

Biology I Final Examination

Name: _____

Date: _____

1. Students are studying some leaves. They group the leaves by shape. Which science process are the students using when they put the leaves in different groups?

A. classifying B. predicting
C. measuring D. experimenting

2. The tracks below were made by a dinosaur.



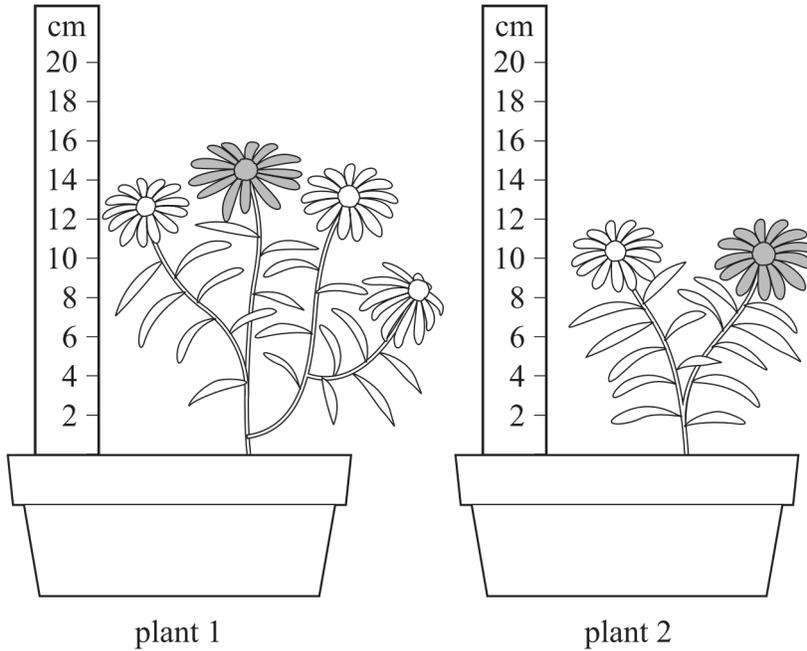
Scientists can conclude by studying these tracks that this dinosaur

- A. could not fly.
B. could not swim.
C. walked using one leg.
D. walked using two legs.

3. Which statement describes a *positive* effect of a scientific discovery?

A. It makes some people upset.
B. It takes a long time to be useful.
C. It helps explain how things work.
D. It causes work to be more difficult.

4. Students are studying the growth of the two plants shown below.



They are preparing a report about these plants. Which data table should be in their report?

A. **Growth of Plants**

Plant	Height (cm)	Number of Leaves	Number of Flowers
1	14	19	3
2	8	15	1

B. **Growth of Plants**

Plant	Height (cm)	Number of Leaves	Number of Flowers
1	16	19	4
2	12	15	2

C. **Growth of Plants**

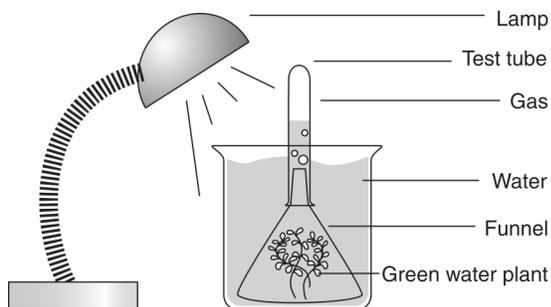
Plant	Height (cm)	Number of Leaves	Number of Flowers
1	16	10	4
2	12	8	2

D. **Growth of Plants**

Plant	Height (cm)	Number of Leaves	Number of Flowers
1	14	10	3
2	8	8	1

5. Why do scientists perform multiple trials of the same experiment?
- to include additional variables in the experiment
 - to complete the steps of the experiment in less time
 - to find a less expensive way to conduct the experiment
 - to increase the likelihood of accurate experiment results
6. Which molecule supplies the energy for cellular functions?
- ATP
 - oxygen
 - DNA
 - water
7. Which of the following gases do plants use in photosynthesis?
- hydrogen
 - oxygen
 - carbon dioxide
 - carbon monoxide

8. **Photosynthesis Experiment**



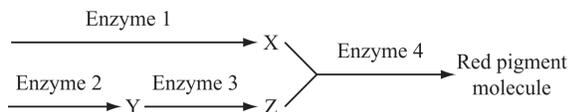
Which gas is forming in the test tube shown above?

- carbon dioxide
- hydrogen
- oxygen
- nitrogen

9. Which of the following is broken down in the body to release energy?
- sugar
 - water
 - salt
 - oxygen
10. Which of the following is produced when sugar is digested in an animal cell?
- carbon dioxide
 - chlorophyll
 - oxygen
 - sunlight
11. Which statement is true about cellular respiration?
- It produces glucose, which provides energy for the cell.
 - It produces ATP, which stores energy that is used by the cell.
 - It produces carbon dioxide, which combines with hydrogen to form sugar.
 - It produces oxygen, which combines with hydrogen to prevent cell poisoning.
12. Which process releases the *most* ATP molecules?
- aerobic respiration
 - photosynthesis
 - fermentation
13. Which type of energy is changed by plants into chemical energy?
- solar
 - nuclear
 - thermal
 - gravitational
14. Yeast cells obtain energy under anaerobic conditions through the process of
- photosynthesis.
 - cell differentiation.
 - cellular respiration.
 - alcoholic fermentation.

15. Two processes that allow cells to release energy from food are
- mitosis and meiosis.
 - excretion and diffusion.
 - fermentation and cellular respiration.
 - osmosis and spontaneous generation.

16. The diagram below shows the final steps of a biochemical pathway used by the bacterium *Serratia marcescens* to produce a red pigment molecule. Letters X, Y, and Z represent intermediate molecules produced in the pathway. Four enzymes are also involved in the pathway, as shown.



A mutant strain of *S. marcescens* produces molecules X and Y but does not produce the red pigment molecule or molecule Z.

Based on this result, it can be concluded that there must be a mutation in the gene coding for which enzyme?

- enzyme 1
 - enzyme 2
 - enzyme 3
 - enzyme 4
17. Some bacteria live in hot springs. Their cells contain enzymes that function best at temperatures of 70°C or higher.
- At a temperature of 50°C, how will the enzymes in these bacterial cells *most* likely be affected?
- The enzymes will be destroyed by lysosomes.
 - The enzymes will lose their bond structure and fall apart.
 - The enzymes will require less energy to function than at 70°C.
 - The enzymes will not increase the rate of reactions as much as they would at 70°C.

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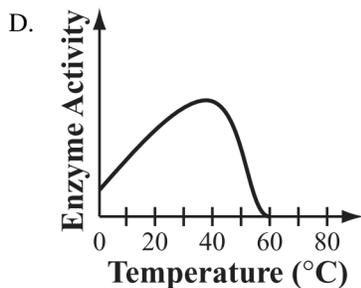
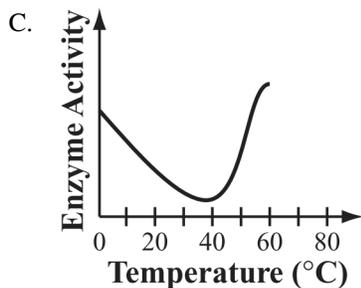
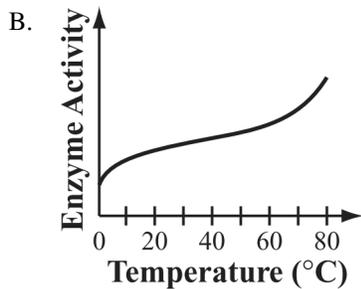
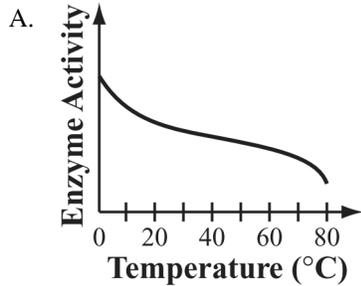
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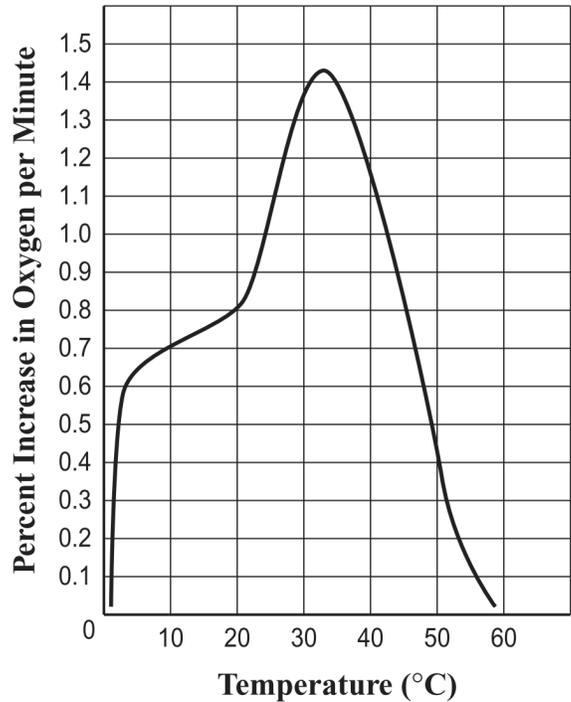
21. In the human digestive system, the enzyme trypsin acts on proteins. The optimal temperature for the enzyme is approximately 40°C.

Which of the following graphs shows how the activity of the enzyme *most likely* relates to the temperature of the reaction environment?



22. The graph below shows the rate of activity for the enzyme catalase at different temperatures. Catalase helps convert hydrogen peroxide to oxygen and water. The rate of catalase activity is directly related to the percent increase in oxygen.

Catalase Activity



Based on the graph, which of the following conclusions can be made about the functioning of catalase?

- A. Catalase works best at 34°C.
 B. Catalase is destroyed at 34°C.
 C. Catalase cannot function at 51°C.
 D. Catalase functions most efficiently at 51°C.
23. If an animal cell is placed in distilled water, it will swell and burst. The bursting of the cell is a result of which biological process?
- A. active transport B. enzyme activity
 C. osmosis D. respiration

24. All living things contain which element?

- A. helium
- B. sodium
- C. copper
- D. carbon

25. Plants and animals are composed of organic compounds. Which of the following are the common elements found in organic compounds?

- A. iron, oxygen, nickel, copper
- B. sodium, potassium, gold, hydrogen
- C. helium, neon, argon, krypton
- D. carbon, hydrogen, oxygen, nitrogen

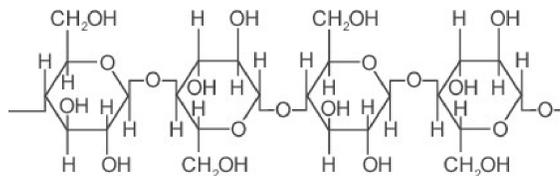
26. Which of the following compounds is *most* likely to be part of living organisms?

- A. $C_6H_{12}O_6$
- B. BF_3
- C. $MoCl_2$
- D. CsI

27. Although there are a limited number of amino acids, many different types of proteins exist because the

- A. size of a given amino acid can vary.
- B. chemical composition of a given amino acid can vary.
- C. sequence and number of amino acids is different.
- D. same amino acid can have many different properties.

28. The structural formula of cellulose is shown.



Which phrase correctly describes cellulose?

- A. A polymer made of glucose
- B. A branched form of sucrose
- C. A disaccharide
- D. A simple sugar

29. Use the pictures below to answer the question.



cell



organ



tissue

Which shows the correct order from simplest to most complex?

- A. Cell → Tissue → Organ
- B. Organ → Tissue → Cell
- C. Cell → Organ → Tissue
- D. Tissue → Organ → Cell

30. Use the pictures below to answer the question.



cell



organ



tissue

Which shows the correct order from simplest to most complex?

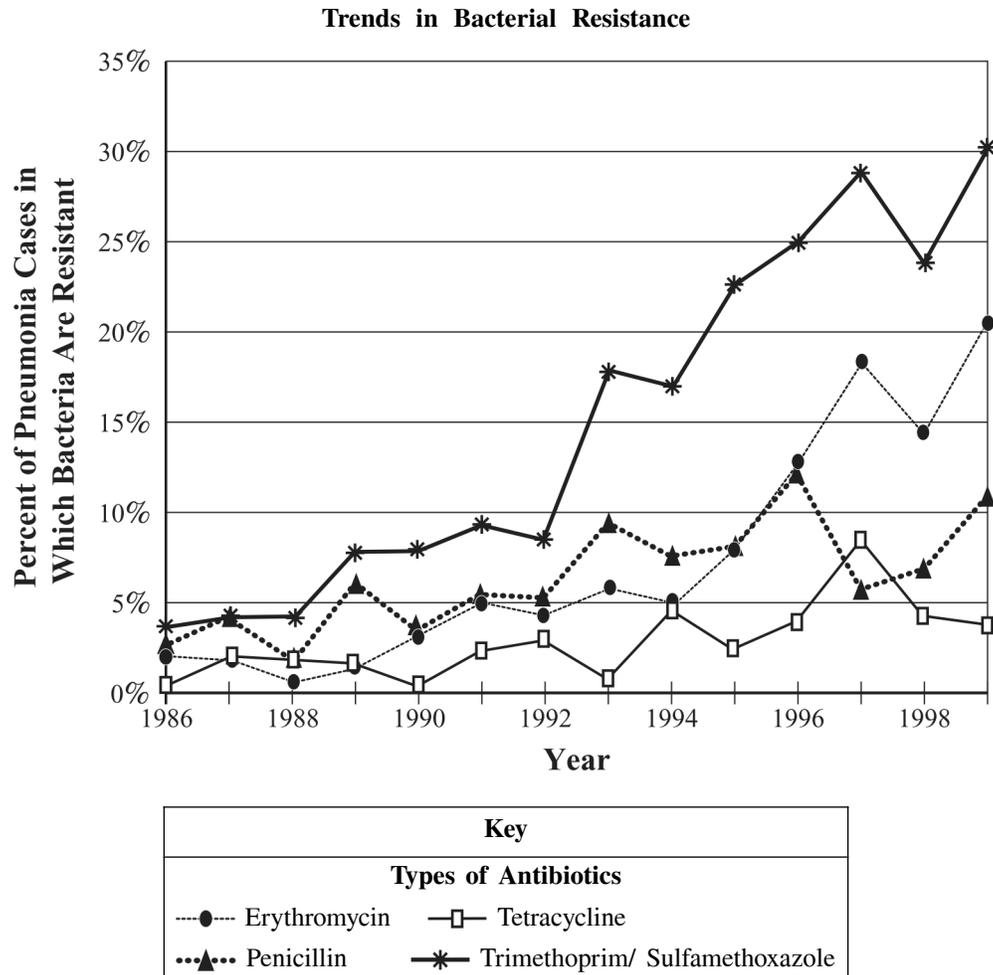
- A. Cell → Tissue → Organ
- B. Organ → Tissue → Cell
- C. Cell → Organ → Tissue
- D. Tissue → Organ → Cell

31. Many aquatic birds secrete waxy organic substances that repel water. The birds use these substances to coat their feathers. An analysis of these substances would reveal that they are composed mostly of
- A. lipids. B. proteins.
C. carbohydrates. D. nucleic acids.
32. Which of the following is a primary function of carbohydrates?
- A. storage of energy
B. transmission of genetic material
C. acceleration of chemical reactions
D. transport of molecules across membranes
33. Which of the following lists of elements contains the *most common* elements in organic compounds?
- A. calcium, iron, and potassium
B. carbon, hydrogen, and oxygen
C. chlorine, phosphorus, and sodium
D. copper, magnesium, and sulfur
34. Which of the following statements describes a DNA molecule?
- A. It contains the base uracil.
B. It has a double helix shape.
C. It contains five phosphate groups per nucleotide.
D. It has a backbone of twenty different nucleotides.

The following section focuses on bacterial resistance to several antibiotics.

One of the most important developments in modern medicine was the discovery of antibiotics. Antibiotics are used to treat infections caused by bacteria. However, strains of bacteria that are resistant to antibiotics are emerging. The rate of increase in infections caused by these antibiotic-resistant strains of bacteria is a concern for human health.

The bacterium *Streptococcus pneumoniae* is a major cause of the respiratory disease pneumonia. The graph below shows trends in bacterial resistance to different antibiotics in pneumonia cases from 1986 to 1999.



35. Resistance to antibiotics results from variations in the genetic code of *Streptococcus pneumoniae*. Which type of molecule encodes genetic information in *Streptococcus pneumoniae*?

- A. carbohydrate B. fatty acid
- C. nucleic acid D. protein

36. Which of the following is a lipid?

- A. Cholesterol B. Cellulose
- C. Glucose D. Protein

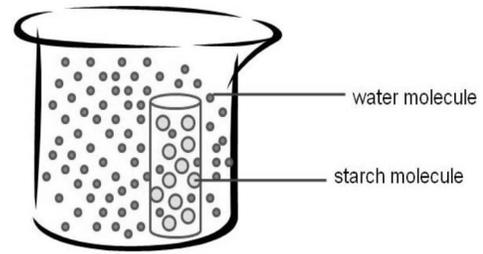
37. Why do eukaryotic cells require mitochondria?

- A. to break down cell debris for recycling
- B. to control division for cell reproduction
- C. to release stored energy for cell activities
- D. to package materials inside cells for transport

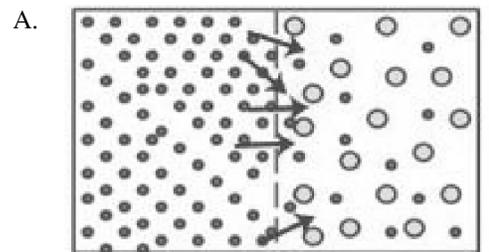
38. Which structure is outside the nucleus of a cell and contains DNA?

- A. chromosome B. gene
- C. mitochondrion D. vacuole

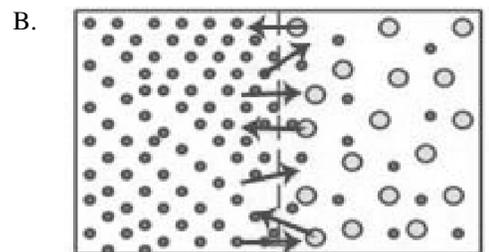
39. A potato core was placed in a beaker of water as shown in the figure below.



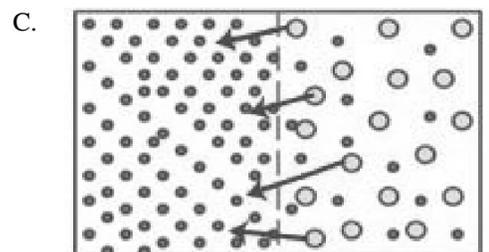
Which diagram *best* represents the net movement of molecules?



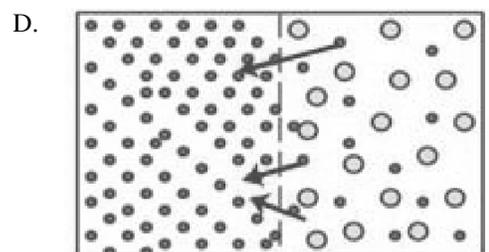
Semi-permeable membrane



Semi-permeable membrane

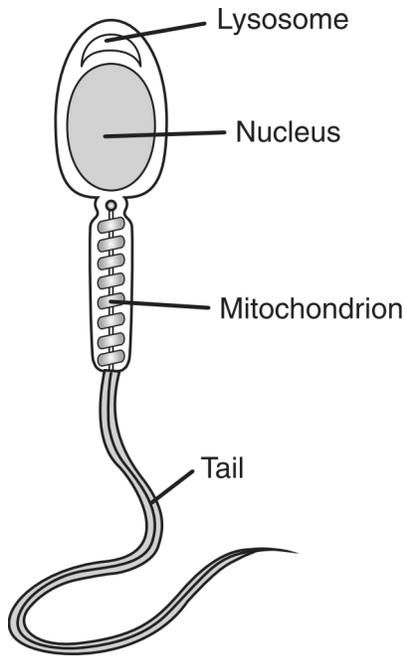


Semi-permeable membrane



Semi-permeable membrane

40. The diagram below shows a male gamete.



Which structure stores most of the genetic information?

- A. mitochondrion B. lysosome
 - C. nucleus D. tail
41. Which of the following lacks a nucleus?
- A. a plant cell B. an animal cell
 - C. an amoeba D. a virus
42. Which of the following organelles use carbon dioxide to produce sugars?
- A. vacuoles B. ribosomes
 - C. chloroplasts D. mitochondria

43. The plasma membrane of a cell consists of

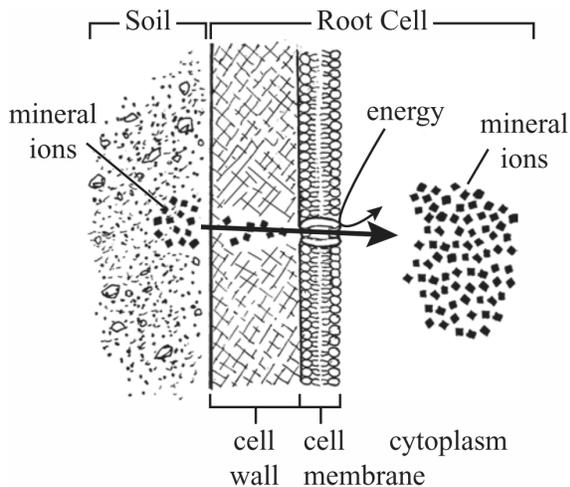
- A. protein molecules arranged in two layers with polar areas forming the outside of the membrane.
 - B. two layers of lipids organized with the nonpolar tails forming the interior of the membrane.
 - C. lipid molecules positioned between two carbohydrate layers.
 - D. protein molecules with polar and nonpolar tails.
44. Which statement about plant and animal cells is true?
- A. Plant cells have a nucleus and a cell wall; animal cells do not have either of these structures.
 - B. Plant cells have a cell wall and chloroplasts; animal cells do not have either of these structures.
 - C. Plant cells have a cell wall and a cell membrane; animal cells have a cell wall but not a cell membrane.
 - D. Plant cells have chloroplasts and mitochondria; animal cells have chloroplasts but do not have mitochondria.
45. Under what conditions will a substance be likely to enter a cell through diffusion?
- A. when the substance is a particle of food
 - B. when a molecule of the substance is very large
 - C. when the concentration of the substance is greater outside the cell than inside
 - D. when the concentration of the substance is greater inside the cell than outside

46. Blight is a plant disease caused by a fungus that affects potato plants. Some wild breeds of potato have natural resistance to the fungus. These wild potatoes contain chemical compounds that cause them to taste bad. Scientists are trying to produce potato plants that are resistant to blight but still produce potatoes that taste good.

Which of the following describes an important difference between a potato plant cell and a human cell?

- A. Plant cells have a cell wall, and animal cells do not.
- B. Animal cells store water inside, and plant cells do not.
- C. Plant cells have a cell nucleus, and animal cells do not.
- D. Animal cells perform respiration, and plant cells do not.

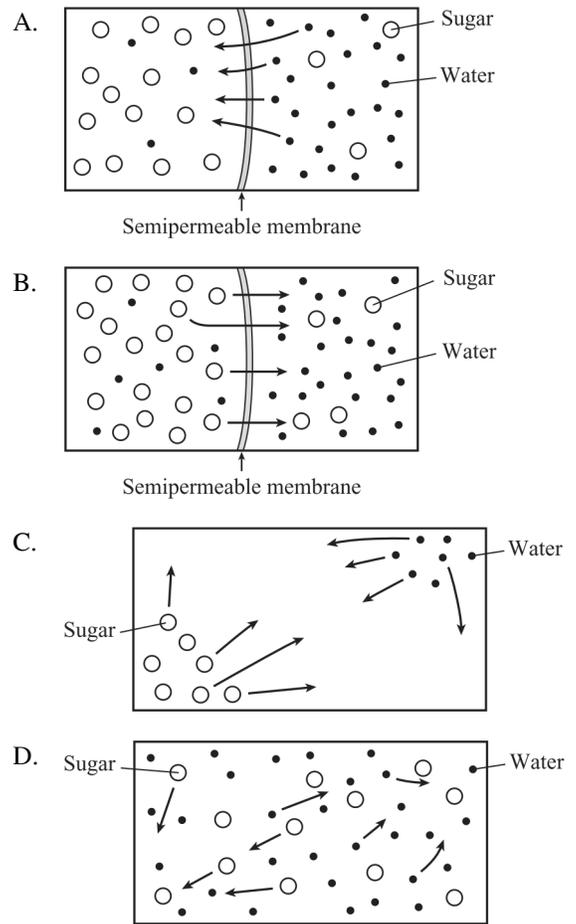
47. The diagram below illustrates how plant root cells take in mineral ions from the surrounding soil.



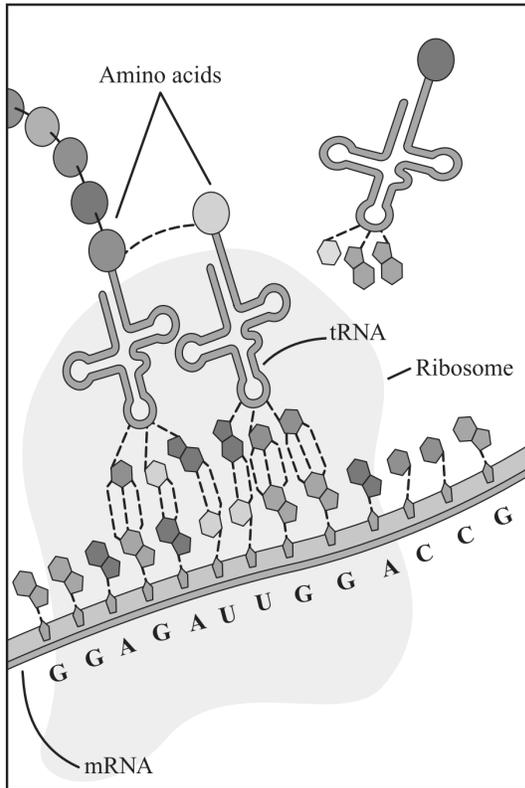
Which of the following processes is illustrated?

- A. active transport
- B. diffusion
- C. osmosis
- D. passive filtration

48. Which of the diagrams below *best* represents the net movement of molecules in osmosis?



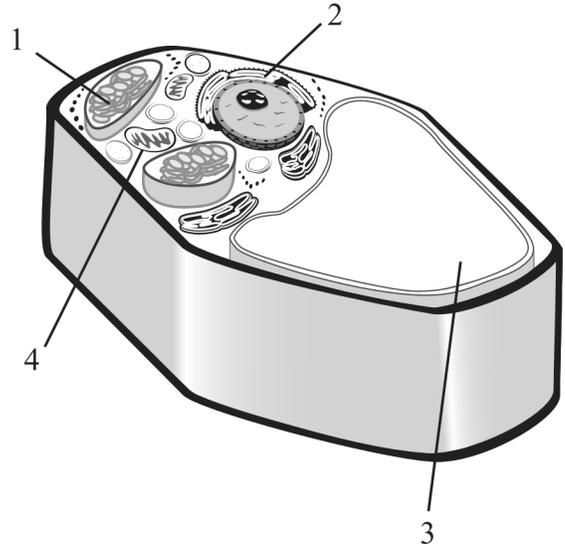
49. The diagram below represents part of a process that occurs in cells.



Which process is represented?

- A. meiosis B. osmosis
 C. replication D. translation
50. Which of the following describes DNA replication in eukaryotic cells?
- A. A copy of the DNA is made in the nucleus.
 B. A molecule of RNA is produced from the DNA.
 C. Each strand of DNA is combined with a strand of RNA.
 D. Each strand of DNA is separated into a new chromosome.

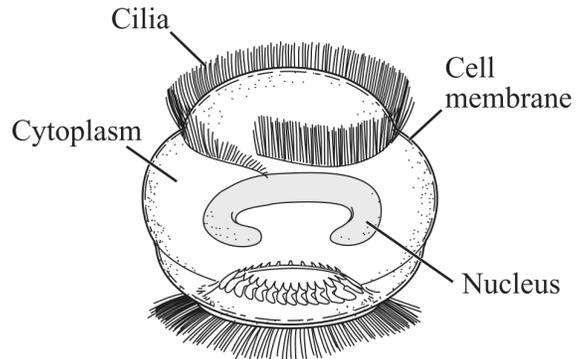
51. A diagram of a plant cell is shown below.



Which number identifies the organelle that functions to store water and dissolved salts?

- A. 1 B. 2 C. 3 D. 4

52. The diagram below represents *Trichodina*.



Trichodina is a eukaryotic organism that attaches itself to fish and eats bacteria. Which of the following distinguishes *Trichodina* from all prokaryotes?

- A. *Trichodina* is unicellular.
 B. *Trichodina* has a nucleus.
 C. *Trichodina* has cytoplasm.
 D. *Trichodina* is heterotrophic.

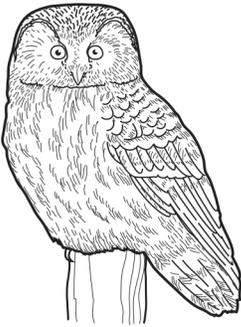
53. Which organism needs to make its own food?

A.



mushroom

B.



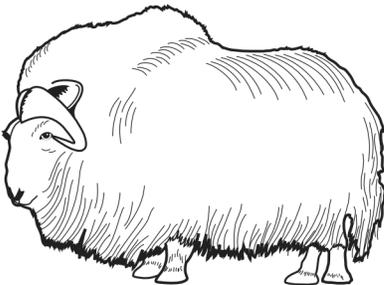
owl

C.



plant

D.



musk ox

54. How do the spines of a cactus help it survive?

- A. Spines help the cactus get moisture.
- B. Spines anchor the cactus in the ground.
- C. Spines protect the cactus from animals.
- D. Spines support the stems and branches of the cactus.

55. Which of the following *best* explains how stems transport water to other parts of the plant?

- A. through a chemical called chlorophyll
- B. by using photosynthesis
- C. through a system of tubes
- D. by converting water to food

56. Which animals are *most* likely to carry the seeds found in berries from the parent plant to another area?

- A. bees
- B. birds
- C. flies
- D. caterpillars

57. Many animals depend on plants for

- A. shelter.
- B. pollination.
- C. seed dispersal.
- D. sunlight.

58. Peach trees have sweet-smelling blossoms and produce rich fruit. What is the main purpose of the flowers of a peach tree?

- A. to attract bees for pollination
- B. to create flower arrangements
- C. to protect the tree from disease
- D. to feed migratory birds

59. Study the table below.

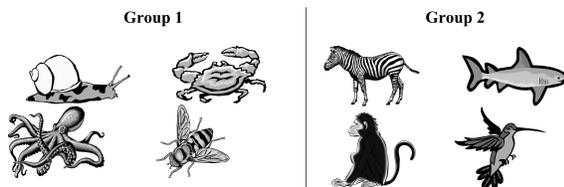
Student's Observation of Characteristics

Organism	Characteristic 1	Characteristic 2
W	teeth	scales
X	reproduces	grows
Y	hair	moves
Z	feathers	eats

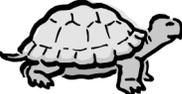
A student records observed characteristics for four organisms. Based on this student's observations, which organism has two characteristics of *all* living things?

- A. organism W B. organism X
 C. organism Y D. organism Z

60. The pictures below show animals separated into two groups.



The animals are grouped by whether they have a backbone or not. Which of the following belongs in Group 1?

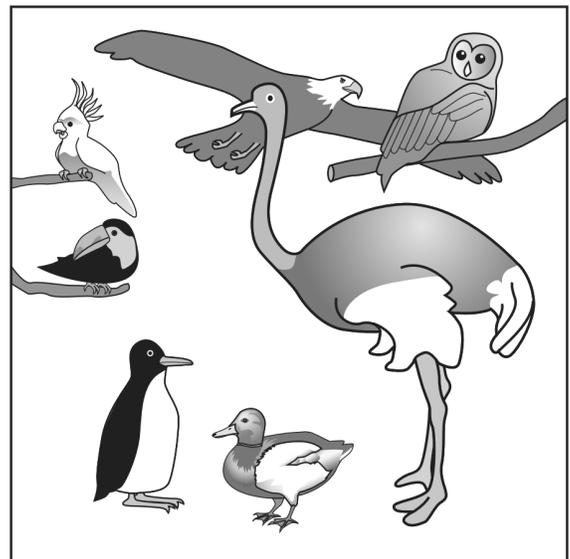
- A. 
- B. 
- C. 
- D. 

61. Many life scientists study only one kind of animal their entire career. Which type of life scientist would likely study the animal shown below?



- A. fish scientist B. snail scientist
 C. insect scientist D. reptile scientist

62. The picture below shows several different birds.



What characteristic do all birds share?

- A. They can fly.
 B. They have feathers.
 C. They have webbed feet.
 D. They eat worms.

63. The following table lists characteristics of five different types of animals. Use the information in the table to answer the following question(s).

Characteristics	Type I	Type II	Type III	Type IV	Type V
Segments	fewer than 5 segments	5 or more segments	fewer than 5 segments	fewer than 5 segments	5 or more segments
Antennae	one pair of antennae	one pair of antennae	no antennae	two pairs of antennae	no antennae
Number of Legs	fewer than 10 legs	10 or more legs	fewer than 10 legs	10 or more legs	no legs
Mandibles	yes	yes	no	yes	no
Exoskeleton	yes	yes	yes	yes	no
Wings	yes	no	no	no	no

An animal has 20 body segments and has no mandibles. Which type of animal is it?

- A. Type II B. Type III
 C. Type IV D. Type V
64. Which of the following is the template for the production of RNA within a cell?
- A. DNA B. ATP
 C. protein D. carbohydrate
65. Which sequence of DNA bases would pair with the ones shown in the partial strand below?

1 2 3
 ATG TGA CAG

- A. 1 2 3
 ATG TGA CAG
- B. 1 2 3
 TAC ACT GTC
- C. 1 2 3
 GTA AGT GAC
- D. 1 2 3
 CAT TCA CTG

66. What molecules do both DNA and RNA contain?
- A. uracil B. thymine
 C. nucleotides D. deoxyribose

67. Which of the following *best* describes how DNA and RNA are similar?
- A. They both contain the nitrogen bases thymine and adenine.
 B. They both are formed in a double-helix structure.
 C. They both are composed of five different nucleotides.
 D. They both contain the nitrogen bases cytosine and guanine.

68. **Codons Found in Messenger RNA**

		Second Base				
		U	C	A	G	
First Base	U	Phe	Ser	Tyr	Cys	U
	Phe	Ser	Tyr	Cys	C	
	Leu	Ser	Stop	Stop	A	
	Leu	Ser	Stop	Trp	G	
C	Leu	Pro	His	Arg	U	
Leu	Pro	His	Arg	C		
Leu	Pro	Gln	Arg	A		
Leu	Pro	Gln	Arg	G		
A	Ile	Thr	Asn	Ser	U	
Ile	Thr	Asn	Ser	C		
Ile	Thr	Lys	Arg	A		
Met	Thr	Lys	Arg	G		
G	Val	Ala	Asp	Gly	U	
Val	Ala	Asp	Gly	C		
Val	Ala	Glu	Gly	A		
Val	Ala	Glu	Gly	G		

A strand of mRNA containing the repeating sequence AAGAAGAAGAAG could code for which of the following amino acid sequences?

- A. lys-arg-glu-lys B. ser-ser-glu-glu
 C. lys-arg-lys-arg D. lys-lys-lys-lys
69. One human disease is caused by a change in one codon in a gene from GAA to GUA. This disease is the result of
- A. a mutation. B. a meiosis error.
 C. crossing-over. D. polyploidy.

70. 5' G T A _____ A A 3'
3' C A T G C A T T 5'

This segment of DNA has undergone a mutation in which three nucleotides have been deleted. A repair enzyme would replace them with

A. CGT. B. GCA. C. CTG. D. GTA.

71. Semi-conservative replication of DNA refers to the idea that

- A. DNA molecules need to unwind before duplication begins.
- B. each new DNA molecule contains two new single RNA strands.
- C. the two strands of DNA molecules run in opposite directions.
- D. each half of the original DNA molecule is joined with a new complementary DNA strand.

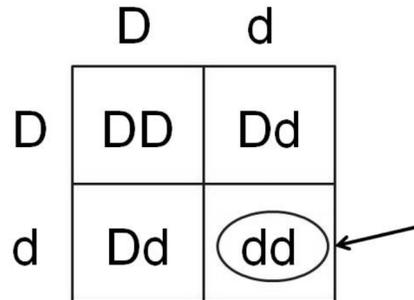
72. If Jessica has light eyes (*bb*) and both of her parents have dark eyes (*Bb*) which statement is true?

- A. Jessica inherited both genes from her father.
- B. Jessica inherited both genes from her mother.
- C. Jessica inherited one recessive form of the gene from each parent.
- D. Jessica inherited one dominant form of the gene from each parent.

73. Which statement about the genetic traits of humans is true?

- A. Recessive forms of genes are always visible in offspring.
- B. Visible traits are the same for each member of a family.
- C. Dominant forms of genes are always inherited from both parents.
- D. Visible traits depend on the dominant and recessive forms of genes from each parent.

74. The figure below shows a Punnet Square for an inherited trait.



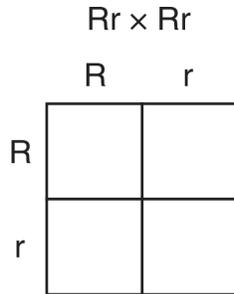
The arrow is pointing to a circled genotype in the square. What genotype does the circled “dd” represent?

- A. the genotype in the mother’s egg
- B. the genotype that only the girls will inherit
- C. the genotype that any of the children could inherit
- D. the genotype that exactly $\frac{1}{4}$ of the children will inherit

75. In fruit flies, the allele for red eyes (*R*) is dominant and the allele for sepia eyes (*r*) is recessive. A female fly has red eyes. How can you determine the female fly’s genotype?

- A. Mate the female with a male with red eyes. If any of the offspring have sepia eyes, she must be *RR*.
- B. Mate the female with a male with red eyes. If any of the offspring have red eyes, she must be *Rr*.
- C. Mate the female with a male with sepia eyes. If any of the offspring have sepia eyes, she must be *Rr*.
- D. Mate the female with a male with sepia eyes. If any of the offspring have red eyes, she must be *RR*.

76. The diagram below represents a cross between two pea plants.



In pea plants, the allele for round seeds (R) is dominant to the allele for oval seeds (r). In a cross between the two plants above, what percentage of the offspring will have round seeds?

- A. 100% B. 75% C. 50% D. 25%
77. In fruit flies, the gene for red eyes (R) is dominant and the gene for sepia eyes (r) is recessive. What are the possible combinations of genes in the offspring of two red-eyed heterozygous flies (Rr)?

- A. RR only
 B. rr only
 C. Rr and rr only
 D. RR, Rr, and rr only

78. If a human baby boy inherits a recessive allele from his mother, in which circumstance would he *most* likely show the trait coded for by the recessive allele?

- A. The baby inherits the dominant allele from his father.
 B. The allele is on an autosomal chromosome and the baby is a twin.
 C. The allele is on the X chromosome.
 D. The allele is on the Y chromosome.

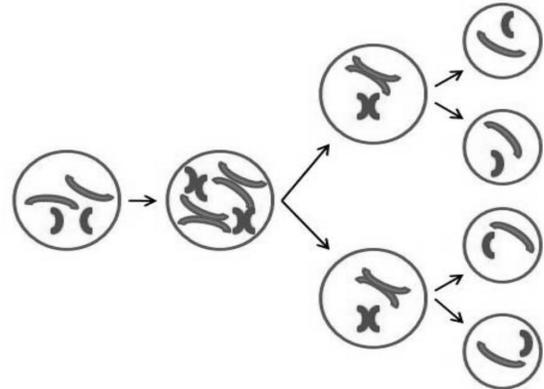
79. **Rabbit coat color**

Allele	Phenotype
C	Rabbit with fully colored coat
c ^{ch}	Rabbit with light gray coat
c ^h	Himalayan rabbit: white with dark ear tips, nose, paws, and tail
c	Albino rabbit

Order of dominance C → c^{ch} → c^h → c

The chart shows four alleles at the same locus that affect rabbits' coat color. Each allele is dominant to the ones below it. Rabbits with an albino or Himalayan coat are more susceptible to predators. Which of the following genotypes will produce a rabbit that is *least* likely to survive?

- A. c^{ch}c B. Cc C. c^hc D. Cc^h
80. The distribution of chromosomes in one type of cell division is shown in the diagram below.



Which process and type of resulting cells are represented in the diagram?

- A. mitosis, which produces gametes
 B. mitosis, which produces body cells
 C. meiosis, which produces gametes
 D. meiosis, which produces body cells

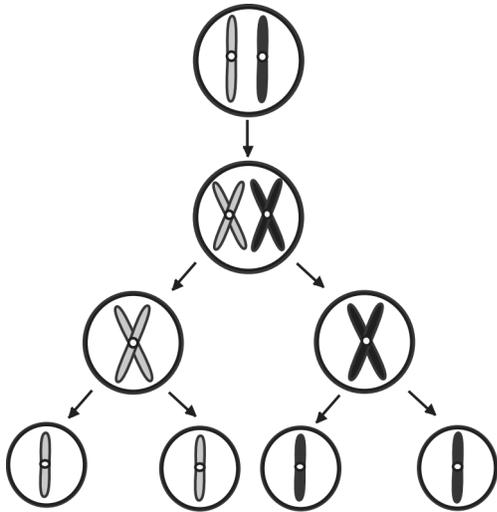
81. Which of the following produces identical nuclei in cells?

- A. pollination B. mitosis
C. osmosis D. fertilization

82. Which of the following cell types is formed by meiosis?

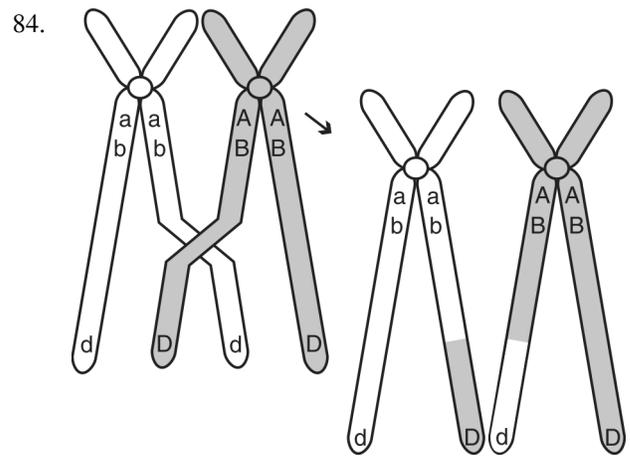
- A. muscle cells B. sperm cells
C. skin cells D. blood cells

83. The diagram below shows a cellular process that occurs in organisms.



This process is known as

- A. meiosis. B. mitosis.
C. endocytosis. D. phagocytosis.



The diagram above shows homologous chromosomes during prophase I of meiosis. Which of the following correctly describes the process being illustrated?

- A. mutation in which the DNA content of the gene is altered
B. segregation of sister chromatids
C. condensation and segregation of alleles
D. crossing-over in which alleles are exchanged

85. Which of the following sequences represents chromosome number during fertilization?

- A. $n + n \rightarrow 2n$ B. $2n \rightarrow n + n$
C. $n \rightarrow n$ D. $2n \rightarrow 2n$

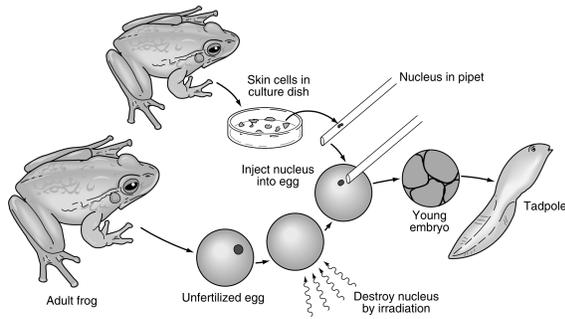
86. Based only on the sex chromosomes in typical human egg and sperm cells at fertilization, the probability of producing a female is

- A. 25%. B. 50%. C. 75%. D. 90%.

87. Mendel hypothesized that reproductive cells have only one factor for each inherited trait. This hypothesis is supported by the observation that

- A. haploid cells are produced by mitosis.
B. diploid cells are produced by mitosis.
C. haploid cells are produced by meiosis.
D. diploid cells are produced by meiosis.

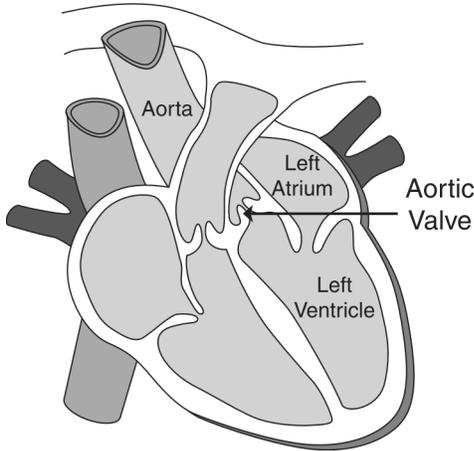
88. The diagram below shows the procedure scientists used to clone a frog from the nucleus of a skin cell.



Every body cell in a frog contains the exact same genetic information. What accounts for the different tissues in an adult frog?

- A. Tissues cause mutations in the genetic material.
- B. Different tissues have different genes that are active.
- C. Frogs can alter their DNA to have genes produce different proteins.
- D. The genes undergo metamorphosis.
89. Which two body systems would *most directly* remove extra fluid from a person's lungs?
- A. nervous and digestive
- B. nervous and circulatory
- C. respiratory and digestive
- D. respiratory and circulatory
90. Which is a primary function that kidneys perform for the excretory system?
- A. They control sensory input using nerve cells.
- B. They conduct chemical digestion using hormones.
- C. They remove waste from blood using filtration structures.
- D. They exchange oxygen for carbon dioxide using capillaries.
91. Which list shows different levels of organization within a population ordered from *least* to *most* complex?
- A. organ systems, organs, organelles, organisms
- B. organelles, organs, organ systems, organisms
- C. organisms, organ systems, organs, organelles
- D. organs, organelles, organisms, organ systems
92. Which of the following systems breaks food into nutrients that can be used by the body?
- A. circulatory
- B. digestive
- C. respiratory
- D. reproductive
93. Where does oxygen-rich blood go after leaving the lungs?
- A. the brain
- B. the heart
- C. the kidney
- D. the stomach
94. Which of the following levels of organization *best* represents the sequence from smallest unit to largest?
- A. A cell, organism, organ, tissue
- B. cell, tissue, organ, organ system
- C. cell, organism, tissue, organ system
- D. cell, tissue, organism, organ

95. The diagram below shows a human heart.



When contracted, the left ventricle pumps oxygenated blood to the body. What is the purpose of the aortic valve that separates the left ventricle from the aorta?

- A. to prevent blood from flowing back into the left ventricle
- B. to prevent blood from flowing into the aorta
- C. to push blood into the left ventricle
- D. to push blood into the aorta

96. Blood type indicates the type of antigens present on red blood cells. For a transfusion to be successful, the donor's blood type and the recipient's blood type must be compatible. If not, antibodies present in the plasma of the recipient will cause the blood to clump.

BLOOD TYPES

BLOOD TYPE	ANTIGENS	ANTIBODIES
O	none	anti-A and anti-B
A	A	anti-B
B	B	anti-A
AB	A and B	none

According to the table, a person with which blood type could donate blood to any other individual, regardless of the recipient's blood type?

- A. O
- B. A
- C. B
- D. AB

97. Nutrition involves those activities by which organisms

- A. remove cellular waste products.
- B. obtain and process materials needed for other activities.
- C. exchange gases with their environment.
- D. absorb and circulate materials.

98. Western coral snakes have a striped color pattern and are poisonous. Arizona mountain kingsnakes look like western coral snakes but are not poisonous.

The color pattern of the Arizona mountain kingsnake is an example of

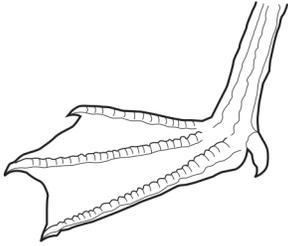
- A. camouflage.
- B. mimicry.
- C. mutualism.
- D. parasitism.

99. Ducks live near ponds and lakes. The shape of a duck's foot helps it swim and walk on muddy ground. Which factor is *most* important in determining the shape of a baby duck's foot?

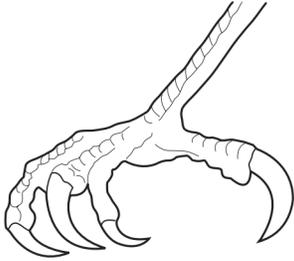
- A. the shape of the parent ducks' feet
- B. the temperature of the pond water
- C. the amount of mud in the bottom of the pond
- D. the amount of rain that fell before the duck was born

100. Which bird foot is *best* for swimming?

A.



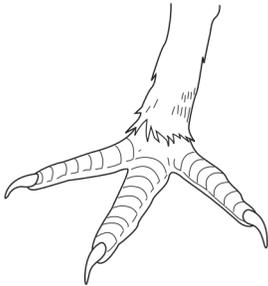
B.



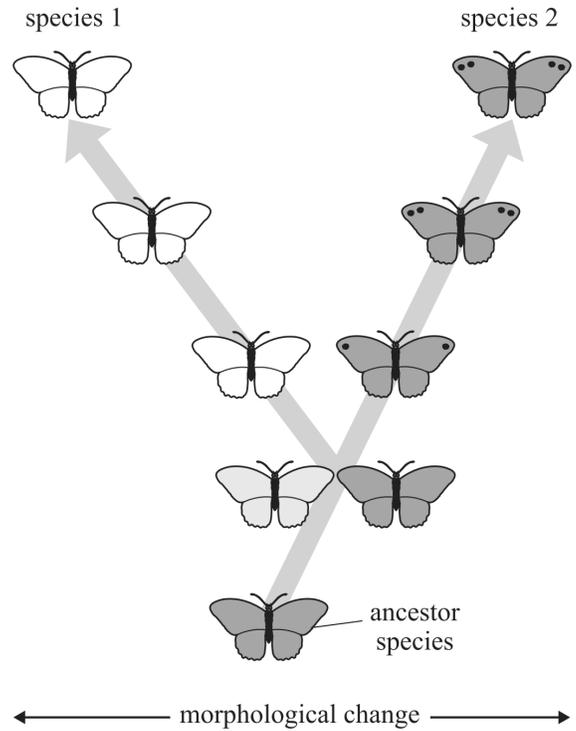
C.



D.



101. The illustration below shows the morphological change of two species.



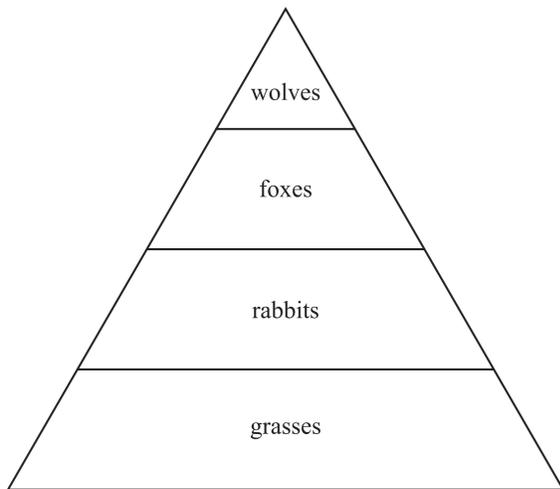
Which statement explains why species 1 and species 2 are different?

- A. An individual changed itself to suit the environment.
- B. Natural selection can cause gradual speciation changes.
- C. Interbreeding of species 2 results in no genetic mutations.
- D. Extinction of ancestor species occurs as a result of interbreeding.

102. Which statement about fossils could be used as evidence that evolution by natural selection has been in effect for millions of years?

- A. Fossils found in higher layers of rock are older than those found in lower layers.
- B. Fossils found in lower layers of rock are more complex than those found in higher layers.
- C. Fossils of current species have been found throughout rock layers that are billions of years old.
- D. Fossils of species that no longer exist but are ancestors of current species have been found in rock layers.

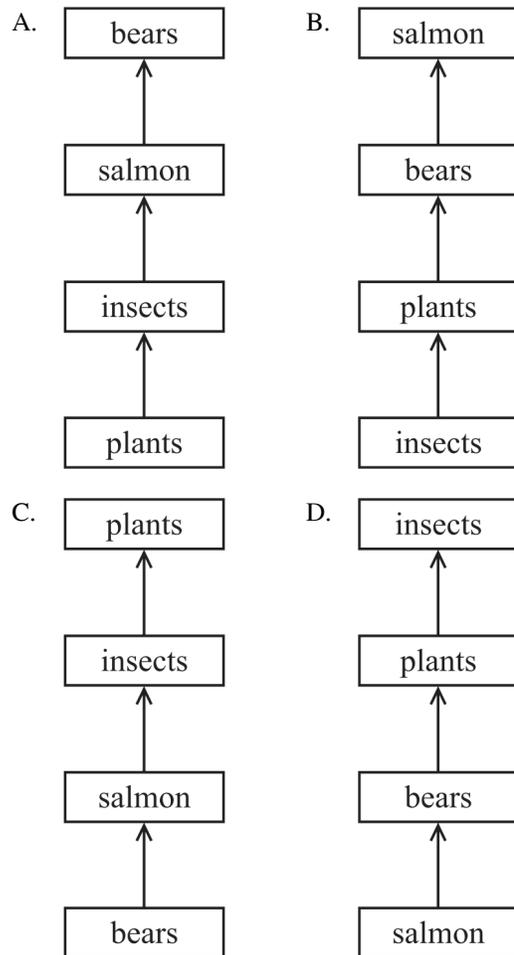
103. The picture below shows an energy pyramid.



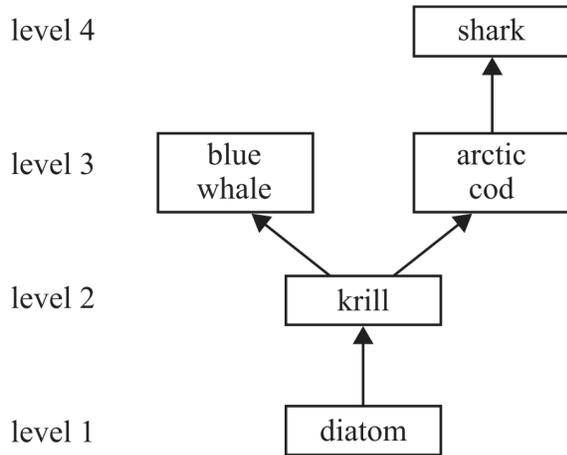
What will *most likely* happen to the foxes and the wolves if the rabbits are removed?

- 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.

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



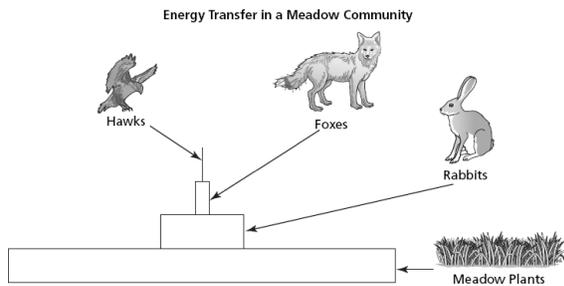
105. A marine food web is shown in the diagram below.



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

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

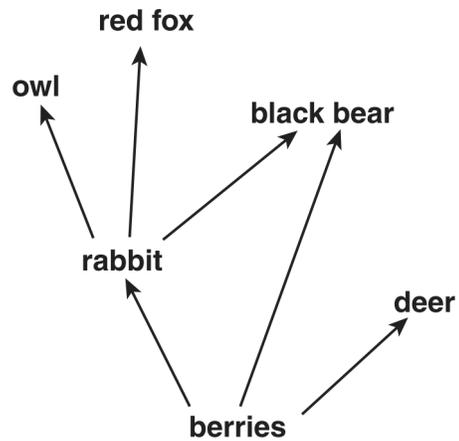
106. The picture below shows the energy flow through a meadow community.



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.

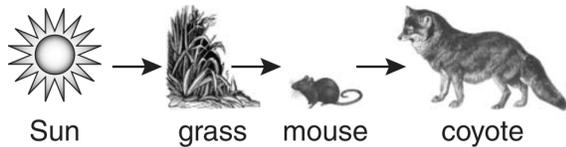
107. The diagram below shows a simple food web.



Which animal is classified as an omnivore?

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

108. The diagram below shows a simple food web.

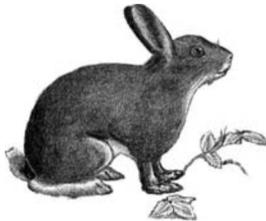


Which of the following animals might compete with the coyote in this food chain?

A.



B.



C.



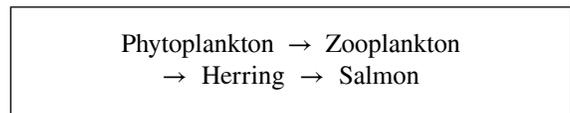
D.



109. Decomposers are important in the food chain because they

- A. produce their own food using light from the Sun.
- B. stop the flow of energy from one organism to another.
- C. break down dead organisms and recycle nutrients into the soil.
- D. are microscopic and other organisms cannot consume them.

110. The diagram below shows a marine food chain.



The zooplankton in this food chain are

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

111. What is a primary role of decomposers in an ecosystem?

- A. They eliminate matter by taking nitrogen from the ecosystem.
- B. They eliminate matter by taking phosphorus from the ecosystem.
- C. They cycle matter by returning carbon and other matter to the ecosystem.
- D. They cycle matter by returning oxygen and other matter to the ecosystem.

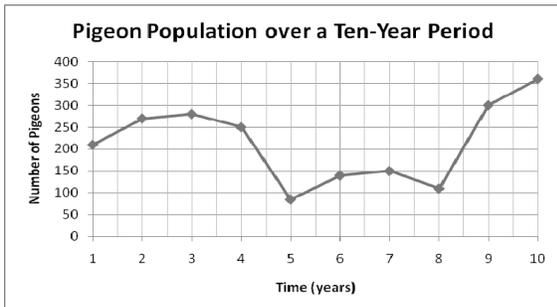
112. Which of the following does *not* give an example of how sparrows use resources in their environment to survive?

- A. Sparrows breathe air.
- B. Sparrows drink water.
- C. Sparrows use the sun for food.
- D. Sparrows use plants for shelter.

113. In a desert environment, cactus wrens often build their nests in cholla cacti to avoid predators. This behavior does not hurt the cacti. Which type of relationship do cactus wrens and cholla cacti demonstrate?

- A. competitive
- B. commensalism
- C. mutualism
- D. parasitism

114. The graph below shows a population of pigeons living in a neighborhood over a ten-year period.



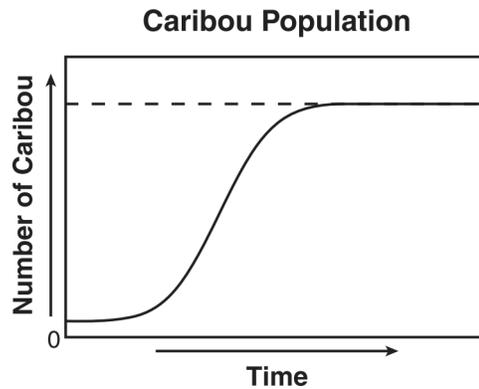
Which of the following statements could account for the change in population seen between years 7 and 8?

- A. The birth rate of the pigeons increased.
- B. The emigration rate of the pigeons decreased.
- C. The death rate of the pigeons exceeded the birth rate.
- D. The neighborhood reached its carrying capacity for the pigeon population.

115. Salt concentration, water temperature, plankton, and the whale shark might all be used in a description of an ocean

- A. climate.
- B. food web.
- C. ecosystem.
- D. population.

116. The graph below shows changes in a caribou population over time.



Based on the graph, which of the following is a possible explanation for the stabilization of the caribou population?

- A. an equal number of deaths and births
- B. an unequal number of deaths and births
- C. an equal number of immigrants and births
- D. an unequal number of immigrants and deaths

117. After a volcanic eruption has covered an area with lava, which of the following is the *most* likely order of succession in the repopulation of the area?

- A. lichens → grasses → shrubs → trees
- B. mosses → grasses → lichens → trees
- C. grasses → trees → mosses → lichens
- D. shrubs → grasses → trees → lichens

118. Scientists found that, over a period of 200 years, a mountain pond was transformed into a meadow. During that time, several communities of organisms were replaced by different communities. Which of these best explains why new communities were able to replace older communities?

- A. The original species became extinct.
- B. Species in the older community died from old age.
- C. The abiotic characteristics of the habitat changed.
- D. Diseases that killed the older organisms disappeared.

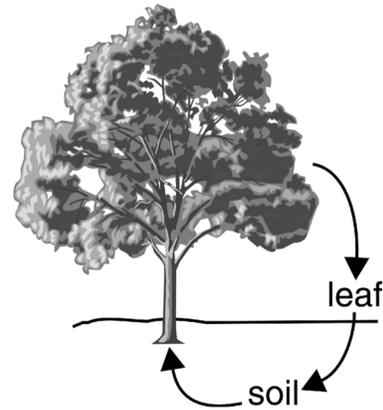
119. Carbon in the atmosphere is *most* often found as which of the following compounds?

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

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

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

121. 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

122. 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.

123. In one of the steps of the carbon cycle, a person exhales a molecule of carbon dioxide (CO_2) 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.