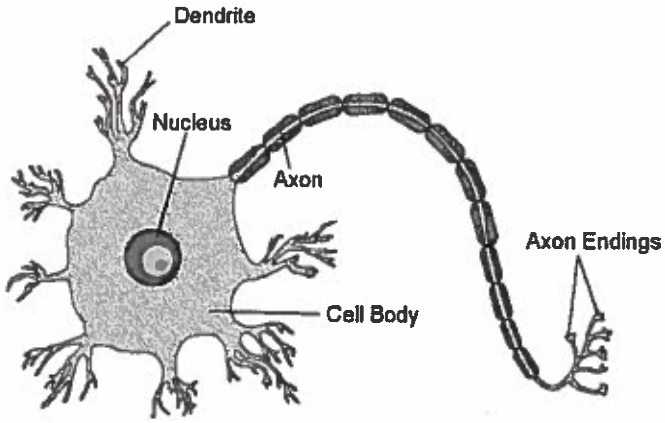
Spring 2017 Biology Semester Final - *Review*

Multiple Choice:
Identify the choice that best completes the statement or answers the question.

1. Many scientists classify viruses as non-living things. Which of these statements below best describes why?

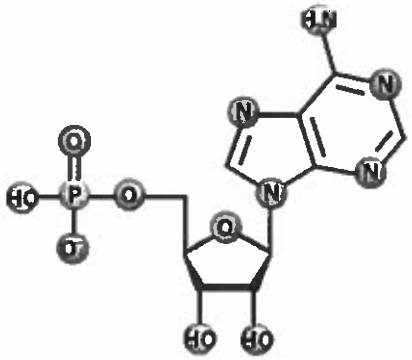
   a. It has genetic material.
   b. It reproduces only when it is inside a host cell.
   c. It can take control of a cell and change its normal activities.
   d. Its effects on an organism are sometimes harmful.

2. All animals have specialized cells that perform different jobs to help keep the animal alive. Specialized cells of different animals often appear similar. For instance, motor neurons from crocodiles look very much like motor neurons in kangaroos: both are long and thin with many branches. Why do these cells look similar even though they come from different animals?



   a. Motor neurons in both organisms use energy.
   b. Motor neurons in both organisms have recently undergone cell division.
   c. Motor neurons perform similar functions in both crocodiles and kangaroos.
   d. The shape of motor neurons is determined by neighboring cells.

3. DNA is a polymer which is made up of subunits called nucleotides. Nucleotides have three basic parts. Which of these is **not** a nucleotide component?



a. amino acid group
b. phosphate group
c. ribose sugar
d. nitrogenous base

4. A nitrogenous base is an important component of the nucleotides making up DNA. Which of the following correctly lists the four possible nitrogenous bases in DNA?
a. adenine, guanine, cytosine, uracil
b. leucine, proline, tyrosine, phenylalanine
c. glutamine, proline, tyrosine, phenylalanine
d. adenine, guanine, cytosine, thymine

5. Which of the following correctly shows a complementary base pair of nitrogenous bases in a DNA molecule?
a. adenine - guanine
b. guanine - cytosine
c. cytosine - adenine
d. guanine - thymine

6. When an error is made during DNA replication, transcription, or cell division, a change in DNA can occur. Any change in the DNA sequence is called ____.
a. a triplet
b. mRNA
c. a codon
d. a mutation

7. A special type of cell division, called meiosis, is used to form sex cells or gametes. Which statement is **true** about this type of cell division?
a. The products of meiosis are two identical daughter cells.
b. DNA is not copied during meiosis.
c. The new cells have half the DNA of the parent cell.
d. Meiosis is complete after only one cell division.

8. Fossils are traces of organisms from long ago. Which example does **not** describe a fossil?
   a. wood that has changed to stone
   b. an imprint of a leaf in rock
   c. an ancient animal frozen in ice
   d. ancient cave drawings of animals

In England in the mid-1800s, a dramatic change happened to the peppered moth population. Before 1845, peppered moths were light colored with dark specks. Their color allowed them to blend into the light gray bark of the trees. After 1845, coal smoke from local factories blackened the bark of trees. Dark colored moths began to appear. After several generations, 90% of the total moth population was dark.

9. Refer to the information above. The dark-colored moths likely arose by mutation, a random change in their genes. A mutation that helps an organism to survive better in its environment is called ____.
   a. a response
   b. an adaptation
   c. a trait
   d. a phenotype

10. Penicillin is widely used to kill bacteria which cause disease. However, this drug does not affect as many species of bacteria today as it did when it was first discovered. Which statement describing this situation is ***false***?
   a. Thousands of years were required for bacteria to become resistant to penicillin.
   b. The ability of bacteria to resist penicillin varies within a population.
   c. Bacteria which are resistant to penicillin will survive exposure to the drug.
   d. Bacteria which are resistant to penicillin will produce penicillin-resistant offspring.

11. Which of these statements about natural selection is **true**?
   a. Organisms which survive to reproduce can pass favorable variations on to offspring.
   b. Natural selection works on individuals, rather than a population of organisms.
   c. All organisms within a species are genetically identical.
   d. Offspring can inherit traits of an organism which that organism develops during its life.

12. Listed below are the scientific names for some trees and shrubs:

Quercus alba	*Pieris floribunda*
Cornus alba	*Quercus rubrum*
Acer rubrum	*Malus floribunda*

Which two species are most closely related?
a. *Quercus alba* and *Cornus alba*
b. *Malus floribunda* and *Pieris floribunda*
c. *Quercus rubrum* and *Acer rubrum*
d. *Quercus rubrum* and *Quercus alba*

Four major groups of organic compounds are particularly important to living things. Most life processes rely on molecules from one or more of these groups.

13. Refer to the information above. To which group do enzymes belong?
a. lipids
b. proteins
c. carbohydrates
d. nucleic acids

14. Refer to the information above. To which group do oils belong?
a. nucleic acids
b. carbohydrates
c. lipids
d. proteins

15. Refer to the information above. To which group do sugars belong?
a. nucleic acids
b. proteins
c. lipids
d. carbohydrates

16. In a food chain, a producer is an organism that ____.
a. is often a predator
b. is usually on the third level of the food chain
c. can be an herbivore or a carnivore
d. uses energy from the sun in the production of nutrients

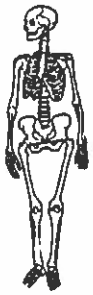
17. What is the main difference between a prokaryote and a eukaryote?
a. The need for nutrients
b. Plasma membranes
c. Organelles
d. Amount of energy needed

Organisms play important roles in cycling nutrients and other materials through the environment.

18. Study the statement above. The process of respiration, by which animals return carbon dioxide to the atmosphere, is a key component of the ____.
    a. nitrogen cycle
    b. carbon cycle
    c. phosphorous cycle
    d. water cycle

19. Study the statement above. The process of nitrogen fixation, by which atmospheric nitrogen is changed into usable forms, is a key component of the ____.
    a. carbon cycle
    b. nitrogen cycle
    c. water cycle
    d. phosphorous cycle

20. Our bodies have a skeletal system made of bones and cartilage. The skeletal system has many important roles in the body. Which is ***not*** a function of the skeletal system?



    a. It enables the body to move.
    b. It gives the body its shape.
    c. It protects vital organs.
    d. It moves food through the body.

21. Vertebrates use two main body systems to swim, slither, fly, hop, walk, and run. Which two systems are these?
    a. Circulatory and muscular
    b. Immune and skeletal
    c. Respiratory and circulatory
    d. Muscular and skeletal

22. Every morning Kiyoshi walks from her house to school. She has over 600 muscles in her body that help her make the journey. Some of Kiyoshi's muscles are voluntary and some are involuntary. What is one thing that Kiyoshi's **voluntary** muscles might be helping her do on her morning walk to school?

a. whistling a song
b. excreting hormones
c. pumping blood through her body
d. digesting her breakfast

23. Celia steps off the sidewalk without looking into the street, and narrowly misses being hit by a car. Her heart beats faster, her breathing becomes more rapid, her skin gets cold and clammy, and she begins to tremble. Which of the following triggers this fight-or-flight response in Celia?

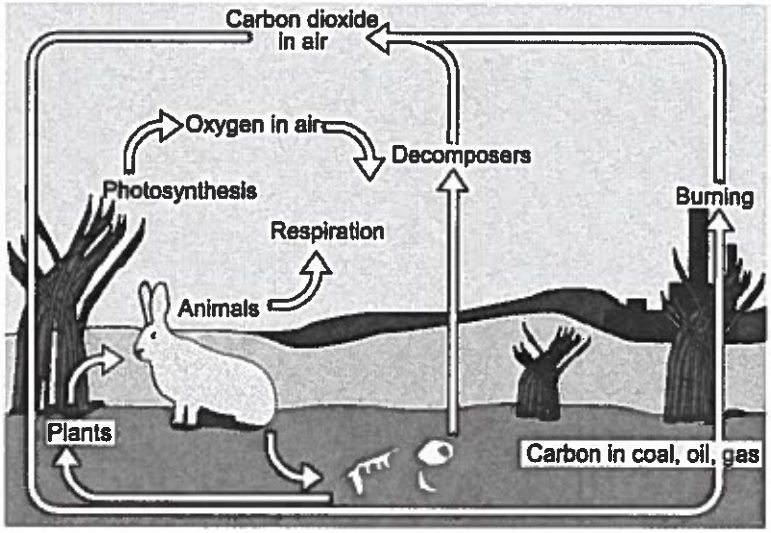
Examples of Physical Fight-or-Flight Responses
Muscles tense
Blood pressure increases
Digestion slows or stops entirely
Breathing and heart rates increase
Pupils dilate

a. food moving through the digestive system
b. the failure of neurons to conduct impulses quickly enough
c. the release of hormones and the activation of the sympathetic nervous system
d. fluid movement in the cochlea resulting in bending of hair cells

24. Which of the following describes an organism that has the genotype Bb?
a. homozygous
b. heterozygous
c. inbreed
d. all of these

25. Messenger RNA is formed in the process of _____.
a. transcription
b. translation
c. replication
d. mutation

The diagram below illustrates examples of how carbon dioxide (CO_2) and oxygen (O) cycle throughout an ecosystem.



26. Refer to the diagram above. How does photosynthesis affect the oxygen-carbon dioxide cycle?
    a. Photosynthesis adds carbon dioxide to the atmosphere, but does not affect oxygen levels.
    b. Photosynthesis adds oxygen to the atmosphere but does not affect carbon dioxide levels.
    c. Photosynthesis adds oxygen to the atmosphere while removing carbon dioxide.
    d. Photosynthesis adds carbon dioxide to the atmosphere while removing oxygen.

A close, permanent relationship between organisms of different species is called symbiosis.

27. Study the definition of symbiosis given above. The acacia tree provides a home and food for ants. The ants protect the acacia by attacking other organisms that try to eat the tree. What type of symbiotic relationship exists between these organisms?
    a. mutualism
    b. parasitism
    c. commensalism
    d. competition

28. Study the definition of symbiosis above. As the mistletoe plant gets food and water from a host tree, the tree can be weakened. What type of symbiotic relationship exists between these organisms?
    a. competition
    b. mutualism
    c. parasitism
    d. Commensalism

29. Read the definition of symbiosis given above. Barnacles attach to whales because they cannot move on their own. The whales are not harmed by the barnacles. What type of symbiotic relationship exists between these organisms?
    a. competition
    b. mutualism
    c. parasitism
    d. commensalism

30. Many animals that live in forests or jungles have stripes or spots on their fur. How does an animal's pattern on its fur represent a successful adaptation?

    a. An animal inherits its fur pattern from its parents.
    b. The patterns help the animal blend into its environment and hide from predators.
    c. The animal's fur helps it to stay warm in the winter and cool in the summer.
    d. Animals with patterns are able to run fast to avoid enemies.

The diagram below shows a simple food chain involving producers, herbivores, and carnivores.

31. Refer to the food chain diagram above. A disease strikes the hawk population, killing a significant percentage of the birds. How would the mouse population in this ecosystem be affected?
    a. The number of mice would increase.
    b. The number of mice would decrease.
    c. The number of mice would initially decrease, then increase dramatically.
    d. The number of mice would not change.

32. Refer to the food chain diagram above. Persistent drought conditions cause much of the grass in this ecosystem to die. How would the hawk population in this ecosystem be affected?
    a. The hawks would not be affected by this change.
    b. There would be more mice for the hawks to eat.
    c. There would be fewer mice for the hawks to eat.
    d. The mice would no longer be prey for hawks.

33. The coyote feeds on jackrabbits, which feed on plants.

Which of these **best** describes the jackrabbit in this desert community food web?

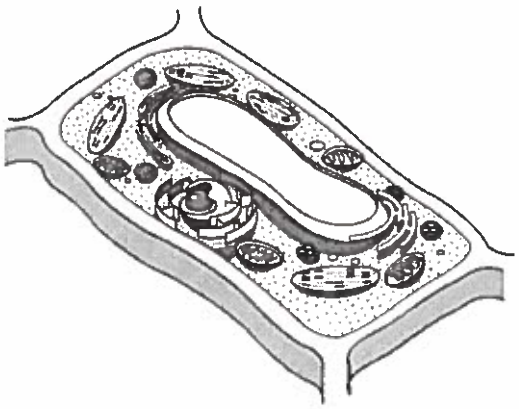
a. The jackrabbit is an autotroph.
b. The jackrabbit is a producer.
c. The jackrabbit is prey for the coyote.
d. The jackrabbit is a carnivore.

3′ AATCGC 5′

TTAGCG

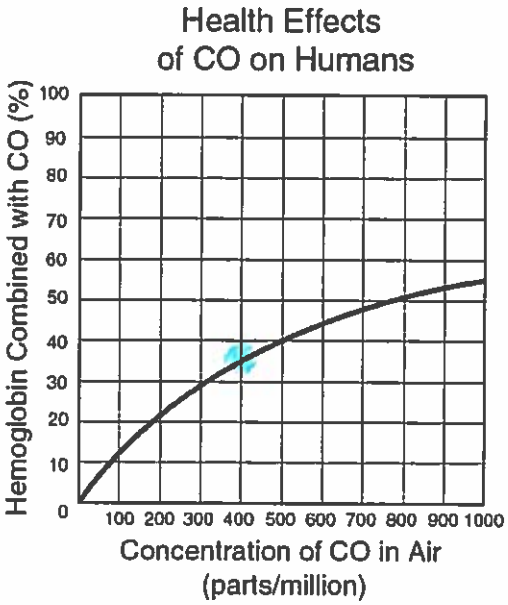
34. Which of the following nucleotide base sequences complements the section of DNA modeled above?

a. 5'UTCGCA3'
b. 5'TTAGCG3'
c. 5'GCGATT3'
d. 5'TTUCGC3'



35. The cell above most likely belongs to an organism of the kingdom —

a. Animalia
b. Plantae
c. Fungi
d. Eubacteria



36. The graph shows the percentage of hemoglobin that combines with carbon monoxide (CO) at various concentrations. Exposure to 400 parts per million of CO in air can cause people to experience nausea and a throbbing headache. According to the graph, about what percentage of hemoglobin is bound to CO at a CO concentration of 400 parts per million?
    a. 25%
    b. 35%
    c. 40%
    d. 55%

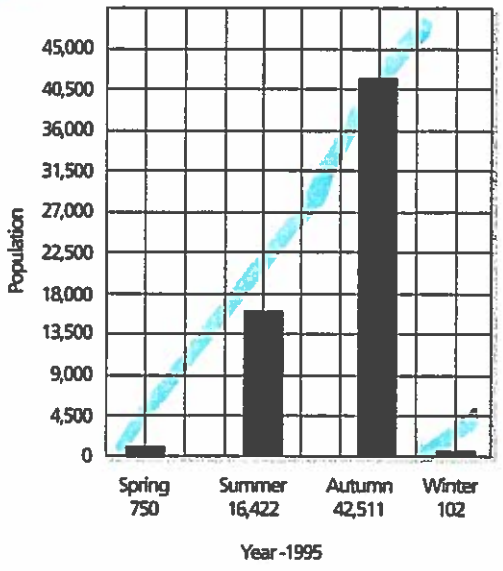
37. A thermostat maintains the temperature of a room at a given level. What cell process is similar to this?
    a. Homeostasis
    b. Energy production
    c. Food storage
    d. Protein modification

38. The National Aeronautics and Space Agency (NASA) has a command center in Houston, Texas, that directs space missions. Which part of a cell is analogous to this command center?
    a. Plasma membrane
    b. Nucleus
    c. Mitochondria
    d. Vacuole

Population of unknown organisms				
Year	Spring	Summer	Autumn	Winter
1995	564	14,598	25,762	127
1996	750	16,422	42,511	102
1997	365	14,106	36,562	136

39. Which of the following graphs correctly reflects the data in the table?

a.



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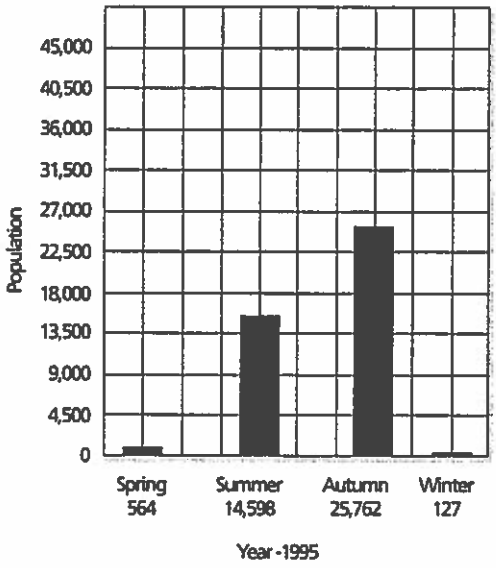

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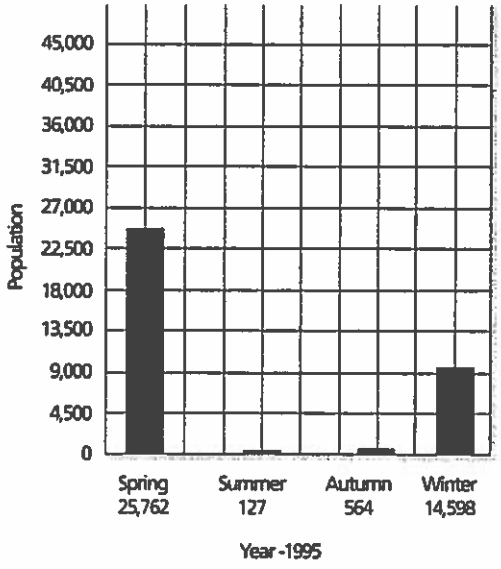
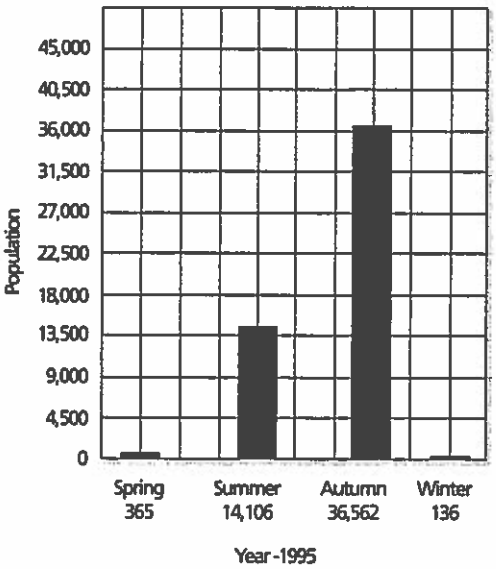
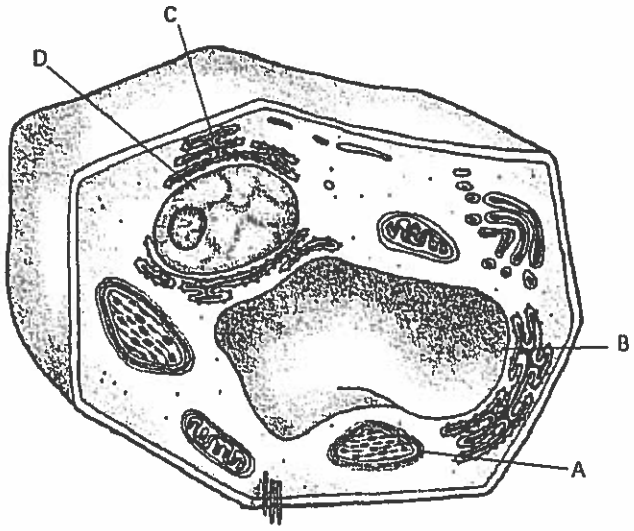


d.





40. Which of the following can be called a cell's "powerhouses?"
    a. vacuoles
    b. lysosomes
    c. flagella
    d. mitochondria

	W	w
?	Ww	ww
?	Ww	ww

41. Using the art above, what is the genotype of each parent?
    a. *WW; Ww*
    b. *Ww; ww*
    c. *Ww; Ww*
    d. *WW; WW*

42. A system for naming species in which two words are used to name an organism is _____.
    a. binomial nomenclature
    b. dichotomous keying
    c. cladistics
    d. fan diagramming

First Base in Codon	Second Base in Codon				Third Base in Codon
A	A	G	T	C	
	phenylalanine	serine	tyrosine	cysteine	A
	phenylalanine	serine	tyrosine	cysteine	G
	leucine	serine	stop	stop	T
	leucine	serine	stop	tryptophan	C
G	leucine	proline	histidine	arginine	A
	leucine	proline	histidine	arginine	G
	leucine	proline	glutamine	arginine	T
	leucine	proline	glutamine	arginine	C
T	isoleucine	threonine	asparagine	serine	A
	isoleucine	threonine	asparagine	serine	G
	isoleucine	threonine	lysine	arginine	T
	methionine (start)	threonine	lysine	arginine	C
C	valine	alanine	aspartate	glycine	A
	valine	alanine	aspartate	glycine	G
	valine	alanine	glutamate	glycine	T
	valine	alanine	glutamate	glycine	C

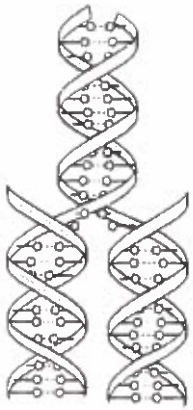
43. A codon consists of the bases adenine, guanine, and cytosine in that order. Based on the table above, which amino acid is represented by this codon?

AGC

a. cysteine
b. phenylalanine
c. serine
d. tryptophan

44. Based on the table above, which of the following nitrogen base sequences does NOT code for alanine?

a. CGA
b. CGG
c. CGT
d. CAC



45. Which cellular process is modeled in this diagram?
    a. Replication, in which DNA is copied before mitosis occurs
    b. Deletion, in which a chromosome breaks and a piece of DNA is lost
    c. Transcription, in which the information stored in DNA is copied to mRNA
    d. Translation, in which the information stored in mRNA is used to synthesize a protein

Ecosystem Factors

Group 1	Group 2	Group 3	Group 4
Soil	Soil	Soil	Soil
Water	Water	Water	Producers
Light	Light	Light	Light
Consumers	Producers	Air	Air
Rainfall	Consumers	Rainfall	Rainfall

46. The table lists four groups of factors found in a particular ecosystem. Which group consists of only abiotic factors?
    a. Group 1
    b. Group 2
    c. Group 3
    d. Group 4

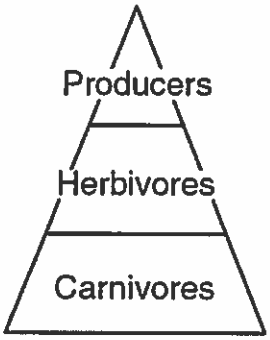
47. Natural selection can best be defined as the _____.
    a. survival of the biggest and strongest organisms in a population
    b. elimination of the smallest organisms by the biggest organisms
    c. survival and reproduction of the organisms that occupy the largest area
    d. survival and reproduction of the organisms that are genetically best adapted to the environment

48. Plant cells all have a _____ composed of cellulose.
    a. cell wall
    b. cell membrane
    c. nucleus
    d. cytoplasm

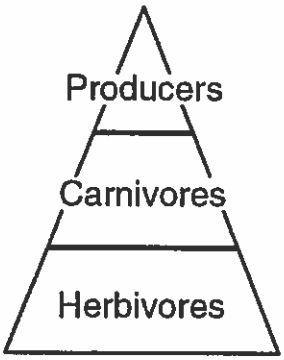
49. A person with AIDS is susceptible to all kinds of infectious diseases because HIV _____.
    a. destroys pathogens
    b. weakens the immune system
    c. causes an increase of antigens
    d. causes antibody production

50. A food pyramid represents the relative amount of energy in trophic levels. Which of the following correctly shows a food pyramid?

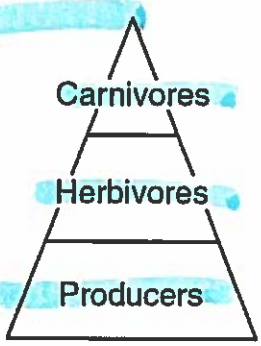
a.



b.



c.



d.