Florida EOC Coach Jumpstart, Biology 1

# Posttest

Name: _____

1. Matthias Schleiden was one of the scientists who contributed to modern cell theory. His early version of cell theory stated the following:

   I. The cell is the basic unit of structure, function, and organization in living things.

   II. The cell exists as both a unit and as a building block in larger, multicellular organisms.

   III. Cells form by a method similar to the formation of crystals.

   Which part or parts of Schleiden's version of cell theory differ from the modern version of cell theory?

   **A.** II only

   **B.** III only

   **C.** I and II

   **D.** I and III

2. Which of the following takes place during the S phase of the cell cycle?

**A.** The cell repairs damaged organelles.

**B.** The cell duplicates its chromosomes.

**C.** The cell produces extra cytoplasm and organelles.

**D.** The chromosomes move to opposite ends of the cell.

3. Several factors affect how blood flows through the body. Which of the following can interfere with blood flow?

**A.** moderate exercise

**B.** reduction in heart rate

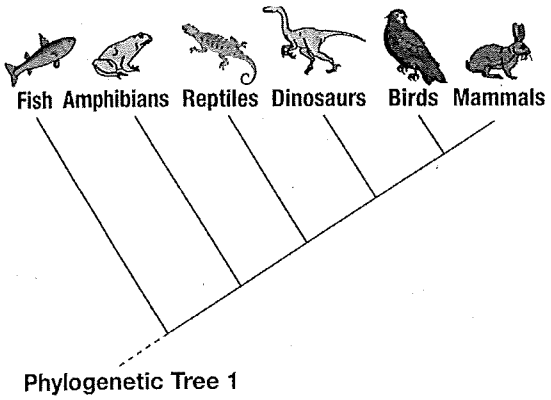
**C.** the narrowing of blood vessels

**D.** normal blood cholesterol levels

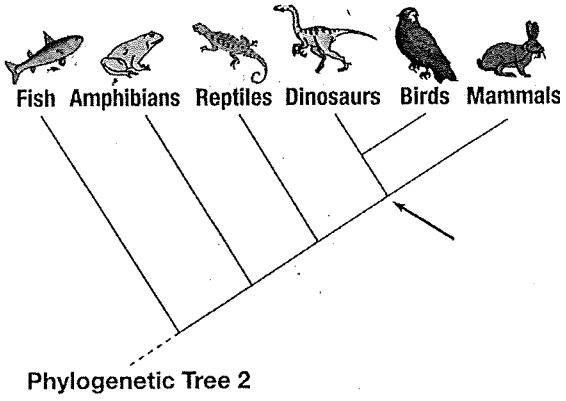
**For questions 4, 5, 6, and 7, refer to the following passage and diagrams.**

Both mammals and birds are endothermic and have hearts divided into four chambers. For this reason, scientists for most of the last century thought that birds and mammals shared a common ancestor more recently than other vertebrate groups (such as dinosaurs, reptiles, or amphibians). This relationship is shown in Phylogenetic Tree 1.

Later in the 1900s, however, some scientists concluded that the ancestor of modern birds was a dinosaur. This relationship is shown in Phylogenetic Tree 2. This new hypothesis was supported by many lines of evidence, including the skeletal anatomy of birds and dinosaurs and the discovery of fossil species that resemble both birds and dinosaurs. Today, the idea that birds descended from dinosaurs is widely accepted by scientists, and birds have been reclassified as a subgroup of dinosaurs. However, some scientists still challenge this reclassification.




Phylogenetic Tree 1




Phylogenetic Tree 2

4. Why did the classification of birds change from the early 1900s to the present?

   **A.** The final, correct classification was discovered.

   **B.** New evidence suggested a better classification.

   **C.** Scientists used DNA evidence to reclassify birds.

   **D.** Scientists interpreted the old evidence in a new way.

Posttest

5. If Phylogenetic Tree 2 is correct, which two groups of organisms would be expected to have the **greatest** number of differences in their DNA?

**A.** birds and mammals

**B.** birds and dinosaurs

**C.** dinosaurs and reptiles

**D.** dinosaurs and mammals

6. The arrow in Phylogenetic Tree 2 points to the most recent common ancestor of dinosaurs, birds, and mammals. Neither birds nor bats inherited wings from this ancestor. Instead, the wings of birds and bats evolved independently to serve a similar function. Which of the following describes the wings of birds and bats?

**A.** vestigial structures

**B.** analogous structures

**C.** embryonic structures

**D.** homologous structures

7. The red blood cells of mammals lose their nuclei, while the red blood cells of birds retain them. Which of the following would be evidence supporting the hypothesis that birds descended from dinosaurs?

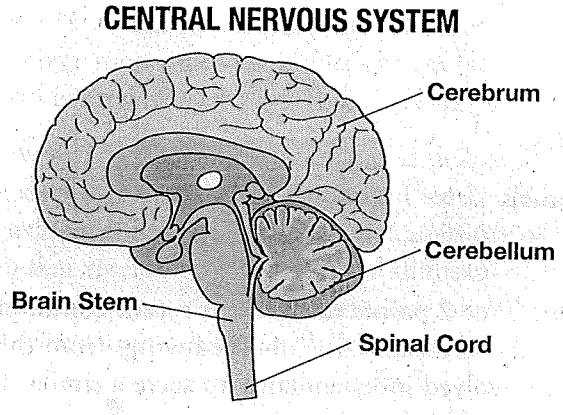
**A.** the discovery that dinosaurs had red blood cells that lost their nuclei

**B.** the discovery of a bird species with red blood cells that lose their nuclei

**C.** the discovery that dinosaurs had red blood cells that retained their nuclei

**D.** the discovery of a mammal species with red blood cells that retain their nuclei

8. The illustration below shows the four main parts of the central nervous system.




Which part of the central nervous system interprets information collected by the senses?

**A.** brain stem

**B.** cerebrum

**C.** spinal cord

**D.** cerebellum

9. Which type of cell contains DNA in the form of a circular plasmid located in the cytoplasm?

**A.** plant

**B.** animal

**C.** protist

**D.** bacteria

**10.** The human immune system has three lines of defense that protect the body from disease: barriers to infection, the inflammatory response, and the immune response. Which of the following is part of an inflammatory response?

**A.** A pathogen enters the eyes but is washed away by tears.

**B.** Macrophages, T cells, and B cells attack and destroy harmful cells.

**C.** Plasma fills the spaces between cells, carrying white blood cells to an injury.

**D.** Swallowed pathogens enter the stomach and are destroyed by stomach acid.

**11.** Diseases are either infectious or noninfectious. Which of the following is a way in which a person might contract an infectious disease?

**A.** developing lung cancer after being exposed to asbestos

**B.** contracting malaria from the bite of an infected mosquito

**C.** carrying a gene that may or may not cause Alzheimer's disease

**D.** developing heart disease from poor dietary choices and lack of exercise

12. A sedge is a grasslike plant with fibrous roots, which are small, shallow roots that branch out from the base of the plant. Which of the following **best** explains how the structure of the roots helps the plant?

**A.** The plant gets its support from the roots, which serve as a kind of anchor.

**B.** The roots transport water between the stems and leaves of the plant.

**C.** The plant uses its roots to capture water that is close to the surface of the soil.

**D.** The roots allow for the exchange of gases the plant needs for photosynthesis.

13. Enzymes help cells to carry out necessary chemical reactions. Most enzymes work best under specific conditions. Which of the following factors is **least likely** to affect the activity of an enzyme?

**A.** temperature

**B.** pH of the cell

**C.** concentration of the reactants

**D.** concentration of the products

**14.** Which of the following cell structures modifies proteins after they are assembled?

**A.** ribosome

**B.** Golgi body

**C.** mitochondrion

**D.** endoplasmic reticulum

**15.** Some molecules cross the cell membrane by facilitated diffusion. Which of the following are required for facilitated diffusion?

I. energy in the form of ATP

II. protein channels in the cell membrane

III. a concentration gradient

**A.** I and II

**B.** I and III

**C.** II and III

**D.** I, II, and III

16. DNA in the cell replicates to form new DNA. Which of the following describes how DNA replicates?

**A.** The two DNA strands separate, each strand forms a new complementary strand through base pairing, and the two newly formed strands join to form a new DNA double strand.

**B.** The two DNA strands remain joined, the double strand forms a new complementary strand through base pairing, and the newly formed strand separates.

**C.** The two DNA strands separate, each strand forms a new complementary strand through base pairing, and one old and one new strand combine to form new DNA double strands.

**D.** The two DNA strands remain joined, the double strand forms a new complementary strand through base pairing, and each half of the original double strand separates to pair with a newly formed strand.

17. If the climate in southern Florida changed so that it was hot and dry year-round, with very little rain, which of the following would **most likely** occur?

**A.** Plant diversity in the area would increase.

**B.** Animals in the area would find ways to adapt.

**C.** Plants usually found in deserts would begin to grow in the area.

**D.** Animals in the area would begin seasonal migrations.

18. The table below shows the amino acids coded for by each DNA codon.

**THE GENETIC ALPHABET**

| First Base | Second Base | | | | Third Base |
|---|---|---|---|---|---|
| | T | C | A | G | |
| T | phenylalanine | serine | tyrosine | cysteine | T |
| T | phenylalanine | serine | tyrosine | cysteine | C |
| T | leucine | serine | (stop) | (stop) | A |
| T | leucine | serine | (stop) | tryptophan | G |
| C | leucine | proline | histidine | arginine | T |
| C | leucine | proline | histidine | arginine | C |
| C | leucine | proline | glutamine | arginine | A |
| C | leucine | proline | glutamine | arginine | G |
| A | isoleucine | threonine | asparagine | serine | T |
| A | isoleucine | threonine | asparagine | serine | C |
| A | isoleucine | threonine | lysine | arginine | A |
| A | methionine | threonine | lysine | arginine | G |
| G | valine | alanine | aspartic acid | glycine | T |
| G | valine | alanine | aspartic acid | glycine | C |
| G | valine | alanine | glutamic acid | glycine | A |
| G | valine | alanine | glutamic acid | glycine | G |

Based on the information in the table, which of the following point mutations would NOT change the sequence of amino acids coded for by the following sequence of codons: ATG ATT TAC AGC?

**A.** ATC ATT TAC AGC

**B.** ATG ATC TAC AGC

**C.** ATG ATT TAG AGC

**D.** ATG ATT TAC ACC

19. The ocean is divided into three life zones: the intertidal zone, the neritic zone, and the oceanic zone. Which of the following organisms **most likely** live in the oceanic zone?

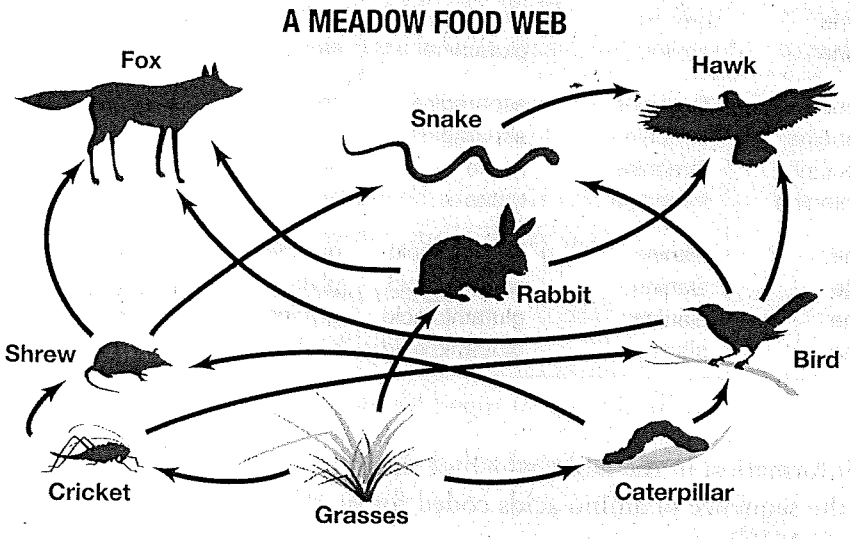
**A.** crabs, snails, and mussels

**B.** jellyfish, whales, and squids

**C.** coral, clownfish, and algae

**D.** sponges, sea urchins, and sea stars

20. A meadow food web is shown below.




Which of the following organisms is in the trophic level that sustains this ecosystem?

**A.** hawk

**B.** snake

**C.** rabbit

**D.** grass

Posttest

21. A cell in a person's retina differs from a cell found in the lining of that person's small intestine. Which of the following **best** explains why these cells are different?

**A.** Genes are translated in different ways.

**B.** Genes are transcribed in different ways.

**C.** Different genes are contained in the nuclei of these cells.

**D.** Different genes are transcribed and translated.

22. Eukaryotic cells have many characteristics in common. Which of the following is shared by nearly all eukaryotic organisms?

**A.** the genes making up the chromosomes

**B.** the number of chromosomes in a body cell

**C.** the code for translating genes into proteins

**D.** the amount of genetic information in the nucleus

**23.** The diploid chromosome number in dogs is 78. Which of the following correctly describes the body cells and sex cells of a dog?

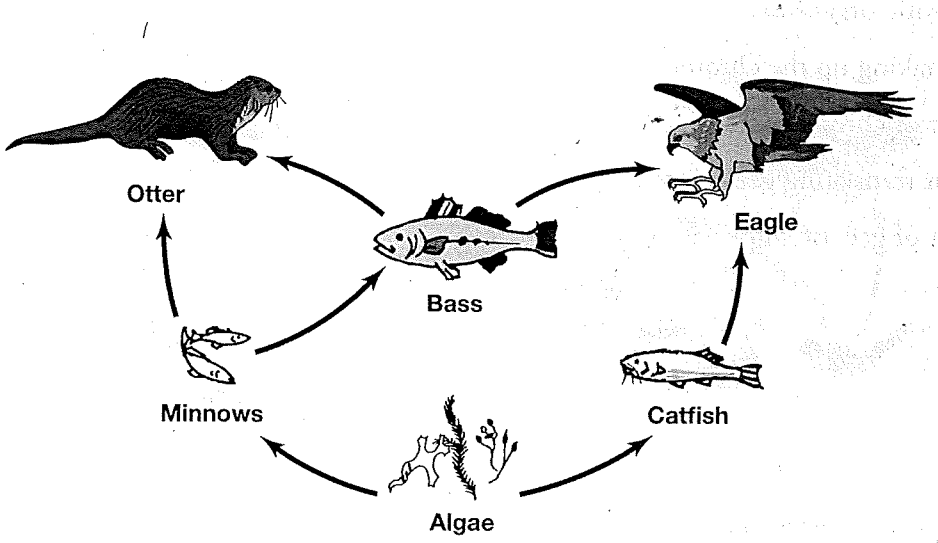
**A.** A dog's body cells have 39 chromosomes, and its sex cells have 78 chromosomes.

**B.** A dog's body cells have 78 chromosomes, and its sex cells have 39 chromosomes.

**C.** A dog's body cells have 78 chromosomes, and its sex cells have 156 chromosomes.

**D.** A dog's body cells have 156 chromosomes, and its sex cells have 78 chromosomes.

**24.** A food web is shown below.




Which of the following is a secondary consumer in this food web?

**A.** bass

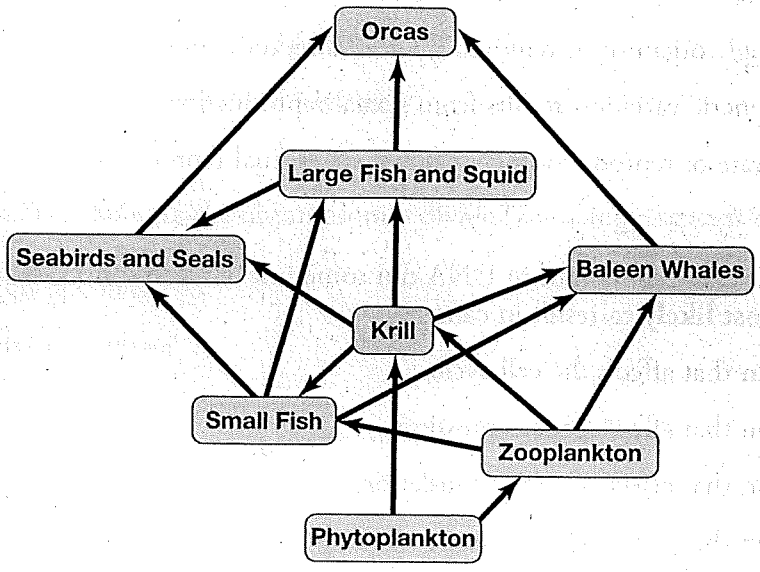
**B.** algae

**C.** catfish

**D.** minnows

Postest

**25.** A marine food web is shown below.




Which of the following would be a long-term effect of removing baleen whales from the ecosystem represented by this food web?

**A.** The krill population would increase.

**B.** The orca population would increase.

**C.** The phytoplankton population would increase.

**D.** The large fish and squid population would increase.

26. Which of the following is an advantage of sexual reproduction over asexual reproduction?

**A.** Fewer mutations result from sexual reproduction.

**B.** Only a single organism is required for sexual reproduction.

**C.** Greater genetic variation results from sexual reproduction.

**D.** A higher rate of reproduction is possible with sexual reproduction.

27. Substances that cause mutations in DNA can sometimes lead to cancer. Which type of mutation is **most likely** to result in cancer?

**A.** a mutation that affects the cell cycle

**B.** a mutation that affects gene expression

**C.** a mutation that affects protein translation

**D.** a mutation that affects chromosome number

**28.** The phases of mitosis are listed below.

Prophase

Metaphase

Anaphase

Telophase

In which phases of mitosis are the chromosomes divided into single strands of DNA?

**A.** anaphase and telophase

**B.** prophase and metaphase

**C.** prophase, anaphase, and telophase

**D.** metaphase, anaphase, and telophase

**29.** A power company wants to build a new electric power plant next to a river and use water from the river for cooling. Which of the following should be studied before deciding whether to let the company build the plant?

**A.** the price of the high-voltage wires used to transmit electricity

**B.** the effects of warmer water on the fish species that live in the river

**C.** the power company's contributions to support local sports teams

**D.** the efficiency of the generators that the company plans to build

**30.** Genetic engineering has been used to improve crop plants, such as corn and rice. When scientists genetically engineer a plant, they insert a foreign gene into the plant. They often link this gene to an antibiotic resistance marker (ARM) gene, which helps determine if the first gene was successfully inserted into the plant. Some scientists argue that this practice is completely safe. Other scientists fear that it will create new strains of diseases that are resistant to antibiotics. Which **best** describes the ethical issue related to ARMs?

**A.** Using ARMs in genetically engineered food will harm future generations.

**B.** Using ARMs in genetically engineered food carries a risk of harming people.

**C.** Using ARMs in genetically engineered food will affect profits because people will not want to buy the resulting crops.

**D.** Using ARMs in genetically engineered food is safe because no new strains of disease have occurred so far.

**31.** The wood stork is a large wading bird that was once abundant in the Florida Everglades. Today, only a few wood storks remain in this area. Which of the following would cause a further decline in the wood stork population?

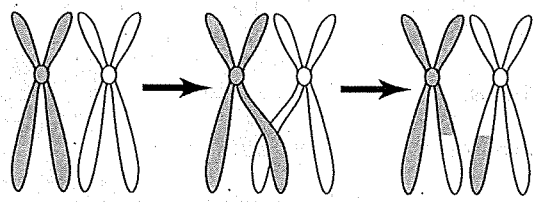
**A.** a decreasing emigration rate and an increasing birth rate

**B.** a decreasing birth rate and an increasing immigration rate

**C.** an increasing death rate and a decreasing immigration rate

**D.** an increasing emigration rate and an increasing immigration rate

**32.** A process that occurs during cell division is shown below.



During which phase of meiosis does this process take place?

**A.** Prophase I

**B.** Prophase II

**C.** Metaphase I

**D.** Metaphase II

**33.** A healthy diet includes a variety of nutrients, minerals, and vitamins. The body breaks nutrients down into smaller parts that it can use. Which type of nutrient is broken into parts that are used to repair tissues and form new tissues?

**A.** fat

**B.** sugar

**C.** protein

**D.** carbohydrate

**34.** Enzymes are biological molecules that are essential for the reactions that take place inside cells. How do enzymes help cells to carry out biochemical reactions?

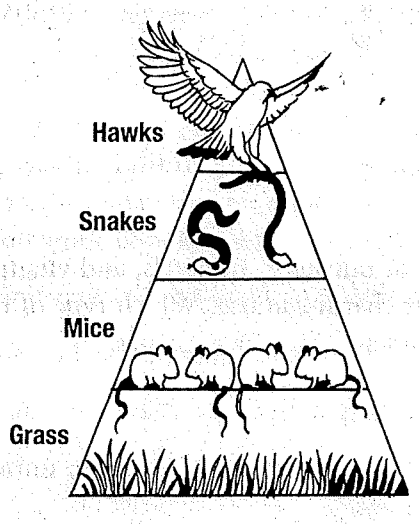
**A.** Enzymes provide energy for reactions.

**B.** Enzymes increase the speed of reactions.

**C.** Enzymes are broken down to form the products of reactions.

**D.** Enzymes decrease the amount of matter required for reactions.

**35.** An energy pyramid is shown below.




Which of the following statements describes the transfer of energy in this pyramid?

**A.** Energy is transferred from grass to mice to hawks.

**B.** Energy is transferred from hawks to snakes to mice.

**C.** Energy is transferred from grass to mice to snakes to hawks.

**D.** Energy is transferred from hawks to snakes to mice to grass.

36. The carbon-oxygen cycle is the continual transfer of carbon and oxygen between Earth's living organisms and the nonliving parts of the environment. When fuel is burned, which of the following is removed from the atmosphere?

**A.** oxygen

**B.** nitrogen

**C.** water vapor

**D.** carbon dioxide

37. Desertification is the transformation of productive land into a desert. Which of the following would **most likely** cause desertification?

**A.** overhunting on a grassland

**B.** polluting lakes and rivers

**C.** overfishing in lakes and rivers

**D.** cutting all the trees in a forested area

38. Scientists who classify organisms are known as taxonomists. Which of these is a reason for taxonomists to place two species in the same genus?

**A.** They have many anatomical traits in common.

**B.** They share their most recent common ancestor.

**C.** They occupy the most similar ecological niches.

**D.** They have the greatest numbers of DNA differences.

39. Which group of organisms includes all of the following: species that are capable of photosynthesis, species that are consumers, and species that are unicellular?

**A.** Protista

**B.** Plantae

**C.** Fungi

**D.** Animalia

40. Modern humans are classified as hominids. Several other hominid species evolved and died out in the past. Which of the following occurred last in hominid evolution?

**A.** the development of the ability to walk upright

**B.** an increase in the size of the brain

**C.** the development of spoken language

**D.** a decrease in the size of the jaw and teeth

41. Which of the following substances is produced by cellular respiration and used in photosynthesis?

**A.** oxygen

**B.** glucose

**C.** carbohydrate

**D.** carbon dioxide

42. During the first trimester of pregnancy, a ball of cells called the gastrula is formed. The gastrula consists of three germ layers. In time, the middle germ layer develops into which of the following?

**A.** the brain and spinal cord

**B.** skin, nerves, and sense organs

**C.** the digestive system and lungs

**D.** bones, muscles, and connective tissue

43. A limiting factor is anything in an environment that can limit the size of a population. Limiting factors may be either density-dependent or density-independent. Which of the following describes a density-independent limiting factor in Florida?

**A.** An extremely dry, hot summer causes the death of many organisms in an environment.

**B.** The alligator population grows so large that it reduces the number of waterfowl.

**C.** Competition among bird species leads to a reduction in the population of one of those species.

**D.** Too many people move into a community near a beach, causing a housing shortage and polluting the beach.

44. Life on Earth is thought to have begun with simple molecules. These molecules would have had functions similar to what the parts of cells do now. Which of the following functions must have appeared first?

**A.** forming a nucleus

**B.** assembling proteins

**C.** acting as a membrane

**D.** storing genetic information

45. Which of the following is necessary for natural selection to occur in a population?

**A.** competition among members of the population for mates

**B.** exposure to chemicals that produce a high rate of mutations

**C.** production of fewer offspring than the environment can support

**D.** genetic variation among members of the population

46. What is the original source of the chemical energy in maple syrup?

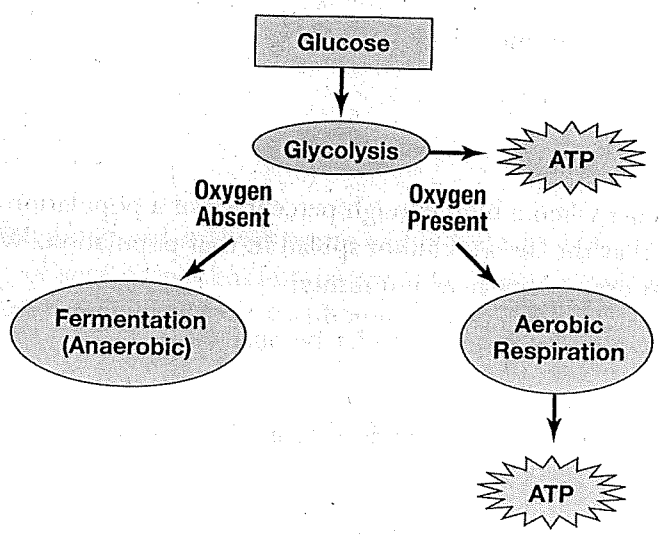
**A.** ATP

**B.** water

**C.** oxygen

**D.** sunlight

47. Cells can get energy from glucose by aerobic respiration in the presence of oxygen. They can also get energy from glucose by fermentation, or anaerobically, without using oxygen. The diagram shows the processes of fermentation and aerobic respiration.




Which of the following describes the difference between aerobic respiration and fermentation?

**A.** Aerobic respiration uses more glucose and produces more ATP.

**B.** Fermentation uses more glucose and produces more ATP.

**C.** Both processes use the same amount of glucose, but aerobic respiration produces more ATP.

**D.** Both processes produce the same amount of ATP, but aerobic respiration uses more glucose.

48. Which of the following is **most likely** to cause smog?

**A.** clear-cutting forests

**B.** heavy motor vehicle traffic

**C.** dust in the air from mining

**D.** many homes using electricity

49. Herd immunity occurs when a high enough percentage of a population becomes protected against a disease so that the disease cannot spread in that population. Which of the following is the **best** example of herd immunity?

**A.** Polio is unknown in the Americas today because most children receive polio vaccinations.

**B.** Employees at a company are encouraged to get flu shots to avoid becoming sick and missing work.

**C.** A county sprays trees to kill mosquitoes in order to prevent people from becoming sick after being bitten.

**D.** A school reduces the number of colds in children by encouraging frequent hand-washing.

**50.** A woman has dimples, which are a dominant trait. She has a son with no dimples. What is the woman's genotype?

**A.** homozygous recessive

**B.** homozygous dominant

**C.** heterozygous recessive

**D.** heterozygous dominant

**51.** A fruit fly with a gray body and red eyes mates with a fruit fly with a brown body and white eyes. The offspring all have brown bodies and red eyes. However, when the offspring mate with each other, they produce some flies with gray bodies and white eyes and some with brown bodies and red eyes. They also produce offspring that resemble the original pair of flies.

Why does the third generation of flies have combinations of traits that were not seen in the first generation?

**A.** The alleles for the traits are recessive.

**B.** The alleles for the traits are dominant.

**C.** The alleles for the traits assort independently.

**D.** The alleles for the traits segregate into gametes.

52. A fertilized egg undergoes several stages before it is successfully implanted. In which structure of the female human reproductive system is the egg fertilized by a sperm?

**A.** ovary

**B.** uterus

**C.** vagina

**D.** fallopian tube

53. Scientists are asking people who work in the fishing industry to help determine the number and location of Chinese mitten crabs, which are native to East Asia and have been found along the Atlantic and Gulf coasts. Which is the **most likely** reason why scientists are trying to determine the number and location of these crabs in the United States?

**A.** The crabs might reduce biodiversity if they are more successful than native species.

**B.** The crabs might carry diseases that could be transmitted to humans who consumed them.

**C.** The crabs might upset the territorial boundaries of native crab species, thereby disrupting breeding.

**D.** The crabs might interbreed with native crabs, creating a new species and disrupting the existing food chain.

**54.** ATP provides energy for reactions in the cell. Which of the following describes how ATP provides energy for these reactions?

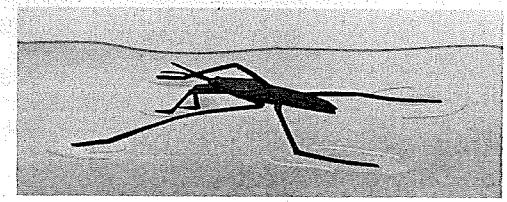
**A.** ATP is converted to ADP.

**B.** ADP is converted to ATP.

**C.** ATP is broken down and used in the reactions.

**D.** ATP breaks down glucose to be used in the reactions.

**55.** The water strider shown below can walk on water because water has a high surface tension.



Which property of water molecules gives water its high surface tension?

**A.** Water molecules pack together tightly.

**B.** Water molecules attract other water molecules.

**C.** Water molecules are farther apart in the solid phase.

**D.** Water molecules attract molecules of adjacent surfaces.

**For questions 56, 57, and 58, refer to the following passage and table.**

A group of scientists wants to determine the reason for the size differences between chickens bred to lay eggs and chickens bred for their meat. Both types of chickens have undergone decades of selective breeding. Farmers have crossed male and female chickens thought to produce the best eggs, as well as male and female chickens thought to produce the most and best meat. The table below shows the differences in size between the two types of chickens.

| Age (days) | Average Mass of Chicken Bred to Lay Eggs (grams) | Average Mass of Chicken Bred for Meat (grams) |
|---|---|---|
| 1 | 7 | 7 |
| 8 | 14 | 99 |
| 20 | 249 | 709 |
| 30 | 400 | 1,588 |
| 45 | 601 | 2,400 |

56. Based on this information, which of the following is the **best** conclusion regarding the chickens bred for meat?

**A.** They lay poor-quality eggs.

**B.** They eat very high-quality food.

**C.** They have genes that make them large and heavy.

**D.** They have been genetically modified to produce good meat.

57. The scientists want to extend their investigation to explain the data in the table. Which hypothesis would be **most** useful?

**A.** It is more ethical to breed chickens for eggs than for meat.

**B.** Genetic engineering can produce a chicken with more meat.

**C.** Certain alleles occur more often in chickens bred for meat.

**D.** Chickens bred for meat were fed better than chickens bred for eggs.

58. The scientists want to do an experiment to find out whether the chickens that are bred for meat are as healthy as other chickens. Which of the following should be the independent variable?

**A.** the varieties of chickens being tested

**B.** the natural life span of the chickens

**C.** the kind of food the chickens are fed

**D.** the number of parasites in the chickens

59. Molecules in a cell work together to synthesize proteins based on instructions in the genes. Which of the following describes the role of mRNA in the synthesis of proteins?

**A.** mRNA transports amino acids to the ribosome.

**B.** mRNA stores genetic information in the nucleus.

**C.** mRNA carries genetic information to the ribosome.

**D.** mRNA joins amino acids together to form a protein.

60. Which of the following is **most likely** to lead to secondary succession in an area of forest?

**A.** a hurricane that causes flooding and topples trees

**B.** lava and ash produced by a volcanic eruption

**C.** the annual migration of large numbers of birds

**D.** the introduction of a new plant species

**61.** Students working with plants of a single species crossbreed plants that produce red flowers with plants that produce white flowers. All the resulting offspring produce pink flowers. Which of the following describes the trait of having red flowers?

**A.** recessive

**B.** dominant

**C.** polygenic

**D.** codominant

**62.** Many diseases are caused by viruses. Which of the following correctly describes viruses?

**A.** They are prokaryotic organisms.

**B.** They cannot reproduce on their own.

**C.** They absorb nutrients from the host's body.

**D.** They are a main cause of noninfectious disease.

63. Which of the following is found in all prokaryotes and fungi?

A. a cell wall

B. a nucleus

C. chloroplasts

D. mitochondria

64. Individual organisms in a population have different traits due to genetic variation. Which of the following processes is the **original** source of genetic variation in a population?

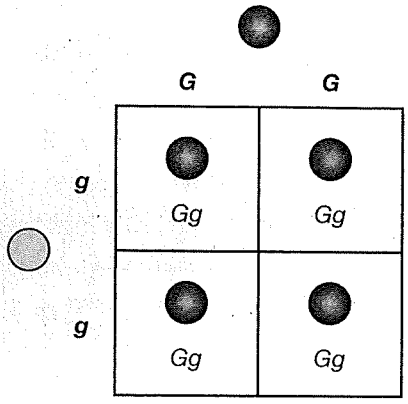
A. mutation

B. crossing over

C. recombination

D. sexual reproduction

**65.** The Punnett square below shows a cross between two purebred pea plants. One parent produces green peas (top), and the other produces yellow peas (side).




What conclusion can be drawn from this cross?

**A.** The allele for green peas is recessive.

**B.** The allele for green peas is dominant.

**C.** Producing green peas is a polygenic trait.

**D.** The alleles for green peas and yellow peas are codominant.

66. Macromolecules are large molecules that are made up of smaller molecules. Lipids are an important group of biological macromolecules. Which of these is made up largely of lipids?

**A.** chromosomes

**B.** cytoplasm

**C.** cell walls

**D.** cell membranes