

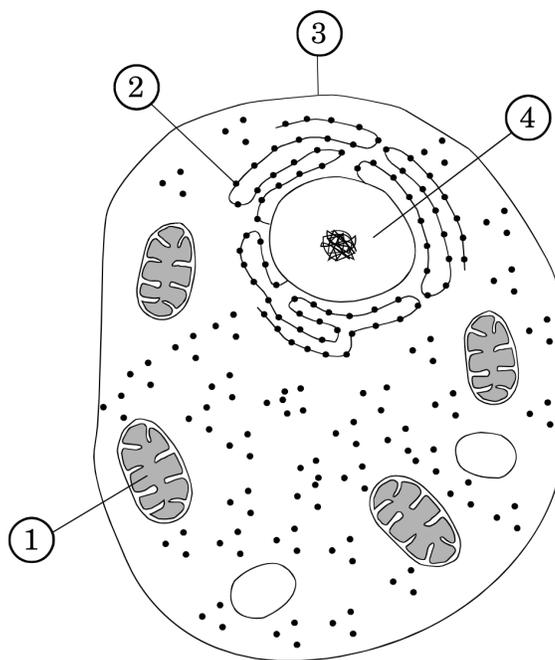
EOC Practice Exam

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

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

- An iodine solution is placed on the cut side of a potato. Within seconds, a blue-black color appears. What is *most likely* occurring?
  - a positive test for proteins
  - a positive test for starches
  - a negative test for proteins
  - a negative test for starches
  
- A person with swollen gums rinses his mouth with warm salt water, and the swelling decreases. Which has occurred?
  - The swollen gums have absorbed the saltwater solution.
  - The saltwater solution lowers the temperature of the water in the gums.
  - The salt in the solution has moved against the concentration gradient.
  - The water in the gums has moved from a high to a low concentration of water.
  
- Which statement *best* explains the reason muscle cells have more mitochondria than skin cells?
  - Muscle cells use more energy than skin cells.
  - Muscle cells have fewer proteins than skin cells.
  - Muscle cells have a smaller nucleus than skin cells.
  - Muscle cells have more excess water than skin cells.

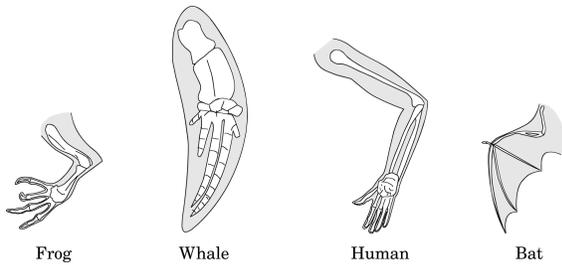
- This diagram represents a cell.



Which organelle is the site where amino acids are synthesized into proteins?

- 1
  - 2
  - 3
  - 4
- 
- Which organism is *most likely* to use anaerobic respiration?
    - bird
    - moss
    - tree
    - yeast

6. This diagram represents the bone structures of the front limbs of four different animals.



What do the similarities of the structures suggest about these organisms?

- They grow at the same rate.
- They live in the same environment.
- They live for the same length of time.
- They evolved from a common ancestor.

7. This chart represents amino acids that are coded from different combinations of mRNA codons.

Codons in mRNA									
First Base	Second Base						Third Base		
	U	C		A		G			
	UUU	Phenylalanine	UCU	Serine	UAU	Tyrosine	UGU	Cysteine	U
U	UUC	Phenylalanine	UCC	Serine	UAC	Tyrosine	UGC	Cysteine	C
	UUA	Leucine	UCA	Serine	UAA	Stop	UGA	Stop	A
	UUG	Leucine	UCG	Serine	UAG	Stop	UGG	Tryptophan	G
	CUU	Leucine	CCU	Proline	CAU	Histidine	CGU	Arginine	U
C	CUC	Leucine	CCC	Proline	CAC	Histidine	CGC	Arginine	C
	CUA	Leucine	CCA	Proline	CAA	Glutamine	CGA	Arginine	A
	CUG	Leucine	CCG	Proline	CAG	Glutamine	CGG	Arginine	G
	AUU	Isoleucine	ACU	Threonine	AAU	Asparagine	AGU	Serine	U
A	AUC	Isoleucine	ACC	Threonine	AAC	Asparagine	AGC	Serine	C
	AUA	Isoleucine	ACA	Threonine	AAA	Lysine	AGA	Arginine	A
	AUG	Methionine or start	ACG	Threonine	AAG	Lysine	AGG	Arginine	G
	GUU	Valine	GCU	Alanine	GAU	Aspartic Acid	GGU	Glycine	U
G	GUC	Valine	GCC	Alanine	GAC	Aspartic Acid	GGC	Glycine	C
	GUA	Valine	GCA	Alanine	GAA	Glutamic Acid	GGA	Glycine	A
	GUG	Valine	GCG	Alanine	GAG	Glutamic Acid	GGG	Glycine	G

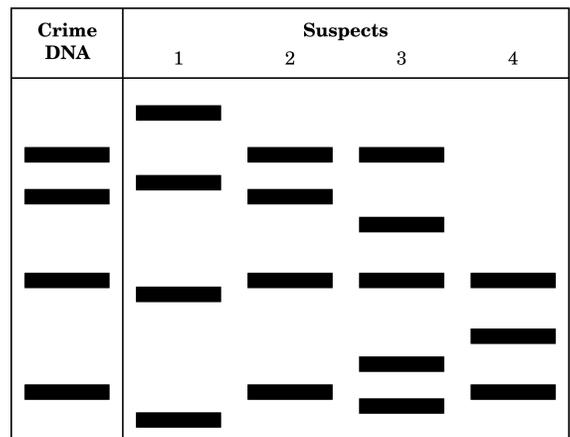
Which amino acid sequence can be coded from the DNA sequence CAG TAG CGA?

- Valine — Isoleucine — Glycine
- Valine — Aspartic Acid — Alanine
- Valine — Isoleucine — Alanine
- Valine — Phenylalanine — Alanine

8. Which set of parents can *most likely* produce a child with type O blood?

- one parent with type AB blood, and the other parent with type A blood
- one parent with type AB blood, and the other parent with type O blood
- one parent with heterozygous type A blood, and the other parent with type O blood
- one parent with homozygous type A blood, and the other parent with homozygous type B blood

9. This diagram represents samples of DNA that were cut with a restriction enzyme during DNA fingerprinting in a crime lab.



Which technique was used to produce these bands?

- cloning
- gel electrophoresis
- gene splicing
- genetic engineering

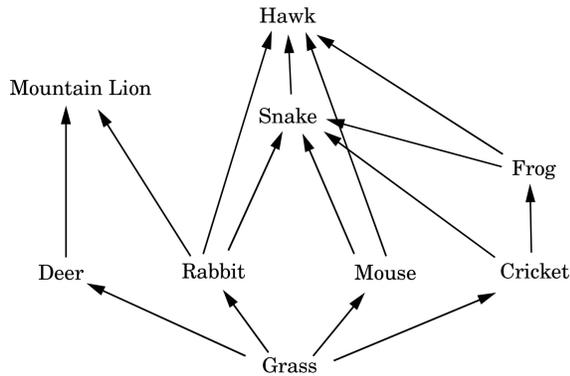
10. What process produces many variations in phenotypes?

- independent assortment
- asexual reproduction
- regeneration
- cloning

11. Which disease *most likely* occurs after excessive exposure to ultraviolet radiation?
- A. malaria                      B. asthma  
C. skin cancer                  D. polio

12. A plant species lives in an area with limited sunlight. Which physical adaptation would be *most* useful to the plant?
- A. colorful flowers            B. large leaves  
C. deep roots                  D. thin cuticle

13. This diagram shows a food web of a meadow.

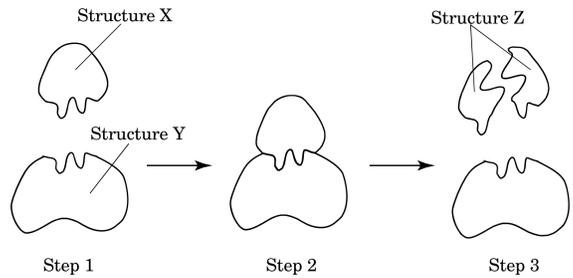


Due to insecticides, the cricket population is greatly reduced. Which population is *most* affected by this event?

- A. Mouse                      B. Hawk  
C. Grass                      D. Frog
14. The crab *Lybia tessellata* carries a pair of sea anemones on its claws. The crab uses the sea anemone's stinging tentacles as protection and the sea anemone obtains small food particles released by the crab as it feeds. Which type of symbiotic relationship does this *best* illustrate?
- A. commensalism              B. mutualism  
C. parasitism                  D. predation

15. Which substance is considered to be a factor affecting Earth's ozone layer?
- A. chlorofluorocarbons      B. ethyl alcohol  
C. nitrogen gas                D. water vapor

16. This diagram shows an enzyme-substrate complex.



Which is represented by Structure X?

- A. substrate                    B. product  
C. enzyme                      D. complex
17. Two different species of bacteria are examined. Scientists find that Species X always produces CO<sub>2</sub> and H<sub>2</sub>O during cellular respiration. Species Y always produces ethyl alcohol and CO<sub>2</sub>. Which conclusion can be made from these observations?
- A. Only Species Y is aerobic.  
B. Only Species Y is anaerobic.  
C. Both Species X and Y are aerobic.  
D. Both Species X and Y are anaerobic.
18. What advantage do sexually reproducing organisms have over asexually reproducing organisms?
- A. genetic variation  
B. genetic stability  
C. increased fertilization rate  
D. increased reproductive rate

19. This chart shows a list of messenger RNA codons.

Codons in mRNA									
First Base	Second Base						Third Base		
	U	C	A	G					
U	UUU	Phenylalanine	UCU	Serine	UAU	Tyrosine	UGU	Cysteine	U
	UUC	Phenylalanine	UCC	Serine	UAC	Tyrosine	UGC	Cysteine	C
	UUA	Leucine	UCA	Serine	UAA	Stop	UGA	Stop	A
	UUG	Leucine	UCG	Serine	UAG	Stop	UGG	Tryptophan	G
C	CUU	Leucine	CCU	Proline	CAU	Histidine	CGU	Arginine	U
	CUC	Leucine	CCC	Proline	CAC	Histidine	CGC	Arginine	C
	CUA	Leucine	CCA	Proline	CAA	Glutamine	CGA	Arginine	A
	CUG	Leucine	CCG	Proline	CAG	Glutamine	CGG	Arginine	G
A	AUU	Isoleucine	ACU	Threonine	AAU	Asparagine	AGU	Serine	U
	AUC	Isoleucine	ACC	Threonine	AAC	Asparagine	AGC	Serine	C
	AUA	Isoleucine	ACA	Threonine	AAA	Lysine	AGA	Arginine	A
	AUG	Methionine or start	ACG	Threonine	AAG	Lysine	AGG	Arginine	G
G	GUU	Valine	GCU	Alanine	GAU	Aspartic Acid	GGU	Glycine	U
	GUC	Valine	GCC	Alanine	GAC	Aspartic Acid	GGC	Glycine	C
	GUA	Valine	GCA	Alanine	GAA	Glutamic Acid	GGA	Glycine	A
	GUG	Valine	GCG	Alanine	GAG	Glutamic Acid	GGG	Glycine	G

A strand of DNA with the sequence AAC AAG CCC undergoes a mutation, and the first A is changed to a C. How will this mutation affect the amino acid sequence?

- One amino acid will change.
- Two amino acids will change.
- All of the amino acids will change.
- The amino acids will remain the same.

20. Which is a use of genetically engineered bacteria?

- identifying the remains of an unknown person
- developing a DNA fingerprint for blood left at a crime scene
- making human insulin for diabetics
- producing corn that is resistant to herbicides

21. Which types of organisms developed first due to the early environmental conditions on Earth?

- prokaryotic and aerobic
- prokaryotic and anaerobic
- eukaryotic and aerobic
- eukaryotic and anaerobic

22. Which is an example of a learned behavior?

- A bear cub practices catching salmon the way its mother does.
- A baby gazelle rises to its feet within a few minutes of its birth.
- A baby kangaroo climbs into its mother's pouch as soon as it is born.
- An adult salmon returns to its freshwater stream when it is time to reproduce.

23. Sandworms are annelid worms that live on the seafloor. They absorb oxygen and excrete wastes through their skin. Which characteristic will *best* help the worm carry out these functions?

- large number of hearts
- large diameter blood vessels
- large mouth compared to body volume
- large surface area compared to body volume

24. In an ecosystem, which is the *most likely* reason for an increase in the producer population if there is an increase in the carnivore population?

- fewer herbivores
- higher temperatures
- less food
- more oxygen

25. Which is the *most likely* function of a group of cells that contains a high number of chloroplasts?

- respiration
- transpiration
- fermentation
- photosynthesis

26. A sugar, a phosphate group, and a nitrogen base form the building blocks of which organic compound?

- carbohydrates
- lipids
- nucleic acids
- proteins

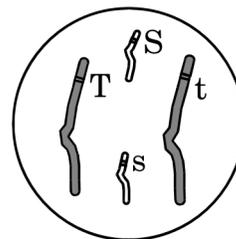
27. In which way are photosynthesis and cellular respiration different?
- Cellular respiration stores ATP, while photosynthesis releases ATP.
  - Cellular respiration produces oxygen, while photosynthesis uses oxygen.
  - Photosynthesis releases energy, while cellular respiration stores energy.
  - Photosynthesis uses carbon dioxide, while cellular respiration produces carbon dioxide.

28. A researcher sprays a new pesticide on thousands of insects of the same species that live in a large field. A few of the insects survive. What can be concluded by the researcher?
- The species of insects will likely become resistant to the pesticide.
  - The ideal interval between the first and second applications of the pesticide should be increased.
  - The pesticide has no effect on the species.
  - The concentration of the pesticide was too weak.

29. According to fossil records, the horses that lived 50 million years ago were much smaller, weaker, and slower than modern horses. Which process is *most likely* responsible for the changes that have led to the increased size, strength, and speed in horses?
- commensalism
  - inbreeding
  - migration
  - natural selection

30. In a particular species of plants, when the soil pH is greater than 7, blue flowers are produced. However, when the soil pH is less than 7, pink flowers are produced. Which statement *best* explains the color change in the plant?
- Multiple alleles determine the color of the flowers.
  - The change in flower color is a result of a mutation.
  - Polygenic inheritance produces the different flower colors.
  - The environment influences the expression of the gene for flower color.

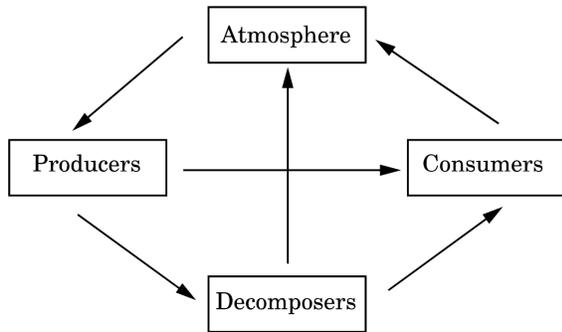
31. This diagram shows a diploid cell with two pairs of homologous chromosomes.



Due to independent assortment, what is the possible genetic make-up of gametes produced by this organism?

- SsTt
  - Ss, Tt
  - S, s, T, t
  - ST, St, sT, st
32. When worker bees return to the hive, they perform a sequence of movements called a waggle dance to show other members of the colony where food is located. Which type of behavior does this *best* illustrate?
- aggressive behavior
  - courtship behavior
  - social behavior
  - territorial behavior
33. Which kingdoms have photosynthetic organisms?
- fungi and plants
  - fungi and protists
  - protists and plants
  - plants and animals

34. This diagram shows the flow of carbon in a terrestrial ecosystem.



Which will *most likely* happen if the decomposers are removed from the carbon cycle?

- A. The amount of carbon dioxide in the atmosphere will increase.  
 B. The amount of carbon dioxide in the atmosphere will decrease.  
 C. The amount of carbon dioxide used by producers will increase.  
 D. The amount of carbon dioxide needed by consumers will decrease.
35. Hitchhiker's thumb (H) is dominant to no hitchhiker's thumb (h). A woman who does not have hitchhiker's thumb marries a man who is heterozygous for hitchhiker's thumb. What is the probable genotypic ratio of their children?
- A. 0% Hh : 100% hh    B. 50% Hh : 50% hh  
 C. 75% Hh : 25% hh    D. 100% Hh : 0% hh
36. 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.

37. Which statement about plant and animal cells is true?

- A. Both have a cell wall to give them support.  
 B. Both have a large vacuole to store water.  
 C. Both use mitochondria to produce energy.  
 D. Both use chloroplasts to store energy.

38. 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

39. Which of the following organelles releases energy from sugars?

- A. ribosomes                      B. vacuoles  
 C. chloroplasts                  D. mitochondria

40. The table below shows the classifications of four animals.

Animal Classification				
Animal	Q	R	S	T
Kingdom	Animalia	Animalia	Animalia	Animalia
Phylum	Chordata	Chordata	Chordata	Chordata
Class	Mammalia	Mammalia	Mammalia	Mammalia
Order	Carnivora	Rodentia	Rodentia	Carnivora
Family	Canidae	Muridae	Muridae	Felidae
Genus and Species	<i>Canis familiaris</i>	<i>Mus musculus</i>	<i>Mesocricetus auratus</i>	<i>Felis sylvestris</i>

According to their classification, which of the following animals are *most* closely related?

- A. Q and R                      B. S and T  
 C. Q and T                      D. R and S

41. A portion of one strand of a DNA molecule has the sequence shown below.

**ACCTGAAGG**

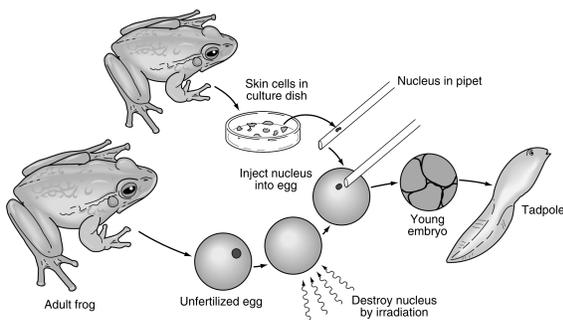
Assuming there are no mutations in this portion of the DNA, what is the corresponding sequence on the complementary DNA strand?

- A. **ACCTGAAGG**      B. **GTTCAGGAA**  
 C. **TGGAATTCC**      D. **UGGACUCC**

42. Which of these *best* describes the correct sequence in the expression of a trait?

- A. trait → gene → enzyme  
 B. gene → protein → trait  
 C. protein → gene → trait  
 D. gene → trait → DNA

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



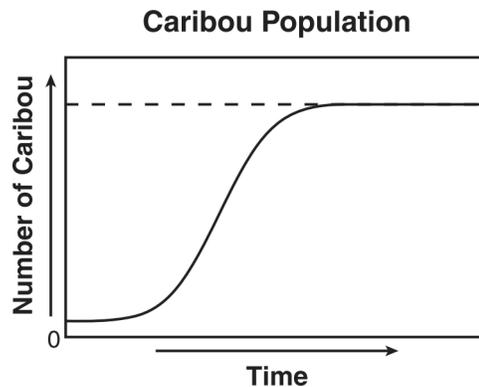
Every body cell in a frog contains the exact same genetic information. What accounts for the different tissues in an adult frog?

- 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.

44. Which of the following occurs in meiosis but *not* in mitosis?

- A. Chromosomes coil and condense.  
 B. Spindle fibers form across the cell.  
 C. The nuclear membrane breaks down.  
 D. Pairs of homologous chromosomes are separated.

45. 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

46. Black terns are a species of bird living in marshes, ponds, and marshy lakes. They feed on insects, fish, and crustaceans. They usually make their nests on loose, floating vegetation.

Which of the following environmental changes would *most likely* decrease the size of the black tern population?

- A. A competing bird population decreases in size.
  - B. Fish species have a more successful breeding season than usual.
  - C. A new plant species invades the environment and creates a dense cover of vegetation.
  - D. Insect larvae experience lower than average rates of predation and survive to adulthood.
47. Which of the following statements *best* explains why geographic isolation can lead to speciation?
- A. Physical separation of populations reduces competition for each group.
  - B. Physical separation of populations prevents interbreeding and mixing of gene pools.
  - C. Physical separation of populations provides more space for each group's size to increase.
  - D. Physical separation of populations stresses the organisms and causes mutations in their genetic code.
48. Which of the following is currently a primary cause of species decline worldwide?
- A. habitat destruction
  - B. intraspecific competition
  - C. random mating
  - D. viral outbreaks

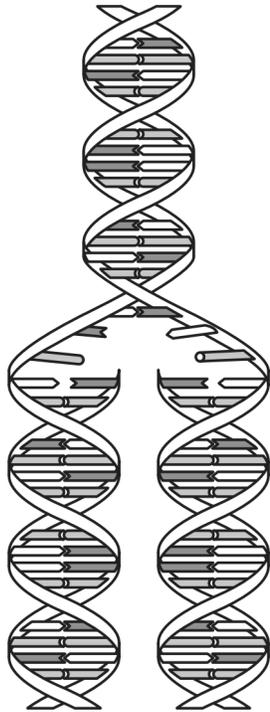
49. Which of the following will *most likely* happen to a predator population if its prey population decreases?

- A. There will be no change in the predator population.
- B. There will be a decrease in the predator population over time.
- C. There will be an increase in the predator population over time.
- D. There will be an immediate extinction of the predator population.

50. In which situation would passive transport *most likely* be used to remove a substance from inside a cell?

- A. when the substance is composed of positive ions
- B. when the substance is composed of large protein molecules
- C. when the concentration of the substance is lower outside the cell than inside the cell
- D. when the concentration of the substance is higher outside the cell than inside the cell

51. The diagram below represents a process that occurs in the nucleus of a eukaryotic cell.



Which of the following statements describes what is happening in this process?

- A. Molecules of RNA are forming chromosomes.
- B. A molecule of mRNA is directing the production of tRNA.
- C. Molecules of DNA are being packaged for export to the ribosomes.
- D. A molecule of DNA is being replicated to make two identical copies.

52. A sodium-potassium pump within a cell membrane requires energy to move sodium and potassium ions into or out of a cell. The movement of glucose into or out of a cell does not require energy. Which statement *best* describes the movement of these materials across a cell membrane?

- A. Sodium and potassium ions move by active transport, and glucose moves by osmosis.
- B. Sodium and potassium ions move by active transport, and glucose moves by facilitated diffusion.
- C. Sodium and potassium ions move by facilitated diffusion, and glucose moves by osmosis.
- D. Sodium and potassium ions move by facilitated diffusion, and glucose moves by active transport.

53. Which example is an activity that a fish *most likely* uses to maintain homeostasis within its body?

- A. using camouflage to avoid predators
- B. feeding at night to regulate body temperature
- C. moving to deeper water to regulate metabolic wastes
- D. exchanging gases through its gills to regulate oxygen levels

54. Which of the following is a source of genetic variation within a species?

- A. cloning
- B. mutation
- C. selective breeding
- D. natural selection

55. How is natural selection in the evolution of long necks in giraffes *best* explained?
- Shorter-necked giraffes were killed by long-necked giraffes.
  - Giraffe necks grew longer because of the bone structure of the animals.
  - Giraffes with longer necks survived because they were better suited to the environment.
  - Long-necked giraffes mated only with other long-necked giraffes.

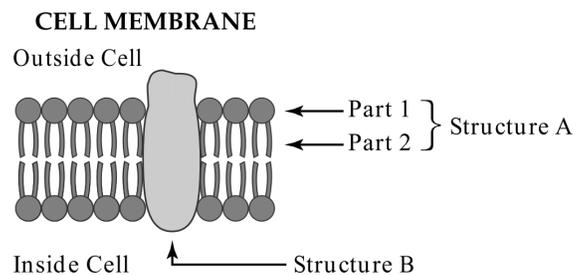
56. Some species of bacteria produce a substance that is toxic to insects but harmless to humans. Scientists have isolated the gene that controls production of this substance.

Which of the following is the *best* reason for inserting this gene into corn plants?

- The corn will grow faster.
  - Less fertilizer will be needed.
  - Fewer pesticides will be needed.
  - The corn will be more nutritious.
57. A single prokaryotic cell can divide several times in an hour. Few eukaryotic cells can divide as quickly. Which of the following statements *best* explains this difference?
- Eukaryotic cells are smaller than prokaryotic cells.
  - Eukaryotic cells have less DNA than prokaryotic cells.
  - Eukaryotic cells have more cell walls than prokaryotic cells.
  - Eukaryotic cells are more structurally complex than prokaryotic cells.

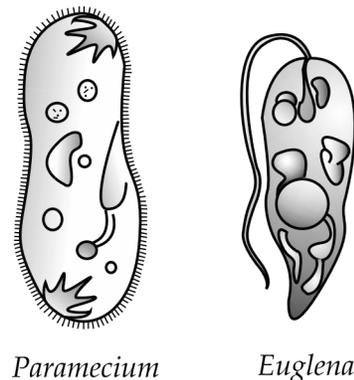
58. Which of the following functions does active transport perform in a cell?
- packaging proteins for export from the cell
  - distributing enzymes throughout the cytoplasm
  - moving substances against a concentration gradient
  - equalizing the concentration of water inside and outside the cell

59. Use the figure of a cell membrane below to answer the following question(s).



What kind of molecule is Structure A?

- an amino acid
  - a phospholipid
  - a carbohydrate
  - a nucleic acid
60. Refer to the diagram below of the single-celled, eukaryotic organisms to answer the following question(s).



*Euglena* uses which of these to move?

- cilia
- a vacuole
- a flagellum
- pseudopodia

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- |   |  |
|---|--|
| 1.<br>Answer:     B                       | 20.<br>Answer:     C                       |
| 2.<br>Answer:     D                       | 21.<br>Answer:     B                       |
| 3.<br>Answer:     A                       | 22.<br>Answer:     A                       |
| 4.<br>Answer:     B                       | 23.<br>Answer:     D                       |
| 5.<br>Answer:     D                       | 24.<br>Answer:     A                       |
| 6.<br>Answer:     D<br>Objective:   B.07A | 25.<br>Answer:     D                       |
| 7.<br>Answer:     C<br>Objective:   B.06C | 26.<br>Answer:     C                       |
| 8.<br>Answer:     C                       | 27.<br>Answer:     D                       |
| 9.<br>Answer:     B                       | 28.<br>Answer:     A                       |
| 10.<br>Answer:     A                      | 29.<br>Answer:     D                       |
| 11.<br>Answer:     C                      | 30.<br>Answer:     D<br>Objective:   B.06D |
| 12.<br>Answer:     B                      | 31.<br>Answer:     D                       |
| 13.<br>Answer:     D                      | 32.<br>Answer:     C                       |
| 14.<br>Answer:     B                      | 33.<br>Answer:     C                       |
| 15.<br>Answer:     A                      | 34.<br>Answer:     B                       |
| 16.<br>Answer:     A                      | 35.<br>Answer:     B<br>Objective:   B.06F |
| 17.<br>Answer:     B                      | 36.<br>Answer:     C                       |
| 18.<br>Answer:     A                      | 37.<br>Answer:     C                       |
| 19.<br>Answer:     A                      | 38.<br>Answer:     A                       |

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