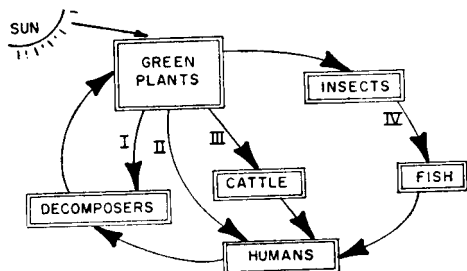


## Cycling of Nutrients and Energy

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. The diagram shown represents four possible pathways for the transfer of energy stored by green plants.



Through which pathway would the Sun's energy be most directly available to humans?

- A. I      B. II      C. III      D. IV

2. In this diagram, humans are shown to be

- A. herbivores, only      B. carnivores, only  
C. omnivores      D. parasites

3. The cattle in the diagram represent

- A. primary consumers  
B. secondary consumers  
C. producers  
D. autotrophs

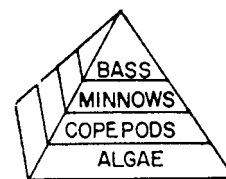
4. In the food chain below, which organisms are the primary consumers?

Weeds → grasshoppers → praying mantises  
→ shrews → barn owls

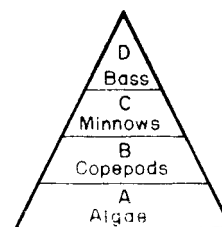
- A. shrews      B. praying mantises  
C. weeds      D. grasshoppers

5. Which level of this food pyramid represents the largest biomass?

- A. bass  
B. minnows  
C. copepods  
D. algae



6. The diagram shown represents a food pyramid of organisms inhabiting a pond.



At which level of the food pyramid is the *smallest* percentage of total stored energy found?

- A. A      B. B      C. C      D. D

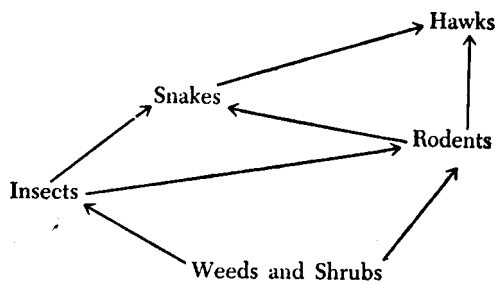
7. Which organisms in the food pyramid function as primary consumers?

- A. bass
- B. minnows
- C. copepods
- D. algae

8. What is the original source of energy for all organisms in this food pyramid?

- A. water
- B. sunlight
- C. the substratum
- D. carbon dioxide

9. In the food web shown, which organisms contain the greatest amount of stored energy?



- A. snakes and hawks
- B. rodents and insects
- C. weeds and shrubs
- D. insects and hawks

10. Which sequence of organisms best represents the flow of energy in an ecosystem?

- A. autotrophs → herbivores → carnivores
- B. secondary consumers → producers → heterotrophs
- C. carnivores → decomposers → producers
- D. consumers → heterotrophs → saprophytes

11. Which energy pyramid below correctly illustrates a part of this food chain?

grass → grasshopper → frog → snake → hawk

- A.
- B.
- C.
- D.

12. In this food chain, which population normally would have the *smallest* number of individuals?

grass → grasshopper → frog → snake → hawk

- A. grasshopper
- B. hawk
- C. frog
- D. grass

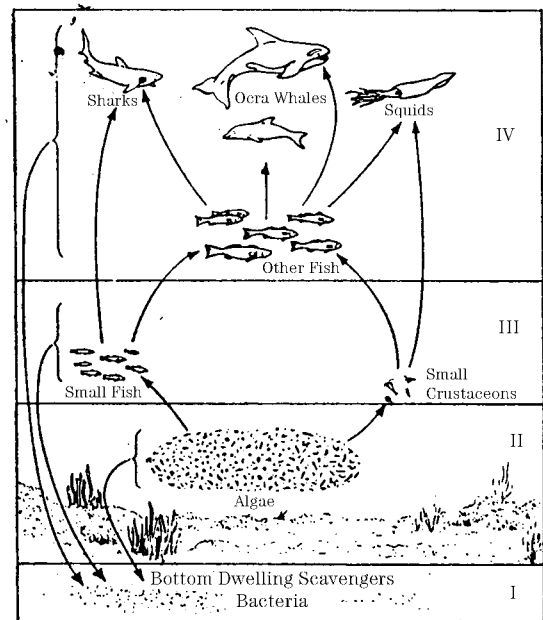
13. What is the correct order of organisms in a food chain?
- A. carnivores → producers → herbivores
  - B. producers → herbivores → carnivores
  - C. herbivores → producers → carnivores
  - D. producers → carnivores → herbivores

14. Food webs consist of many predator-prey relationships because many consumers
- A. are very large scavengers
  - B. have anaerobic patterns of respiration
  - C. have several alternate nutrient supplies
  - D. are able to carry on photosynthesis

15. Which statement best explains why a food web is a more realistic representation of nutritional patterns than a food chain?
- A. Energy is consumed in metabolic activities and gained at every feeding level.
  - B. Decomposers return materials from the top-order predators to inorganic form.
  - C. Energy always flows through the consumers to the producers.
  - D. Practically all species are consumed by or feed on more than one species.

16. Fungi and bacteria that live on dead matter are classified as
- A. parasites
  - B. carnivores
  - C. omnivores
  - D. saprophytes

17. The diagram shown represents a food web. The numerals I, II, III, and IV represent four nutritional levels within the community in which different species compete.



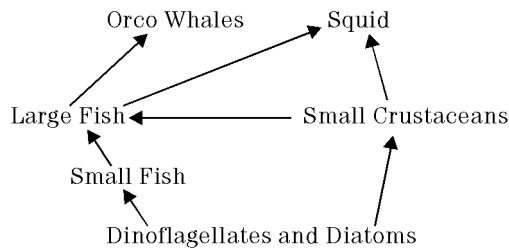
Which organisms are producers?

- A. sharks
- B. algae
- C. small crustaceans
- D. bottom-dwelling scavengers

18. A snapping turtle will kill animals for food, as well as feed on dead organisms. The snapping turtle is considered both a

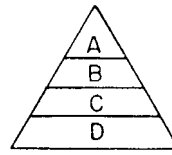
- A. saprophyte and a herbivore
- B. scavenger and a herbivore
- C. predator and a scavenger
- D. predator and an omnivore

19. The diagram shown represents some of the food relationships between several organisms in a marine community. Which organisms would normally be the *least* numerous in this marine community.



- A. diatoms
- B. small fish
- C. small crustaceans
- D. orca whales

20. Which statement best describes an ecological principle represented by the pyramid?

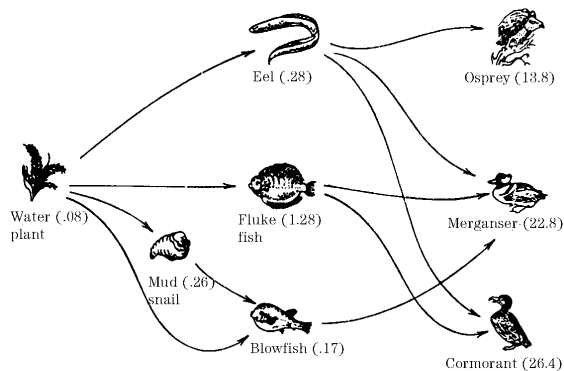


- A. The biomass of level *D* is less than the biomass of level *B*.
- B. Biomass is decreased with each successive feeding level from *D* to *A*.
- C. The biomass is identical in each level of the pyramid.
- D. Energy to sustain the pyramid enters level *A* first and level *D* last.

21. Which pyramid level contains the greatest amount of stored energy?

- A. *A*
- B. *B*
- C. *C*
- D. *D*

22. The diagram shown represents a portion of a food web in a Long Island ecosystem. The numbers show the concentration of DDT in parts per million (ppm) in the body tissues of the various organisms.



Which represents a food chain in this food web?

- A. water plant → eel → blowfish
- B. water plant → eel → merganser
- C. eel → cormorant → fluke fish
- D. mud snail → blowfish → water plant

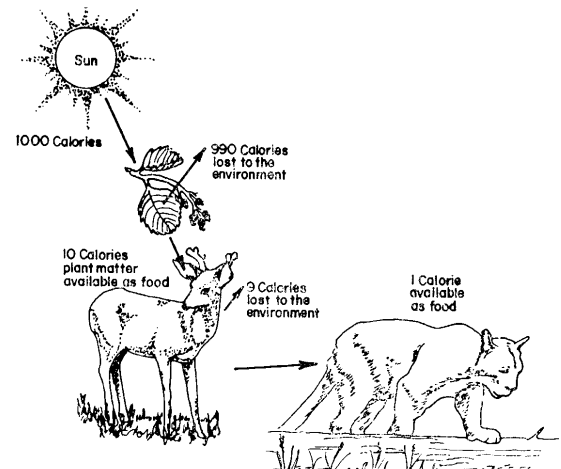
23. Which is a characteristic of DDT in the food web?

- A. The highest concentration of DDT is located in the producer.
- B. DDT tends to decrease in concentration as it is transferred from primary consumer to secondary consumer.
- C. The lowest concentrations of DDT are located in the birds.
- D. DDT tends to increase in concentration as it is transferred from producer to consumer.

24. What effect would the removal of the cormorant population have on the state of dynamic balance present in the food web?

- A. Populations of fluke fish and eels would increase.
- B. Populations of mud snails and blowfish would increase.
- C. Populations of ospreys and mergansers would decrease.
- D. Populations of eels and ospreys would decrease.

25. Which graph most likely illustrates the interactions of the deer and mountain lion populations?

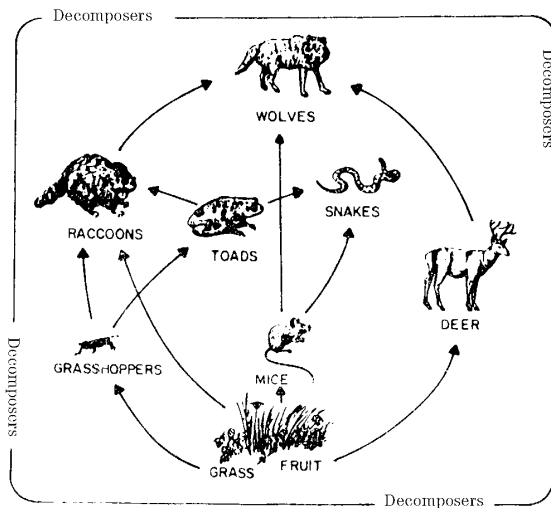


KEY  
Deer -----  
Mountain Lion ———

- A.
- B.
- C.
- D.

26. Which are needed to keep this ecosystem self-sustaining?
- A. sunlight and deer
  - B. deer and plants
  - C. mountain lions and deer
  - D. plants and sunlight

27. Which group of organisms have the largest biomass in this meadow environment?



- A. deer
- B. wolves
- C. mice
- D. grasses

28. Which food chain sequence can be found in this meadow?
- A. fruit → toad → snake → mouse
  - B. snake → grasshopper → deer → wolf
  - C. mouse → raccoon → snake → toad
  - D. grass → grasshopper → raccoon → wolf

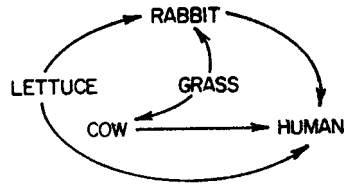
29. Which organisms are omnivorous?

- A. raccoons
- B. toads
- C. snakes
- D. grasshoppers

30. The function of decomposers in this meadow environment is the

- A. conversion of light energy into chemical energy
- B. recycling of nutrients from dead organisms back into the soil
- C. synthesis of organic molecules from inorganic raw materials
- D. splitting of water into hydrogen and oxygen gas

31. Based on the diagram shown, the human can be classified as



- A. an omnivore                      B. a saprophyte  
C. an autotroph                      D. a producer

32. What is the primary role of wheat in the food chain shown?

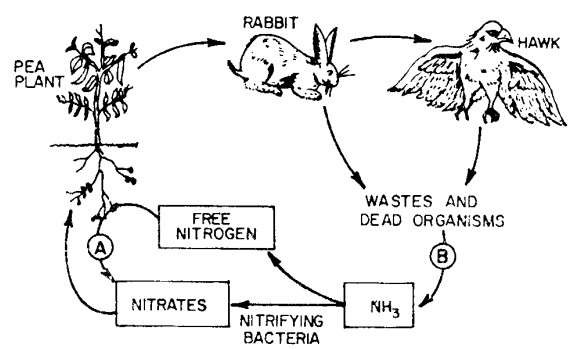
wheat → mouse → snake → hawk

- A. It provides nesting sites for hawks.  
B. It releases energy from the soil.  
C. It provides seeds for the hawks and snakes to eat.  
D. It transforms radiant energy into chemical energy.

33. The complex compounds found in organic wastes and dead organisms are finally returned to the abiotic environment as inorganic substances by the action of

- A. decomposers                      B. herbivores  
C. carnivores                          D. producers

34. An organism in the diagram that occupies the niche of a secondary consumer is the



- A. nitrifying bacteria              B. pea plant  
C. rabbit                                  D. hawk

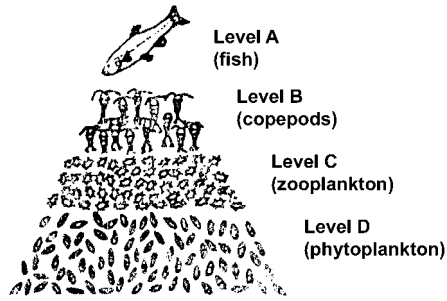
35. The process represented by letter B is

- A. nitrogen-fixation                  B. respiration  
C. decomposition                      D. photosynthesis

36. Which organisms are responsible for the conversion of free nitrogen to nitrates at position A?

- A. bacteria of decay  
B. nitrogen-fixing bacteria  
C. decomposers  
D. denitrifying bacteria

37. Producers are found at level



- A. A      B. B      C. C      D. D

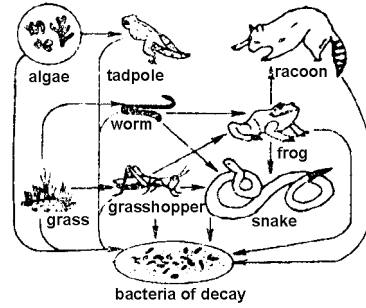
38. Primary consumers are found at level

- A. A      B. B      C. C      D. D

39. Lions and hawks hunt and kill other living things before eating them. Based on this mode of nutrition, lions and hawks are classified as

- A. predators                      B. scavengers  
C. saprophytes                    D. decomposers

40. Which two organisms are classified as producers?



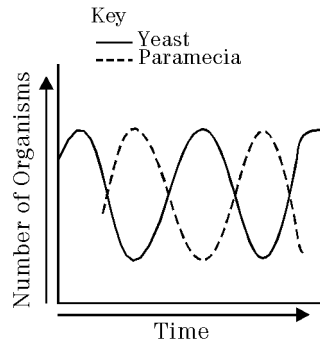
- A. tadpole and worm      B. algae and grass  
C. grass and tadpole      D. raccoon and algae

41. Decomposers are represented by the

- A. algae                              B. tadpole  
C. bacteria of decay                D. snake



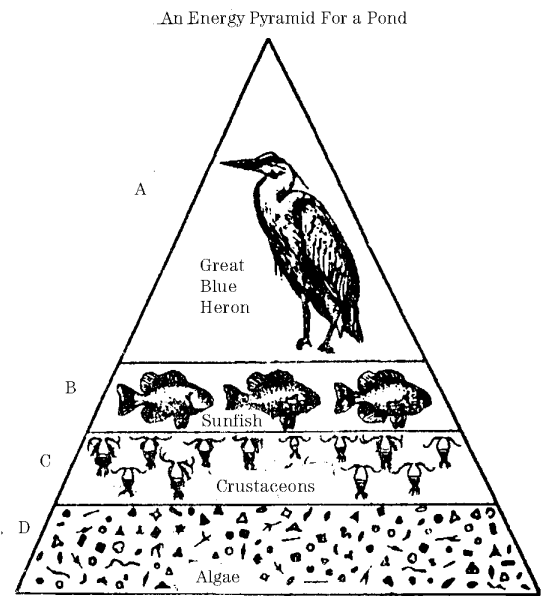
42. In an investigation, yeast was grown in a nutrient culture that was maintained at a constant temperature. After a few days, paramecia that feed on yeast were introduced into the culture medium. The numbers of yeast cells and paramecia were determined over a period of several weeks. A graph illustrating these data is shown.



The paramecia in the investigation are classified as

- A. herbivores                      B. omnivores  
C. producers                      D. consumers
43. What might occur if another species of paramecium that feeds on the same species of yeast is introduced into the culture?
- A. competition between the two species of paramecia  
B. symbiosis between the two species of paramecia  
C. an increase in oxygen production by the yeast  
D. an increase in the reproductive rate of the yeast

44. Which level of the pyramid contains autotrophic organisms?



- A. A                      B. B                      C. C                      D. D
45. Which organism is a primary consumer?
- A. alga                      B. crustacean  
C. sunfish                      D. great blue heron
46. Which is a possible food chain sequence derived from this energy pyramid?
- A. sunfish → alga → great blue heron → crustaceans  
B. great blue heron → crustaceans → sunfish → alga  
C. alga → crustaceans → sunfish → great blue heron  
D. crustaceans → great blue heron → alga → sunfish

47.

Animals in a Community	Food Consumed				
	Shrews	Grass- hoppers	Hawk	Snakes	Plants
Shrews		X			
Hawks	X			X	
Grass- hoppers					X
Spiders		X			
Snakes	X				

According to the information in the chart, shrews are

- A. producers                      B. carnivores                      C. herbivores                      D. omnivores

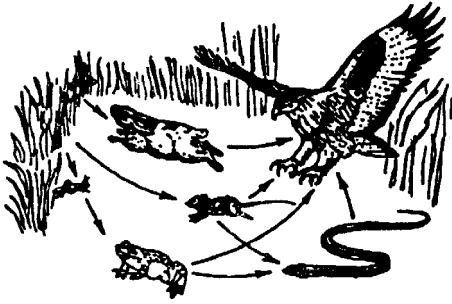
48. Which organisms would be considered primary consumers?

- A. snakes                      B. hawks                      C. spiders                      D. grasshoppers

49. Under normal conditions, the organisms with the greatest biomass in this community are

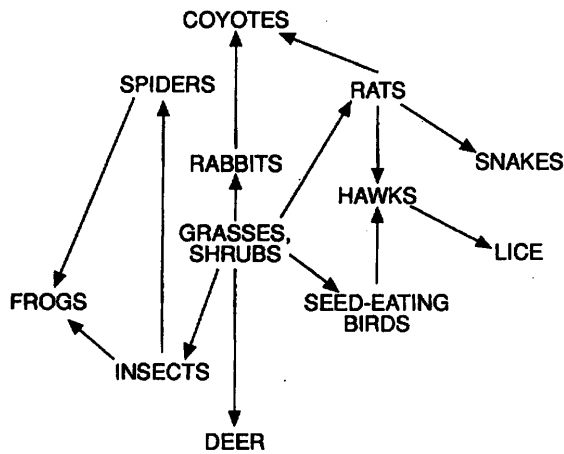
- A. grasshoppers                      B. snakes                      C. plants                      D. hawks

50. Which population would most likely have the smallest biomass?



- A. rabbit B. plant C. hawk D. frog

51. Which organisms would contain the greatest amount of available energy?

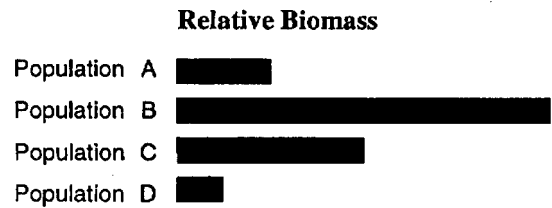


- A. rabbits and deer B. grasses and shrubs  
C. lice D. hawks

52. The primary consumers include

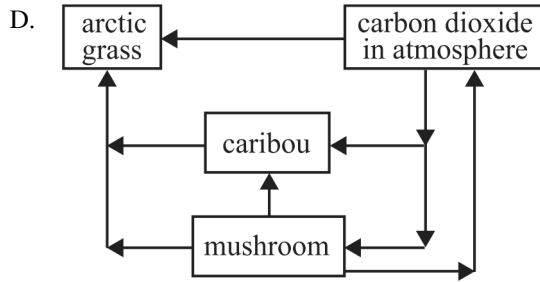
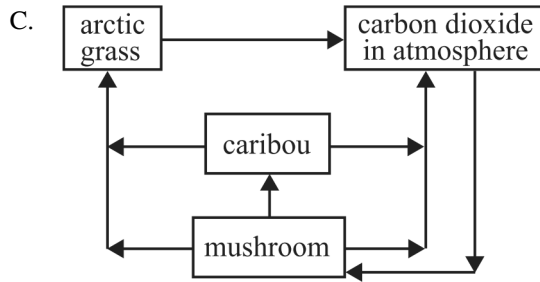
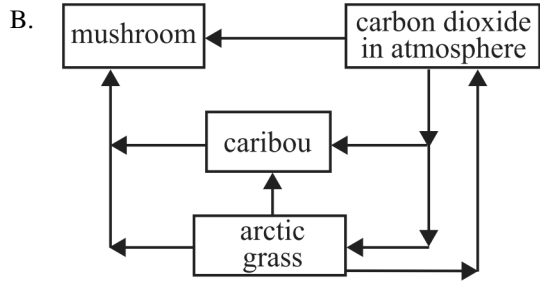
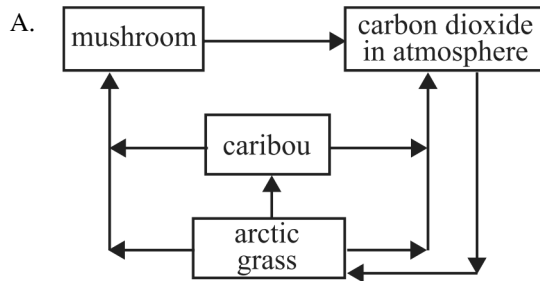
- A. rabbits and snakes  
B. insects and seed-eating birds  
C. rats and frogs  
D. spiders and coyotes

53. The bar graph shows the relative biomass of four different populations of a particular food pyramid. The producers in this pyramid are most likely represented by population



- A. A B. B C. C D. D

54. Which diagram correctly models the movement of carbon in a food web?



55. The table below shows three carbon cycle processes.

Three Carbon Cycle Processes	
Process	One Type of Chemical Reaction Occurring During the Process
animal respiration	sugars + oxygen → carbon dioxide + water + energy
volcanic eruption	carbon monoxide + oxygen → carbon dioxide + energy
fossil fuel combustion	hydrocarbons + oxygen → carbon dioxide + water + energy

How do all three of the processes listed in the table affect another geochemical cycle?

- A. They affect the water cycle by adding water to the atmosphere.
- B. They affect the water cycle by removing water from the atmosphere.
- C. They affect the oxygen cycle by adding oxygen to the atmosphere.
- D. They affect the oxygen cycle by removing oxygen from the atmosphere.

56. How do nitrogen-fixing bacteria help cycle nitrogen through ecosystems?

- A. They release nitrogen into the atmosphere when they replicate their DNA.
- B. They convert sunlight into chemical energy which is then stored in the nitrogen.
- C. They convert ammonia from animal feces and urine into forms that plants can use.
- D. They capture nitrogen from the atmosphere and convert it into forms that plants can use.

57. Complete burning of plant material returns carbon primarily to the

- A. herbivores.
- B. water.
- C. vegetation.
- D. atmosphere.

58. Carbon in the atmosphere is *most* often found as which of the following compounds?

- A. stratospheric ozone
- B. fossil fuel
- C. carbon monoxide
- D. carbon dioxide

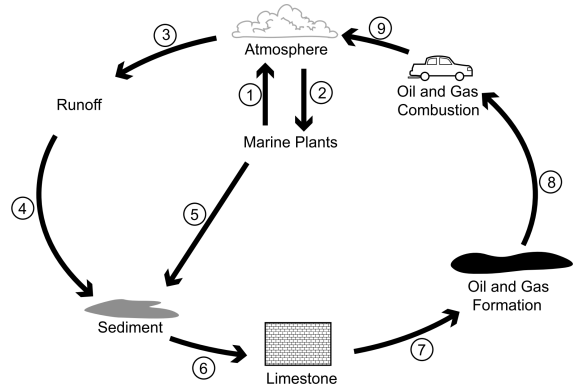
59. Which of the following processes puts carbon from a forest floor back into the atmosphere?

- A. combustion
- B. photosynthesis
- C. evaporation
- D. transpiration

60. During periods of increased global temperatures, which of the following is *most* likely to occur?

- A. a decrease in atmospheric CO<sub>2</sub>
- B. an increase in atmospheric CO<sub>2</sub>
- C. a decrease in earthquakes
- D. an increase in earthquakes

61. The diagram below shows carbon cycling associated with oil and gas consumption.



Which arrow on the carbon cycle diagram represents the process that takes the longest amount of time to occur?

- A. 1
- B. 3
- C. 5
- D. 7

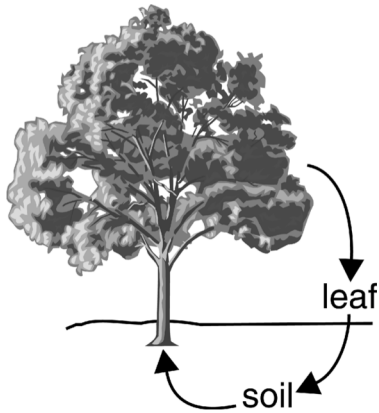
62. A teacher provides her class with a table displaying the relative greenhouse effect per molecule of different gases compared to carbon dioxide.

Carbon Dioxide	Methane	Nitrous Oxide	CFCs
1	30 times	160 times	17,000 times

Based on this table, a student made the conclusion that carbon dioxide is not the main cause of the greenhouse effect. What other data are needed to make a stronger conclusion?

- A. data about the origin of the gases
- B. data about the size of each type of molecule
- C. data about the absorption of these gases by plants
- D. data about the amount of each gas in the atmosphere

63. Use the picture below to answer the following question(s).



The picture represents the flow of a nutrient such as phosphorus in a forest. Which organism would make that nutrient available in the soil?

- A. cricket                      B. woodpecker  
C. squirrel                      D. mushroom

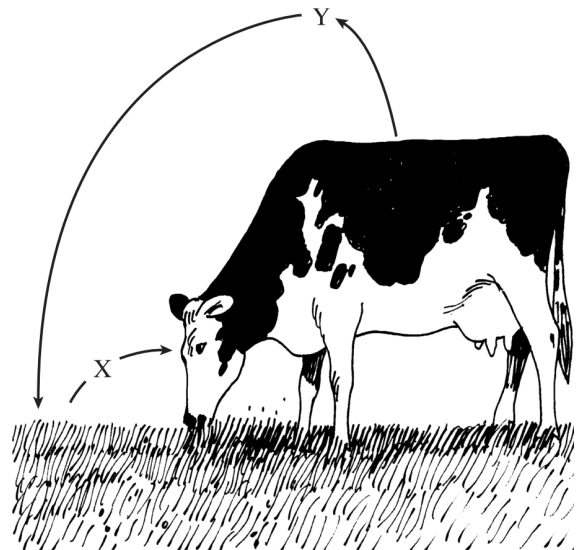
64. Where would nitrogen *most easily* be found in the nitrogen cycle?

- A. in animal waste  
B. in drinking water supplies  
C. in underground mineral deposits  
D. in carbon dioxide released by factories into the atmosphere

65. In the oxygen cycle, which group of organisms replenishes a large portion of the atmospheric oxygen supply?

- A. mammals                      B. fungi  
C. insects                         D. plants

66. The illustration below shows part of the carbon cycle.



At position *Y*, carbon is *most likely* to be in which of the following forms?

- A. protein                         B. carbon solid  
C. carbohydrate                 D. carbon dioxide

67. The natural cycling of oxygen between organisms and their environment is *most* directly accomplished through which of the following pairs of processes?

- A. fermentation and oxidation
- B. transpiration and evaporation
- C. precipitation and condensation
- D. photosynthesis and respiration

68. Which of the following explains why elements, such as carbon and oxygen, that are used in organic molecules are not permanently removed from the environment?

- A. They are replenished by sunlight.
- B. They are cycled through ecosystems.
- C. They are replaced by volcanic eruptions.
- D. They are produced constantly from nutrients.

69. In one of the steps of the carbon cycle, a person exhales a molecule of carbon dioxide (CO<sub>2</sub>) into the atmosphere. Which of the following is *most likely* to happen next to the atom of carbon in this molecule?

- A. It may be used as part of a sugar in a plant.
- B. It may become part of a protein in an animal.
- C. It may be consumed as a fossil fuel is burned.
- D. It may be decomposed into carbon and oxygen by a bacterium.

70. Which of the following correctly explains how atmospheric nitrogen is converted to nitrogen compounds used by living organisms?

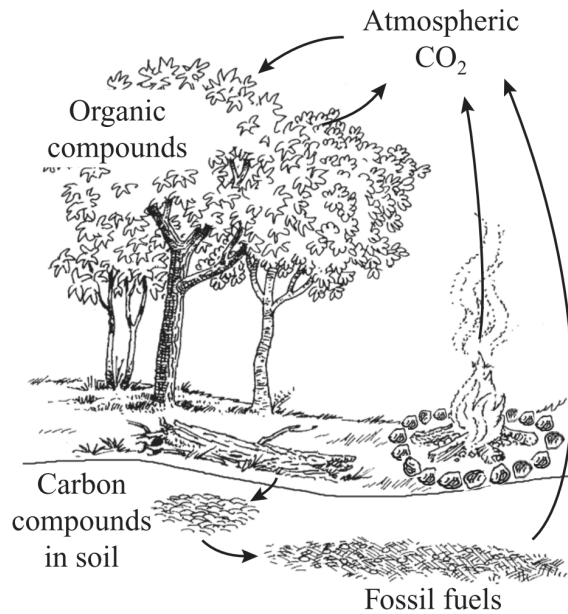
- A. Sunlight converts atmospheric nitrogen to a form usable by protists.
- B. Plant leaves convert atmospheric nitrogen to a form usable by animals.
- C. Bacteria in soil convert atmospheric nitrogen to a form usable by plants.
- D. Invertebrate animals in soil convert atmospheric nitrogen to a form usable by fungi.

71. Fertilizers can enable farmers to grow the same crop in a field for several years in a row. Farmers who use less fertilizer often rotate their crops by planting the crop one year and legumes, such as beans and clover, the following year.

Fertilizer use and crop rotation with legumes both increase the availability of which of the following nutrients in soil?

- A. calcium
- B. nitrogen
- C. oxygen
- D. protein

72. The diagram below shows part of the carbon cycle.



If many trees are removed from a forest by logging, what is the most immediate effect on the carbon cycle in that forest?

- A. increased rates of decomposition
- B. decreased use of atmospheric CO<sub>2</sub>
- C. decreased combustion of fossil fuels
- D. increased production of organic compounds

73. Cellular respiration, decomposition, combustion, and photosynthesis are processes that drive which of the following cycles in ecosystems?

- A. the carbon cycle
- B. the nitrogen cycle
- C. the phosphorus cycle
- D. the water cycle

74. Which of the following roles do nitrogen-fixing bacteria serve in the nitrogen cycle?

- A. They concentrate nitrogen in the atmosphere.
- B. They absorb nitrogen from the wastes of animals.
- C. They convert nitrogen into a form that plants can use.
- D. They release nitrogen from the bodies of decaying organisms.

75. Leaves fall from deciduous trees in autumn. The carbon in these leaves is returned to the atmosphere through which of the following processes?

- A. condensation
- B. decomposition
- C. photosynthesis
- D. transpiration

76. The atmosphere contains about 80% nitrogen gas, but nitrogen in this form cannot be used by plants. Which of the following processes converts atmospheric nitrogen to a useful form for plants?

- A. nitrogen decomposition
- B. nitrogen fixation
- C. photosynthesis
- D. transpiration



77. The table below shows the approximate amounts of nitrogen fixed per year by various processes worldwide.

Process	Amount of Nitrogen Fixed per Year ( $\times 10^6$ metric tons)
<b>Nonbiological</b>	
industrial	50
combustion	20
lightning	10
<b>Biological</b>	
microorganisms on agricultural land	90
microorganisms on forest and nonagricultural land	50
microorganisms in water	35

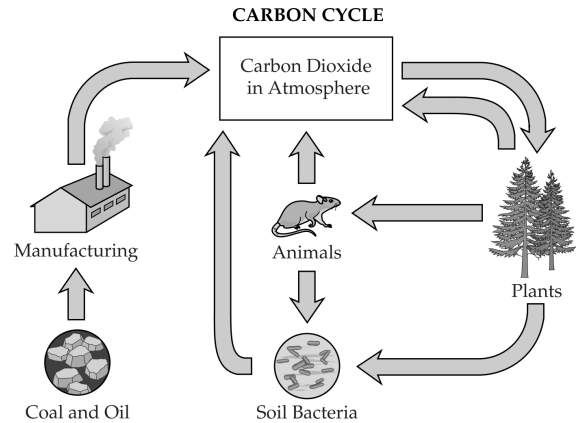
Based on the data, which of the following conclusions can be made?

- A. Aquatic ecosystems are more nitrogen-rich than terrestrial ecosystems.
- B. Forests and nonagricultural land need more nitrogen than agricultural land needs.
- C. The global nitrogen cycle would be relatively unaffected if no fixation occurred by industrial processes.
- D. The amount of nitrogen fixed by biological processes is more than two times the amount fixed by nonbiological processes.

78. Which of these is *not* recycled through Earth's ecosystems?

- A. water
- B. energy
- C. nitrogen
- D. carbon

79. The diagram below shows part of the carbon cycle. Use the diagram to answer the following question(s).



Which of these would lead to an increase in carbon dioxide in the atmosphere?

- A. a decrease in respiration
- B. a decrease in the ozone layer
- C. an increase in photosynthesis
- D. an increase in the burning of fossil fuels

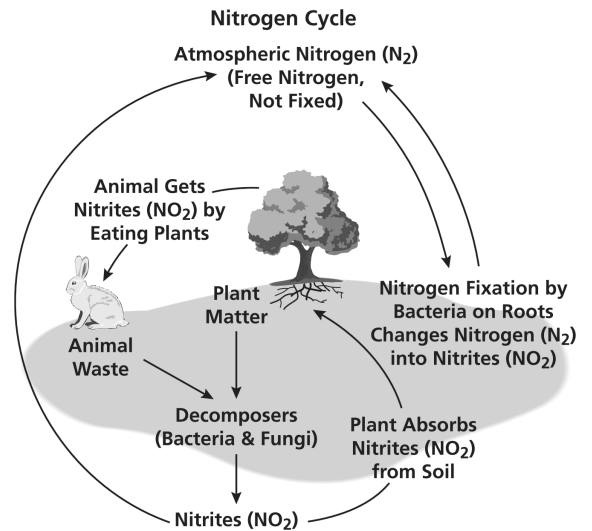
80. All living things need nitrogen. The nitrogen gas in Earth's atmosphere must be changed into ammonia before most living things can use it. Which of these organisms can change nitrogen gas into ammonia?

- A. bacteria
- B. mold
- C. moss
- D. yeast

81. Land animals need nitrogen to survive, but they cannot use the nitrogen gas found in the air they breathe. How do organisms take in the nitrogen they need to survive?

- A. By exercising
- B. By eating food
- C. By drinking water
- D. By swimming in water

82. The following diagram shows the nitrogen cycle.



Animals need nitrite ( $\text{NO}_2$ ) to make proteins. Nitrogen ( $\text{N}_2$ ) is found in the air but is not in a form that animals can use. Through the nitrogen cycle, nitrogen from the atmosphere becomes nitrite.

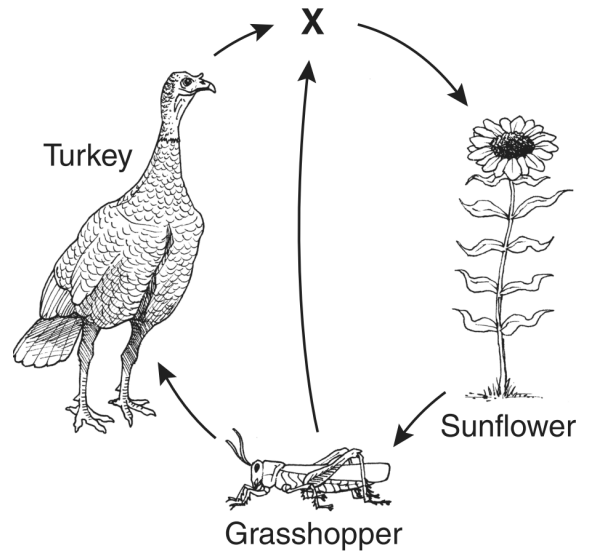
Which of these can be concluded about the importance of bacteria in the nitrogen cycle?

- A. Bacteria are important because they make nitrites that animals need.
- B. Bacteria are important because they change nitrogen into nitrites that animals need.
- C. Bacteria are important because they allow plant roots to absorb nitrites from the air.
- D. Bacteria are important because they decompose plant matter that compete with living plants for nitrites.

83. Which of the following introduces carbon dioxide into the carbon cycle?
- A. Using a windmill to pump water
  - B. Absorbing solar energy
  - C. Burning organic material
  - D. Generating hydroelectric power

84. How is atmospheric nitrogen made available to plants and animals?
- A. Nitrogen is transformed into nitrates by soil bacteria.
  - B. Nitrogen is converted into nitrates as groundwater is filtered.
  - C. Nitrogen is breathed in along with oxygen and discarded as nitrate waste.
  - D. Nitrogen is released rapidly by the weathering of rocks and absorbed by vegetation.

85. The diagram below shows the gas exchange among different organisms.



Which carbon compound is represented by the X?

- A. Carbon dioxide,  $\text{CO}_2$
  - B. Glucose,  $\text{C}_6\text{H}_{12}\text{O}_6$
  - C. Carbonic acid,  $\text{H}_2\text{CO}_3$
  - D. Carbon monoxide,  $\text{CO}$
86. In the nitrogen cycle, which organisms convert nitrates to nitrogen gas?
- A. Plants
  - B. Animals
  - C. Bacteria
  - D. Protists

87. What makes fertilizers a benefit to the farming industry?
- A. They increase the nutrients in soil.
  - B. They increase the growth of helpful bacteria.
  - C. They decrease the chance of bacteria growing in the soil.
  - D. They decrease the chance of plants being eaten by insects.

88. In the carbon cycle, atmospheric carbon dioxide is converted into organic material by which process?

- A. cellular respiration    B. decomposition
- C. photosynthesis        D. transpiration

89. Which *best* explains the importance of nitrogen in the cycling of energy and matter?

- A. Nitrogen increases protein production in plants.
- B. Nitrogen decreases protein production in plants.
- C. Nitrogen decreases the effectiveness of photosynthesis.
- D. Nitrogen increases the effectiveness of photosynthesis.

90. What is the function of autotrophs in the carbon cycle?

- A. to use oxygen to produce glucose
- B. to take in excess water
- C. to use carbon dioxide to produce glucose
- D. to feed on herbivores

91. Which processes are part of the carbon cycle?

- A. photosynthesis and respiration
- B. mitosis and meiosis
- C. osmosis and diffusion

92. Which gas makes up the largest component of the Earth's atmosphere?

- A. argon (Ar)
- B. oxygen (O<sub>2</sub>)
- C. nitrogen (N<sub>2</sub>)
- D. carbon dioxide (CO<sub>2</sub>)

93. A farmer observed that an increase in a field's soil nitrogen content was followed by an increase in producer productivity. What does this observation *most likely* indicate about the relationship between nitrogen and the producers in the field?

- A. Nitrogen was a biotic factor.
- B. Nitrogen was a limiting factor.
- C. Nitrogen became a surplus resource.
- D. Nitrogen became a selection pressure.

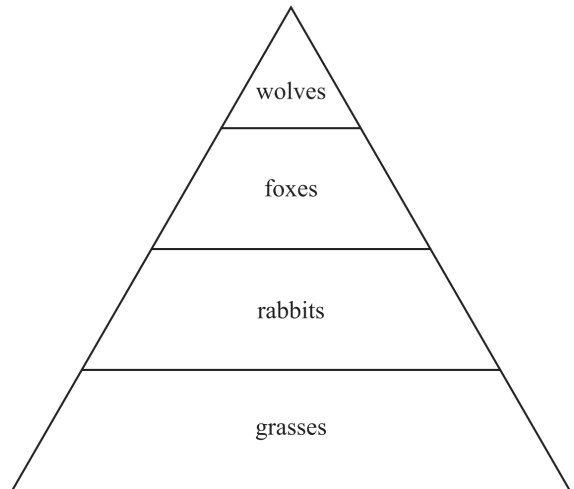
94. Which statement *best* describes how the carbon cycle and oxygen cycle are interrelated?

- A. Animals use  $\text{CO}_2$  and release  $\text{O}_2$  during respiration.
- B. Animals release  $\text{H}_2\text{O}$  during respiration and  $\text{CO}_2$  during transpiration.
- C. Plants use  $\text{CO}_2$  and release  $\text{O}_2$  during photosynthesis.
- D. Plants release  $\text{H}_2\text{O}$  during transpiration and  $\text{CO}_2$  during photosynthesis.

95. Which process is part of the carbon cycle and is *least* dependent on the water cycle?

- A. photosynthesis
- B. decomposition
- C. rock weathering
- D. volcanic eruption

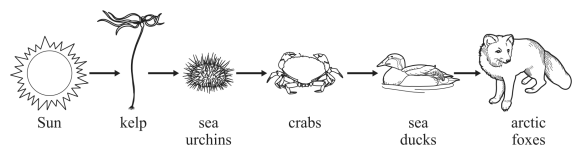
96. The picture below shows an energy pyramid.



What will *most likely* happen to the foxes and the wolves if the rabbits are removed?

- A. The foxes will eat more wolves.
- B. The foxes will eat fewer wolves.
- C. There will be more foxes and wolves.
- D. There will be fewer foxes and wolves.

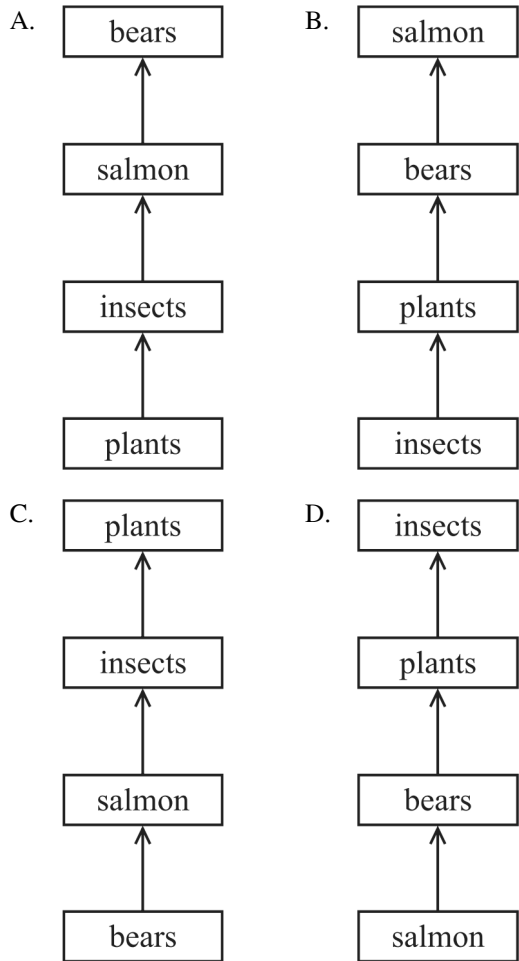
97. The picture below shows an ocean bay food chain.



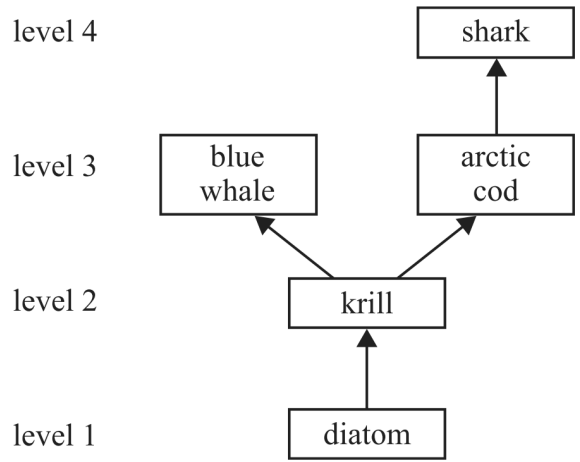
Sea otters move into the ocean bay. They eat all the sea urchins. This change will cause the

- A. kelp to have less food.
- B. crabs to have more food.
- C. sea ducks to have less food.
- D. arctic foxes to have more food.

98. Which model *correctly* shows energy flow in a food chain?



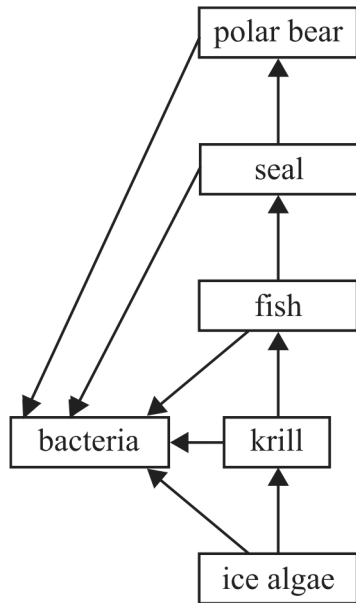
99. A marine food web is shown in the diagram below.



Which organism below belongs in level 3 of this marine food web?

- A. salmon
- B. zooplankton
- C. sea alga
- D. polar bear

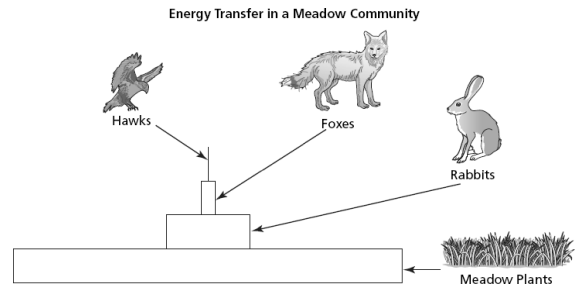
100. A marine food web is shown below.



Which chart *correctly* shows three of the organisms according to their roles in cycling matter in the marine food web?

- A.
- | Primary Consumer | Secondary Consumer | Decomposer |
|------------------|--------------------|------------|
| bacteria         | fish               | seal       |
- B.
- | Primary Consumer | Secondary Consumer | Decomposer |
|------------------|--------------------|------------|
| fish             | seal               | polar bear |
- C.
- | Primary Consumer | Secondary Consumer | Decomposer |
|------------------|--------------------|------------|
| krill            | fish               | bacteria   |
- D.
- | Primary Consumer | Secondary Consumer | Decomposer |
|------------------|--------------------|------------|
| ice algae        | krill              | fish       |

101. The picture below shows the energy flow through a meadow community.



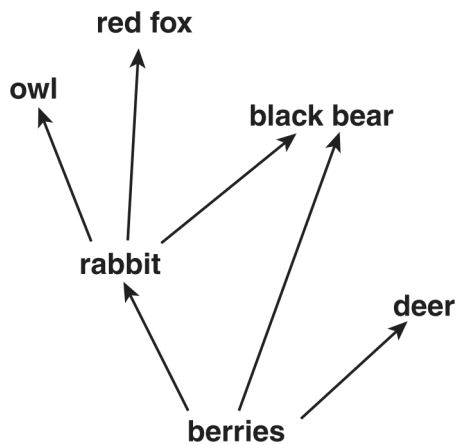
Which of the following would *most likely* occur to the populations within the community of organisms immediately after a wildfire burns the environment?

- A. Hawks would increase and foxes would increase.
- B. Hawks would decrease and foxes would increase.
- C. Meadow plants would increase and rabbits would decrease.
- D. Meadow plants would decrease and rabbits would decrease.
102. Which statement *best* describes what will happen if the population of herbivores in the community decreases?
- A. The population of foxes will increase.
- B. The population of hawks will increase.
- C. The population of rabbits will increase.
- D. The population of meadow plants will increase.

103. Which statement *best* describes the flow of energy as it passes through the organisms in the pyramid?

- A. Energy flows through the organisms from bottom to top and increases at each level.
- B. Energy flows through the organisms from bottom to top and decreases at each level.
- C. Energy flows through the organisms from top to bottom and increases at each level.
- D. Energy flows through the organisms from top to bottom and decreases at each level.

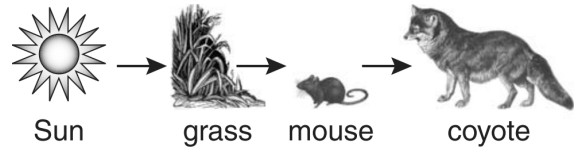
104. The diagram below shows a simple food web.




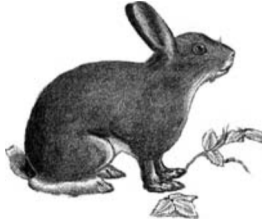


Which animal is classified as an omnivore?

- A. red fox
- B. deer
- C. black bear
- D. rabbit

105. The diagram below shows a simple food web.



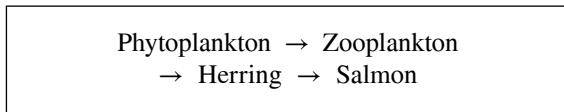
Which of the following animals might compete with the coyote in this food chain?

- A. 
- B. 
- C. 
- D. 



106. Decomposers are important in the food chain because they
- produce their own food using light from the Sun.
  - stop the flow of energy from one organism to another.
  - break down dead organisms and recycle nutrients into the soil.
  - are microscopic and other organisms cannot consume them.

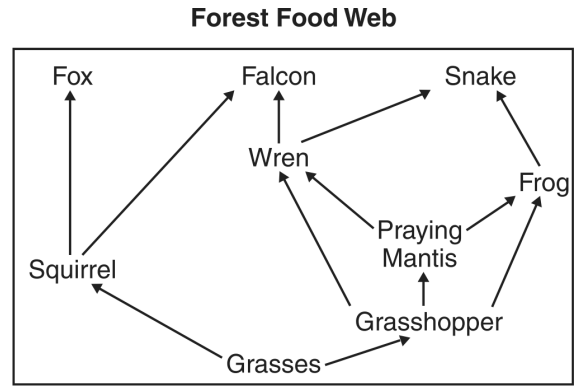
107. The diagram below shows a marine food chain.



The zooplankton in this food chain are

- primary producers.
- primary consumers.
- secondary consumers.
- tertiary consumers.

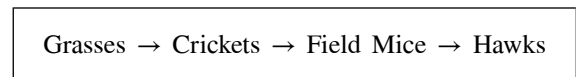
108. A forest-ecosystem food web is shown below.



If additional wrens are introduced into this ecosystem, there will most likely be an immediate decrease in the

- frog population.
- snake population.
- falcon population.
- grasshopper population.

109. A food chain is shown below.



For the food chain shown, which of the following changes would have the most severe consequences?

- a drastic decrease in rainfall, causing drought
- the poaching of predatory hawks by game hunters
- the introduction of a second predator that eats field mice
- a parasitic infestation that reduces the cricket population

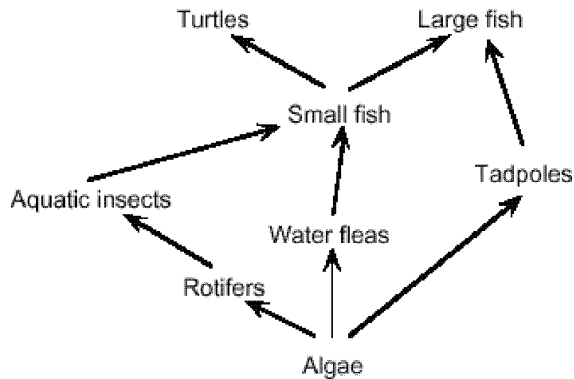
110. Which of these organisms would *most* likely be found at the top of an energy pyramid?

- A. clams
- B. sardines
- C. sharks
- D. kelp

111. Which of these organisms would *most* likely be found at the bottom of a biomass pyramid?

- A. giant squids
- B. sand sharks
- C. sea cucumbers
- D. green algae

112. The diagram shows part of an aquatic food web for a stable lake ecosystem in Connecticut.

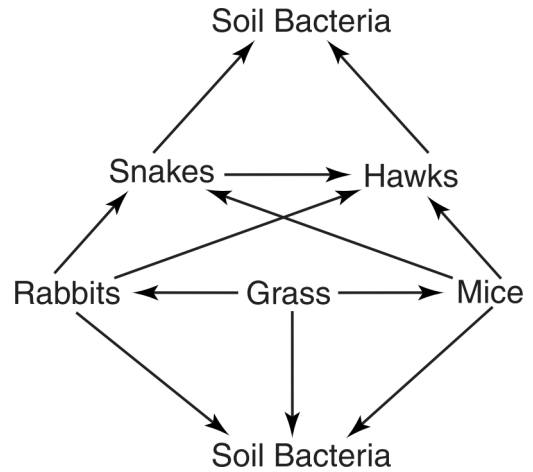


What is the source of energy for the algae?

- A. waves
- B. sunlight
- C. bacteria
- D. rotifers, water fleas and tadpoles

113. Ecosystems are composed of all living and nonliving components in an area. Food webs show the flow of nutrients and energy within an ecosystem.

Use the food web to answer the following questions.



Suppose that a new predator of the rabbit migrated to this ecosystem. What is the most likely *initial* effect on the other organisms?

- A. More competition among the mice for food
- B. More competition among the hawks for food
- C. Less competition among snakes for food
- D. Less grass available for food

114. A chemical pesticide was applied to an area of this ecosystem by a landowner to control the mouse population. There was a decrease in the mouse population due to the presence of this pesticide. Which one of the following would most likely occur first due to this change in the ecosystem?

- A. The amount of grass would decrease.
- B. The snake population would increase.
- C. The rabbit food supply would increase.
- D. The snake food supply would increase.

115. Which one of the following is true of grass in an ecosystem?

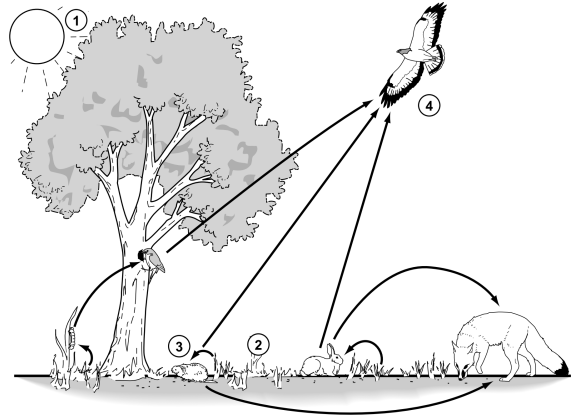
- A. It converts oxygen to glucose.
- B. It produces carbon dioxide from oxygen and water.
- C. It produces glucose from carbon dioxide and water.
- D. It converts water to energy.

116. If animals eat plants to get energy, where do plants get their energy?

- A. Soil
- B. Water
- C. Wind
- D. Sun

117. Interactions in an ecosystem result from the transfer of matter and energy from producers to consumers and eventually to decomposers.

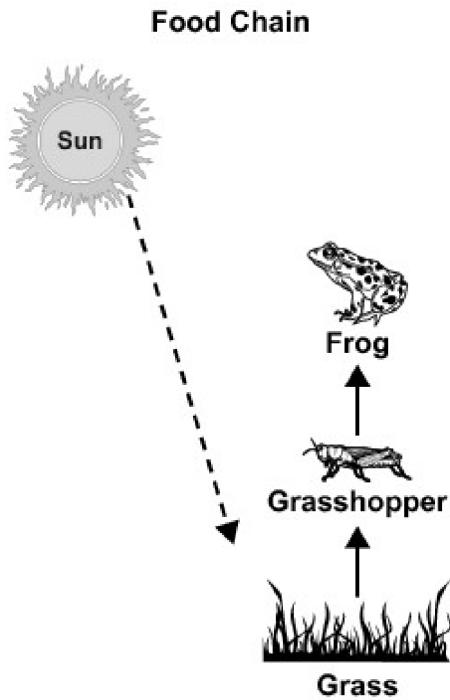
What are the forms of energy transfer from #1 → #4?



- A. Chemical energy to chemical energy
- B. Light energy to chemical energy
- C. Chemical energy to heat energy
- D. Heat energy to mechanical energy

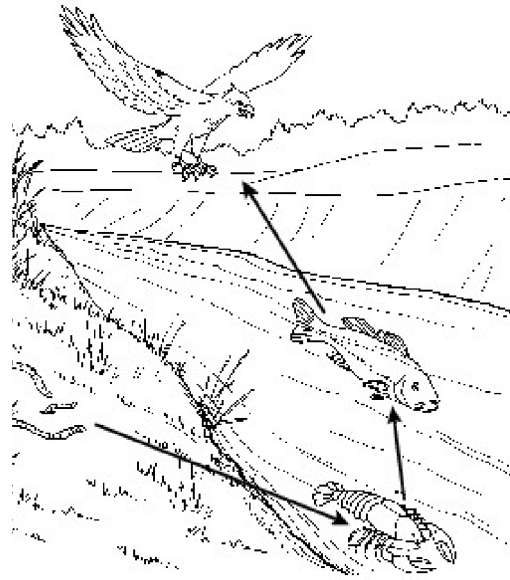
118. A simple food chain is shown.

What is the source of food in this **food** chain?



- A. Sun
- B. Frog
- C. Grass
- D. Grasshopper

119. How would the removal of earthworms from the food chain affect the other organisms?

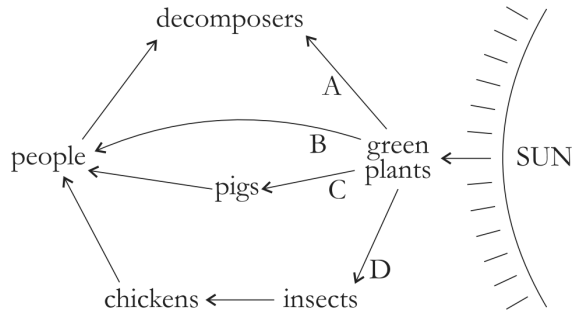


- A. The number of bass will increase.
- B. The number of crayfish will decrease.
- C. The crayfish will get their energy directly from the Sun.
- D. The number of bass and ospreys will increase.

120. Which list *best* shows the transfer of energy in a food chain?

- A. Snake → mouse → grain → Sun
- B. Grain → mouse → snake → Sun
- C. Sun → mouse → snake → grain
- D. Sun → grain → mouse → snake

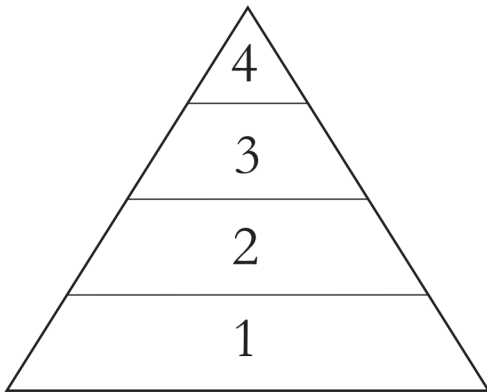
121. In ecosystems, the sun's energy is transferred through food webs as shown below.



The sun's energy is *most* directly available to people through

- A. path A.
- B. path B.
- C. path C.
- D. path D.

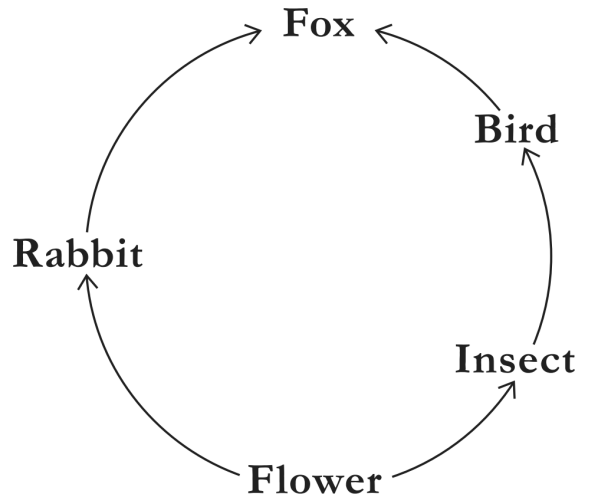
122. Use the diagram below to answer the question.



In this energy pyramid, which organism would most likely be in level 2?

- A. bird
- B. fox
- C. caterpillar
- D. tree

123. Use the diagram below to answer the question.



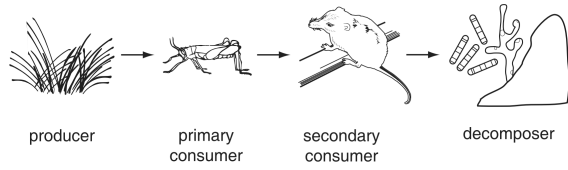
Which group of organisms is not represented in the diagram above of a simple food web?

- A. decomposers
- B. prey
- C. consumers
- D. producers

124. Which food chain correctly summarizes the flow of energy through an ecosystem?

- A. sun → rabbit → grass → fox
- B. rabbit → fox → sun → grass
- C. fox → sun → rabbit → grass
- D. sun → grass → rabbit → fox

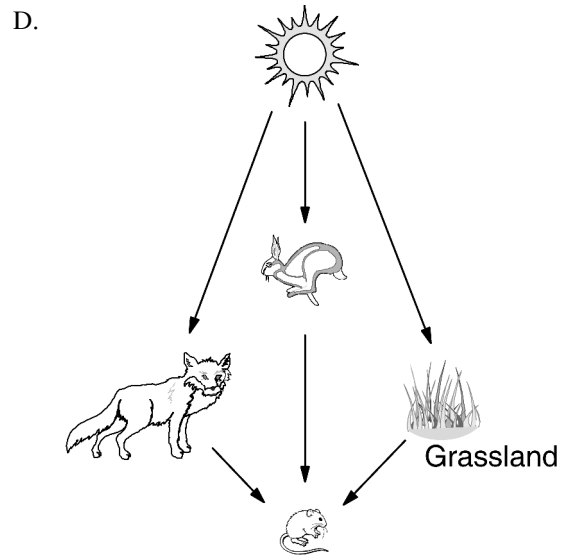
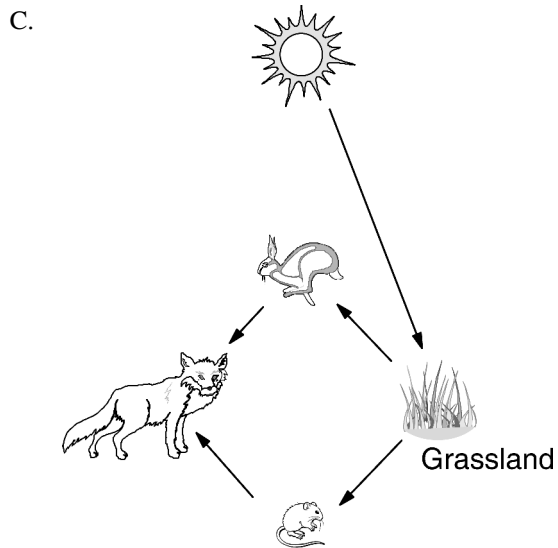
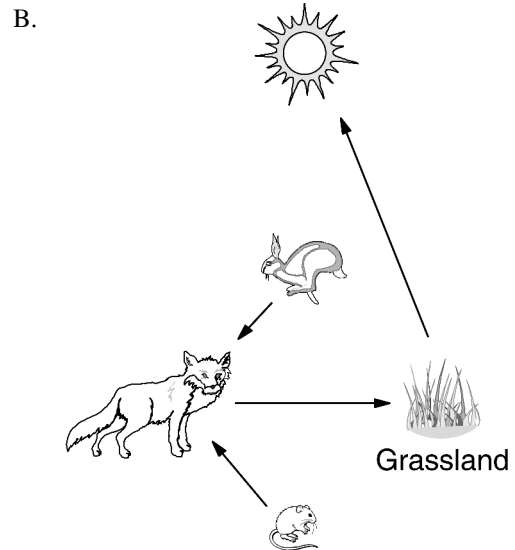
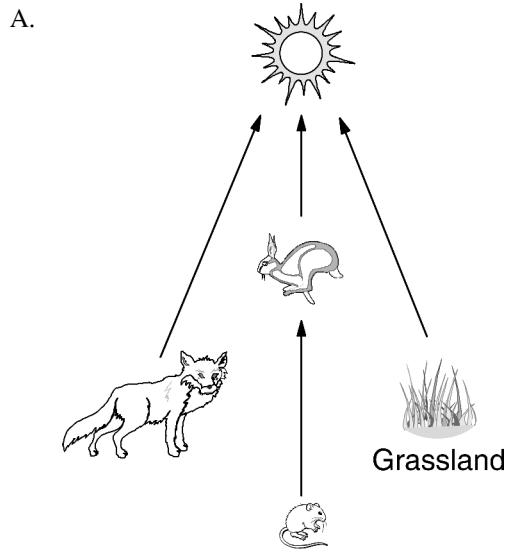
125. Use the diagram below to answer the following question.



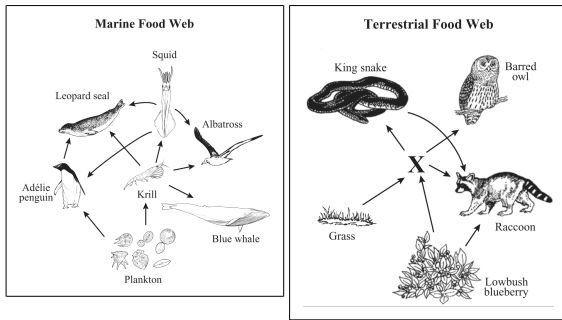
If the organisms in this food chain were arranged in an ecological pyramid, which organism would have the *most* energy available?

- A. decomposer
- B. secondary consumer
- C. primary consumer
- D. producer

126. Which diagram correctly shows the direction of energy flow through a food web?



127. The diagrams below show a marine food web and an incomplete terrestrial food web.



The organism in the terrestrial food web that corresponds to the krill in the marine food web is labeled X. Which of the following organisms is *most likely* organism X?

A. Mouse



B. Fox



C. Oak tree

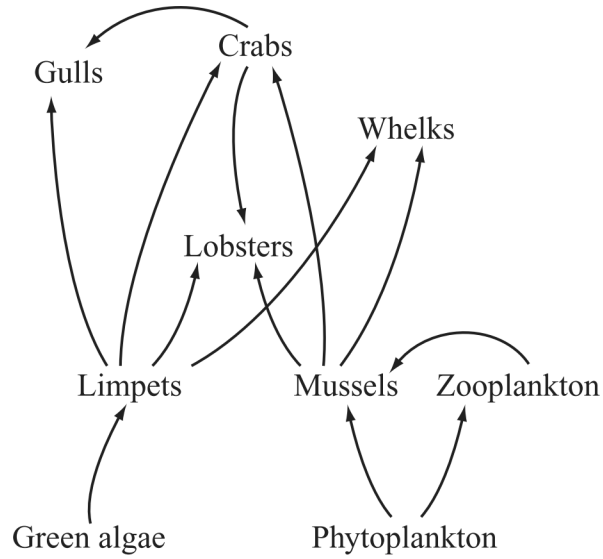


D. Hawk

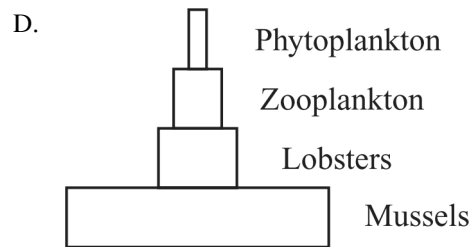
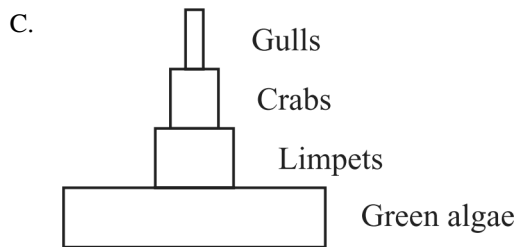
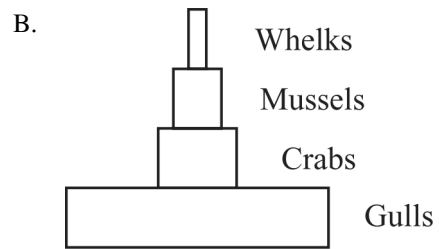
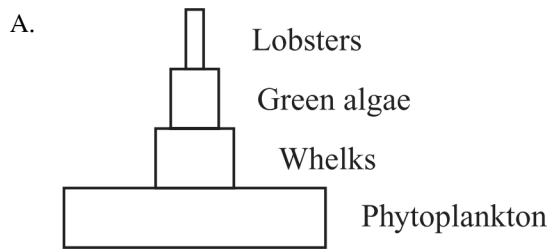




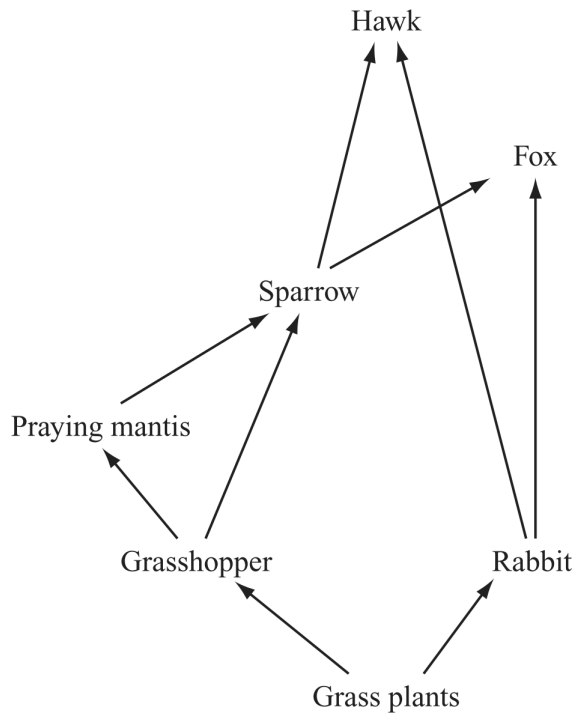
128. A marine food web is shown below.



Which of the following diagrams correctly represents an energy pyramid from this web?



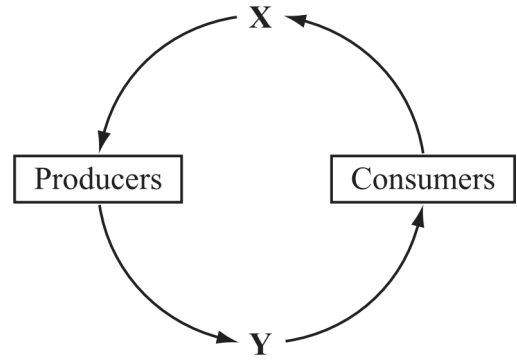
129. A partial food web is shown below.



Which of the following changes is *most likely* to occur if the sparrow population decreases?

- A. The fox population decreases.
- B. The hawk population increases.
- C. The grasshopper population competes less with the praying mantis population.
- D. The hawk population and the fox population prey more heavily on grasshoppers.

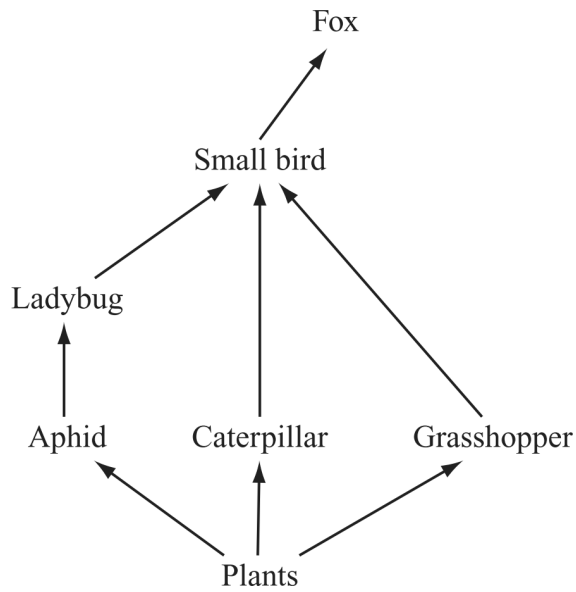
130. A simple diagram of nutrient cycling is shown below.



What substances do **X** and **Y** represent in this nutrient cycle?

- A. Substance **X** is salt and substance **Y** is water.
- B. Substance **X** is glucose and substance **Y** is starch.
- C. Substance **X** is nitrogen and substance **Y** is ammonia.
- D. Substance **X** is carbon dioxide and substance **Y** is oxygen.

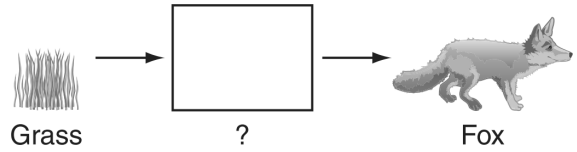
131. A partial food web is shown below. The insect species in this food web are ladybugs, aphids, caterpillars, and grasshoppers.



Which of the following statements describes what will *most likely* happen if another animal that preys on insects enters the community?

- A. The plant populations will decrease.
- B. The ladybug population will increase.
- C. The small bird population will decrease.
- D. The grasshopper population will increase.

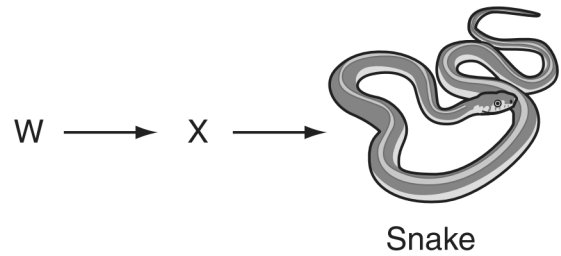
132. Use the picture below to answer the following question(s).



Which organism belongs in the empty box to make this a food chain?

- A. a wolf
- B. a snake
- C. a tree
- D. a rabbit

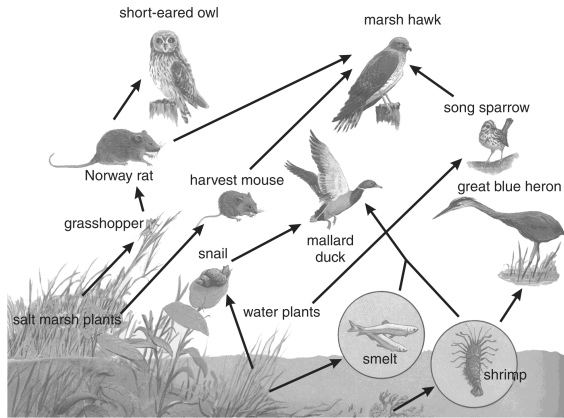
133. The diagram below shows a food chain.



Which organism is the *best* choice for W in the food chain?

- A. bacteria
- B. grass
- C. mouse
- D. fox

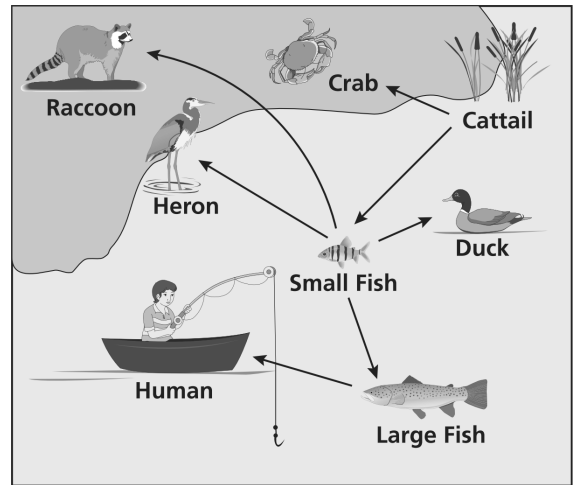
134. The picture below shows a food web.



The harvest mouse population is decreasing. A logical reason for this decrease might be that

- A. the song sparrow population has increased.
- B. the smelt population has decreased.
- C. the marsh hawk population has increased.
- D. the snail population has decreased.

135. Fishermen add a type of large fish into a lake. The fish reproduce and increase in number. The following food web shows that this large fish becomes a top predator.



Which statement describes a change that will happen to the organisms in this food web?

- A. Herons and raccoons will have fewer small fish to eat.
- B. More ducks will come to the lake to eat the large fish.
- C. Small fish will have more offspring to feed the organisms.
- D. The number of crabs will decrease because raccoons will eat more cattails.

136. Hailey studied a salt marsh ecosystem. She made the following list of some of the organisms that live in a salt marsh:

- Hawks: top predators
- Sparrows: insectivores
- Grasshoppers: herbivores
- Cordgrass: primary producer

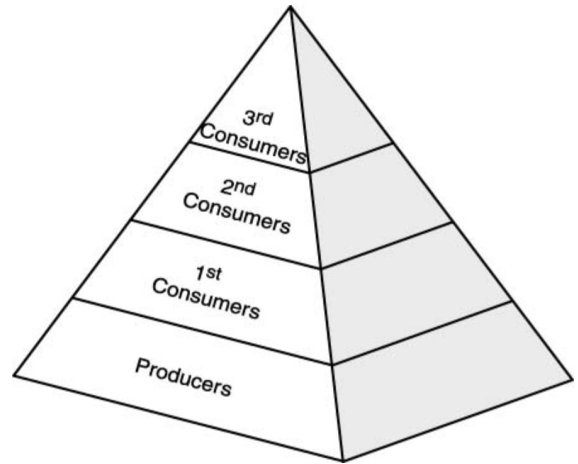
Which food chain shows a probable path of energy in this ecosystem?

- A. Cordgrass → Grasshopper → Sparrow → Hawk
- B. Cordgrass → Hawk → Grasshopper → Sparrow
- C. Hawk → Cordgrass → Grasshopper → Sparrow
- D. Hawk → Sparrow → Grasshopper → Cordgrass

137. Which of the following food chains is *most* likely found in a temperate forest biome?

- A. Phytoplankton → krill → cod → sea lion → polar bear
- B. Seeds → mice → black snake → hawk
- C. Grass → zebra → hyena → lion
- D. Algae → krill → cod → barracuda → shark

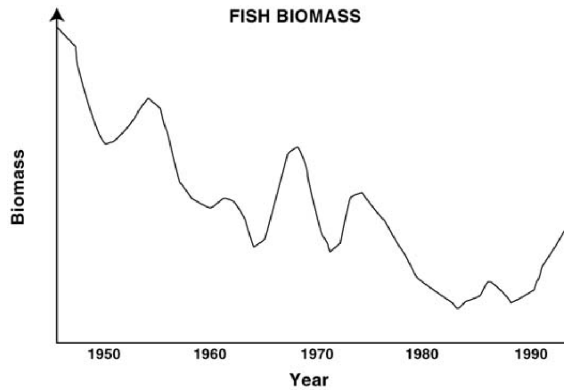
138.



Which group shown in the energy pyramid above is *most* immediately affected by the decomposition of other organisms?

- A. Producers
- B. 1st consumers
- C. 2nd consumers
- D. 3rd consumers

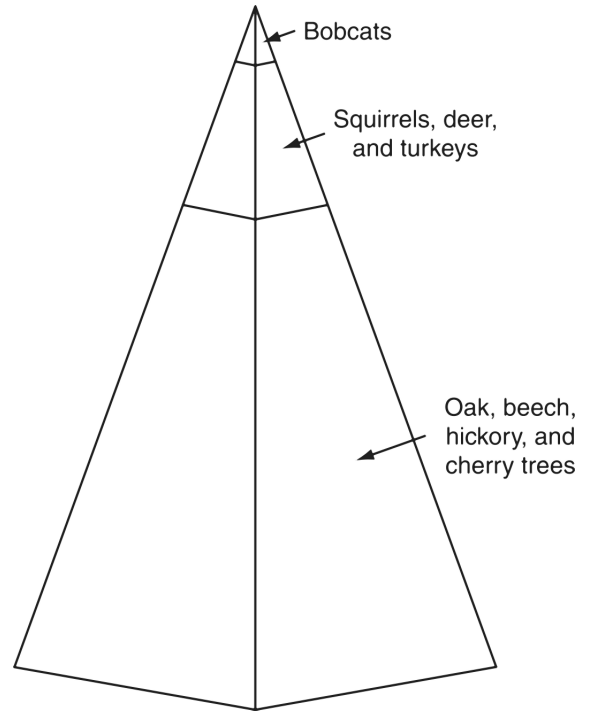
139.



The graph shows the total biomass of fish of an area from 1946 to 1993. Which of these *most* likely increased in this area in the mid-1970s?

- A. Predator populations
- B. Temperatures
- C. Amount of rainfall
- D. Amount of minnow births

140. The diagram below shows an energy pyramid for a forest ecosystem.



What do the sizes of the levels in the energy pyramid represent?

- A. the amount of energy available in the organisms at each level
- B. the amount of energy used daily by the organisms at each level
- C. the amount of heat given off daily by the organisms at each level
- D. the amount of energy recycled by the organisms at each level

141. Which type of organisms are the producers in *most* food webs?

- A. birds
- B. plants
- C. insects
- D. mammals

Cycling of Nutrients and Energy 4/30/2019

- |         |   |         |   |
|---------|---|---------|---|
| 1.      |   | 21.     |   |
| Answer: | B | Answer: | D |
| 2.      |   | 22.     |   |
| Answer: | C | Answer: | B |
| 3.      |   | 23.     |   |
| Answer: | A | Answer: | D |
| 4.      |   | 24.     |   |
| Answer: | D | Answer: | A |
| 5.      |   | 25.     |   |
| Answer: | D | Answer: | D |
| 6.      |   | 26.     |   |
| Answer: | D | Answer: | D |
| 7.      |   | 27.     |   |
| Answer: | C | Answer: | D |
| 8.      |   | 28.     |   |
| Answer: | B | Answer: | D |
| 9.      |   | 29.     |   |
| Answer: | C | Answer: | A |
| 10.     |   | 30.     |   |
| Answer: | A | Answer: | B |
| 11.     |   | 31.     |   |
| Answer: | D | Answer: | A |
| 12.     |   | 32.     |   |
| Answer: | B | Answer: | D |
| 13.     |   | 33.     |   |
| Answer: | B | Answer: | A |
| 14.     |   | 34.     |   |
| Answer: | C | Answer: | D |
| 15.     |   | 35.     |   |
| Answer: | D | Answer: | C |
| 16.     |   | 36.     |   |
| Answer: | D | Answer: | B |
| 17.     |   | 37.     |   |
| Answer: | B | Answer: | D |
| 18.     |   | 38.     |   |
| Answer: | C | Answer: | C |
| 19.     |   | 39.     |   |
| Answer: | D | Answer: | A |
| 20.     |   | 40.     |   |
| Answer: | B | Answer: | B |

41.  
Answer: C

42.  
Answer: D

43.  
Answer: A

44.  
Answer: D

45.  
Answer: B

46.  
Answer: C

47.  
Answer: B

48.  
Answer: D

49.  
Answer: C

50.  
Answer: C

51.  
Answer: B

52.  
Answer: B

53.  
Answer: B

54.  
Answer: A

55.  
Answer: D

56.  
Answer: D

57.  
Answer: D

58.  
Answer: D

59.  
Answer: A

60.  
Answer: B

61.  
Answer: D

62.  
Answer: D

63.  
Answer: D

64.  
Answer: A

65.  
Answer: D

66.  
Answer: D

67.  
Answer: D

68.  
Answer: B

69.  
Answer: A

70.  
Answer: C

71.  
Answer: B

72.  
Answer: B

73.  
Answer: A

74.  
Answer: C

75.  
Answer: B

76.  
Answer: B

77.  
Answer: D

78.  
Answer: B

79.  
Answer: D

80.  
Answer: A

81.  
Answer: B

82.  
Answer: B

83.  
Answer: C

84.  
Answer: A

85.  
Answer: A



86.  
Answer: C

87.  
Answer: A

88.  
Answer: C

89.  
Answer: A

90.  
Answer: C

91.  
Answer: A

92.  
Answer: C

93.  
Answer: B

94.  
Answer: C

95.  
Answer: D

96.  
Answer: D

97.  
Answer: C

98.  
Answer: A

99.  
Answer: A

100.  
Answer: C

101.  
Answer: D

102.  
Answer: D

103.  
Answer: B

104.  
Answer: C

105.  
Answer: C

106.  
Answer: C

107.  
Answer: B

108.  
Answer: D

109.  
Answer: A

110.  
Answer: C

111.  
Answer: D

112.  
Answer: B

113.  
Answer: B

114.  
Answer: C

115.  
Answer: C

116.  
Answer: D

117.  
Answer: B

118.  
Answer: C

119.  
Answer: B

120.  
Answer: D

121.  
Answer: B

122.  
Answer: C

123.  
Answer: A

124.  
Answer: D

125.  
Answer: D

126.  
Answer: C

127.  
Answer: A

128.  
Answer: C

129.  
Answer: A

130.  
Answer: D

131.  
Answer: C

132.  
Answer: D

133.  
Answer: B

134.  
Answer: C

135.  
Answer: A

136.  
Answer: A

137.  
Answer: B

138.  
Answer: A

139.  
Answer: A

140.  
Answer: A

141.  
Answer: B