38. Carnivorous birds that fed on organisms exposed to this chemical produced fragile eggs. The chemical is
- a. CFC
 - b. DNA
 - c. DDT
 - d. nitrogen oxide

- ___ 39. Which country has the fewest species of mammals?
- a. Canada
 - b. United States
 - c. Mexico

- ___ 40. If the communities in Figure 5-4 were put in order of least to most biological diversity, they would be _____.

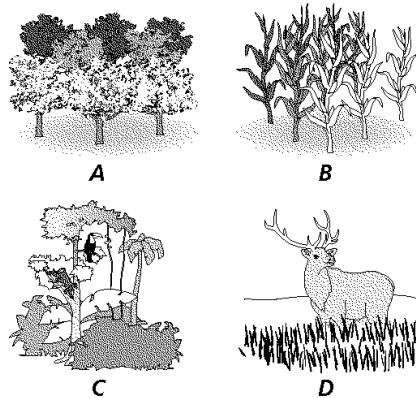


Figure 5-4

- a. ABCD
- b. CADB
- c. DBCA
- d. BDAC

- ___ 41. Desert iguanas remain in their burrows when soil surface temperatures cool below 39°C. Why don't they venture out in cool weather?
- a. They move sluggishly and risk being caught by a warm-blooded predator.
 - b. They will die within minutes if their body temperature drops below 39°C.
 - c. Their prey are also inactive when temperatures are cooler.
 - d. Their hearing is impaired at low temperatures because sound travels more slowly.

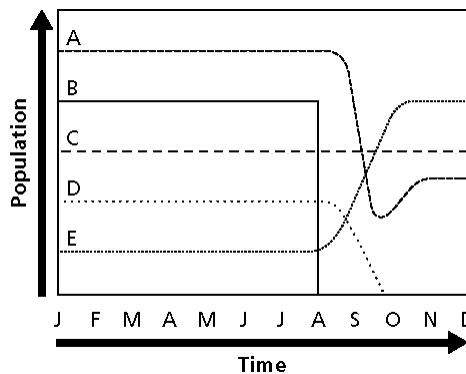


Figure 5-6

- ___ 42. What happened to species B in the graph shown in Figure 5-6?
- a. it increased in biodiversity
 - b. it decreased in population slightly
 - c. it became carnivorous
 - d. it became extinct
- ___ 43. What effect did the loss of species B have on species A and D in Figure 5-6?
- a. it caused the populations of A and D to decrease
 - b. it caused the populations of A and D to increase
 - c. it caused the populations of A and D to become extinct
 - d. it had no effect on the populations of A and D
- ___ 44. Suggest what happened to species E in Figure 5-6.
- a. it became extinct
 - b. it replaced species B in its niche
 - c. it stopped eating species B
 - d. it started eating species A

- _____ 45. An individual giant red velvet mite emerges from its burrow in the sands of the Mojave Desert only once each year. What important functions does the mite perform during such
- a. bathing and drinking
 - b. finding nesting material
 - c. feeding and mating
 - d. all of the above
- _____ 46. The Mojave Desert sits at about 35° N. latitude. It is a desert because there is little rainfall, but it is also very hot. Why so hot?
- a. Due to the tilt of the earth, there is more solar radiation striking 30-35° than other latitudes.
 - b. There is a broad band of thinner atmosphere at this latitude (N and S) so that more radiation can penetrate to the ground.
 - c. In a year there are more hours of daylight at this latitude compared with others.
 - d. Sinking cold, dry air (originally from the equator) heats up as it falls and slams into the earth at around 30-35° N and S latitudes.
 - e. a & c
47. In which of the following biomes would you expect the greatest above-ground biomass?
- a. Rain forest
 - b. Boreal forest
 - c. Grassland
 - d. Tundra
 - e. a & b
- _____ 48. Which of the following ecological regions has the slowest transit time for carbon?
- a. Tropical rain forest
 - b. Littoral zone
 - c. Bog
 - d. Oligotrophic lake
- _____ 49. The term $(K-N)/K$ of the logistic growth equation...
- a. Is only relevant for r-selected organisms
 - b. Is only relevant for K-selected organisms
 - c. Is a density-independent factor
 - d. Does not take into account the size of the population
 - e. None of the above
- _____ 50. The age distribution for a population of an r-selected organism would be...
- a. Pyramidal
 - b. Rectangular
 - c. An inverse pyramid
 - d. Bimodal

- _____ 51. The fact that you find giant Anolis lizards on islands of the Lesser Antilles (in the Caribbean) is an example of...
- siderosis
 - adaptive radiation
 - mimicry
 - allelic dysentery
- _____ 52. Since there is so much nitrogen available in the atmosphere (70% of air is N₂), this element tends not to be a critical or limiting nutrient for plants.
- true
 - false
- _____ 53. If large carnivores in an ecosystem are killed off, the number of primary producers in the area may also decrease dramatically, even though the carnivores don't eat the primary producers. How do you explain this effect?
- It is the result of a trophic inversion.
 - The death of the carnivores leads to increased decomposition which pollutes the primary producers.
 - The carnivores are most likely keeping the herbivore population in check.
 - Angular stratification of the grazer biome is rectified when the carnivores are killed.
- _____ 54. Toxins in the food chain are magnified as you go to higher and higher trophic levels. This is because...
- Higher trophic levels are mostly filled with many less-complex organisms so there are more individuals eating the toxins.
 - Most of the toxins released into the environment are consumed only by animals high on the food chain.
 - Many toxins are not cleared from tissues, so each animal that eats another retains a relatively small percentage of the carbon, nitrogen, etc but 100% of the toxins.
 - Organisms higher on the food chain are larger, so the toxins are easier to see.
- _____ 55. Which of the following is the largest single factor in species loss?
- chemical pollution
 - thermal pollution
 - habitat loss
 - introduced species
- _____ 56. All of the energy generated through photosynthesis in an ecosystem – respiration by both heterotrophs and autotrophs is:
- Gross Primary Productivity (GPP)
 - Net Ecosystem Productivity (NEP)
 - Net Primary Productivity (NPP)
- _____ 57. In the Sonoran Desert, the lesser long-nosed bat pollinates the saguaro cactus as it feeds from the nectar from the flowers, this is a classic example of
- commensalism
 - mutualism
 - parasitism
 - predation

- _____ 58. At nighttime, desert temperature
- stay scorching hot
 - cool down to a warm and balmy temperature
 - often cool down to freezing temperatures
 - vary significantly from desert to desert
- _____ 59. What is desertification?
- a serious world problem when deserts disappear due to increasing rainfall
 - a rapid increase in the number of desert species over a period of 5-10 years
 - a rapid decrease in the number of desert species over a period of 5-10 years
 - a serious world problem when deserts encroach on arable land
- _____ 60. What characteristics of grasses allow them to thrive in the grassland biome?
- they grow from the bottom rather than the top, thus being able to rebound after a fire
 - they require thick layers of healthy soil to grow
 - they require constant rainfall
 - all of the above
- _____ 61. In their natural state, which of the following factors contribute to the maintenance of the grasslands:
- climate, topography, and grazing
 - climate, topography, and fire
 - topography, fire, and grazing
 - climate, fire, and grazing

Completion *Complete each sentence or statement.*

62. Organism, population, and community make up the _____.
63. Parasitism, commensalism, and mutualism are examples of _____.
64. In a pond ecosystem, ducks, mosquitoes, pond plants, and frogs are _____ factors.
65. Both the alga and the fungus are benefited from their relationship in a lichen. This relationship is one of _____.
66. Water, carbon, and nitrogen are released back into the atmosphere during _____.
67. Energy that passes through a food chain is lost to the environment as _____.
68. To explain and show how the amount of living material at each trophic level of a food chain changes, you could use a pyramid of _____.
69. In ecological classification, the next smallest level after the biosphere is the _____.
70. Instead of growing explosively, population growth tends to level off because the population reaches the _____ of a particular environment.
71. A population of bacteria that doubles its size every 20 minutes exhibits _____ growth.

72. Which North American desert has the most complex vegetation of any desert on Earth?

73. Joshua trees live only in the _____ desert.

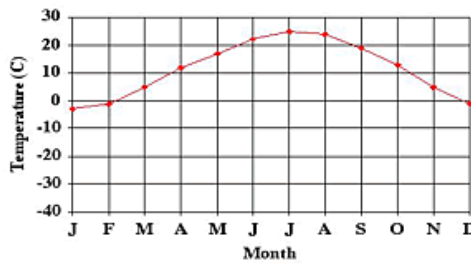
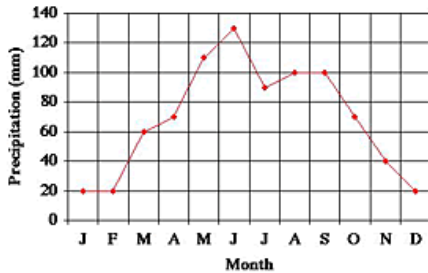
74. Saguaro and other columnar cacti are indicator species of the _____

Match the given biome to the plant life that it can support.

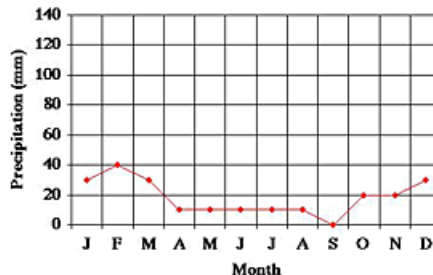
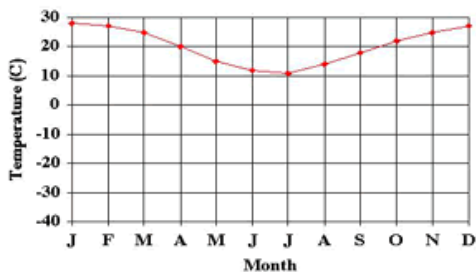
- | | |
|--------------------------------|--------------------|
| 75. Tundra | a. evergreen trees |
| 76. Taiga | b. cacti |
| 77. Temperate Deciduous Forest | c. shrubs |
| 78. Tropical Rain Forest | d. grasses |
| 79. Chaparral | e. broadleaf trees |
| 80. Desert | f. orchids |
| 81. Grassland | g. lichen |

Label which biomes the following pairs of temperature and precipitation graphs belong to.

82. _____



83. _____



84. Define and list abiotic factors in an ecosystem.

85. What is the most common limiting factor in a desert environment?

86. Name the four North American Deserts.

87. List three common greenhouse gases, and explain the difference between global warming and the greenhouse effect.

Short Answer

88. Label the energy available at each trophic level for figure 1:

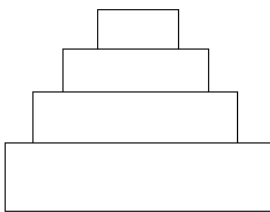


Figure 1

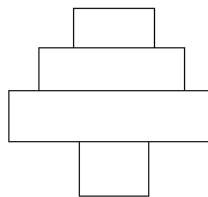
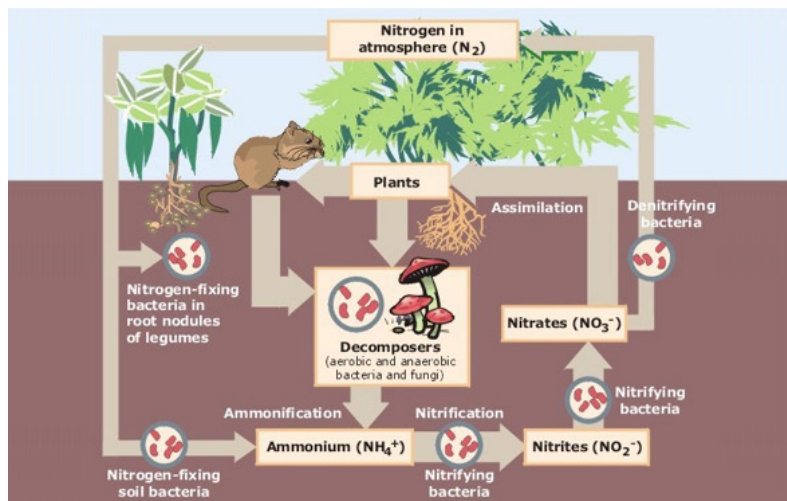


Figure 2

89. What type of pyramid might figure 2 be?

90. In a grassland biome, what food chain might this pyramid represent?

91. What is the name of the following cycle, and in what step of this cycle is necessary for plants to receive the nutrients from this cycle?



Tiebreakers: these will be used to determine who wins in the case of a tie.

92. List three or more adaptations in desert organisms and their functions.

93. List three or more adaptations in grassland organisms and their functions.

94. List three common greenhouse gases, and explain the difference between global warming and the greenhouse effect