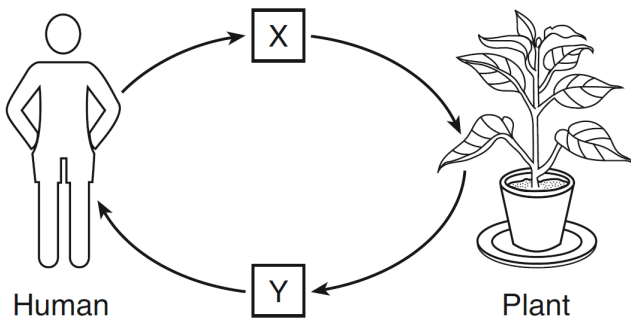


1. The diagram below represents a cycling of materials.



Which row in the chart below shows the substances represented by *X* and *Y*?

Row	X	Y
(1)	oxygen	carbon dioxide
(2)	glucose	oxygen
(3)	carbon dioxide	oxygen
(4)	amino acids	carbon dioxide

- (1) 1      (2) 2      (3) 3      (4) 4

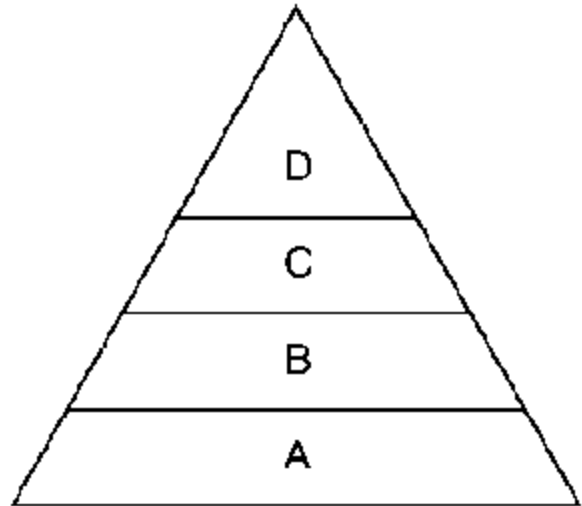
2. All the red foxes inhabiting a given forest constitute a

- (1) community              (2) population  
(3) biosphere              (4) biome

3. What could humans do in order to reduce consumption of nonrenewable resources?

- (1) heat household water with solar radiation  
(2) burn coal to heat houses instead of using oil  
(3) increase industrialization  
(4) use a natural-gas grill to barbecue instead of using charcoal

4. The diagram below represents an energy pyramid.



Which organisms would *most likely* be found at level A?

- (1) algae                      (2) birds  
(3) mammals              (4) worms

5. Puppies are often given medicine to eliminate roundworms from their intestines. These worms consume some of the food the puppies have digested. The worms and the puppies represent a relationship known as

- (1) parasite-host  
(2) predator-prey  
(3) consumer-producer  
(4) autotroph-heterotroph

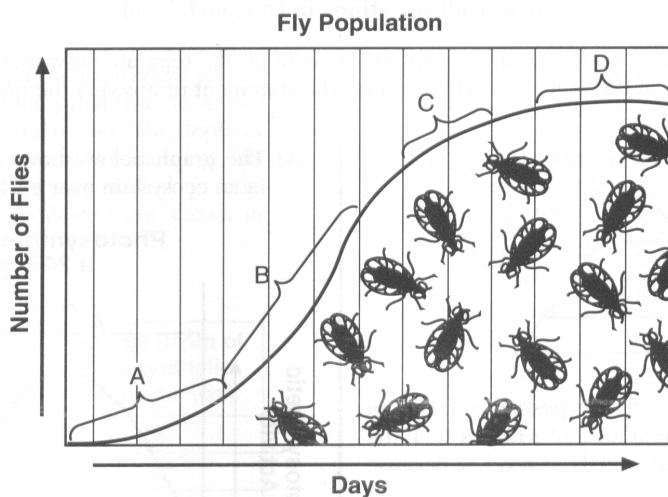
6. Decomposition and decay of organic matter are accomplished by the action of

- (1) scavengers              (2) green plants  
(3) viruses and algae      (4) bacteria and fungi

7. The *negative* effect humans have on the stability of the environment is most directly linked to an increase in

- (1) supply of finite resources  
(2) predation and disease  
(3) human population size  
(4) recycling activities by humans

8. Two closely related species of birds live in the same tree. Species *A* feeds on ants and termites, while species *B* feeds on caterpillars. The two species coexist successfully because
- (1) birds compete for food
  - (2) they use different methods of reproduction
  - (3) they interbreed
  - (4) each occupies a different niche
9. One way that humans could have a positive impact on local environments is to
- (1) generate waste products as a result of technological advances
  - (2) increase planting large areas of one crop
  - (3) increase the use of pesticides
  - (4) use resources that are renewable
10. The graph below represents the growth of a population of flies in a jar.

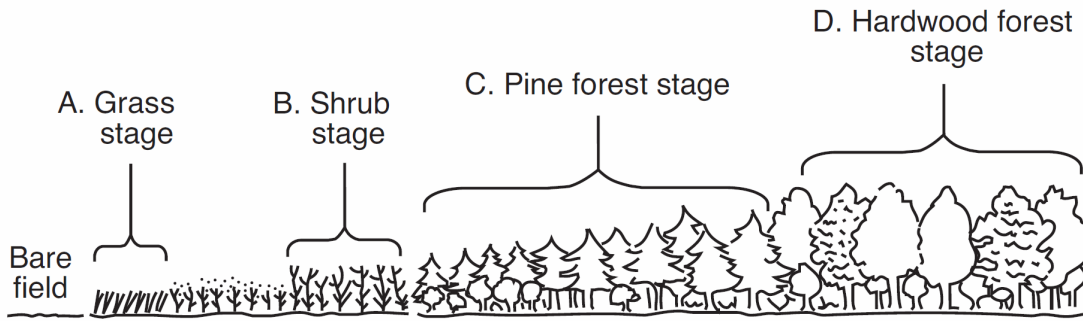


Which letter indicates the part of the graph that represents the carrying capacity of the environment in the jar?

- (1) *A*
  - (2) *B*
  - (3) *C*
  - (4) *D*
11. Which farming practice causes the *least harm to the environment*?
- (1) planting the same crop in the same field each year for 10 years
  - (2) planting the same crop for 1 year on all the fields in the area
  - (3) adding chemical fertilizers to all the crops in the area
  - (4) using natural predators to reduce insect numbers

12. Which sequence shows increasing complexity of levels of ecological organization?
- (1) community, ecosystem, biosphere
  - (2) biosphere, ecosystem, community
  - (3) biosphere, community, ecosystem
  - (4) ecosystem, biosphere, community

13. The diagram below represents the various stages of ecological succession in New York State.



If the ecosystem is not altered, which stage would be the most stable?

- (1) shrub
- (2) hardwood forest
- (3) grass
- (4) pine forest

14. In an ecosystem, which component is *not* recycled?

- (1) energy
- (2) water
- (3) carbon
- (4) oxygen

15. The chart below shows three ecological terms used to describe levels of organization on Earth.

A	ecosystem
B	population
C	biosphere

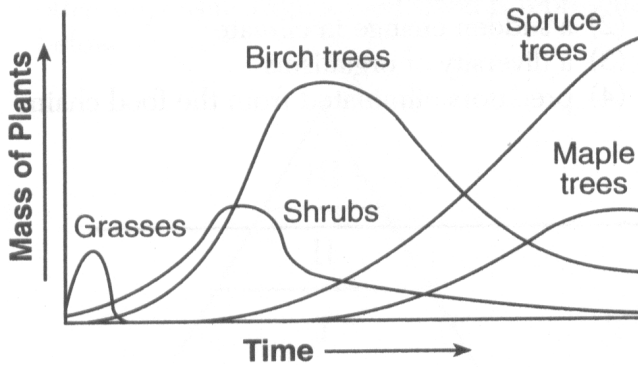
Which diagram best represents the relationship of these ecological terms?

- (1)
- (2)
- (3)
- (4)

16. The oxpecker, a small African bird, periodically cleans ticks and other pests off the skin of the impala. The impala, in turn, protects the oxpecker from larger predatory birds and provides it with a constant supply of food. This relationship is an example of

- (1) mutualism
- (2) saprophytism
- (3) parasitism
- (4) commensalism

17. Which concept is represented in the graph below?

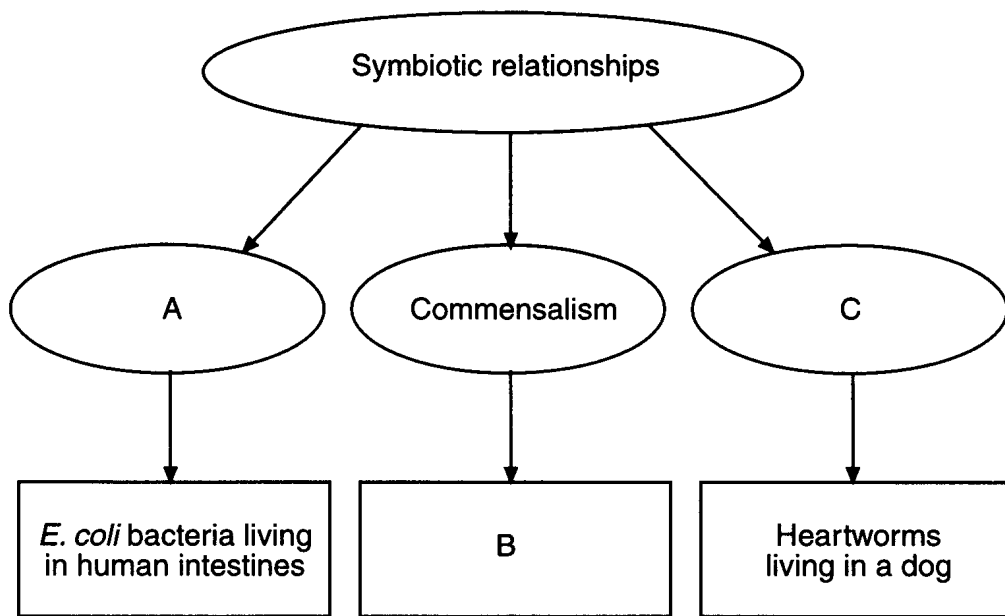


- (1) cycling of carbon and nitrogen in a forest
- (2) energy flow in a food chain over time
- (3) negative human impact on the environment
- (4) ecological succession in a community

18. One advantage of biodiversity in an ecosystem is that it

- (1) guarantees that the largest organisms will dominate the area
- (2) develops relationships between organisms that are always positive over long periods of time
- (3) increases the chance that some organisms will survive a major change in the environment
- (4) ensures a large amount of identical genetic material

Base your answers to questions 19 and 20 on the diagram below and on your knowledge of biology.



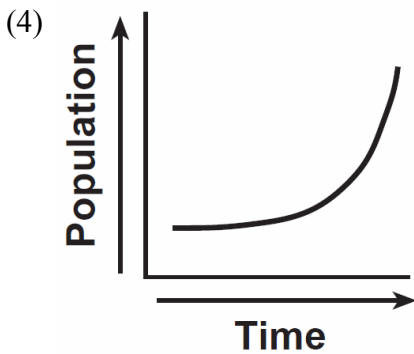
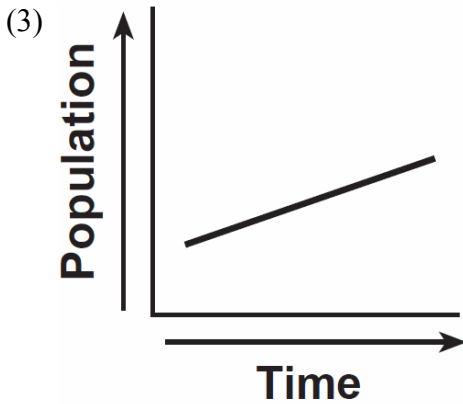
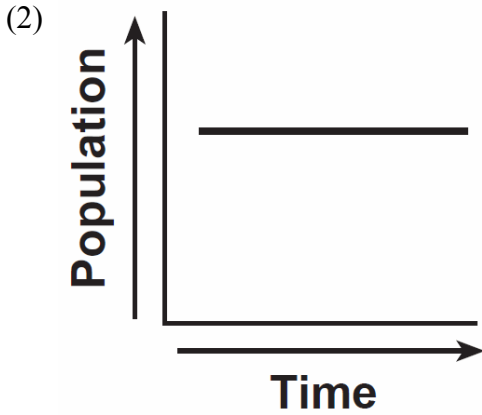
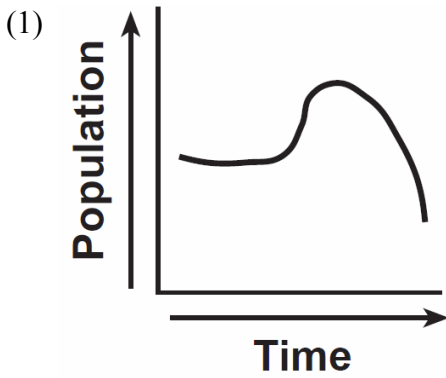
19. Which term belongs in area *A*?

- (1) saprophytism    (2) mutualism    (3) host    (4) prey

20. Organisms that are always part of the relationship indicated by letter *C* may be classified as

- (1) scavengers    (2) carnivores    (3) parasites    (4) bryophytes

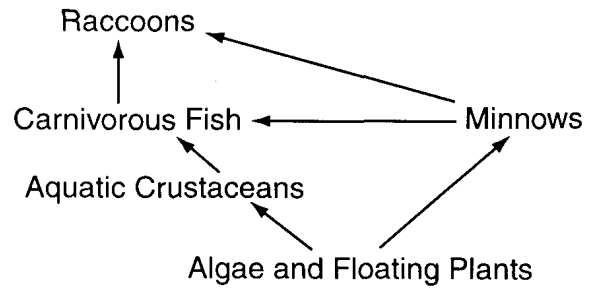
21. Which graph best illustrates the change in the human population over the past 2000 years?



22. Which organisms would most likely be the pioneer organisms on a newly formed volcanic island?

- (1) conifers                      (2) lichens  
(3) deciduous trees              (4) tall grasses

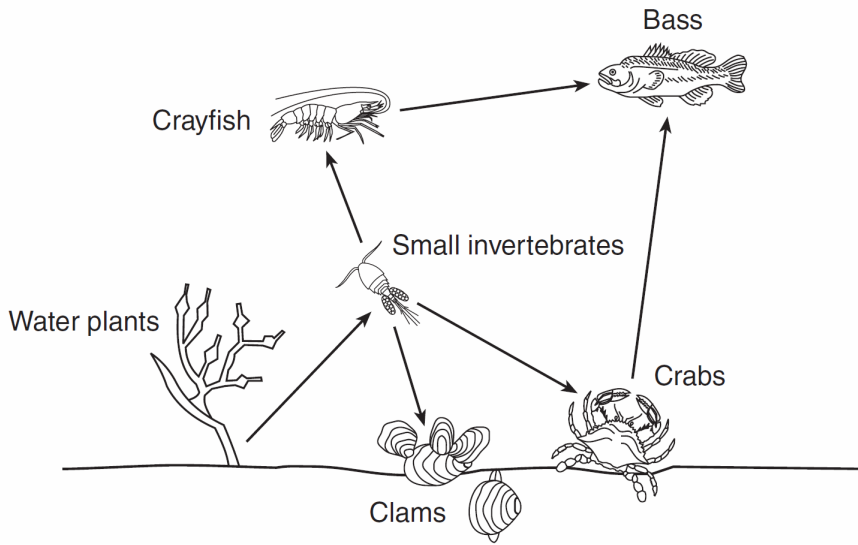
23. The diagram below shows the relationships between the organisms in and around a pond.



One additional biotic factor needed to make this a stable ecosystem is the presence of

- (1) decomposers                  (2) herbivores  
(3) consumers                      (4) producers

24. A food web is represented below.



When water used to cool machinery is returned to a river, it raises the river water temperature.

This causes a sharp decline in small invertebrate populations. Based on the food web, a likely consequence of this change would be

- (1) a decrease in the number of water plants
- (2) an increase in the number of crabs
- (3) an increase in the number of clams
- (4) a decrease in the number of crayfish

25. Which relationship best describes the interactions between lettuce and a rabbit?

- (1) decomposer — scavenger
- (2) predator — prey
- (3) parasite — host
- (4) producer — consumer

26. A finite resource in the environment that keeps a population from steadily increasing is known as

- (1) a reproductive enzyme
- (2) a limiting factor
- (3) dynamic equilibrium
- (4) ecological succession

27. In New York State, small farms that were abandoned many years ago have become hardwood forests. This is an example of

- (1) ecological succession
- (2) local deforestation
- (3) biotechnology
- (4) habitat loss

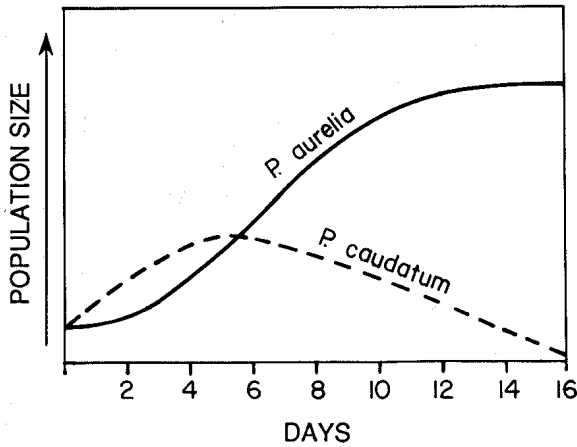
28. Base your answer to the following question on the information below and on your knowledge of biology.

Lichens are composed of two organisms, a fungus that cannot make its own food and algae that contain chlorophyll. Lichens may live on the bark of trees or even on bare rock. They secrete acids that tend to break up the rock they live on, helping to produce soil. As soil accumulates from the broken rock and dead lichens, other organisms, such as plants, may begin to grow.

The ability of lichens to alter their environment, enabling other organisms to grow and take their places in that environment, is one step in the process of

- (1) biological evolution
- (2) maintenance of cellular communication
- (3) differentiation in complex organisms
- (4) ecological succession

29. Base your answer to the following question on the graph below which shows the population growth curves of *Paramecium aurelia* and *Paramecium caudatum* cultures after they were mixed together.



One inference that could correctly be drawn from the graph is that *Paramecium aurelia* and *Paramecium caudatum* cannot successfully

- (1) utilize oxygen for anaerobic respiration
  - (2) live in marine environments
  - (3) utilize the same wavelengths of light
  - (4) occupy the same niche
30. A symbiotic relationship exists between two organisms of different species. If only one organism benefits from the relationship and the other is not harmed, the relationship is known as
- (1) mutualism
  - (2) commensalism
  - (3) saprophytism
  - (4) parasitism
31. Knowing the type of food consumed by an organism helps to identify the role of the organism in the community. This role is known as its
- (1) nesting site
  - (2) territorial range
  - (3) biomass
  - (4) niche
32. Which statement describes a situation that would reduce the stability of a forest ecosystem?
- (1) The energy in the ecosystem flows from the Sun.
  - (2) The number of producers remains constant in the ecosystem.
  - (3) Organisms frequently interact within the ecosystem.
  - (4) A fierce predator is removed from the ecosystem.

33. Which ecosystem has a better chance of surviving when environmental conditions change over a long period of time?

- (1) one with little or no genetic diversity
- (2) one with animals and bacteria but no plants
- (3) one with plants and animals but no bacteria
- (4) one with a great deal of genetic diversity

34. A serious threat to biodiversity is

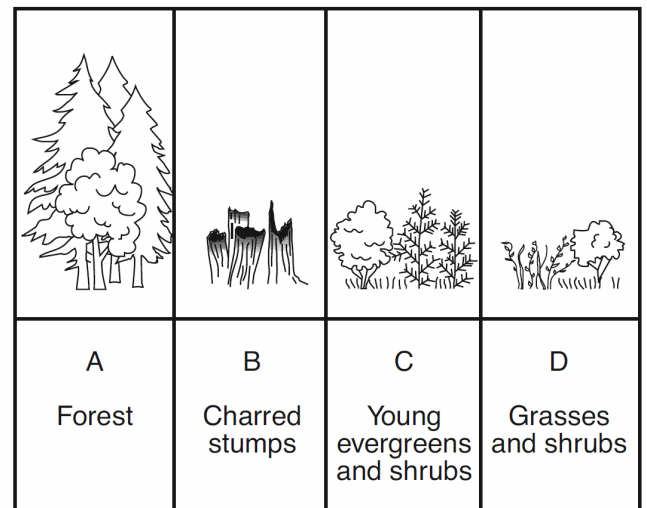
- (1) habitat destruction
- (2) a stable population size
- (3) maintenance of food chains
- (4) competition within a species

35. Deforestation would most immediately result in

- (1) the disappearance of native species
- (2) global warming
- (3) the depletion of the ozone shield
- (4) industrialization of an area

36. Over a long period of time, the stages represented in the diagram below were each present in a particular ecosystem.

Stages in an Ecosystem



After a forest fire, what is the most likely order in which these stages appeared?




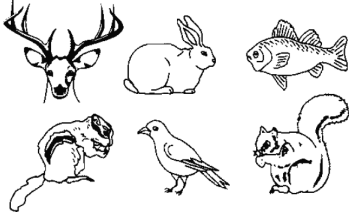
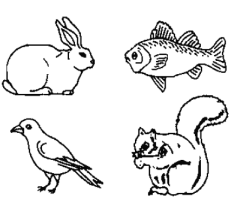

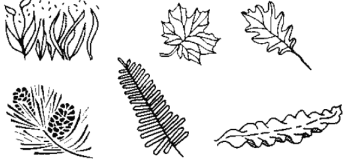
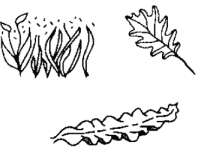


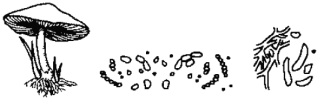

- (1)  $A \rightarrow B \rightarrow C \rightarrow D$
- (2)  $B \rightarrow C \rightarrow D \rightarrow A$
- (3)  $D \rightarrow C \rightarrow A \rightarrow B$
- (4)  $B \rightarrow D \rightarrow C \rightarrow A$



37. What will the continued depletion of the ozone layer *most likely* cause?

- (1) an increase in marine ecosystem stability
- (2) an increase in skin cancer among humans
- (3) a decrease in climatic changes
- (4) a decrease in atmospheric pollutants

38. The diagram below represents the varying biodiversity in three ecosystems.

Ecosystem A	Ecosystem B	Ecosystem C
<p>Carnivores</p> 	<p>Carnivores</p> 	<p>Carnivores</p> 
<p>Herbivores</p> 	<p>Herbivores</p> 	<p>Herbivores</p> 
<p>Autotrophs</p> 	<p>Autotrophs</p> 	<p>Autotrophs</p> 
<p>Decomposers</p> 	<p>Decomposers</p> 	<p>Decomposers</p> 

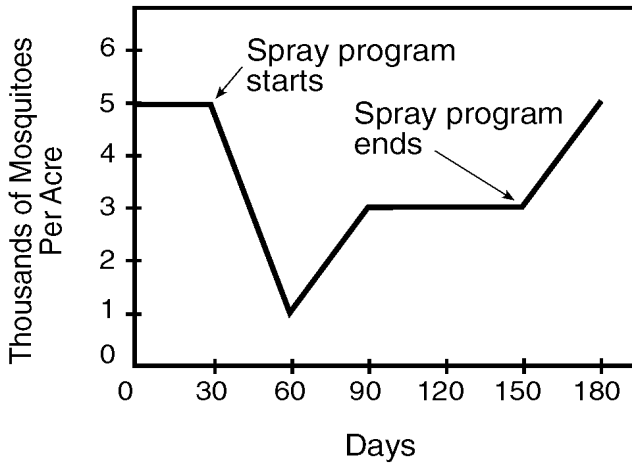
The level of biodiversity in ecosystem *A* is high because it has the

- |  |   |
|--|---|
| <ol style="list-style-type: none"> <li>(1) greatest variety of genetic material</li> <li>(3) greatest number of decomposers</li> </ol> | <ol style="list-style-type: none"> <li>(2) least variety of energy levels</li> <li>(4) least number of ecological niches</li> </ol> |
|--|---|



39. Base your answer to the following question on the information below and on your knowledge of biology.

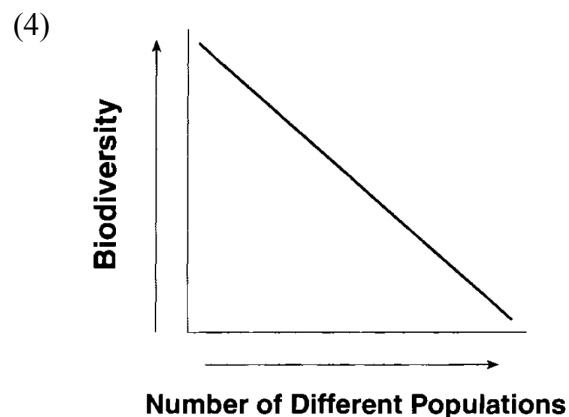
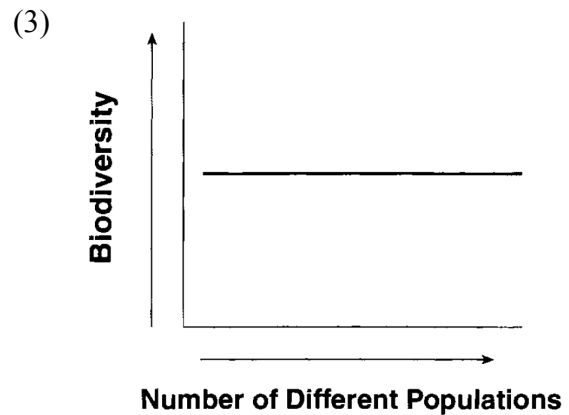
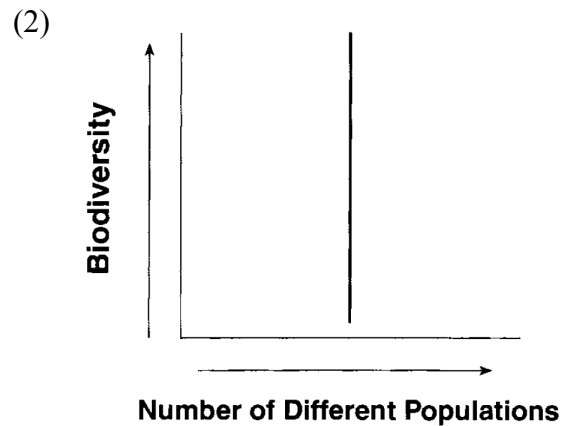
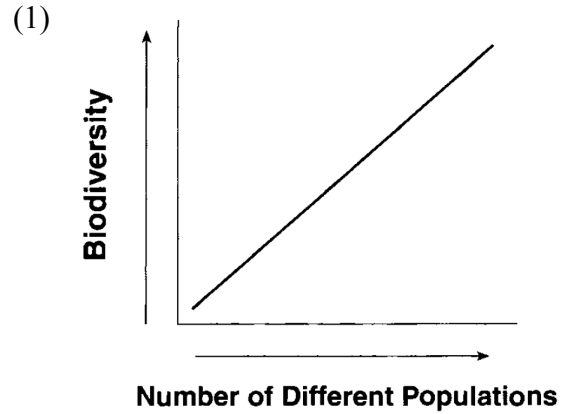
A small village was heavily infested with mosquitoes. The village was sprayed weekly with an insecticide for a period of several months. The results of daily counts of the mosquito population are shown in the graph below.



Which statement *best* explains the decreased effectiveness of the insecticide?

- (1) Mosquitoes resistant to the insecticide lived and produced offspring.
  - (2) The insecticide reacted chemically with the DNA of the mosquitoes and was destroyed.
  - (3) The insecticide caused mutations that resulted in immunity in the mosquito.
  - (4) All of the mosquitoes produced antibodies that activated the insecticide.
40. In a certain ecosystem, rattlesnakes are predators of prairie dogs. If the prairie dog population started to increase, how would the ecosystem most likely regain stability?
- (1) The rattlesnake population would start to increase.
  - (2) The prairie dog population would increase rapidly.
  - (3) The prairie dog population would begin to prey on the rattlesnakes.
  - (4) The rattlesnake population would start to decrease.

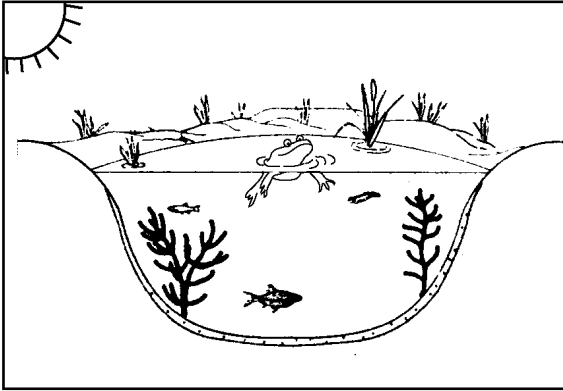
41. Which graph best shows the relationship between the amount of biodiversity and the number of different populations in an ecosystem?



42. Which human activity has probably contributed most to the acidification of lakes in the Adirondack region?

- (1) establishing reforestation projects in lumbered areas
- (2) passing environmental protection laws
- (3) using pesticides for the control of insects that feed on trees
- (4) burning fossil fuels that produce air pollutants containing sulfur and nitrogen

43. A pond ecosystem is represented in the diagram below.



Energy for this ecosystem originally comes from

- (1) plants
- (2) water
- (3) consumers
- (4) sunlight

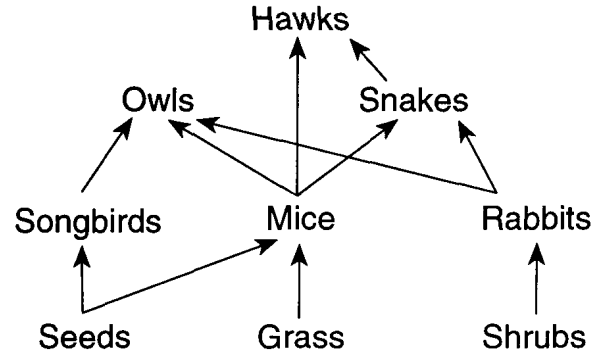
44. Which pair of organisms would most likely compete for the same ecological niche?

- (1) tree and fungi
- (2) bacteria and fungi
- (3) deer and bacteria
- (4) deer and wolf

45. The use of ladybugs and praying mantises to consume insect pests in gardens is an example of

- (1) exploitation of insect pests
- (2) abiotic control of insect pests
- (3) biological control of insect pests
- (4) use of biocides to control insect pests

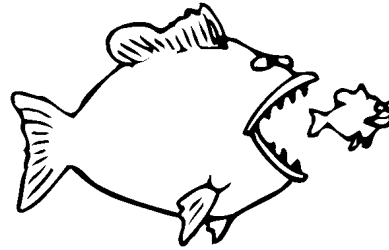
46. The diagram below represents a food web.



Which organisms are primary consumers?

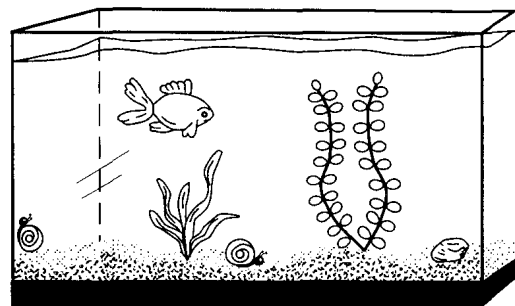
- (1) owls, snakes, and hawks
- (2) grass, mice, and hawks
- (3) songbirds, mice, and rabbits
- (4) seeds, grass, and shrubs

47. Which group contains terms that are *all* directly associated with one of the organisms shown in the diagram below?



- (1) carnivore, predator, heterotroph, multicellular
- (2) producer, parasite, fungus, fish
- (3) herbivore, prey, autotroph, host
- (4) predator, scavenger, decomposer, consumer

48. An aquarium ecosystem is shown below.



A community in this aquarium consists of the

- (1) water and gravel
- (2) plants and gravel
- (3) fish, water, and snails
- (4) fish, plants, and snails

49. Base your answer to the following question on the key below.

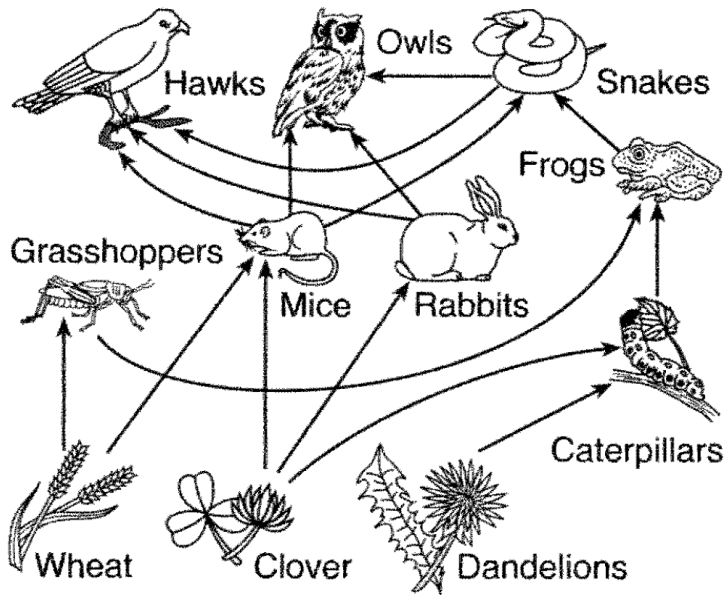
**Key**

0 = organism is not affected  
 + = organism is benefited  
 - = organism is adversely affected

Which set of symbols indicates a relationship that is least likely to exist in nature?

- (1) +, 0    (2) +, +    (3) +, -    (4) -, -

50. Base your answer to the following question on the diagram below and on your knowledge of biology. The diagram represents a food web in an ecosystem.



Which row in the chart below best identifies the relationships between the mice and the wheat?

Row	Role of Mice	Role of Wheat
(1)	producer	consumer
(2)	predator	host
(3)	host	predator
(4)	consumer	producer

- (1) 1                      (2) 2                      (3) 3                      (4) 4

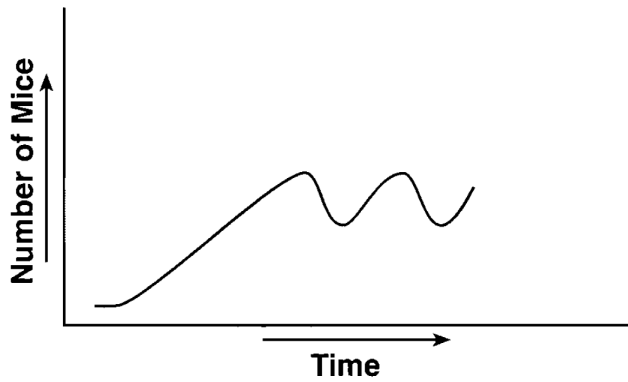
51. For a natural ecosystem to be self-sustaining, many essential chemical elements must be

- (1) converted to energy  
 (2) permanently removed from the environment  
 (3) cycled between organisms and the environment  
 (4) changed into fossil fuels such as oil and coal

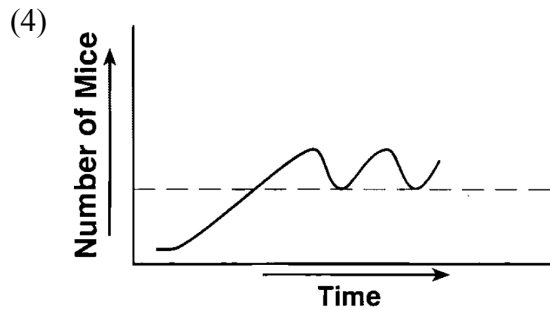
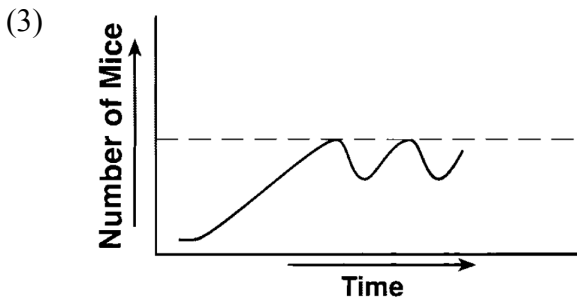
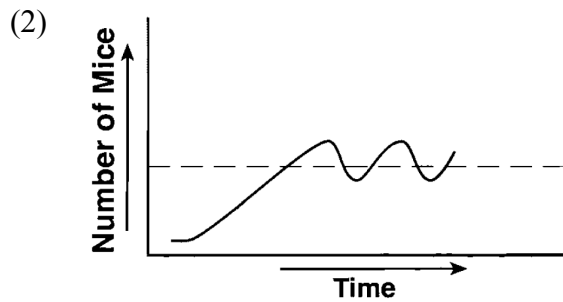
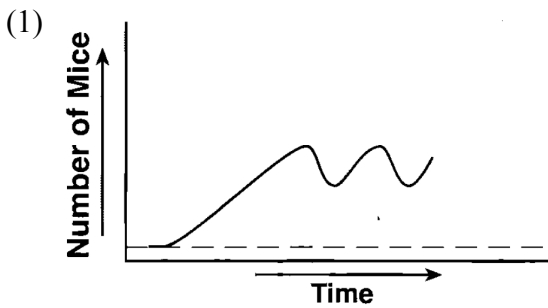
52. Which human activity would most likely result in the addition of an organism to the endangered species list?

- (1) use of pollution controls  
 (2) habitat destruction  
 (3) use of erosion controls  
 (4) cover cropping

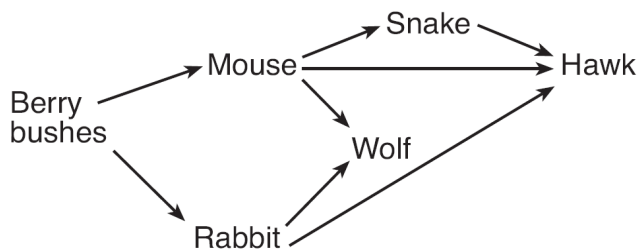
53. The graph below shows the growth of a field mouse population in an ecosystem over time.



The dashed line indicating the carrying capacity for the mouse population is correctly shown on which graph?



54. A food web is represented in the diagram below.



Which population in this food web would most likely be *negatively* affected by an increase in the mouse population?

- (1) rabbit (2) hawk (3) wolf (4) snake

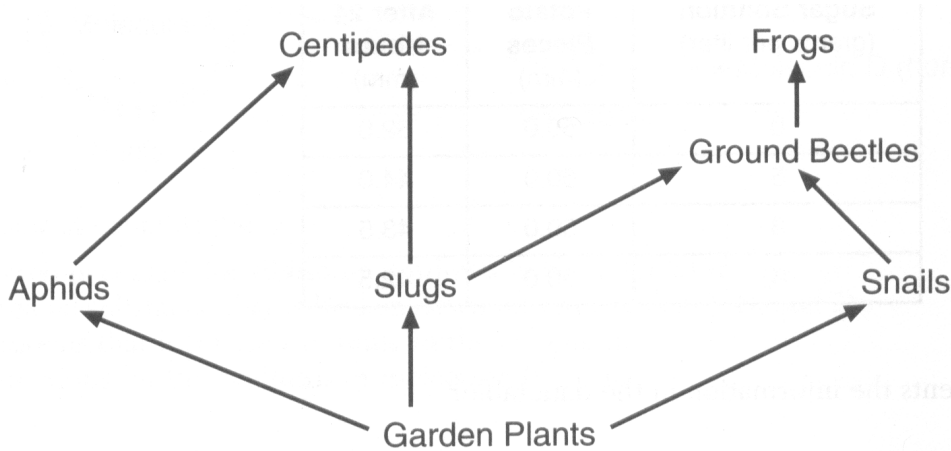
55. Some data suggest that the average global temperature will increase by 1°C-2°C by the year 2050. If this occurs, a major concern for humans would most likely be that

- (1) long-term stability of the climate will benefit ecosystems
- (2) the threat of extinction of land organisms will decrease
- (3) the availability of salt water for agricultural use will increase
- (4) sea levels might rise enough to flood some coastal areas

56. The science of ecology is best defined as the study of

- (1) weather and its effects on food production in the ocean
- (2) the classification of plants and animals
- (3) the interactions of living organisms and their environment
- (4) technology and its effects on society

57. Base your answer to the following question on the information below and on your knowledge of biology.



Gardeners sometimes use slug traps to capture and kill slugs. These traps were tested in a garden with a large slug population. Organisms found in the trap after one week are shown in the table below.

**Organisms in Trap**

Organism	Number in Trap
slugs	8
snails	1
aphids	13
centipedes	1
ground beetles	98

How many organisms in the trap were herbivores?

- (1) 5
- (2) 22
- (3) 99
- (4) 9

58. An earthworm lives and reproduces in the soil. It aerates the soil and adds organic material to it. The earthworm is a source of food for other organisms. All of these statements together best describe

- (1) autotrophic nutrition
- (2) competition
- (3) a habitat
- (4) an ecological niche

59. Which phrase best describes an ecosystem?

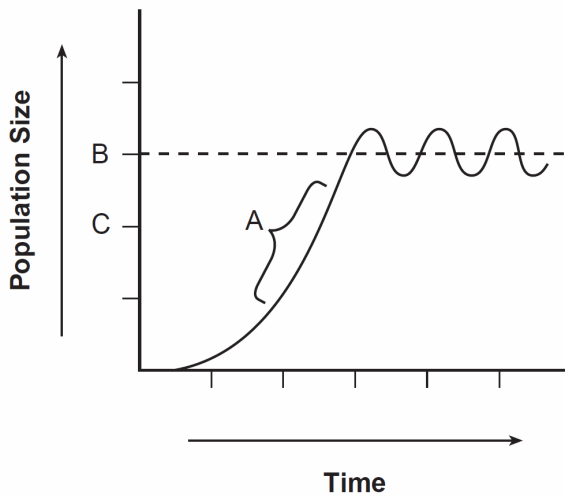
- (1) all the nonliving materials in a specific location
- (2) all the living organisms in a specific location
- (3) some nonliving materials passing through a living organism in a specific location
- (4) living organisms and nonliving materials interacting in a specific location

60. Starting on bare rock, what is the usual ecological succession of organisms?

- (1) lichens → grasses → shrubs → trees
- (2) lichens → shrubs → grasses → trees
- (3) grasses → shrubs → lichens → trees
- (4) grasses → shrubs → lichens → trees

61. Base your answer to the following question on the graph below and on your knowledge of biology. The graph shows the growth of a population of rabbits in a specific ecosystem.

**Rabbit Population in a Specific Ecosystem**



Over a period of time, the location of the dashed line would move from location *B* to location *C* on this graph if

- (1) there was a decrease in the number of rabbit predators and an increase in the availability of plants
- (2) there was a decrease in the availability of minerals, water, and shelter
- (3) the birthrate of the rabbit population was equal to the death rate of the rabbit population
- (4) the entire rabbit population migrated to a new ecosystem containing more autotrophs

62. Nitrogen-fixing bacteria live on the roots of leguminous plants in swellings called nodules. The bacteria synthesize nitrogen compounds that are used by the plants, and the plants provide moisture and nutrients for the bacteria. The interaction between the nitrogen-fixing bacteria and the leguminous plants is known as

- (1) saprophytism
- (2) commensalism
- (3) mutualism
- (4) parasitism

63. The importation of organisms such as the Japanese beetle and gypsy moth to areas where they have no natural enemies best illustrates

- (1) a human activity that disrupts existing ecosystems
- (2) the selection of species to mate with each other to produce a new variety
- (3) the use of abiotic factors to reduce pest species
- (4) attempts by humans to protect extinct species

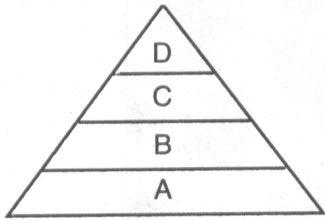
64. The stable stage that is established in an area as a result of the process of ecological succession is known as the

- (1) pioneer stage
- (2) heterotroph community
- (3) biotic stage
- (4) climax community

65. Which change is a cause of the other three?

- (1) destruction of the ozone shield
- (2) destruction of natural habitats
- (3) increased industrialization
- (4) increased fossil fuel consumption

66. The diagram below represents a food pyramid.



The concentration of the pesticide DDT in individual organisms at level D is higher than the concentration in individuals at level A because DDT is

- (1) passed through levels A, B, and C to organisms at level D
- (2) synthesized by organisms at level D
- (3) produced by organisms at level C which are eaten by organisms at level D
- (4) excreted by organisms at level A as a toxic waste

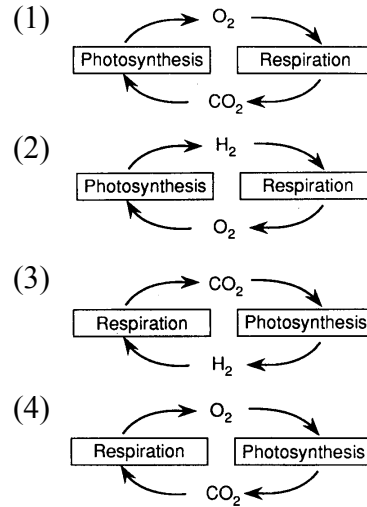
67. As water flows downhill, its energy can be used to generate electricity. Later, this water may evaporate, fall as rain, and be used again to generate electricity in the same way. This explains why electricity generated with water is considered

- (1) a source of water pollution
- (2) responsible for global warming
- (3) more expensive than nuclear energy
- (4) a renewable form of energy

68. Which statement concerning the climax stage of an ecological succession is correct?

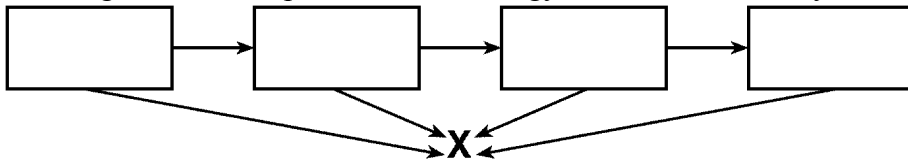
- (1) It changes rapidly.
- (2) It is the first community to inhabit an area.
- (3) It consists entirely of plants.
- (4) It persists until the environment changes.

69. Which diagram best represents the cycling of respiratory and photosynthetic gases in green algae?





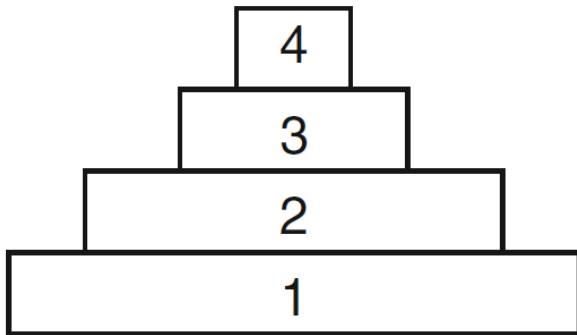
70. The diagram below represents some energy transfers in an ecosystem.



Which type of organism is most likely represented by letter *X*?

- (1) decomposer      (2) herbivore      (3) autotroph      (4) producer

71. Four levels of an energy pyramid are represented below.



Which statement about this energy pyramid is correct?

- (1) Organisms in level 2 are carnivores.  
 (2) Organisms in level 4 receive their energy directly from the Sun.  
 (3) Organisms in level 2 receive their energy from level 3.  
 (4) Organisms in level 1 are autotrophic

72. The portion of Earth in which all life exists is known as

- (1) a population      (2) a biotic community  
 (3) the biosphere      (4) the climax stage

73. Decomposers are necessary in a food chain because they

- (1) absorb energy from the Sun  
 (2) produce organic nutrients  
 (3) manufacture food by photosynthesis  
 (4) return nutrients to the ecosystem

74. Which human activity would have the most positive effect on the environment of an area?

- (1) using fire to eliminate most plants in the area  
 (2) introducing a foreign plant species to the area  
 (3) clearing the area to eliminate weed species  
 (4) protecting native flowers and grasses in the area

75. Which activity would reduce biodiversity in a forest ecosystem?

- (1) replacing harvested trees with young trees that are naturally found in the forest  
 (2) protecting wildflowers from logging activities  
 (3) clearing a large area and planting one species of hardwood tree that can be used for lumber  
 (4) adding plants that are naturally resistant to insects

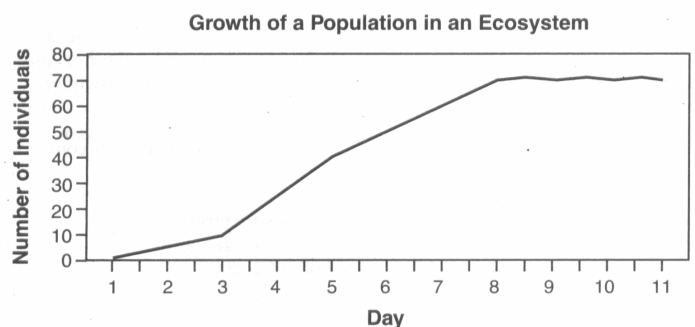
76. Compared to a natural forest, the wheat field of a farmer *lacks*

- (1) autotrophs  
 (2) significant biodiversity  
 (3) heterotrophs  
 (4) stored energy

77. The first living things to grow successfully on a newly formed sand dune are known as

- (1) carnivorous plants      (2) pioneer organisms  
 (3) saprophytes      (4) heterotrophs

78. On which day did the population represented in the graph below reach the carrying capacity of the ecosystem?

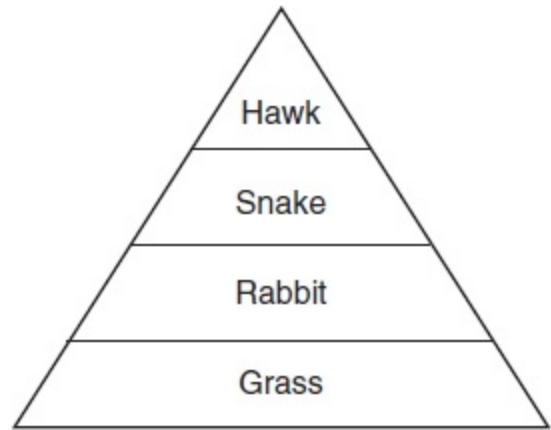


- (1) day 11      (2) day 5  
 (3) day 3      (4) day 8

79. Damage to the ozone shield over the United States is likely to cause

- (1) reduction in the pH of acid precipitation
- (2) reduction in the frequency of floods and droughts
- (3) increased warming of local ecosystems
- (4) increased exposure to ultraviolet light

80. The diagram below represents a food pyramid in an ecosystem.



The best explanation for the decrease in the amount of energy transferred to each succeeding level is that much of the energy is

- (1) released as heat
- (2) consumed by predators
- (3) used in photosynthesis
- (4) stored within inorganic materials