

PRACTICE TEST B**DIRECTIONS**

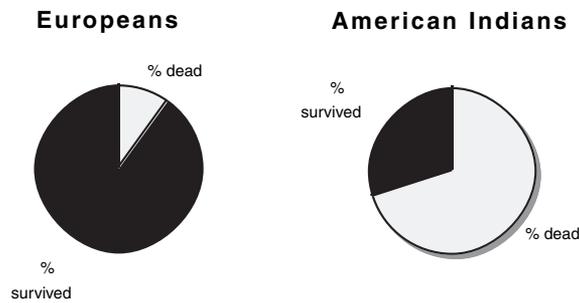
Read each question carefully. Determine the best answer to the question from the answer choices provided. Then fill in the answer on your answer sheet.

- 1 The tropical rain forests have been called the lungs of the planet. They take huge quantities of carbon dioxide from the atmosphere during photosynthesis and give off large quantities of oxygen. Vast tracts of tropical rain forests are being cleared for farms by people cutting down and burning the trees. Which of the following is the best hypothesis about the effect that rain forest destruction may have on atmospheric carbon dioxide levels?
 - A Rain forest destruction will not influence overall carbon dioxide levels, because it will affect only areas around the equator.
 - B Any carbon dioxide added to the atmosphere because of rain forest destruction will fall into the oceans and be used in building coral reefs.
 - C Cutting down rain forest trees will decrease atmospheric carbon dioxide levels, because plants give off carbon dioxide as a result of cellular respiration.
 - D Cutting down trees, which take carbon dioxide from the atmosphere, and burning the trees, which adds carbon dioxide to the atmosphere, will increase atmospheric carbon dioxide levels.

- 2 If a heterozygous individual (Aa) was crossed with another heterozygous individual (Aa), which correctly identifies the chance that their offspring would have a heterozygous genotype?
 - F 0%
 - G 50%
 - H 75%
 - J None of the above

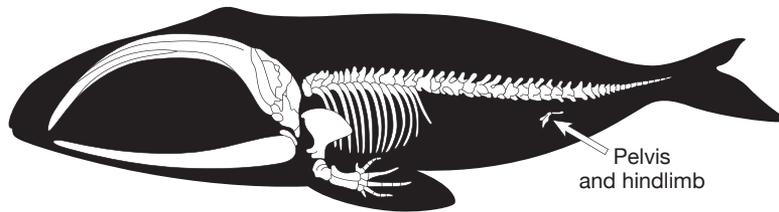
- 3 Which of the following statements describes a way in which a healthy kidney helps maintain homeostasis?
 - A The kidney removes proteins and fats from the bloodstream.
 - B The kidney helps the body maintain proper hydration.
 - C The kidney removes water for excretion when the body is dehydrated.
 - D The kidney returns excess oxygen from the bloodstream back to the lymph vessels.

- 4 In the 1520s, the Spanish explorer Cortes and his armies carried the virus that causes smallpox to North America and South America.



The graphs above illustrate the death rate among both Europeans and American Indians from smallpox at that time. Which of the following statements best explains the difference in death rates?

- F People in Europe were healthier than American Indians.
 - G Antibiotics were available in Europe but not in North America.
 - H American Indians had never been exposed to the smallpox virus, so resistant individuals had not yet become common.
 - J American Indians were exposed to a virus that was different from the virus for smallpox in Europe.
- 5 Some whale species have pelvic and upper and lower limb bones as shown in the illustration below.



These bones are greatly reduced in size and do not appear to play a role in the whale's motion. What is the most likely explanation for the presence of these bones in modern-day whales?

- A Modern whales use the pelvis and limb bones for purposes other than motion.
- B All vertebrates have the same bones, but they are much smaller in organisms that don't use them.
- C The bones are common anatomical structures inherited from a terrestrial ancestor.
- D Modern whales are beginning to evolve structures for walking on land as global warming threatens to dry up the oceans.

- 6 Scientists once grouped fungi with plants. Which of the following is a major factor that determines why fungi are not classified as part of the plant kingdom?
- F Fungi do not have leaves.
 - G Fungi grow close to the ground.
 - H Fungi can reproduce either sexually or asexually.
 - J Fungi are heterotrophs.
- 7 According to the primordial soup model, the first organic molecules could have formed from simpler inorganic substances in Earth's early oceans, but only if there were a source of energy to cause such chemical reactions to take place. Which are possible sources of energy that could have led to the production of these first precursors to life?
- A Lightning and cellular respiration
 - B Nuclear radiation and photosynthesis
 - C Photosynthesis and cellular respiration
 - D Solar radiation, volcanic eruptions, and lightning
- 8 The Punnett square below shows a cross between two rabbits.

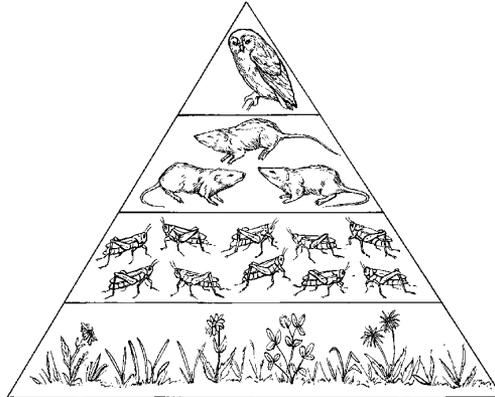
		<i>B</i>	<i>b</i>
<i>Bb</i> × <i>Bb</i>	<i>B</i>	1	2
	<i>b</i>	3	4

Black fur (*B*) is dominant to brown fur (*b*). What would be the phenotype of the offspring indicated by box 3?

- F Black
- G White
- H Brown
- J A mixture of brown and black

- 9 Cancer is one of the leading causes of death in the United States. Which of the following best describes cancer?
- A An infection of foreign bodies called tumors
 - B An uncontrolled growth and division of cells
 - C An infectious cellular disease that you inherit
 - D An individual's immune system attacking itself
- 10 Cells and the organisms they make up reproduce through cell division. Some organisms reproduce through mitosis, while others reproduce through meiosis and fertilization. What advantage does meiosis give to organisms that reproduce sexually?
- F Meiosis ensures that offspring inherit genes from their parents.
 - G Meiosis ensures that offspring will not inherit any genetic disorders.
 - H Meiosis ensures that offspring are genetically different from their parents.
 - J Meiosis ensures that offspring will have identical phenotypes to their parents.
- 11 Rivers and the aquatic life that live within them can change over time due to human activity and natural forces. Which of these changes would likely have the greatest effect on a river system?
- A A city being built near the mouth of the river
 - B A bridge that crosses the river high in the mountains
 - C A change in the salinity of the ocean into which it flows
 - D A dam on the river near where it flows from the mountains
- 12 Noxious weeds are weeds that invade ecosystems and grow very quickly and aggressively. How do noxious weeds affect the biodiversity of an ecosystem?
- F The biodiversity increases slightly because they represent another species in the area.
 - G They increase the biodiversity because they increase the total energy of the producers.
 - H The biodiversity usually decreases greatly as the noxious weeds outcompete the local plants.
 - J The biodiversity is not affected at all since the noxious weeds simply replace the dominant plant in the ecosystem.

13 The diagram below shows an energy pyramid.

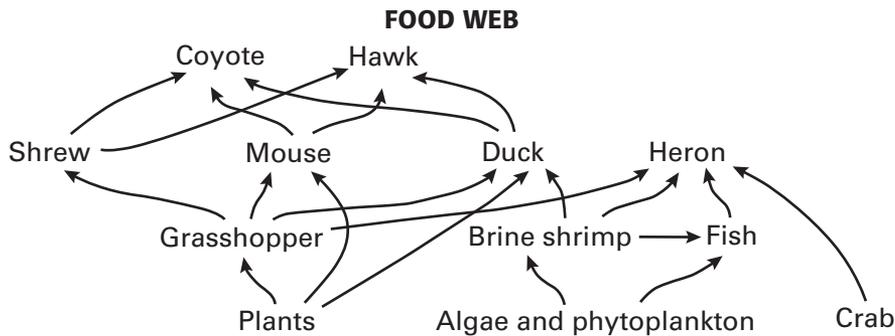


What level has the least amount of available energy?

- A The level that contains rats
 - B The level that contains grasses
 - C The level that contains the owl
 - D The level that contains grasshoppers
- 14 Photosynthesis and cellular respiration are important processes that help transfer energy through ecosystems. Which of the following statements correctly describes the relationship between the products and reactants of photosynthesis and cellular respiration?
- F An increase in glucose production among plants results in an increase in energy intake among animals.
 - G An increase in carbon dioxide production among plants results in an increase in energy intake among animals.
 - H A decrease in glucose production among plants results in an increase in carbon dioxide production among animals.
 - J A decrease in glucose production among plants results in a decrease in oxygen production among animals.

- 15 Which of these evolutionary mechanisms is most likely to lead to an increase in genetic diversity in a population?
- A Natural selection
 - B Gene flow
 - C Genetic drift
 - D Sexual selection

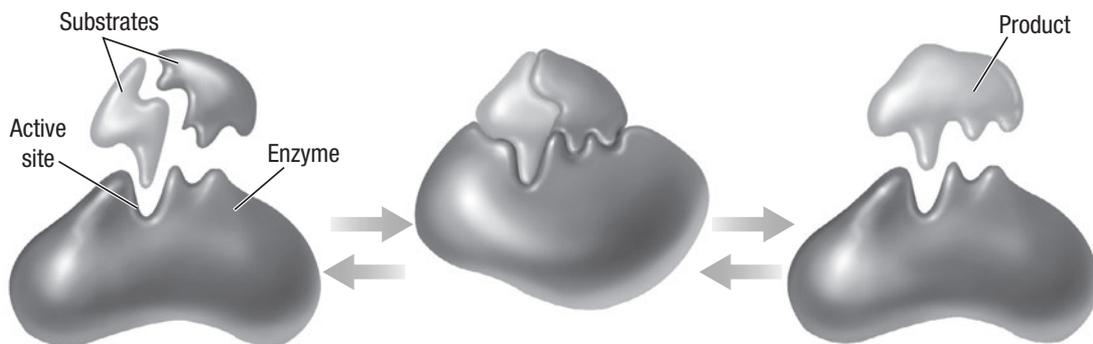
- 16 The food web below represents the interactions between organisms in a salt marsh ecosystem and organisms in an old field ecosystem.



Which group of organisms is missing from this diagram?

- F Consumers are missing from this diagram.
 - G Producers are missing from this diagram.
 - H Decomposers are missing from this diagram.
 - J All the different types of organisms are included.
- 17 Enzymes catalyze chemical reactions that keep cells alive. Imagine that a cell had no enzymes. How would having no enzymes affect the chemical reactions in the cell?
- A They would happen too slowly to support cellular processes.
 - B They would happen too rapidly to support cellular processes.
 - C They would happen at the same rate as they do with enzymes.
 - D They would happen normally, only they would use different reactants.

- 18** A researcher studies the role of proteins in the transport of polar molecules through cell membranes. His data show that the number of polar molecules that can pass through the membrane when proteins are present is nearly five times greater than when proteins are absent from the lipid bilayer. What does this investigation indicate about the transport of molecules?
- F** All molecules must be carried through the cell membrane on receptor proteins.
 - G** The lipid bilayer is permeable to nonpolar molecules, but not to polar molecules.
 - H** Proteins create passageways that allow polar molecules to pass through the semipermeable membrane.
 - J** All polar molecules pass through the cell membrane at the same rate.
- 19** The diagram below shows how living things use enzymes in chemical reactions.



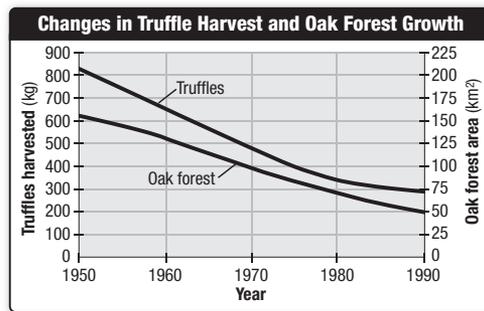
- Which statement describes how enzymes affect the reactions in which they take part?
- A** Most enzymes slow down chemical reactions.
 - B** Enzymes are converted into products in the reaction.
 - C** Enzymes increase the activation energy of the reaction.
 - D** Enzymes decrease the activation energy of the reaction.

- 20** Disorders caused by recessive alleles may not be expressed in an individual who carries only one of these alleles, but the allele may be passed on to future generations. Only characteristics that are expressed can be targets of natural selection. Therefore, natural selection cannot operate on recessive alleles, even if they are unfavorable. What does this explain?
- F** Why recessive alleles are never expressed
 - G** Why genetic disorders can persist in a population
 - H** Why advantageous offspring are more likely to survive and reproduce
 - J** Why natural selection can act only against heterozygous carriers of a recessive disorder
- 21** Imagine that a mouse has white fur because of a mutation in its DNA. Which of the following conclusions can be drawn?
- A** The white mouse increases the diversity of the species.
 - B** The white mouse decreases the diversity of the species.
 - C** The internal organs of the white mouse must not function as well as those of other mice.
 - D** The white mouse is more likely to survive than other mice because it is more visible to predators.
- 22** In the presence of the protein lactose, bacterial cells produce enzymes that break down lactose. When lactose is not present, how do bacterial cells stop the production of the enzymes?
- F** The *lac* operon is turned off, disrupting the production of RNA polymerase.
 - G** The *lac* operon is turned off, disrupting transcription.
 - H** The *lac* operon is turned on, disrupting translation.
 - J** The *lac* operon is turned on, disrupting DNA replication.

- 23** Which of the following is an example of a microorganism maintaining the healthy balance of an ecosystem?
- A** Nitrogen-fixing bacteria become depleted from the soil of farmland.
 - B** Phytoplankton masses produce a red tide in an estuary ecosystem.
 - C** An algal bloom blocks sunlight and takes up excessive oxygen in a lake ecosystem.
 - D** Hydrocarbon-eating bacteria clean up oil spills in an aquatic ecosystem.
- 24** Bt corn contains a gene from a bacterium. How did genetic engineers most likely begin the process of creating Bt corn containing this bacterial gene?
- F** By using ligase to insert the desired gene into corn DNA
 - G** By removing a plasmid from the bacterium
 - H** By using restriction enzymes to cut the bacterial DNA on either side of the desired gene
 - J** By cloning the corn plant
- 25** *Daphnia* are small, aquatic invertebrates that are almost transparent. Like all animals, *Daphnia* require chemical energy to live. Which statement below describes how *Daphnia* obtain chemical energy and convert it into a usable form?
- A** *Daphnia* obtain glucose from ingested algae and then use fermentation to release chemical energy in the form of ATP.
 - B** *Daphnia* obtain pyruvate from ingested algae and then use gluconeogenesis to release chemical energy in the form of ADP.
 - C** *Daphnia* obtain glucose from ingested algae and then use cellular respiration to release chemical energy in the form of ATP.
 - D** *Daphnia* obtain glucose from ingested algae and then use cellular respiration to release chemical energy in the form of NADP.

- 26** During the time in which the Grand Canyon formed, the canyon divided a single population of squirrels into two populations. One of these squirrel populations now lives on the North Rim of the canyon, and the other population lives on the South Rim. Which of the following factors would make the evolution of the populations into separate species less likely?
- F** Different predators live on the North and South rims of the canyon.
 - G** A few of the squirrels manage to cross the canyon and breed with squirrels on the other side.
 - H** Different trees in which squirrels make their homes grow on the North and South rims of the canyon.
 - J** A disease attacks one population of squirrels and kills most of them. The squirrels on the other side of the canyon are not affected.
- 27** Although the arms of a human, the wings of a bat, and the fins of a whale have different functions, they have similar structures, suggesting these organisms evolved from a common ancestor. What type of evidence are these examples of?
- A** Analogous structures
 - B** Anatomical homologies
 - C** Biogeography
 - D** Molecular homologies
- 28** The fossil record indicates that mass extinctions have happened over Earth's history. Which of the following statements describes how the physical world, and the subsequent fossil record, changed after a mass extinction?
- F** Fossil layers indicate large gaps where there appeared to be no life on Earth.
 - G** Fossil layers show large layers of sediment that contain volcanic ash.
 - H** Fossil layers contain evidence of the disappearance of old, dominant species and the appearance of new species.
 - J** Fossil layers contain evidence of the disappearance of old, dominant species and the fossil evidence of their immediate descendants.

- 29** Prokaryotes can be divided by the way they obtain energy and nutrients. Which of the following correctly matches the name of a group of prokaryotes with the source of their energy and nutrition?
- A Chemoautotrophs—from sunlight through photosynthesis
 - B Photoautotrophs—from sunlight through photosynthesis
 - C Heterotrophs—from molecules that contain sulfur or nitrogen
 - D Chemoautotrophs—from other organisms
- 30** According to the endosymbiont theory, organisms similar to cyanobacteria most likely develop into which organelle?
- F Chloroplasts
 - G Nucleus
 - H Ribosomes
 - J Endoplasmic reticulum
- 31** The graph below shows changes in truffle harvesting in an oak forest over a period of 40 years.



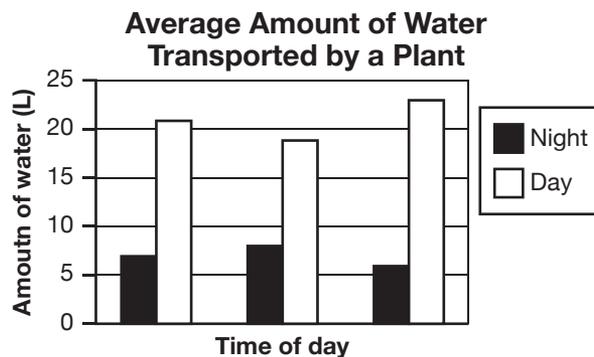
Which statement best describes the relationship between the oak forest and the truffle population?

- A As the amount of oak forest increased, the number of truffles available for harvest also increased.
- B As the amount of oak forest declined, the number of truffles available for harvest also decreased.
- C As the amount of oak forest declined, the number of truffles available for harvest remained the same.
- D As the amount of oak forest increased, the number of truffles available for harvest decreased.

32 Because plants are unable to move as much as animals, on what does their ability to reproduce depend?

- F Vascular tissue
- G Roots
- H Seeds and spores
- J Leaves

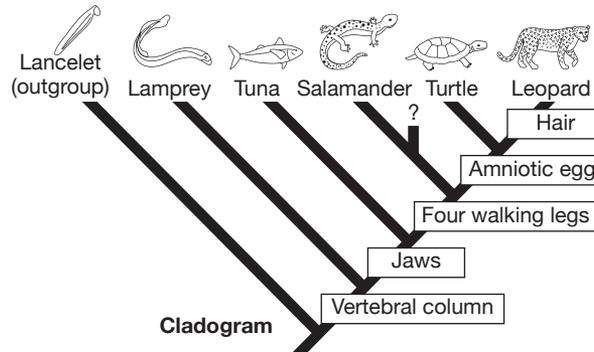
33 A botanist measures the amount of water absorbed through the roots of a plant and into the vascular system over several days. Her research data are shown below.



Which of the following statements accurately explains the relationship between time of day and water transport through the plants?

- A At night, the stomata are closed so water in the leaves cannot evaporate, which reduces the need for absorption of water at the roots.
- B At night, transpiration through the stomata increases, requiring less water absorption through the roots.
- C During the day, photosynthesis in the leaves generates water molecules, requiring less water transport through the vascular system.
- D During the day, the plant's cellular activity decreases, allowing it to transport more water through the vascular system.

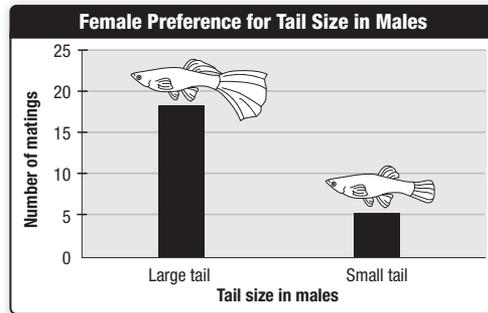
- 34 A cladogram shows the hierarchical relationships between organisms based on similarities and differences among groups. The illustration below is a cladogram of Kingdom Animalia.



Recently scientists discovered a new species of animal in the rainforests of Indonesia, indicated by a question mark on the cladogram. Based on the placement of its branch, what characteristics must this newly discovered animal have?

- F Amniotic egg, hair
 - G Four walking legs
 - H Vertebral column, jaws, four walking legs, amniotic egg
 - J Vertebral column, jaws, four walking legs
- 35 Each cell within a developing body will express different genes, depending on the cell's age and the location within the body. How is gene expression regulated?
- A By external and environmental cues
 - B By messenger RNA
 - C By temperature and light exposure
 - D By mutations caused by imperfect gene replication

36 The diagram below shows guppy mating preferences.



How will the frequency of the genes that result in long tails change over the next few generations?

- F Sexual selection will cause the genes that result in long tails to become less and less frequent.
- G Sexual selection will cause the genes that result in long tails to become more frequent.
- H The frequency of the genes that result in long tails will fluctuate slightly but remain relatively stable.
- J There is not enough information to draw a conclusion about future gene frequency.

37 The general equations for photosynthesis and cellular respiration show how the two processes are interconnected in natural cycles. Which substance is a product of cellular respiration and a reactant in photosynthesis?

- A Carbon dioxide
- B Glucose
- C Oxygen
- D Water

38 A species of bacteria lives in human intestines. The bacteria get food from the person in whom they live, and the person gets vitamins that the bacteria produce. What kind of relationship do these bacteria and humans have?

F Commensalism

G Mutualism

H Parasitism

J Predation

39 A population of sea turtles comes ashore to lay their eggs each breeding season on a beach along the northeast coast of Texas. One year a resort and an amusement park are built along part of the beach. A team of naturalists that counts the turtle nests on the beach each year collects the data shown below from three sites.

Number of Sea Turtle Nests Found on Beach

	Site 1 (hotel)	Site 2 (amusement park)	Site 3 (no building)
Before construction	110	95	104
1 year after construction	65	60	83
2 years after construction	42	39	40

Which of the following statements best explains the data for Site 3?

A The naturalists made an error when counting the nests.

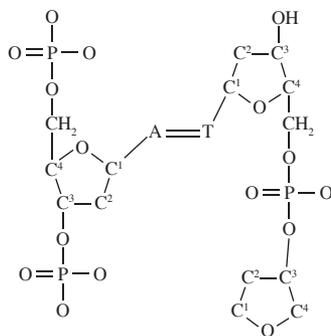
B Habitat destruction on the other beaches drove the turtles to Site 3 for nesting.

C The construction had no impact on the breeding population at Site 3.

D The whole turtle population declined as a result of external influences that destroyed their nesting habitat.

- 40** The cells of your body need energy to carry out life functions. Which of the following body responses is a sign that your cells need more energy?
- F** Your breathing rate increases.
 - G** You begin to shiver.
 - H** You feel hungry.
 - J** You feel thirsty.
- 41** Several organ systems work together to maintain homeostasis when body temperatures rise. Sensory neurons in the skin sense when the internal temperature rises. They send signals to the brain, which triggers blood vessels near the skin to dilate and sweat glands to release sweat. As the sweat evaporates, the body is cooled. Which of the following systems interact in the example of thermoregulation described above?
- A** respiratory system, muscular system, excretory system
 - B** immune system, digestive system, circulatory system
 - C** muscular system, immune system, nervous system
 - D** nervous system, excretory system, circulatory system

- 42 Carbon is part of many different compounds because of its unique ability to form a variety of structures. One of the carbon-based biomolecules is shown below.

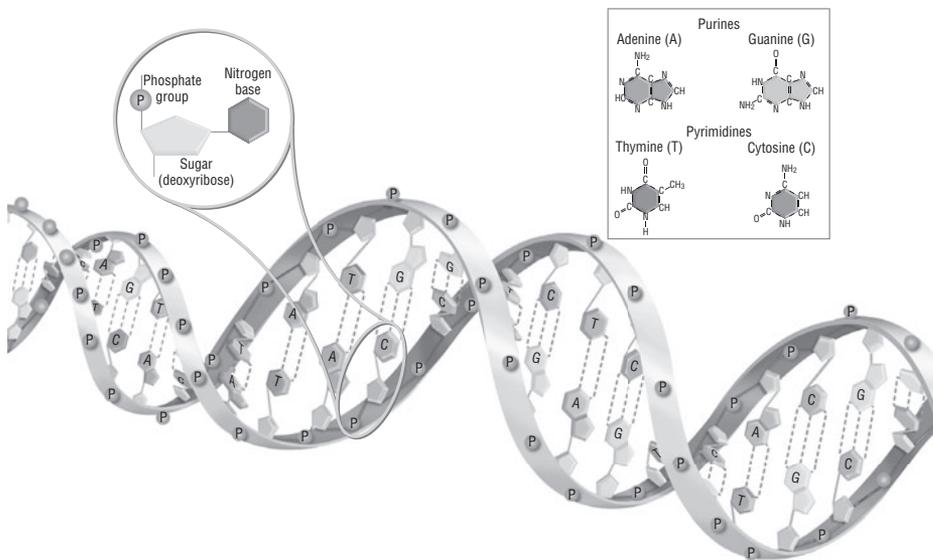


How does the function of this biomolecule compare to the function of a lipid?

- F** This biomolecule is an important source of energy for organisms; while lipids are important for insulating and waterproofing organisms.
- G** This biomolecule is important in catalyzing chemical reactions; while lipids are important in storing energy.
- H** This biomolecule contains an organism's genetic material; while lipids make up cell membranes.
- J** This biomolecule is a light-absorbing compound that is important to photosynthesis; while lipids direct protein synthesis.
- 43 Tay-Sachs disease is a genetic disorder in which the body has a malfunctioning enzyme that is responsible for breaking down certain fatty acids. The buildup of these fatty acids destroys nerve cells in the brain, until eventually the entire nervous system stops working. Researchers have discovered that a point mutation changing a guanine to a cytosine is one cause of Tay-Sachs. Which of the following statements describes a general mechanism during which this nucleotide switch could occur?
- A** Genetic information in DNA is transcribed into RNA, which is translated into proteins that determine an organism's phenotype.
- B** Genetic information in DNA undergoes semiconservative replication and is passed to daughter cells.
- C** Crossing over of sections of chromosomes during meiosis results in genetic variation.
- D** Multiple three-letter codons on the RNA strand code for the same amino acid.

- 44 The cell cycle allows organisms to grow from a single cell into large, complex individuals. The cell cycle has several stages. Which stage is not paired with its function?
- F M: Chromosomes line up in the center of the cell and then move to opposite ends and separate, forming daughter cells.
 - G S: DNA undergoes replication, resulting in two copies of every chromosome.
 - H G2: Chromosomes condense and form distinct shapes as the nuclear membrane forms.
 - J G1: There is intense cell growth, including synthesis of proteins and organelles.

- 45 DNA is composed of strands of nucleotides that pair in regular patterns and are held together by the forces shown in the diagram below.



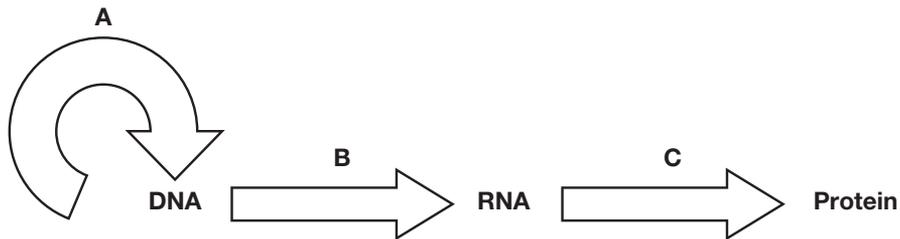
What forces, represented by dotted lines, hold together the two strands of DNA shown in the diagram above?

- A Ionic bonds
- B Covalent bonds
- C Hydrogen bonds
- D Carbon-carbon bonds

46 A strand of messenger RNA is attached to a ribosome and is directing protein synthesis. The next exposed codon of this messenger RNA has the code GAA. What will the code in the anticodon be?

- F GAA
- G CTT
- H CUU
- J GUU

47 The diagram below shows the processes that occur during gene expression.

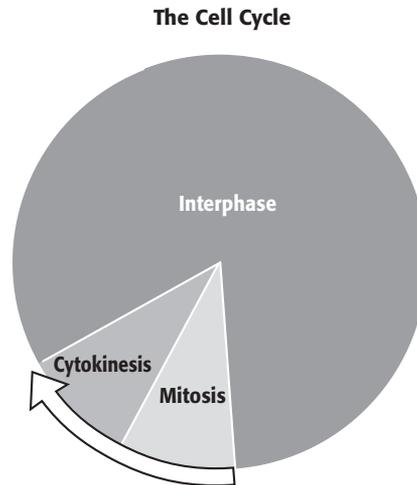


At which step would transfer RNA (tRNA) be necessary?

- A Step *A*
 - B Step *B*
 - C Step *C*
 - D Steps *A*, *B*, and *C*
- 48 Most biomolecules are made up of monomers, or smaller units joined together to make larger compounds. Which of the following is the best example of a monomer?
- F The protein amylase
 - G A sample of cooking oil
 - H The sugar glucose
 - J A strand of DNA

- 49** In the past, smallpox, which is caused by a virus, was a common and deadly disease. Now, people no longer get smallpox. Which method eradicated the smallpox virus?
- A Vaccination
 - B Cooking food thoroughly
 - C Water purification programs
 - D More sanitary living conditions
- 50** Many body systems interact to help the body maintain homeostasis. For example, the primary function of the kidneys is filtering waste from the blood. Hormones are released in response to salt concentrations, pH, and sugar levels in the blood. These hormones help regulate how the kidneys function. For example, if salt concentrations in the blood are too high, the hormone ADH may be secreted by the pituitary gland to signal the kidneys to excrete less water in the urine. Which systems are interacting in this description?
- F Excretory, circulatory, digestive
 - G Excretory, endocrine, respiratory
 - H Endocrine, digestive, respiratory
 - J Endocrine, circulatory, excretory

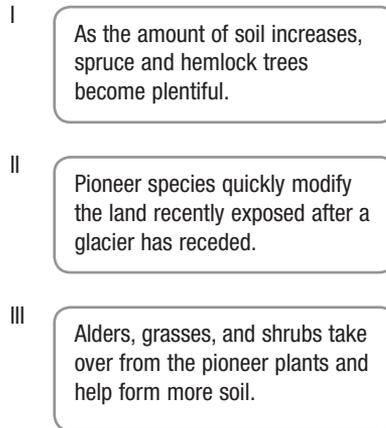
51 The chart below shows the lengths of the different stages of the cell cycle.



How is the cell occupied most of the time?

- A Growing and carrying out normal functions
 - B Separating chromatids
 - C Splitting into two daughter cells
 - D Dissolving the nuclear membrane
- 52 Several organ systems contribute to an animal's defense system against foreign invaders, or pathogens. Which of the following statements describes the role an organ system plays in a general, nonspecific defense against illness?
- F The skeletal system produces leucocytes that engulf and destroy pathogens.
 - G The integumentary system blocks most foreign invaders from entering the body.
 - H The nervous system produces hormones that block the chemical signaling of antigens.
 - J The immune system produces antibodies that bind to antigens and helps destroy them.

- 53 A biologist compares how different ecosystems undergo succession. She divides the series of events that happen during succession into three different stages below.



In what order do the events occur?

- A I, III, II
- B II, III, I
- C II, I, III
- D I, II, III
- 54 A remora is a fish that attaches itself to larger marine animals such as sharks. Remoras “hitch a ride” and feed on scraps of food left by sharks. The remoras benefit from this relationship, while sharks are unaffected. What is this type of relationship called?
- F Commensalism
- G Mutualism
- H Parasitism
- J Predation