

Directions: Please choose the best answer choice for each of the following questions.

1. The table below shows the characteristics of four cells that students are comparing under a microscope.

Characteristics of Four Cells

Cell	Is there a cell wall?	Is there a nucleus?
1	Yes	No
2	Yes	Yes
3	No	Yes
4	No	No

Which cell in the table is a eukaryotic plant cell?

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

Answer Choice Rationale

- A. No rationale available
- B. Correct
- C. No rationale available
- D. No rationale available

ItemID LCS_TestAdmin.2304
Correct B
Standard(s) SCI.9-12.SC.912.L.14.3

2. Anna is preparing a presentation comparing the structures and evolutionary history of eukaryotes and prokaryotes. What significant information should Anna include in her presentation?

- A. Eukaryotes are more complex and contain mitochondria.
- B. Eukaryotes are more simple and do not contain mitochondria.
- C. Prokaryotes are more complex and do not contain mitochondria
- D. Prokaryotes are more simple and contain mitochondria

Answer Choice Rationale

- A. Correct
- B. No rationale available

- C. No rationale available
- D. No rationale available

ItemID LCS_TestAdmin.2326
Correct A
Standard(s) SCI.9-12.SC.912.L.14.3

3. In science, a theory is an explanation for some phenomenon that is based on observation, experimentation and reasoning. One important theory in biology is the cell theory. What kinds of observations led to the development of the cell theory?

- A. discoveries of fossil bacteria
- B. isolations of DNA and RNA
- C. microscopic views of plants and animals
- D. testing for AIDS virus

Answer Choice Rationale

- A. No rationale available
- B. No rationale available
- C. Correct
- D. No rationale available

ItemID LCS_TestAdmin.2350
Correct C
Standard(s) SCI.9-12.SC.912.L.14.1

4. What type of microscope would you use to view a sample of live microorganisms in pond water?

- A. Compound Light Microscope
- B. Scanning Electron Microscope (SEM)
- C. Scanning Tunneling Microscope
- D. Transmission Electron Microscope

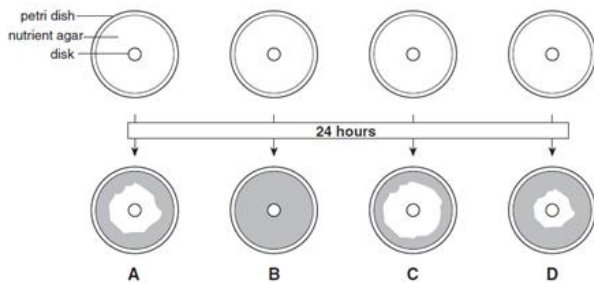
Answer Choice Rationale

- A. Correct
- B. No rationale available
- C. No rationale available
- D. No rationale available

ItemID LCS_TestAdmin.2351
Correct A
Standard(s) SCI.9-12.SC.912.L.14.4

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5. A student investigated the effectiveness of four different mouthwashes in destroying bacteria. He inoculated the nutrient agar in four petri dishes with bacteria. Each of four paper disks, 1 centimeter in diameter, was soaked in a different mouthwash sample and placed on a different agar surface. Sterile procedures were used throughout the experiment. Each petri dish was placed in an incubator at a temperature of 37°C for a 24-hour period. The diagram below represents the sequence of events in this investigation. The shaded areas in the petri dishes represent regions of bacterial growth.



Which petri dish contains the most effective mouthwash and why?

- A. Dish A because it has the largest area free of bacteria
- B. Dish B because it has the largest area free of bacteria
- C. Dish C because it has the largest area free of bacteria
- D. Dish D because it has the largest area free of bacteria

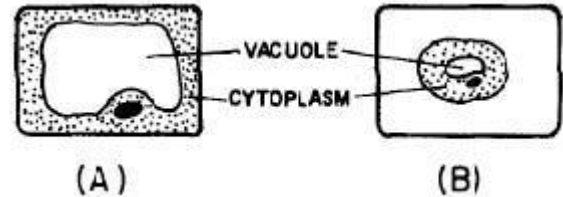
Answer Choice Rationale

- A. No rationale available
- B. No rationale available
- C. Correct
- D. No rationale available

ItemID LCS_TestAdmin.3010
 Correct C
 Standard(s) SCI.9-12.SC.912.L.14.52

6. A biology student looked through a microscope and observed an Elodea cell in a drop of water then illustrated it in diagram A. He added a 10% hypertonic salt solution to the slide. He then observed the cell and illustrated the change in diagram B.

Which statement below offers the best explanation for the observed changes in diagram B below?



- A. Less salt flowed into the cell than out of the cell.
- B. More salt flowed into the cell than out of the cell.
- C. More water flowed into the cell than out of the cell.
- D. More water flowed out of the cell than into the cell.

Answer Choice Rationale

- A. No rationale available
- B. No rationale available
- C. No rationale available
- D. Correct

ItemID LCS_TestAdmin.2356
 Correct D
 Standard(s) SCI.9-12.SC.912.L.14.2

7. The cell theory was developed by the work of Van Leeuwenhoek, Hook, Schwann, Schleiden, Virchow and many other scientists. Why did the cell theory require many scientific contributions?
- A. Each scientist set out to prove the cell theory and discovered the same results.
 - B. It takes several scientists to first make the laws so that they can then become theories.
 - C. It takes several scientists to find conflicting data to create scientific debate.
 - D. The work of many scientists is needed to provide a range of supporting data to develop a theory.

Answer Choice Rationale

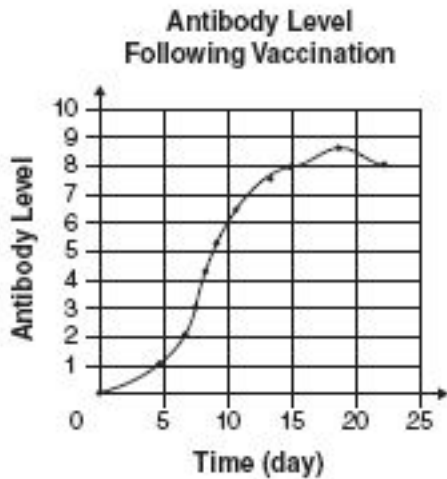
- A. No rationale available
- B. No rationale available
- C. No rationale available

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D. Correct

ItemID LCS_TestAdmin.2359
 Correct D
 Standard(s) SCI.9-12.SC.912.L.14.1, SCI.9-12.SC.912.N.3.1

8. Antibodies are produced by the body to help fight disease and illness. Higher levels of antibodies are more effective at treating disease or illness than lower levels. The manufacturer indicates that the antibody is "highly effective within 3 weeks of administration in treating the flu". Which evidence statement BEST supports the manufacturer's claim?



- A. maximum level of antibodies is reached on day 5
- B. maximum level of antibodies is reached on day 15
- C. maximum level of antibodies is reached on day 18
- D. maximum level of antibodies is reached on day 23

Answer Choice Rationale

- A. No rationale available
- B. No rationale available
- C. Correct
- D. No rationale available

ItemID LCS_TestAdmin.3014
 Correct C
 Standard(s) SCI.9-12.SC.912.L.14.52

9. What are the first steps of DNA replication?
- A. Complementary nucleotides are added, DNA strands separate, DNA unwinds.
 - B. Complementary nucleotides are added, DNA unwinds, DNA strands separate.
 - C. DNA strands separate, complementary nucleotides are added, DNA unwinds
 - D. DNA unwinds, DNA strands separate, complementary nucleotides are added

Answer Choice Rationale

- A. No rationale available
- B. No rationale available
- C. No rationale available
- D. Correct

ItemID LCS_TestAdmin.2364
 Correct D
 Standard(s) SCI.9-12.SC.912.L.16.3

10. What is the result of DNA replication?
- A. One double-stranded molecule produces two different double-stranded molecules.
 - B. One double-stranded molecule produces two identical double-stranded molecules.
 - C. Two double-stranded molecules produce a single different double-stranded molecule.
 - D. Two double-stranded molecules produce a single identical double-stranded molecule.

Answer Choice Rationale

- A. No rationale available
- B. Correct
- C. No rationale available
- D. No rationale available

ItemID LCS_TestAdmin.2366
 Correct B
 Standard(s) SCI.9-12.SC.912.L.16.3

11. What is the difference between a heart, a lung, and a kidney cell of a single individual?
- A. Each of these cells contains different genes.
 - B. Each of these cells uses a different method of gene transcription and translation.
 - C. Each type of cell expresses different genes.
 - D. Each type of cell uses different genetic coding rules.

Answer Choice Rationale

- A. No rationale available
- B. No rationale available
- C. Correct
- D. No rationale available

ItemID LCS_TestAdmin.2362
 Correct C
 Standard(s) SCI.9-12.SC.912.L.16.5

12. It has been observed that bats, horses, and humans have nearly the same amino acid sequence for hemoglobin. Which of the following ideas is supported by this observation?
- A. All species can obtain nucleotides from their environments.
 - B. All species have the ability to change structures as they adapt to their environments.
 - C. Genetic mutations can lead to abrupt changes and create new species.
 - D. Specific components of the genetic code are common to all species.

Answer Choice Rationale

- A. No rationale available
- B. No rationale available
- C. No rationale available
- D. Correct

ItemID LCS_TestAdmin.2365
 Correct D
 Standard(s) SCI.9-12.SC.912.L.16.9

13. An amoeba reproduced using mitosis. What is true about the number of chromosomes in a daughter cell?
- A. It has a new set of chromosomes.
 - B. It has half as many chromosomes.
 - C. It has the same number of chromosomes.
 - D. It has twice as many chromosomes.

Answer Choice Rationale

- A. No rationale available
- B. No rationale available
- C. Correct
- D. No rationale available

ItemID LCS_TestAdmin.2305
 Correct C
 Standard(s) SCI.9-12.SC.912.L.16.14

14. A cancerous tumor is made up of cells that have uncontrolled cell growth. This uncontrolled cell growth can be caused by a mutation in DNA. What causes uncontrolled cell growth in one part of a mouse's body but not in others?
- A. A mutation in a somatic cell in this mouse's body.
 - B. A mutation in a somatic cell produced by one of this mouse's parents.
 - C. A mutation in a sex cell produced by this mouse's parents.
 - D. A mutation in one of the sex cells produced this mouse.

Answer Choice Rationale

- A. Correct
- B. No rationale available
- C. No rationale available
- D. No rationale available

ItemID LCS_TestAdmin.2328
 Correct A
 Standard(s) SCI.9-12.SC.912.L.16.8

15. Two species, A and B, both inhabit the same environment. Species A reproduces asexually while Species B reproduces sexually. A sudden change in its environment leads to the extinction of Species A. Why did Species B survive the change in the environment?
- Individuals from Species B all share identical genetic codes.
 - Individuals from Species B can reproduce quickly to replace those that do not survive.
 - Species B has a higher degree of genetic variation because of recombination of genes.
 - Species B has a lower rate of genetic mutation.

Answer Choice Rationale

- No rationale available
- No rationale available
- Correct
- No rationale available

ItemID LCS_TestAdmin.2369
 Correct C
 Standard(s) SCI.9-12.SC.912.L.16.17

16. Enzymes, comprised of proteins, are an important component of the cell environment. Each enzyme is specific to a particular reaction or group of similar reactions. How do enzymes contribute to chemical reactions in a cell?
- They change into products so a smaller amount of the reactants are needed.
 - They change into reactants so a smaller amount of the reactants are needed.
 - They decrease the amount of activation energy required to make the reaction occur.
 - They increase the amount of activation energy required to make the reaction occur.

Answer Choice Rationale

- No rationale available
- No rationale available
- Correct
- No rationale available

ItemID LCS_TestAdmin.2330
 Correct C
 Standard(s) SCI.9-12.SC.912.L.18.11

17. What happens when the bonds between phosphate groups in ATP are broken?
- Energy is absorbed.
 - Energy is released.
 - The adenosine molecule breaks apart from the remaining phosphates.
 - The adenosine molecule is absorbed by the remaining phosphates.

Answer Choice Rationale

- No rationale available
- Correct
- No rationale available
- No rationale available

ItemID LCS_TestAdmin.2329
 Correct B
 Standard(s) SCI.9-12.SC.912.L.18.10

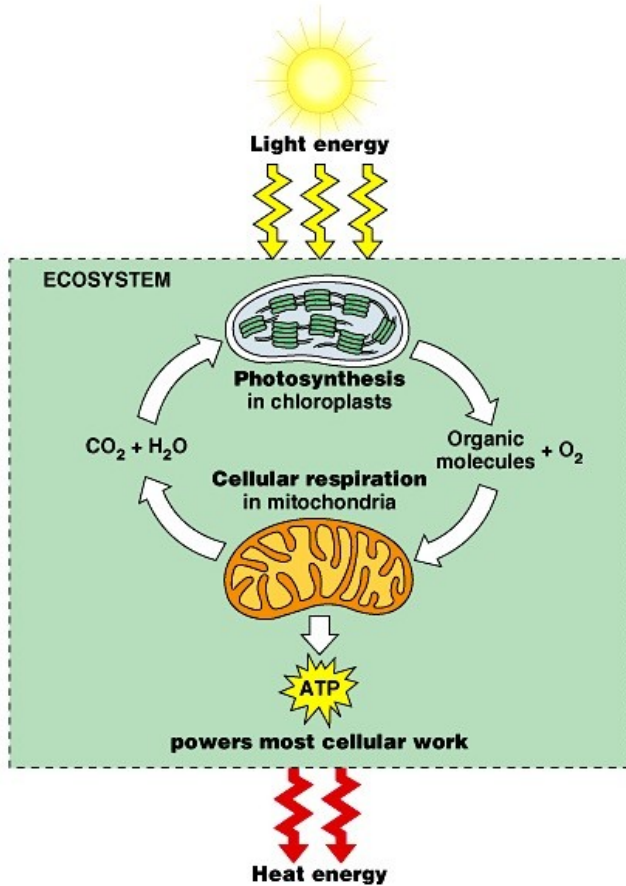
18. During the winter you become sick with the flu. Shortly after that, you become sick with strep throat. Will the same type of B-cells that fought the pathogen that caused the flu fight the pathogen that causes strep throat?
- Yes, every B-cell is capable of fighting every pathogen with which it comes in contact.
 - Yes. B-cells recognize similar antigens such as bacterial and viral pathogens.
 - No. B-cells fight viruses while T cells fight bacteria.
 - No. Each B-cell is capable of recognizing one specific antigen.

Answer Choice Rationale

- No rationale available
- No rationale available
- No rationale available
- Correct

ItemID LCS_TestAdmin.2446
 Correct D
 Standard(s) SCI.9-12.SC.912.L.14.52

19.



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Refer to the diagram above. What is the relationship between the processes of photosynthesis and cellular respiration?

- A. ATP is produced during cellular respiration, which is then used during photosynthesis to produce glucose.
- B. Carbon dioxide and glucose are produced during cellular respiration and are used during photosynthesis to harness energy from the Sun.
- C. Glucose is used during photosynthesis to produce ATP, which is then used during cellular respiration to create proteins.
- D. Oxygen and glucose are produced during photosynthesis and produce ATP during cellular respiration to perform vital cellular functions.

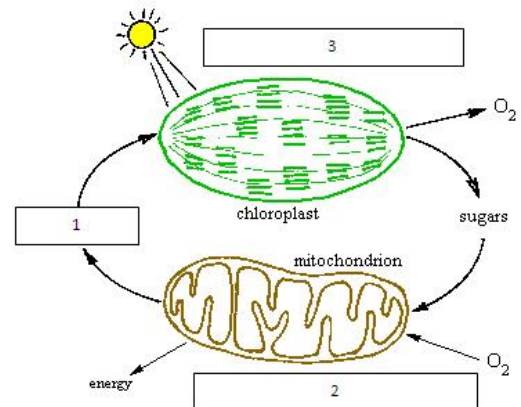
Answer Choice Rationale

- A. No rationale available
- B. No rationale available
- C. No rationale available

D. Correct

ItemID LCS_TestAdmin.2323
 Correct D
 Standard(s) SCI.9-12.SC.912.L.18.9, 5E/M1b

20. The diagram below illustrates the interrelated nature of photosynthesis and two important biological processes. Which process is represented by #2 in the diagram?



- A. Cellular Respiration
- B. Photosynthesis
- C. Protein Synthesis
- D. Transpiration

Answer Choice Rationale

- A. Correct
- B. No rationale available
- C. No rationale available
- D. No rationale available

ItemID LCS_TestAdmin.2371
 Correct A
 Standard(s) SCI.9-12.SC.912.L.18.9

21. In most plants, where are the specialized cells which absorb water and minerals are found?
- A. flowers
 - B. leaves
 - C. roots
 - D. stems

Answer Choice Rationale

- A. No rationale available
- B. No rationale available

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- C. Correct
- D. No rationale available

ItemID LCS_TestAdmin.2374
 Correct C
 Standard(s) SCI.9-12.SC.912.L.14.7

22. A chewing insect damages the vascular tissue of a plant stem. What affect does this damage have on the plant?
- A. conduction of water and minerals between the roots and leaves.
 - B. diffusion of oxygen between root epidermal cells.
 - C. excretion of carbon dioxide by roots cells.
 - D. synthesis of plant hormones in the roots.

Answer Choice Rationale

- A. Correct
- B. No rationale available
- C. No rationale available
- D. No rationale available

ItemID LCS_TestAdmin.2373
 Correct A
 Standard(s) SCI.9-12.SC.912.L.14.7

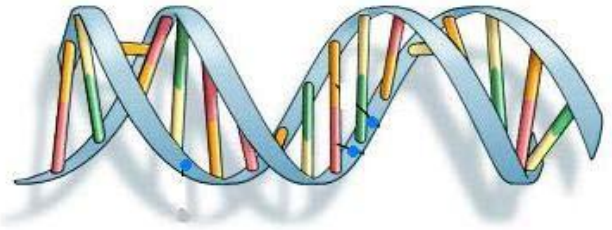
23. What type of biological macromolecule might be used for energy storage in an organism?
- A. Carbohydrate
 - B. Lipid
 - C. Nucleic acid
 - D. Protein

Answer Choice Rationale

- A. No rationale available
- B. Correct
- C. No rationale available
- D. No rationale available

ItemID LCS_TestAdmin.2382
 Correct B
 Standard(s) SCI.9-12.SC.912.L.18.1

24. What is the function of the class of macromolecules represented in the following diagram?



- A. Formation of biological membranes.
- B. Formation of bones and muscles.
- C. Storage of cellular energy.
- D. Storage of genetic information.

Answer Choice Rationale

- A. No rationale available
- B. No rationale available
- C. No rationale available
- D. Correct

ItemID LCS_TestAdmin.2388
 Correct D
 Standard(s) SCI.9-12.SC.912.L.18.1

25.



Water has a high surface tension. What property of water allows the organism pictured in the diagram to "walk" on water?

- A. Adhesion
- B. Cohesion
- C. Ionic Bonds
- D. Nonpolar Covalent Bonds

Answer Choice Rationale

- A. No rationale available
- B. Correct
- C. No rationale available
- D. No rationale available

ItemID LCS_TestAdmin.2375
 Correct B
 Standard(s) SCI.9-12.SC.912.L.18.12

26. Water travels against gravity through plant tissues from roots to leaves. This is important for plant survival and function. Which property of water is responsible for this process?

- A. Cohesion
- B. Expansion upon freezing.
- C. The ability to moderate temperature.
- D. Versatility as a solvent.

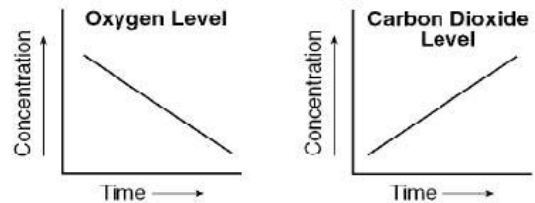
Answer Choice Rationale

- A. Correct
- B. No rationale available
- C. No rationale available

D. No rationale available

ItemID LCS_TestAdmin.2376
 Correct A
 Standard(s) SCI.9-12.SC.912.L.18.12

27. The graphs below show the changes in the relative concentrations of two gases in the air surrounding a group of organisms at a given time. Which process in the organisms most likely accounts for the changes shown?



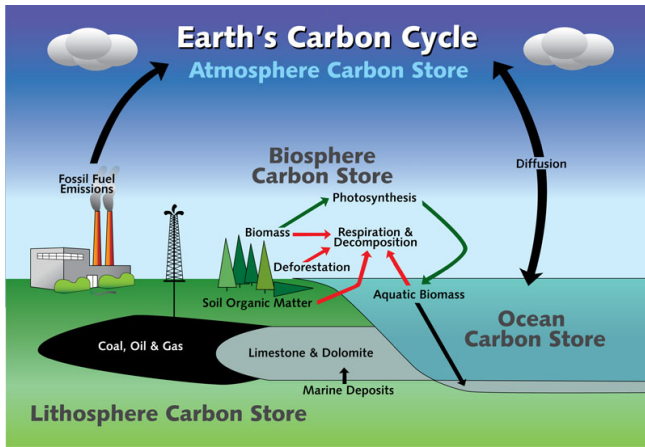
- A. Active Transport
- B. Cellular Respiration
- C. Evaporation
- D. Photosynthesis

Answer Choice Rationale

- A. No rationale available
- B. Correct
- C. No rationale available
- D. No rationale available

ItemID LCS_TestAdmin.2380
 Correct B
 Standard(s) SCI.9-12.SC.912.L.18.8

28.



Which part of the diagram above relates to carbon moving from an abiotic to a biotic part of the ecosystem?

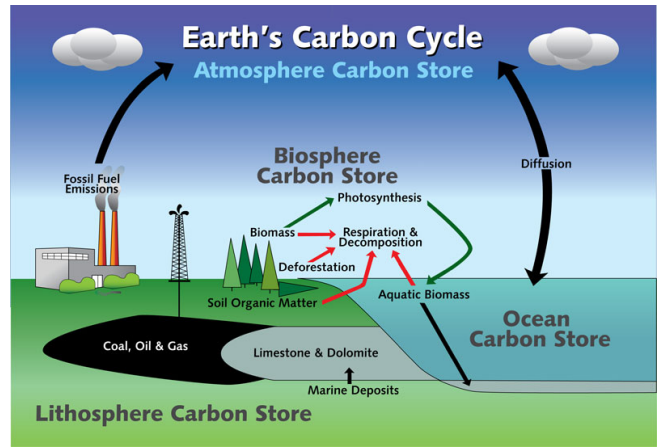
- A. Deforestation
- B. decomposition
- C. Fossil fuels
- D. Photosynthesis

Answer Choice Rationale

- A. No rationale available
- B. No rationale available
- C. No rationale available
- D. Correct

ItemID LCS_TestAdmin.4078
 Correct D
 Standard(s) SCI.9-12.SC.912.E.7.1

29.



Using the carbon cycle diagram, what impact would deforestation have on the carbon cycle?

- A. Decrease the levels of carbon dioxide found in the atmosphere.
- B. Decrease the levels of carbon found in limestone deposits.
- C. Increase the levels of carbon dioxide found in the atmosphere.
- D. Increase the levels of carbon stored in fossil fuels.

Answer Choice Rationale

- A. No rationale available
- B. No rationale available
- C. Correct
- D. No rationale available

ItemID LCS_TestAdmin.2402
 Correct C
 Standard(s) SCI.9-12.SC.912.E.7.1

30. The table below summarizes the number of differences in amino acids between humans and four other species.

Amino Acid Differences Between Species

Species	Amino Acid Differences
Humans and Species 1	1
Humans and Species 2	13
Humans and Species 3	21
Humans and Species 4	51

Which conclusion can be made based on this data?

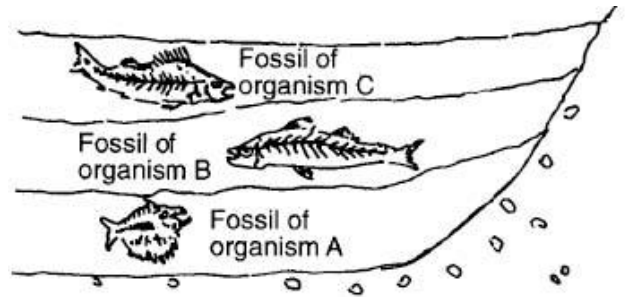
- A. Species 1 is most closely related to humans.
- B. Species 2 is most closely related to humans.
- C. Species 2 is most closely related to species 4.
- D. Species 3 is most closely related to species 4.

Answer Choice Rationale

- A. Correct
- B. No rationale available
- C. No rationale available
- D. No rationale available

ItemID LCS_TestAdmin.2415
 Correct A
 Standard(s) SCI.9-12.SC.912.L.15.1

31. The diagram below represents undisturbed rock strata in a given region. A representative fossil of an organism is illustrated in each layer. What is the relationship between these representative organisms?



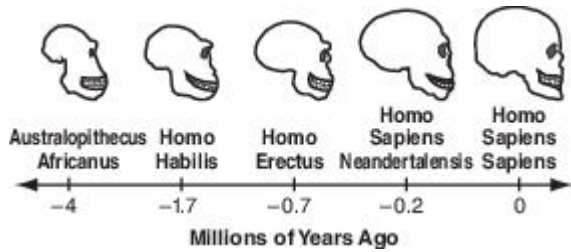
- A. All of these organisms probably evolved at the same time.
- B. Organism A was probably more primitive than organism B and organism C.
- C. Organism A was probably more structurally advanced than organism B and organism C.
- D. Organism C is an older form of organism A and organism B.

Answer Choice Rationale

- A. No rationale available
- B. Correct
- C. No rationale available
- D. No rationale available

ItemID LCS_TestAdmin.2414
 Correct B
 Standard(s) SCI.9-12.SC.912.L.15.1

32. The diagram below shows trends in brain size in hominid evolution.



If brain capacity is reflected in skull size, infer which of the hominid species had the most developed language.

- A. *Australopithecus africanus*
- B. *Homo erectus*
- C. *Homo habilis*
- D. *Homo sapiens neandertalensis*

Answer Choice Rationale

- A. No rationale available
- B. No rationale available
- C. No rationale available
- D. Correct

ItemID LCS_TestAdmin.2416
 Correct D
 Standard(s) SCI.9-12.SC.912.L.15.10

33. When antibiotics were first used, they were extremely effective in treating bacterial infections. Over time, bacteria have become resistant to many antibiotics. Why has bacterial resistance to antibiotics become more common?

- A. Chemicals that are toxic to certain organisms, such as antibiotics, always become less effective with time.
- B. Random mutations caused some bacteria to be resistant to antibiotics, and those bacteria survived to pass on the trait.
- C. The bacteria needed to survive the changing conditions so they developed new mutations.
- D. The bacteria survived equally well in many different environmental conditions because they are tiny organisms.

Answer Choice Rationale

- A. No rationale available
- B. Correct

- C. No rationale available
- D. No rationale available

ItemID LCS_TestAdmin.2418
 Correct B
 Standard(s) SCI.9-12.SC.912.L.15.13

34. How could the currently accepted theory of evolution be described?

- A. Organisms evolved because of random mutations leading to variations selected by nature to pass on to the next generation.
- B. Organisms evolved spontaneously from nothing, as there was no life on Earth.
- C. Organisms evolved because of adaptations that arose in their bodies and were inherited by offspring.
- D. Organisms evolved from a few spores that came from other planets and germinated on Earth.

Answer Choice Rationale

- A. Correct
- B. No rationale available
- C. No rationale available
- D. No rationale available

ItemID LCS_TestAdmin.2403
 Correct A
 Standard(s) SCI.9-12.L.12.13, SCI.9-12.SC.912.L.15.13, 5F/H3

35. Scientists compared fossil remains of a species that lived 5,000 years ago with members of the same species living today. Scientists concluded that this species had changed very little over the entire time period. Why has such little change occurred with this species?

- A. The environment changed significantly and those offspring without favorable characteristics died.
- B. The environment changed significantly but the species had no natural enemies for a long period of time.
- C. The environment did not change significantly and those offspring expressing new characteristics did not survive.
- D. The environment did not change significantly and those offspring expressing new characteristics survived their natural enemies.

Answer Choice Rationale

- A. No rationale available

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- B. No rationale available
- C. Correct
- D. No rationale available

- C. Correct
- D. No rationale available

ItemID LCS_TestAdmin.2405
 Correct C
 Standard(s) SCI.9-12.SC.912.L.15.13

ItemID LCS_TestAdmin.2413
 Correct C
 Standard(s) SCI.9-12.SC.912.L.15.6

36. The DNA sequence that codes for a certain gene is similar in several different animals. The DNA sequence for this gene is identical in chickens and turkeys and differs by only two bases in ducks and turkeys. Based on this information, what evolutionary relationship can be made?
- A. Chickens and ducks are more closely related to one another than they are to turkeys.
 - B. Chickens and ducks have no evolutionary relationship.
 - C. Chickens and turkeys are more closely related to one another than they are to ducks.
 - D. Chickens, ducks and turkeys can interbreed because they have similar DNA sequences.

Answer Choice Rationale

- A. No rationale available
- B. No rationale available
- C. Correct
- D. No rationale available

ItemID LCS_TestAdmin.2417
 Correct C
 Standard(s) SCI.9-12.SC.912.L.15.4

37. The cells in a multicellular organism have the following characteristics:
- no photosynthesis
 - no cell walls
 - ingest nutrients
 - nucleus
- How would the organism be classified?
- A. It is classified as *Archea*.
 - B. It is classified as *Bacteria*.
 - C. It is classified as *Eukarya*.
 - D. It is classified as a *Fungi*.

Answer Choice Rationale

- A. No rationale available
- B. No rationale available

38. The Miller-Urey experiment illustrated the formation of organic molecules from Earth's early atmosphere. Why was this important?
- A. It showed how methane gas forms water.
 - B. It showed how microorganisms appeared through spontaneous generation.
 - C. It showed how simple organic molecules could be made from inorganic compounds.
 - D. It showed how the plasma membrane was formed.

Answer Choice Rationale

- A. No rationale available
- B. No rationale available
- C. Correct
- D. No rationale available

ItemID LCS_TestAdmin.2411
 Correct C
 Standard(s) SCI.9-12.SC.912.L.15.8

39. One of the accepted scientific theories describing the origin of life on Earth is known as chemical evolution. What would need to occur **first** for life to evolve?
- A. The formation of the plasma membrane.
 - B. The start of photosynthesis.
 - C. The start of cell respiration.
 - D. The synthesis of organic molecules.

Answer Choice Rationale

- A. No rationale available
- B. No rationale available
- C. No rationale available
- D. Correct

ItemID LCS_TestAdmin.2410
 Correct D
 Standard(s) SCI.9-12.SC.912.L.15.8

40. Bromthymol blue solution is commonly used as a pH indicator. It starts as a blue solution in water and turns yellow in the presence of Carbon Dioxide. Below are the results of an experiment in which the aquatic plant *Elodea* was placed in a test tube containing a bromthymol blue solution. Which of the following claims below can be used to explain the data?

Time	Tube 1 Control	Tube 2 <i>Elodea</i>	Tube 3 <i>Elodea</i>
0	Yellow	Yellow	Yellow
6 Hours	Yellow	Blue	Blue

- A. Carbon Dioxide was released by the *Elodea* turning the solution yellow.
- B. Carbon dioxide is removed from the solution by the *Elodea*.
- C. Oxygen was removed from the solution by the *Elodea*.
- D. Water was released into the solution by the *Elodea*.

Answer Choice Rationale

- A. No rationale available
- B. Correct
- C. No rationale available
- D. No rationale available

ItemID LCS_TestAdmin.3015
 Correct B
 Standard(s) SCI.9-12.SC.912.L.18.7

41. Sickle cell anemia results from a gene mutation that causes abnormalities in red blood cells. The sickle-cell gene is more common in tropical areas. The individual who is heterozygous for the gene (Ss) has increased resistance to malaria. If two individuals heterozygous (Ss) for the sickle-cell gene have offspring, what percent of their offspring are expected to be heterozygous?
- A. 25%
- B. 50%
- C. 75%
- D. 100%

Answer Choice Rationale

- A. No rationale available
- B. Correct
- C. No rationale available

- D. No rationale available

ItemID LCS_TestAdmin.2406
 Correct B
 Standard(s) SCI.9-12.SC.912.L.16.2

42. How does Mendel's law of independent assortment affect traits on different chromosomes?
- A. All traits are sorted independently during mitosis.
- B. Traits can be inherited from either the mother or the father.
- C. Traits on different chromosomes are sorted independently during meiosis.
- D. Two different traits tend to follow the same pattern of inheritance from generation to generation.

Answer Choice Rationale

- A. No rationale available
- B. No rationale available
- C. Correct
- D. No rationale available

ItemID LCS_TestAdmin.2407
 Correct C
 Standard(s) SCI.9-12.SC.912.L.16.1, 10H/H5

43. What is a way in which recombinant DNA technology is helping human health?
- A. It is creating new molecular diseases.
- B. It is deteriorating human growth hormones.
- C. It is finding molecular causes of diseases.
- D. It is reducing protein production, such as insulin.

Answer Choice Rationale

- A. No rationale available
- B. No rationale available
- C. Correct
- D. No rationale available

ItemID LCS_TestAdmin.2338
 Correct C
 Standard(s) SCI.9-12.SC.912.L.16.10

44. The three alleles for human blood type are A, B, and O. Both the A and B alleles are codominant with one another and dominant over the O allele. A person with O-type blood would have a genotype of OO, and a person with AB-type blood would have a genotype of AB. Which of these couples could produce a child with AB-type blood (genotype AB)?
- A. one parent with AB-type blood and one parent with O-type blood
 - B. one parent with A-type blood and one parent with B-type blood
 - C. two parents with A-type blood
 - D. two parents with O-type blood

Answer Choice Rationale

- A. No rationale available
- B. Correct
- C. No rationale available
- D. No rationale available

ItemID LCS_TestAdmin.2408
 Correct B
 Standard(s) SCI.9-12.SC.912.L.16.1

45. What is the primary concern of using coal energy?
- A. Burning coal contributes to acid rain and global warming.
 - B. Burning coal contributes to the ozone layer.
 - C. Coal contributes to water pollution..
 - D. Coal is difficult to safely transport.

Answer Choice Rationale

- A. Correct
- B. No rationale available
- C. No rationale available
- D. No rationale available

ItemID LCS_TestAdmin.2409
 Correct A
 Standard(s) SCI.9-12.SC.912.L.17.11

46. Why do phytoplankton live on the surface of the ocean?
- A. They require colder temperatures than are found at the ocean's depths.
 - B. They require energy from the Sun to perform photosynthesis.
 - C. They require greater salinity than available at the ocean's depths.
 - D. They require oxygen found only at the surface in order to perform photosynthesis.

Answer Choice Rationale

- A. No rationale available
- B. Correct
- C. No rationale available
- D. No rationale available

ItemID LCS_TestAdmin.2421
 Correct B
 Standard(s) SCI.9-12.SC.912.L.17.2

47. La Niña is characterized by cold ocean temperatures resulting in an accumulation of cold water in the central and eastern Pacific oceans. After it subsides, there is a change in weather patterns and a disruption of ecosystems due to the unusually cold temperatures that last about six to eight months. What would happen within an ecosystem as a result of La Niña?
- A. a change in predator-prey relationships as some prey species become predators
 - B. the adaptation of organisms to the new climate by the mutation of genes
 - C. the extinction of species and the evolution of other species to dominate the ecosystem
 - D. the reduction of some populations in affected areas and the temporary increase in others

Answer Choice Rationale

- A. No rationale available
- B. No rationale available
- C. No rationale available
- D. Correct

ItemID LCS_TestAdmin.2420
 Correct D
 Standard(s) SCI.9-12.SC.912.L.17.4

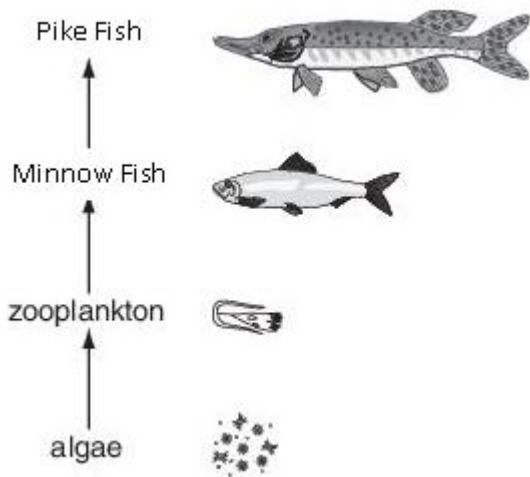
48. It has been estimated that the Amazon rain forest is disappearing at the rate of 5 million acres per year. What is the immediate result of habitat loss on the biodiversity of the area?
- Biodiversity will change unpredictably.
 - Biodiversity will decrease.
 - Biodiversity will increase.
 - Biodiversity will stay the same.

Answer Choice Rationale

- No rationale available
- Correct
- No rationale available
- No rationale available

ItemID LCS_TestAdmin.2419
 Correct B
 Standard(s) SCI.9-12.SC.912.L.17.8

49. The diagram below shows the interdependence of organisms existing in a lake.



If a disease reduces the population of minnows fish, what is the effect on the populations in the lake?

- Algae population would increase.
- All the populations would decrease.
- Pike fish population would increase.
- Zooplankton population would increase.

Answer Choice Rationale

- No rationale available
- No rationale available
- No rationale available

D. Correct

ItemID LCS_TestAdmin.2422
 Correct D
 Standard(s) SCI.9-12.SC.912.L.17.5

50. A species of brown bear in Russia and the brown bear in the United States have a common ancestor. How did speciation produce these different brown bears?
- Mutations and asexual reproduction.
 - Mutations and genetic recombination.
 - The development of structures for climbing trees.
 - The inheritance of acquired traits.

Answer Choice Rationale

- No rationale available
- Correct
- No rationale available
- No rationale available

ItemID LCS_TestAdmin.2428
 Correct B
 Standard(s) SCI.9-12.SC.912.L.15.15

51. Organism X is a multicellular, heterotrophic eukaryotic whose cells lack walls. To which kingdom does Organism X belong?
- Animalia
 - Fungi
 - Plantae
 - Protista

Answer Choice Rationale

- Correct
- No rationale available
- No rationale available
- No rationale available

ItemID LCS_TestAdmin.2425
 Correct A
 Standard(s) SCI.9-12.SC.912.L.15.6

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52. Bacteria and humans are very different organisms. Why is it possible to use bacteria to produce a human protein?

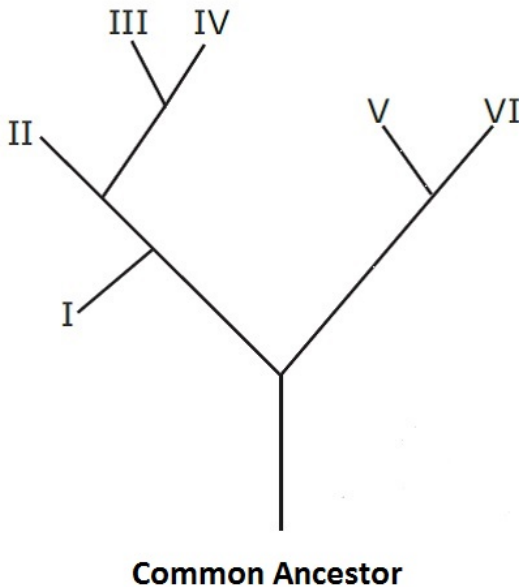
- A. All cells have ribosomes.
- B. All proteins are identical.
- C. Hybridization can occur between the two organisms.
- D. The genetic code is universal.

Answer Choice Rationale

- A. No rationale available
- B. No rationale available
- C. No rationale available
- D. Correct

ItemID LCS_TestAdmin.2427
 Correct D
 Standard(s) SCI.9-12.SC.912.L.16.10

53. This diagram shows a cladogram of six species based on amino acid similarities.



Which two species are the *most closely* related?

- A. I and II
- B. II and IV
- C. I and V
- D. V and VI

Answer Choice Rationale

- A. No rationale available
- B. No rationale available
- C. No rationale available
- D. Correct

ItemID LCS_TestAdmin.3011
 Correct D
 Standard(s) SCI.9-12.SC.912.L.16.5

54. Populations do not continue to grow to an unlimited size. Their environment, including food and other natural resources, limits their size eventually. What term describes the size of the population that an ecosystem can support?

- A. Carrying capacity
- B. Differential population
- C. Predator Limit
- D. Prey maximum

Answer Choice Rationale

- A. Correct
- B. No rationale available
- C. No rationale available
- D. No rationale available

ItemID LCS_TestAdmin.2426
 Correct A
 Standard(s) SCI.9-12.SC.912.L.17.5

55. In his theory, Lamarck suggested that organisms develop and pass on to offspring variations that they need in order to survive in a particular environment. In a later theory, Darwin proposed that changing environmental conditions favor certain variations that promote the survival of organisms. What conclusion can be drawn from this information?

- A. All scientific theories are subject to change and improvement.
- B. Most scientific theories are the outcome of a single hypothesis.
- C. Scientific theories are not subject to change.
- D. Scientific theories that have been changed are the only ones supported by scientists.

Answer Choice Rationale

- A. Correct
- B. No rationale available
- C. No rationale available

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D. No rationale available

D. No rationale available

ItemID LCS_TestAdmin.2424
 Correct A
 Standard(s) SCI.9-12.SC.912.L.15.1

ItemID LCS_TestAdmin.2447
 Correct C
 Standard(s) SCI.9-12.SC.912.L.14.26

56. What factors have the greatest effect on public health?
- A. a skin cancer caused by UV radiation.
 - B. a thyroid disorder that affects twin sisters
 - C. a virus that spreads by airborne transmission
 - D. an increase in algal growth leading to a zooplankton bloom

58. Which structure of the brain is designated by label 2?
- A. Cerebellum
 - B. Cerebrum
 - C. Medulla Oblongata
 - D. Pons

Answer Choice Rationale

- A. No rationale available
- B. No rationale available
- C. Correct
- D. No rationale available

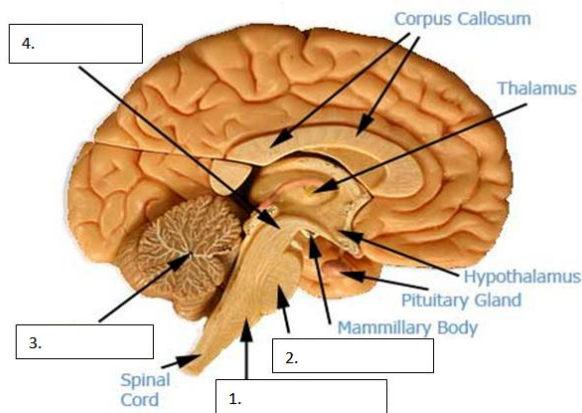
Answer Choice Rationale

- A. No rationale available
- B. No rationale available
- C. No rationale available
- D. Correct

ItemID LCS_TestAdmin.2337
 Correct C
 Standard(s) SCI.9-12.SC.912.L.14.6

ItemID LCS_TestAdmin.2448
 Correct D
 Standard(s) SCI.9-12.SC.912.L.14.26

57. Which structure of the brain is designated by label 1?

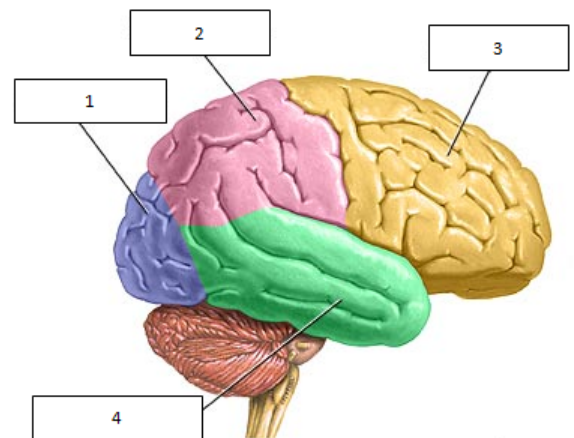


- A. Cerebellum
- B. Cerebrum
- C. Medulla Oblongata
- D. Pons

Answer Choice Rationale

- A. No rationale available
- B. No rationale available
- C. Correct

59. The frontal lobe region of the brain is associated with higher mental functions, such as abstract thought. Which label identifies this region in the diagram?



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

Answer Choice Rationale

- A. No rationale available

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- B. No rationale available
- C. Correct
- D. No rationale available

- C. No rationale available
- D. No rationale available

ItemID LCS_TestAdmin.2449
 Correct C
 Standard(s) SCI.9-12.SC.912.L.14.26

ItemID LCS_TestAdmin.3045
 Correct B
 Standard(s) SCI.9-12.SC.912.L.14.52

60. Mika and his lab partner, Maria, collected data on their heart rates while performing different activities. The chart below shows their averages. The data shows a higher heart rate for increased activity. How would you explain this relationship?

ACTIVITY	MIKE & MARIA'S AVERAGE HEART RATE
Sitting Quietly	60 beats /minute
Walking	80 beats/minute
Running	110 beats/minute

- A. The muscles require a greater amount of carbon dioxide to break down glucose to do work.
- B. The muscles require a greater amount of oxygen in order to break down glucose to do work.
- C. The muscles require less glucose to be delivered to them as their energy source.
- D. The muscles require more hemoglobin to be delivered to them as their energy source.

Answer Choice Rationale

- A. No rationale available
- B. Correct
- C. No rationale available
- D. No rationale available

ItemID LCS_TestAdmin.2444
 Correct B
 Standard(s) SCI.9-12.SC.912.L.14.36

61. Which of the following would be the best way to detect whether someone was infected with a viurs, like HIV?

- A. Check for an inflammatory response in the body
- B. Check for the presence of antibodies in the blood
- C. Check for the presence of histamines in the body
- D. Check for the presence of white blood cells in the blood

Answer Choice Rationale

- A. No rationale available
- B. Correct

62. The choices that humans make every day affect the environment. Sometimes, our lifestyles can harm the enviroment rather than protect it. Which of the following would be most helpful in protecting the environmentand achieving sustainability?

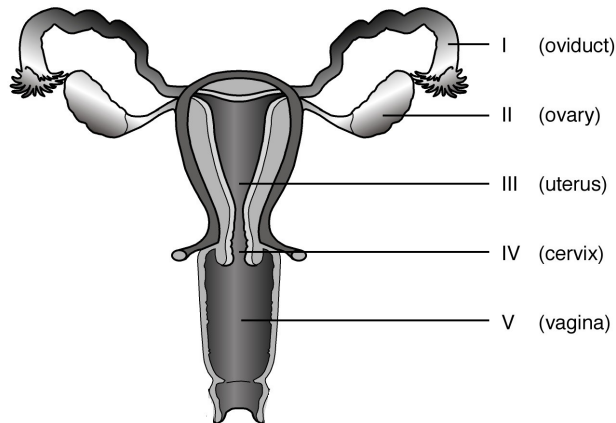
- A. Buying paper products made from harvested trees
- B. Buying fewer mass produced products
- C. using natural gas as a fuel source instead of petroleum
- D. Using solar power to generate electricity

Answer Choice Rationale

- A. No rationale available
- B. No rationale available
- C. No rationale available
- D. Correct

ItemID LCS_TestAdmin.3044
 Correct D
 Standard(s) SCI.9-12.SC.912.L.17.20

63.



Using the diagram above, in what structure of the human female reproductive system does a sperm fertilize an egg?

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

Answer Choice Rationale

- A. Correct
- B. No rationale available
- C. No rationale available
- D. No rationale available

ItemID LCS_TestAdmin.2445
 Correct A
 Standard(s) SCI.9-12.SC.912.L.16.13

64. How could a substitution of a single base in a chromosome cause a cell to produce mutant forms of a protein?

- A. The base is located within a non-coding section of DNA.
- B. The substitution causes a frameshift mutation, which changes all codons that follow it.
- C. The new codon codes form a different amino acid and change the shape of the resulting protein.
- D. The substitution changes the codon to one that codes for the same amino acid as the original codon.

Answer Choice Rationale

- A. No rationale available

- B. No rationale available
- C. Correct
- D. No rationale available

ItemID LCS_TestAdmin.2918
 Correct C
 Standard(s) SCI.9-12.SC.912.L.16.4

65. Before meiosis a cell contains two sets of chromosomes, one set inherited from the mother and one from the father. During meiosis half of the chromosomes go to one side of the cell and half go to the opposite side. Which chromosomes go to each side of the cell?

- A. All of the chromosomes from one parent go to one side.
- B. The chromosomes with the most advantageous traits go to one side.
- C. The chromosomes with the most dominant traits go to one side.
- D. The chromosomes from each parent are randomly divided between the two sides.

Answer Choice Rationale

- A. The student may have the misconception that chromosomes segregate nonrandomly by parental origin. The student may know that chromosome segregation confers an advantage to a population, so he or she may reason that the advantage comes from stacking advantageous traits to ensure that one offspring has all possible advantages.
- B. The student may have the misconception that dominance between alleles affects the distribution of chromosomes during meiosis.
- C. The student understands random chromosome segregation.
- D. The student understands random chromosome segregation.

ItemID LCS_TestAdmin.2919
 Correct D
 Standard(s) SCI.9-12.SC.912.L.16.16

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66. What kind of discovery might lead a scientist to reclassify a hypothetical organism, *Organism X*?
- A. Another species is found that resembles *Organism X*.
 - B. Its DNA sequence is similar to that of another species.
 - C. Fossils show that *Organism X* has always looked the same.
 - D. Fossils show that *Organism X* has evolved over time.

Answer Choice Rationale

- A. This discovery would reassert the classification system already in place.
- B. Correct answer.
When classifying an organism, its physical appearance in fossils is less important than its location in the fossil record.
- C. The evolution of a species does not necessarily mean it needs to be reclassified.

ItemID LCS_TestAdmin.2921
 Correct B
 Standard(s) SCI.9-12.SC.912.L.15.5

67. The trait for red-green colorblindness is an X-linked recessive trait. Which couple could produce a colorblind daughter?
- A. a colorblind mother and a father with normal vision
 - B. a mother with normal vision who is a carrier and a colorblind father
 - C. a mother with normal vision who is a carrier and a father with normal vision
 - D. a mother with normal vision who is not a carrier and a father with normal vision

Answer Choice Rationale

- A. No rationale available
- B. Correct
- C. No rationale available
- D. No rationale available

ItemID LCS_TestAdmin.2922
 Correct B
 Standard(s) SCI.9-12.SC.912.L.16.2

68. In the state of Montana, wolf hunting was recently allowed after a long period when it was banned. Environmentalists continually monitor the wolf population. How can their findings help policymakers with their decisions regarding this issue?
- A. If the wolf population decreases significantly, policymakers may reinforce the ban.
If the wolf population increases even while hunting is permitted, then policymakers will decrease the length of the wolf hunting season.
 - B. If the rabbit population decreases significantly, policymakers may reinforce the ban.
If the rabbit population increases substantially, policymakers will know that they were right to allow hunting.

Answer Choice Rationale

- A. Correct answer.
An increase in the number of wolves, even as they are being hunted, would most likely result in an increase in the length of the hunting season.
- B. The rabbit population would not decrease as a result of fewer wolves in the environment.
This would only be true if the rabbit population were at risk, which is not likely; and, either way, there is not enough information in the question to know if it was or not.

ItemID LCS_TestAdmin.2923
 Correct A
 Standard(s) SCI.9-12.SC.912.L.17.13

69. From scientific research and understanding, what is one method of reducing the amount of pollution caused by plastic bags and bottles?
- A. burning used plastic bags and bottles
 - B. recycling and reusing plastic bags and bottles
 - C. sending used plastic bags and bottles to a landfill
 - D. throwing used plastic bags and bottles into the oceans

Answer Choice Rationale

- A. The student may not understand this would increase pollution.
- B. Correct answer.
- C. Filling landfills will increase pollution.

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- D. Throwing bags and bottles into the oceans will increase pollution and harm ocean life.

ItemID LCS_TestAdmin.2924
 Correct B
 Standard(s) SCI.9-12.SC.912.L.17.20

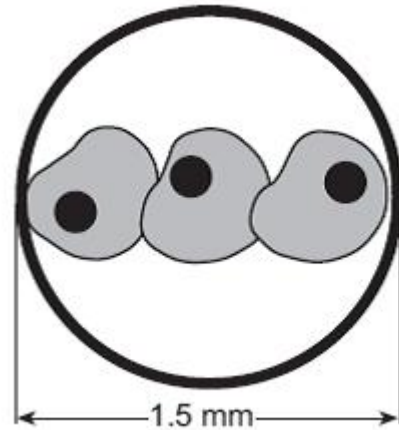
70. Some animal species are able to reproduce both asexually and sexually. Which of these is an advantage of an organism with this ability?
- A. Beneficial traits arise more quickly.
 B. Fewer harmful genetic mutations occur.
 C. New genetic traits are exchanged with mates more easily.
 D. Organisms can still reproduce even when unable to find a mate.

Answer Choice Rationale

- A. Beneficial traits arise in offspring more quickly when reproduction is sexual. Harmful genetic mutations become more common among species that reproduce asexually.
 B. New genetic traits are inherited by offspring, not exchanged with mates.
 C. Correct answer
 D. Correct answer

ItemID LCS_TestAdmin.2920
 Correct D
 Standard(s) SCI.9-12.SC.912.L.16.17

71. The diagram below shows three cells using a low power objective (10X) microscope. the diameter of the field of view is 1.5 millimeters.



What type of cell is shown in the diagram?

- A. Eukaryote
 B. Prion
 C. Prokaryote
 D. Virus

Answer Choice Rationale

- A. Correct
 B. No rationale available
 C. No rationale available
 D. No rationale available

ItemID LCS_TestAdmin.3034
 Correct A
 Standard(s) SCI.9-12.SC.912.L.14.39

72. Along a certain river, two tan lizards had five offspring live long enough to reproduce. Meanwhile, the eggs in several green lizard nests were destroyed during a flood. The next generation of lizards near that river had more tan than green lizards. What kind of evolutionary mechanism is this an example of?
- A. natural selection
 B. mutation
 C. gene flow
 D. genetic drift

Answer Choice Rationale

- If natural selection were involved, the tan lizards would be more successful because they were more difficult for predators to spot, and therefore had a greater chance of living long enough to reproduce.
 A. more difficult for predators to spot, and therefore had a greater chance of living long enough to reproduce.

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- B. An example of a mutation as a causal agent would be if lizards with genes for green color had tan offspring, resulting in genes for tan lizards being more common within the population. Gene flow can change the dynamics of a population when genes from one population move to another, as in a migration. In this question, if a tan lizard moved into a region where previously only green lizards existed, gene flow would be responsible for the change in population.
- C. Correct answer.
- D. Correct answer.

ItemID A2K.1191436
 Correct D
 Standard(s) SCI.9-12.SC.912.L.15.14

73. Which is the BEST reason to recycle plastic bottles rather than throw them away?
- A. Certain plastics leech chemicals that can cause diseases.
- B. The materials needed for plastic bottles are too expensive to throw away.
- C. The materials needed for plastic bottles do not decompose naturally in the environment.
- D. The materials in plastic bottles react with other trash in landfills to produce harmful toxins.

Answer Choice Rationale

- A. While some plastics do leech harmful chemicals, this is not the primary reason for recycling plastic bottles.
- B. Though the cost of plastic is rising, the materials are not so expensive that we could not produce more plastic effectively.
- C. Correct answer.
- D. Typically, plastic materials do not react with other trash to produce toxins.

ItemID A2K.1223612
 Correct C
 Standard(s) SCI.9-12.SC.912.L.17.20

74. Why is the concept of evolution called a theory?
- A. Evolution is not well supported by the evidence.
- B. It does not provide an explanation of how species develop.
- C. It is a well-supported explanation of how species develop.
- D. Evolution does not have enough support to be considered a law.

Answer Choice Rationale

- A. Evolution is well supported by evidence and accepted by a wide community of scientists.
- B. This is a characteristic of the theory of evolution.
- C. Correct answer.
 A law and a theory are separate and distinct concepts. They do not describe two different degrees of support.
- D. Correct answer.

ItemID A2K.1195280
 Correct C
 Standard(s) SCI.9-12.SC.912.N.3.4

75. An egg has been fertilized and has implanted in the uterine wall. What stage of human development is this?
- A. fertilization
- B. first trimester
- C. second trimester
- D. third trimester

Answer Choice Rationale

- A. No rationale available
- B. Correct
- C. No rationale available
- D. No rationale available

ItemID fannins.814
 Correct B
 Standard(s) SCI.9-12.SC.912.L.16.13