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CK-12 Biology Quizzes and Tests



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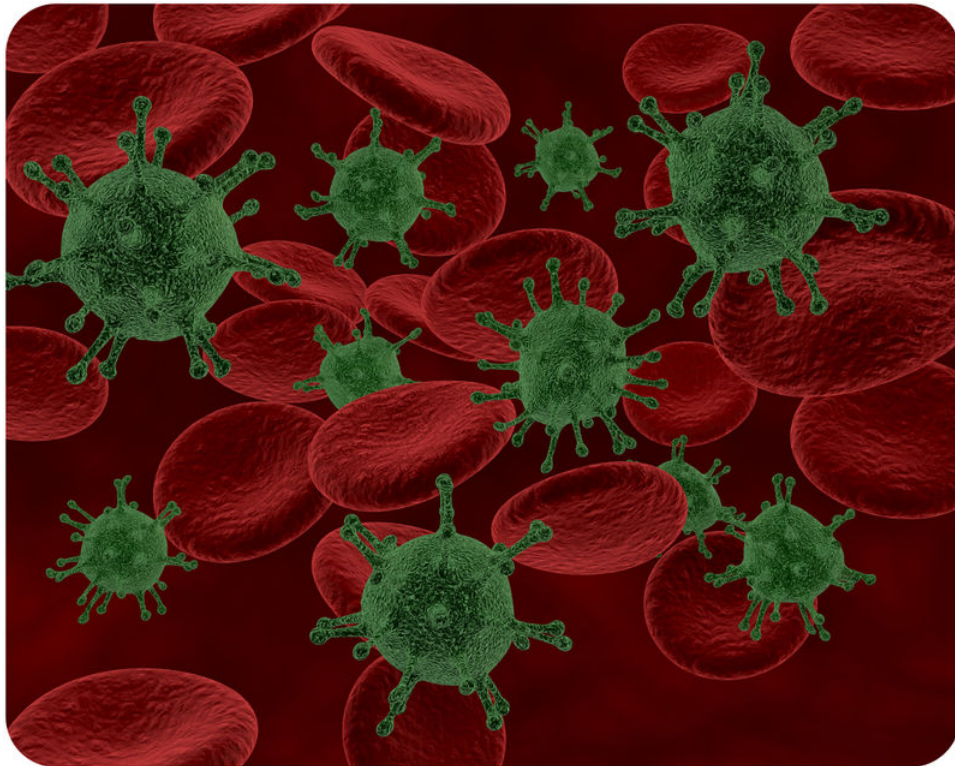
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CHAPTER **1**

What is Biology? Assessments

Chapter Outline

- 1.1 SCIENCE AND THE NATURAL WORLD
 - 1.2 BIOLOGY: THE STUDY OF LIFE
 - 1.3 WHAT IS BIOLOGY?
-



1.1 Science and the Natural World

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

1. A good hypothesis must be
 - a. logical.
 - b. based on scientific knowledge.
 - c. falsifiable.
 - d. all of the above.
2. Testing a(n) _____ involves performing a(n) _____.
 - a. experiment, observation
 - b. hypothesis, experiment
 - c. observation, hypothesis
 - d. conclusion, prediction
3. Scientists must understand that
 - a. science cannot provide answers to all questions.
 - b. scientific ideas are fact, and can never be revised.
 - c. sound scientific ideas are frequently altered.
 - d. nature is a constantly changing wonder, difficult to understand.
4. Natural studies can be more difficult than laboratory studies because scientists
 - a. cannot control which factor is the dependent variable.
 - b. cannot control factors that might affect the variables they are investigating.
 - c. cannot determine which data to analyze.
 - d. cannot determine the best time of day to collect their data.
5. Which is the correct order in a scientific investigation?
 - a. ask a question, test the hypothesis, communicate results, draw conclusions
 - b. make observations, ask a question, form a hypothesis, test the hypothesis
 - c. draw conclusions, ask a question, form a hypothesis, test the hypothesis
 - d. ask a question, make observations, test the hypothesis, draw conclusions
6. A scientific theory is
 - a. an educated guess.
 - b. a guess about how or why something happens.
 - c. a statement that describes what always happens under certain conditions in nature.
 - d. an explanation for events that are generally accepted as true.
7. *Life on Earth was created through a method other than evolution.* This statement
 - a. is an example of a hypothesis.

- b. can be proved using the scientific method.
 - c. is outside the realm of science.
 - d. is a scientific observation.
8. An example of a dependent variable is
- a. the amount of light plants are exposed to each day during an experimental study.
 - b. the amount plants grow under specific conditions during an experimental study.
 - c. the amount of fertilizer given to plants during an experimental study.
 - d. the amount of water given to plants each day during an experimental study.
9. Examples of scientific models include
- a. a diagram of a food chain.
 - b. a map of the solar system.
 - c. a model of an atom showing the location of the nucleus and the electrons.
 - d. all of the above.
10. Science
- a. is a way of gaining knowledge about the natural world.
 - b. is done by following the scientific method.
 - c. is done through scientific investigations.
 - d. all of the above
11. *Science cannot answer all questions.*
- a. The above statement is true because science cannot answer matters of belief.
 - b. The above statement is true because all science is based on logic.
 - c. The above statement is false because science can prove that life evolves over time.
 - d. The above statement is false because science is based on observations and evidence.
12. A main difference between a scientific theory and a hypothesis is that
- a. the theory has been repeatedly tested and proven.
 - b. the theory must be based on scientific knowledge.
 - c. the theory is a possible answer to a scientific question.
 - d. all of the above

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. A scientific theory is always supported by a great deal of evidence.
- _____ 14. The scientific method always begins by asking a question.
- _____ 15. Science can be used to answer all questions.
- _____ 16. Under certain conditions, a scientific law is always true.
- _____ 17. A good hypothesis is always correct.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. A(n) _____ tells what will happen under certain conditions.
19. A(n) _____ is a special type of scientific investigation.
20. The affected variable in an experiment is the _____ variable.
21. A(n) _____, a possible answer to a scientific question, must be based on scientific knowledge.
22. The final step in the scientific method is _____.

23. Science is a distinctive way of gaining knowledge about the _____.
24. Evidence that _____ with your prediction supports your hypothesis.
25. The theory of evolution and the cell theory are well-known scientific _____.

Short Answer

Answer each question in the space provided.

26. What is a hypothesis? Give an example and describe how a scientist would try to prove the hypothesis.

27. What is a scientific theory? Describe the importance of a scientific theory. Give an example.

1.2 Biology: The Study of Life

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Which of the following is **not** true about cells?
 - All living thing begins life as a single cell.
 - The cell is the basic unit of the structure and function of life.
 - It takes many cells to make a living organism.
 - All living cells always come from other living cells.
- The best definition of *biology* is: The science of _____.
 - life
 - plants and animals
 - living organisms
 - the human body
- Homeostasis is
 - the ability to give rise to offspring.
 - maintaining a stable internal environment.
 - the ability to detect and respond to changes in their environment.
 - the ability to grow and develop.
- A complex chemistry is most related to
 - maintaining a stable internal environment.
 - giving rise to offspring.
 - chemical changes.
 - detecting changes in the environment.
- A cell can best be described as
 - the smallest characteristic of living things.
 - the basic structural unit necessary for living things.
 - the smallest unit of function of living things.
 - the basic unit of the structure and function of living things.
- Interdependence of organisms explains the concept that living things
 - cannot live alone.
 - are dependent on other organisms for food.
 - depend on their environment to supply them resources.
 - can be independent organisms.
- Which order of organizational levels is correct, from smallest to largest?
 - population, community, biosphere, biome

- b. population, community, ecosystem, biome
 - c. community, biome, biosphere, ecosystem
 - d. biome, ecosystem, community, population
8. The kingdoms of life include which of the following kingdoms?
- a. Archaeobacteria, Fungus, Plant, and Protist
 - b. Bacteria, Grass, Plant, and Animal
 - c. Bacteria, Protist, Fish, and Animal
 - d. all of the above
9. The scientist most often associated with evolution is
- a. Sir Isaac Newton.
 - b. Albert Einstein.
 - c. Alfred Wallace.
 - d. Charles Darwin.
10. Unifying principles of biology include the cell theory, the gene theory, evolution and
- a. homeostasis.
 - b. natural selection.
 - c. reproduction.
 - d. interdependence of living things.
11. At first, all life on Earth were
- a. simple, multicellular organisms.
 - b. simple, mold-like organisms.
 - c. simple, fish-like organisms.
 - d. simple, single-celled organisms.
12. To be classified as a living organism, an object must
- a. maintain homeostasis.
 - b. have a complex chemistry.
 - c. be made of at least one cell.
 - d. all of the above

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Even the simplest bacterium has a complex chemistry.
- _____ 14. Molecules of DNA have instructions that tell cells what to do.
- _____ 15. Evolution describes why some living things produce more offspring than others do.
- _____ 16. An ecosystem consists of both living and nonliving things.
- _____ 17. The theory of evolution explains how life on Earth first began.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. A(n) _____ is an individual living thing.
19. A cell is the basic unit of the _____ and function of living things.
20. _____ is a change in the characteristics of living things over time.
21. A _____ is made of a group of cells of the same kind.

22. According to the _____ theory, the characteristics of living things are controlled by _____, which are passed from parents to their offspring.
23. The process of maintaining a stable internal _____ is called homeostasis.
24. An adaptation is a characteristic that helps a living thing survive and _____ in a given environment.
25. Symbiosis is a close _____ between organisms of different species in which at least one of the organisms benefits.

Short Answer

Answer each question in the space provided.

26. Describe the organizational relationship between cells and an organism.

27. Explain how the terms *evolution*, *natural selection*, and *adaptation* are related.

1.3 What is Biology?

Chapter Test

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Science is based on certain assumptions, including:
 - nature can be understood through systematic study.
 - scientific ideas are open to revision.
 - sound scientific ideas can withstand the test of time.
 - all of the above.
- An example of a scientific law is the law of
 - evolution.
 - nature.
 - relativity.
 - gravity.
- In order to be useful, a scientific hypothesis must be
 - true.
 - general.
 - falsifiable.
 - supported by evidence.
- In a scientific experiment, one variable is hypothesized to affect another variable. The variable that is affected is called the
 - independent variable.
 - experimental variable.
 - dependent variable.
 - sample variable.
- Which of the following is not one of the four unifying principles of biology?
 - cell theory
 - germ theory
 - homeostasis
 - evolution
- Over many generations, living things become better adapted to their environment through the process of
 - symbiosis.
 - development.
 - natural selection.
 - homeostasis.
- A structure composed of one or more types of tissues is a(n)

- a. organ system.
 - b. organism.
 - c. organ.
 - d. cell.
8. All the living things in a given area, together with the nonliving environment, make up a(n)
- a. species.
 - b. community.
 - c. ecosystem.
 - d. population.
9. The number of different species alive today is a measure of Earth's
- a. biodiversity.
 - b. biosphere.
 - c. biology.
 - d. biome.
10. Which theory best explains why the cells of human beings and chimpanzees share 98 percent of the same genes?
- a. cell theory
 - b. gene theory
 - c. theory of life
 - d. theory of evolution

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. The goal of science is to understand the natural world.
- _____ 12. Science can provide answers to all questions.
- _____ 13. All valid scientific knowledge is based on experimentation.
- _____ 14. You cannot prove without a doubt that a hypothesis is true.
- _____ 15. Reproduction is the process by which living things produce offspring.
- _____ 16. Simple organisms consist of simple molecules.
- _____ 17. Some living things do not have cells.
- _____ 18. The characteristics of living things are controlled by genes.
- _____ 19. An organism is an individual living thing.
- _____ 20. Symbiosis is a relationship between organisms in which one always wins out over the other.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. A statement that describes what always happens under certain conditions in nature is a scientific _____.
22. A(n) _____ is anything that is detected through the senses or with instruments or measuring devices.
23. A possible answer to a scientific question is called a(n) _____.
24. When you state what you think might happen in the future, you are making a(n) _____.
25. A scientific investigation that is performed under controlled conditions is referred to as a(n) _____.
26. A scientific _____ is a broad explanation that is supported by a great deal of evidence.

27. The process of maintaining a stable internal environment is called _____.
28. The _____ is the basic unit of structure and function of living things.
29. A characteristic that helps a living thing survive and reproduce in a given environment is a(n) _____.
30. The _____ is the part of Earth where all life exists.

Short Answer

Answer each question in the space provided.

31. Outline the steps of a scientific investigation. Illustrate your answer with an example.

32. Identify the six basic characteristics of all living things.

33. Define biodiversity and evolution. Then explain how the two concepts are related.

CHAPTER 2

The Chemistry of Life Assessments

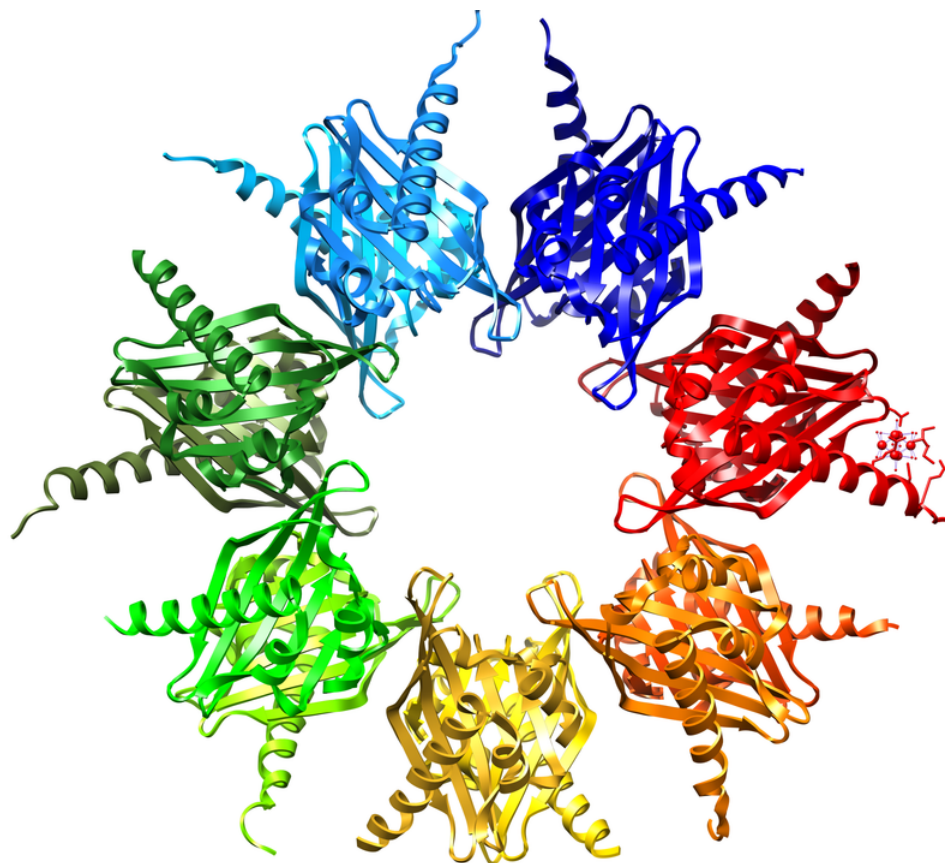
Chapter Outline

2.1 MATTER AND ORGANIC COMPOUNDS

2.2 BIOCHEMICAL REACTIONS

2.3 WATER, ACIDS, AND BASES

2.4 THE CHEMISTRY OF LIFE



2.1 Matter and Organic Compounds

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Which of the following are functions of nucleic acids?
 - They help make proteins.
 - They contain instructions for proteins.
 - They pass instructions from parents to offspring.
 - all of the above
- Types of lipids include:
 - triglycerides.
 - polysaccharides.
 - amino acids.
 - nucleotides.
- The characteristics of DNA include which of the following?
 - DNA is made of nucleotides consisting of a sugar, a phosphate group, and a carbon base.
 - DNA is made of a single polynucleotide chain, which winds into a double helix.
 - DNA is how inherited characteristics are passed from one generation to the next.
 - all of the above
- Differences between DNA and RNA include all of the following, **except** that
 - thymine is a base in DNA, uracil is a base in RNA.
 - RNA consists of just one polynucleotide chain, DNA consists of two chains.
 - DNA uses the information in RNA to assemble the correct amino acids and help make proteins.
 - All of the above are correct.
- A(n) _____ cannot be broken down into other types of substances.
 - element
 - compound
 - molecule
 - metal
- Functions of proteins include
 - giving cells their shape.
 - targeting foreign substances for destruction.
 - speeding up biochemical reactions.
 - all of the above.
- In a DNA molecule, adenine always pairs with
 - cytosine.

- b. guanine.
 - c. thymine.
 - d. nucleotide.
8. DNA nucleotides contain all of the following, **except**
- a. uracil.
 - b. a phosphate group.
 - c. a sugar.
 - d. thymine.
9. The main difference between saturated and unsaturated fatty acids is
- a. the amount of energy found in the fatty acid.
 - b. saturated fatty acids are liquids.
 - c. unsaturated fatty acids can be packed together very tightly.
 - d. the number of hydrogen atoms bonded to the carbon atoms.
10. Complex carbohydrates are made out of subunits called _____.
- a. starch
 - b. monosaccharides
 - c. amino acids
 - d. nucleotides
11. Proteins are made out of subunits called _____.
- a. polypeptides
 - b. monosaccharides
 - c. amino acids
 - d. nucleotides
12. Nucleic acids are made out subunits called _____.
- a. DNA
 - b. monosaccharides
 - c. amino acids
 - d. nucleotides

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Carbon is the main element in organic compounds.
- _____ 14. Starch is a monosaccharide, a type of carbohydrate.
- _____ 15. Lipids are the major components of cell membranes.
- _____ 16. The four major types of organic compounds include carbohydrates, lipids, proteins, and amino acids.
- _____ 17. An element cannot be broken down into other types of substances.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. There are just _____ different amino acids commonly found in the proteins of living things.
19. A chemical _____ is a process that changes some chemical substances into others.
20. The Periodic Table of the Elements arranges elements in groups based on their _____.
21. _____ consist of repeating units called fatty acids.
22. An alpha helix describes the secondary structure of a _____.

23. _____ and _____ are two examples of nucleic acids.

24. The shape of DNA can be described as a _____.

25. Matter is anything that takes up space and has _____.

Short Answer

Answer each question in the space provided.

26. Discuss why carbon is essential to life on Earth.

27. Describe the structures of proteins and nucleic acids, and discuss the functional relationship between these two types of organic compounds.

2.2 Biochemical Reactions

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$. The products in this reaction include
 - methane and oxygen.
 - carbon dioxide and water.
 - carbon dioxide and oxygen.
 - methane and water.
- The “push” needed to start a chemical reaction is the
 - enzymatic energy.
 - endothermic energy.
 - activation energy.
 - reactant energy.
- Enzymes are
 - carbohydrates that store biological energy.
 - lipids that form biological membranes.
 - proteins that speed up biochemical reactions.
 - nucleic acids that have the information to make proteins.
- In the photosynthesis reaction, $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$, there are 18 oxygen atoms in the reactants. How many oxygen atoms are in the products?
 - 6
 - 12
 - 18
 - 24
- Organisms need enzymes because
 - temperatures may too low inside organisms for reactions to occur without enzymes.
 - the levels of reactants may be too low for them to react without assistance from enzymes.
 - they need biochemical reactions to speed up to occur quickly enough to maintain life.
 - all of the above
- An example of a catabolic reaction is
 - making starch from monosaccharides.
 - the formation of proteins from amino acids.
 - the breakdown of glucose to release energy.
 - the joining of nucleotides in the copying of DNA.
- Without enzymes, you could not

- a. burn methane into carbon dioxide and water.
 - b. photosynthesize and make glucose from carbon dioxide and water.
 - c. break down glucose into carbon dioxide and water.
 - d. You could do all of the above without enzymes.
8. Activation energy is required in which of the following reactions?
- a. biochemical reactions only
 - b. only endothermic reactions
 - c. only exothermic reactions
 - d. all chemical reactions
9. The action of enzymes is crucial to life. Enzymes act by
- a. lowering the activation energy needed to start the reaction.
 - b. reducing the amount of energy absorbed during a biochemical reaction.
 - c. reducing the amount of heat released during a biochemical reaction.
 - d. conserving matter in a biochemical reaction, such that the number of atoms in the reactants equals the number in the products.
10. Which represents the correct depiction of an exothermic reaction?
- a. Reactants + Heat \rightarrow Products
 - b. Reactants \rightarrow Products + Heat
 - c. Reactants + Products \rightarrow Heat
 - d. Products + Heat \rightarrow Reactants
11. The activities of enzymes depend on
- a. temperature.
 - b. ionic conditions.
 - c. pH of the surroundings.
 - d. all of the above.
12. What is the main difference between an endothermic reaction and an exothermic reaction?
- a. An endothermic reaction gives off energy and an exothermic reaction absorbs energy.
 - b. An exothermic reaction gives off energy and an endothermic reaction absorbs energy.
 - c. An endothermic reaction does not need activation energy.
 - d. Only an endothermic reaction involves enzymes.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. An enzyme speeds up biochemical reactions by lowering the activation energy.
- _____ 14. The number of atoms in the reactants of a chemical reaction is always the same as the number of atoms in the products.
- _____ 15. Not all chemical reactions involve energy.
- _____ 16. The joining of amino acids to form a protein is a catabolic reaction, building up bigger molecules from smaller ones.
- _____ 17. Enzymes are necessary for life.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. _____ reactions are chemical reactions that take place inside cells.
19. _____ reactions in organisms are called catabolic reactions.

2.3 Water, Acids, and Bases

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- The oxygen in a water molecule
 - attracts electrons more strongly than the hydrogen atoms.
 - has a slight negative charge.
 - binds to a hydrogen of another water molecule through a hydrogen bond.
 - all of the above
- Most of the water on Earth can be found as
 - freshwater in icecaps, glaciers and the inland seas.
 - freshwater in lakes, the atmosphere and as moisture in soil.
 - saltwater in lakes, the atmosphere and as moisture in soil.
 - saltwater in the oceans.
- Acids have a pH
 - less than 14.
 - between 0 and 14.
 - between 0 and 7.
 - between 7 and 14.
- Ice floats on water because
 - ice has a lower density than water.
 - water contracts when it freezes.
 - of the boiling point of water.
 - all of the above
- How do hydrogen bonds affect water's properties?
 - Hydrogen bonds explain why water molecules stick together.
 - Hydrogen bonds cause water to have a relatively high boiling point.
 - Hydrogen bonds also cause water to expand when it freezes.
 - all of the above
- Which is the strongest base?
 - lemon juice
 - soda pop
 - eggs
 - ammonia
- Which is the strongest acid?
 - lemon juice

- b. orange juice
- c. milk
- d. soap

8. Which of the following is an example of a solution?

- a. a pepperoni pizza
- b. a box of Lucky Charms cereal
- c. a glass of orange juice
- d. a hot fudge sundae

True or False

Write true if the statement is true or false if the statement is false.

- _____ 9. Water is a chemical.
- _____ 10. Water is a product of photosynthesis.
- _____ 11. Water is a polar molecule—it has regions with different charges.
- _____ 12. Pure water has a pH of 7.
- _____ 13. The inside of your stomach has a low pH.
- _____ 14. Most of the water on Earth consists of freshwater in the oceans.
- _____ 15. The hydrogen bonds that hold water molecules together are very strong bonds.
- _____ 16. Ammonia is a very strong acid.
- _____ 17. The oxygen atom in a water molecule attracts electrons more strongly than the hydrogen atoms.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Water's _____ gives it unique properties that are important to understand its importance.
19. The positive end of one water molecule is attracted to the _____ end of a nearby water molecule.
20. A _____ is a mixture of two or more substances with the same composition throughout.
21. The _____ point of water is 100°C.
22. The pH scale ranges from _____ to _____.
23. A difference in electrical charge between different parts of the same molecule is called _____.
24. Your stomach is a very _____ environment.
25. _____ bonds form between adjacent water molecules.

Short Answer

Answer each question in the space provided.

26. Discuss why water is a polar molecule.

27. What are the main differences between an acid and a base? Give examples of each.

2.4 The Chemistry of Life

Chapter Test

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Which statement about atoms is false?
 - An atom is the smallest type of particle.
 - An atom consists of smaller particles.
 - An atom has the properties of an element.
 - none of the above
- Which of the following chemical substances is a compound?
 - oxygen
 - water
 - iron
 - hydrogen
- Organic compounds are
 - found mainly in living things.
 - needed for life processes.
 - made mostly of carbon.
 - all of the above
- Sugar and starch are the type of organic compounds called
 - proteins.
 - lipids.
 - carbohydrates.
 - fats.
- Which statement is true about saturated fatty acids?
 - They are found mainly in plants.
 - They have bent chains.
 - They are liquids at room temperature.
 - They have as many hydrogen atoms as possible.
- The basic building blocks of proteins are
 - amino acids.
 - fatty acids.
 - nucleotides.
 - saccharides.
- Nucleic acids carry the genetic code in the sequence of their
 - sugars.

- b. phosphate groups.
 - c. nitrogen bases.
 - d. backbones.
8. Which chemical reactions require activation energy to occur?
- a. only endothermic reactions
 - b. only exothermic reactions
 - c. all chemical reactions
 - d. only chemical reactions in living things
9. What ions determine the acidity of a solution?
- a. H_2O
 - b. H_3O^+
 - c. OH^-
 - d. H^+
10. All of the following statements are true about bases, **except**:
- a. Bases have a pH lower than 7.
 - b. Bases taste bitter.
 - c. Strong bases can be harmful.
 - d. Bases play important roles in living things.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Organisms use carbohydrates and lipids to store energy.
- _____ 12. Adenine always binds with guanine.
- _____ 13. The primary structure of proteins is a double helix.
- _____ 14. Proteins have many functions.
- _____ 15. The burning of methane is an endothermic reaction.
- _____ 16. Most of Earth's water is found in lakes and large rivers.
- _____ 17. A solution has the same composition throughout.
- _____ 18. Bleach is an example of a strong acid.
- _____ 19. Enzymes need acids and bases in order to work.
- _____ 20. Water is involved in most biochemical reactions.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. A chemical _____ is a force that holds together the atoms in a molecule.
22. A chemical _____ is a process that changes some chemical substances into others.
23. A substance that starts a chemical reaction is a(n) _____.
24. A substance that results from a chemical reaction is a(n) _____.
25. Exothermic reactions in organisms are called _____ reactions.
26. Endothermic reactions in organisms are called _____ reactions.
27. A(n) _____ is a protein that speeds up a biochemical reaction.
28. A difference in electrical charge between two parts of the same molecule is termed _____.

29. The type of bond that forms between water molecules is a(n) _____ bond.

30. The pH of water is _____.

Short Answer

Answer each question in the space provided.

31. Why is carbon essential to life on Earth?

32. Explain the importance of enzymes to living things.

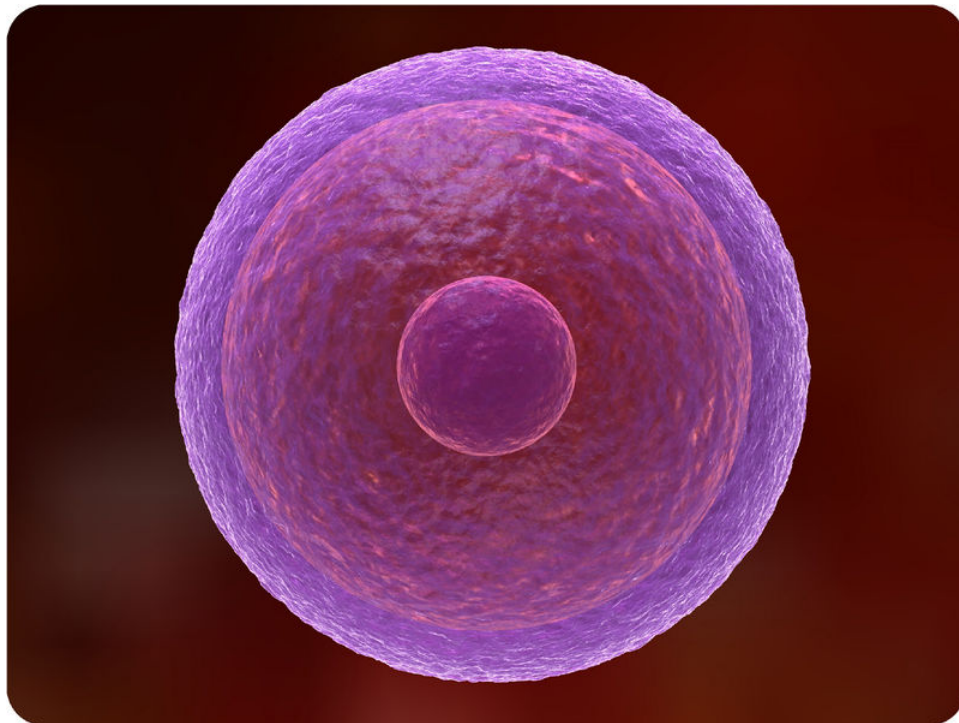
33. Relate water's structure to its properties.

CHAPTER 3

Cellular Structure and Function Assessments

Chapter Outline

- 3.1 INTRODUCTION TO CELLS
- 3.2 CELL STRUCTURES
- 3.3 CELL TRANSPORT AND HOMEOSTASIS
- 3.4 CELLULAR STRUCTURE AND FUNCTION



3.1 Introduction to Cells

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Which of the following structures are present in all cells?
 - ribosomes
 - cytoplasm
 - plasma membrane
 - all of the above
- The first cells observed were from
 - tiny animals.
 - plaque.
 - cork.
 - leaves.
- How do you think the spikes help the pollen grains do their job?
 - The spikes help the insects stick to the pollen grains.
 - The spikes help the pollen grains stick to insects.
 - The spikes help the pollen grains fly through the air.
 - The spikes help the pollen grains stay attached to the plant.
- What is the best description of an organelle?
 - The mitochondria, Golgi apparatus, and endoplasmic reticulum are examples of organelles.
 - Organelles are structures located in the cytoplasm.
 - Organelles are structures that allow eukaryotic cells to carry out more functions than prokaryotic cells.
 - An organelle is a structure that performs a specific job in the cell.
- Which of the following is a characteristic of all living cells?
 - reproduction
 - obtaining energy
 - responding to their environment
 - all of the above
- What is one main difference between eukaryotic cells and prokaryotic cells?
 - Eukaryotic cells are cells that contain a nucleus.
 - Prokaryotic cells have many internal structures, whereas eukaryotic cells are simpler.
 - Prokaryotic cells can be large, whereas eukaryotic cells are usually smaller.
 - All of the above are differences between eukaryotic cells and prokaryotic cells.
- Which of the following are characteristics of ribosomes?
 - Ribosomes are where proteins are made.

- b. Ribosomes are found only in eukaryotic cells.
 - c. Ribosomes can be found attached to the Golgi apparatus.
 - d. As viruses need proteins to function, they must have ribosomes.
8. If a cell is shaped like a cube, and has a side that is 2nm, what is the surface area to volume ratio?
- a. 2
 - b. 3
 - c. 4
 - d. 6
9. Which is true of the nucleus?
- a. It is an organelle surrounded by the nuclear membrane.
 - b. DNA is found in the nucleus.
 - c. It is only found in eukaryotic cells.
 - d. All of the above are true.
10. Which of the following is located in the cytoplasm?
- a. the plasma membrane
 - b. an eukaryotic cell's DNA
 - c. the Golgi apparatus
 - d. all of the above
11. It can be argued that viruses are not living. What is the best evidence to support this?
- a. Viruses are only tiny particles.
 - b. Viruses are not made of cells.
 - c. Viruses only contain DNA.
 - d. Viruses are small, like prokaryotes.
12. Which of the following is **not** part of the cell theory?
- a. All organisms are made of one or more cells.
 - b. All the life functions of organisms occur within cells.
 - c. All cells contain the functional structures necessary for life.
 - d. All cells come from already existing cells.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Prokaryotic cells are usually larger than eukaryotic cells.
- _____ 14. All cells have ribosomes, cytoplasm, and a plasma membrane.
- _____ 15. The word "cell" was first used in 1965.
- _____ 16. Cells are small because small cells are more efficient than larger cells.
- _____ 17. Since all living things have DNA, and as viruses have DNA, they are considered alive.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. By looking through one of the first microscopes, _____ discovered cells.
19. The first cells were observed in a sample taken from _____ .
20. The _____ is the defining organelle in eukaryotic cells, as prokaryotic cells do not have them.
21. _____ are the most common organisms alive today.
22. Mitochondria, the Golgi apparatus, and the endoplasmic reticulum are examples of _____.

23. The plasma membrane is made out of a thin coat of _____.
24. _____ are tiny DNA-containing particles that may cause disease.
25. The _____ states that all organisms are made of one or more cells.

Short Answer

Answer each question in the space provided.

26. Describe three differences between prokaryotic and eukaryotic cells.

27. Are viruses considered to be alive? Discuss why or why not.

3.2 Cell Structures

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Functions of the cytoplasm include
 - suspending cell organelles.
 - providing a site for many of the biochemical reactions of the cell.
 - pushing against the plasma membrane to help the cell keep its shape.
 - all of the above.
- The largest organelle in an eukaryotic cell is the
 - endoplasmic reticulum.
 - nucleus.
 - mitochondria.
 - cytoplasm.
- The plasma membrane has the phospholipids'
 - hydrophilic tails on the interior and hydrophobic heads pointing outwards.
 - hydrophilic heads on the interior and hydrophobic tails pointing outwards.
 - hydrophobic tails on the interior and hydrophilic heads pointing outwards.
 - hydrophobic heads on the interior and hydrophilic tails pointing outwards.
- Functions of plastids include which of the following?
 - Some plastids capture light energy from the sun and use it to make food.
 - Some plastids store substances such as the monomers used to make proteins.
 - Some plastids make and store other pigments.
 - All of the above are characteristics of plastids.
- Organization in which different cells are specialized for different functions, but each cell works alone, is characteristic of
 - cell-level organization.
 - tissue-level organization.
 - organ-level organization.
 - organ system-level organization.
- Organelles specific to plant cells include which of the following?
 - chloroplasts
 - the cell wall
 - peroxisomes
 - centrioles
- Which organelle helps make and transport proteins and lipids?

- a. the ribosome
 - b. the endoplasmic reticulum
 - c. the Golgi apparatus
 - d. the vesicle
8. Which of the following statements about energy is true?
- a. Cells use energy from glucose to make ATP.
 - b. Cells use energy from ATP to make glucose.
 - c. Chloroplasts capture light energy from the sun and use it to make ATP.
 - d. Glucose is made in the mitochondria.
9. Complete the following sentence: DNA “lives” in the _____, proteins are made on the _____, and the _____ consists of everything inside the plasma membrane of the cell.
- a. nucleus, ribosomes, cytoskeleton
 - b. mitochondria, ribosomes, cytoskeleton
 - c. mitochondria, endoplasmic reticulum, central vacuole
 - d. nucleus, ribosomes, cytoplasm
10. An organized structure composed of many cells, in which all of the cells live and work together, is characteristic of
- a. a single-celled organism.
 - b. a biofilm.
 - c. a colony.
 - d. a multicellular organism.
11. Which organelle transfers the energy in glucose into molecules of ATP?
- a. the mitochondria
 - b. the Golgi apparatus
 - c. the endoplasmic reticulum
 - d. the chloroplast
12. In a plant cell, DNA can be found in
- a. mitochondria.
 - b. the nucleus.
 - c. chloroplasts.
 - d. all of the above.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. The plasma membrane controls everything that enters and leaves the cell.
- _____ 14. Small, hydrophilic molecules cannot just flow into the cell, they need help to pass through the plasma membrane.
- _____ 15. The mitochondrion, where the cell’s energy is made, is often considered to be the cell’s control center.
- _____ 16. The nucleus is the largest organelle in a eukaryotic cell.
- _____ 17. All eukaryotic cells have chloroplasts.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The endoplasmic reticulum is an organelle that helps make and _____ proteins and lipids.
19. The _____ theory describes how small prokaryotic cells began to “live” inside larger cells.

20. The _____ can make up as much as 90% of a plant cell's volume.
21. Chloroplasts that contain the green pigment _____, which makes a plant green.
22. In some cells, a cell _____ is outside the plasma membrane,
23. The two layers of phospholipids in the plasma membrane are called a phospholipid _____.
24. _____ are organelles where proteins are made.
25. A _____ organism has different types of cells that are specialized for various functions.

Short Answer

Answer each question in the space provided.

26. Discuss the major differences between a plant cell and an animal cell.

27. List three organelles found in animal cells, and describe their functions.

3.3 Cell Transport and Homeostasis

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

1. What is the main difference between passive transport and active transport?
 - a. Passive transport needs energy, active transport does not.
 - b. Active transport needs energy, passive transport does not.
 - c. Only passive transport involves a protein.
 - d. Only active transport can transport ions across the cell membrane.
2. Which of the following are involved in facilitated diffusion? (1) channel proteins, (2) carrier proteins, (3) pumps, (4) vesicles.
 - a. 1 only
 - b. 1 and 2
 - c. 3 and 4
 - d. 1, 2, and 4
3. If there are 10,000 calcium ions inside the cell and 2,000 calcium ions outside the cell, in which direction will these ions naturally flow?
 - a. They will flow from outside the cell in.
 - b. They will flow from inside the cell out.
 - c. They will flow from the inside of one cell into the next cell.
 - d. Calcium ions cannot flow in or out of the cell.
4. Osmosis is the
 - a. diffusion of ions and small molecules.
 - b. diffusion of glucose and proteins.
 - c. diffusion of water.
 - d. active transport of water, ions, or small molecules.
5. Which of the following are types of active transport? (1) the sodium-potassium pump, (2) exocytosis, (3) endocytosis, (4) osmosis.
 - a. 1 only
 - b. 2 and 3
 - c. 1, 2, and 3
 - d. 1, 2, 3, and 4
6. What part of the cell determines what enters and leaves the cell?
 - a. the plasma membrane
 - b. the nucleus
 - c. the vesicles
 - d. the Golgi apparatus

7. Which of the following proteins changes shape as it transfers materials across the membrane?
 - a. channel proteins
 - b. carrier proteins
 - c. vesicles
 - d. osmosis proteins
8. Which of the following is a type of passive transport?
 - a. osmosis
 - b. facilitated diffusion
 - c. simple diffusion
 - d. all of the above
9. Which process plays an important role in homeostasis?
 - a. facilitated diffusion
 - b. osmosis
 - c. exocytosis
 - d. all of the above
10. During active transport, molecules move from an area of _____ concentration to an area of _____ concentration.
 - a. higher, lower
 - b. lower, higher
 - c. higher, the same
 - d. lower, the same

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Osmosis is the diffusion of small molecules.
- _____ 12. Oxygen and carbon dioxide can squeeze between the phospholipid molecules in the plasma membrane.
- _____ 13. The energy for passive transport comes from ATP.
- _____ 14. The sodium-potassium pump actually changes shape as it shuttles ions across the cell membrane.
- _____ 15. The plasma membrane controls everything that enters and leaves the cell.
- _____ 16. Endocytosis is a type of active transport that moves a substance out of the cell.
- _____ 17. Channel proteins and carrier proteins are both a type of transport protein.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. _____ diffusion involves transport proteins.
19. _____ transport does not need an input of energy from the cell.
20. _____ proteins form pores, or tiny holes, in the membrane.
21. Carrier proteins transport specific _____ or molecules across the cell membrane.
22. The sodium-potassium pump transports _____ ions out of the cell, and _____ ions into the cell.
23. The process of maintaining a stable environment (or condition) inside a cell is _____.
24. _____ is the diffusion of water.
25. Exocytosis is the type of _____ transport that moves a substance out of the cell.

Short Answer

Answer each question in the space provided.

26. Describe active transport and provide an example.

27. Discuss three methods of passive transport.

3.4 Cellular Structure and Function

Chapter Test

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Which statement about cells is **false**?
 - Cells are the smallest units that can carry out life processes.
 - All organisms are made up of one or more cells.
 - Cells are the basic units of structure and function of living things.
 - The cells of all organisms are just alike.
- Cells were first observed under a microscope by
 - Theodor Schwann.
 - Rudolf Virchow.
 - Robert Hooke.
 - Anton van Leeuwenhoek.
- All the material inside the plasma membrane of a cell is referred to as
 - cytosol.
 - cytoplasm.
 - cytoskeleton.
 - endoplasm.
- Which of the following is found in eukaryotic cells but not in prokaryotic cells?
 - DNA
 - nucleus
 - plasma membrane
 - all of the above
- Why are viruses not considered to be living things?
 - They lack DNA.
 - They lack cells.
 - Their cells lack nuclei.
 - Their cell membrane is permeable.
- The plasma membrane of a cell consists of two layers of
 - nucleic acids.
 - carbohydrates.
 - phospholipids.
 - lysosomes.
- Functions of the cytoplasm include
 - helping the cell keep its shape.

- b. making energy available to the cell.
 - c. joining amino acids to make proteins.
 - d. transporting lipids around the cell.
8. Centrioles are organelles involved in
- a. cell division.
 - b. catabolism.
 - c. photosynthesis.
 - d. exocytosis.
9. Passive transport occurs when substances move from an area of higher to lower
- a. temperature.
 - b. pH.
 - c. concentration.
 - d. energy.
10. The energy for active transport comes from
- a. ATP.
 - b. RNA.
 - c. carrier proteins.
 - d. extracellular fluid.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Cell organelles can be seen with a light microscope.
- _____ 12. All living cells have the same size and shape.
- _____ 13. Proteins are made in the ribosomes of cells.
- _____ 14. The interior of a plasma membrane is hydrophilic.
- _____ 15. Cilia are extensions of the cytoplasm of a cell.
- _____ 16. Organelles found in plant but not animal cells include mitochondria.
- _____ 17. Cell walls consist mainly of carbohydrates.
- _____ 18. A thin layer of bacteria that sticks to a surface is called a colony.
- _____ 19. Passive transport requires no energy from the cell.
- _____ 20. Osmosis is a type of active transport.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. Cells without a nucleus are called _____ cells.
22. The watery, gel-like material in the cytoplasm is _____.
23. The _____ of a cell consists of thread-like filaments and tubules.
24. The largest organelle in a eukaryotic cell is the _____.
25. Endosymbiotic theory posits that eukaryotic organelles evolved from _____ cells.
26. The organelle that helps make and transport proteins is the _____.
27. The _____ is a rigid layer that surrounds the cell membrane of a plant cell.
28. Plastids that contain chlorophyll are named _____.

29. The diffusion of water molecules across a membrane is known as _____.

30. The type of vesicle transport that moves substances into a cell is called _____.

Short Answer

Answer each question in the space provided.

31. Explain why cells are always very small.

32. Name and describe the functions of three organelles that are found in both plant and animal cells.

33. Outline the role of cell transport in homeostasis.

CHAPTER

4

Photosynthesis and Cellular Respiration Assessments

Chapter Outline

- 4.1 ENERGY FOR LIFE
- 4.2 PHOTOSYNTHESIS: SUGAR AS FOOD
- 4.3 POWERING THE CELL: CELLULAR RESPIRATION
- 4.4 ANAEROBIC RESPIRATION
- 4.5 PHOTOSYNTHESIS AND CELLULAR RESPIRATION



4.1 Energy for Life

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

1. Which of the following is an example of an autotroph?
 - a. certain bacteria
 - b. a maple tree
 - c. a rose bush
 - d. all of the above
2. The process of photosynthesis can best be described as
 - a. using the energy in sunlight to make food.
 - b. using the energy in food to make ATP.
 - c. using the energy in sunlight to make oxygen and water.
 - d. using the energy in food to make sunlight.
3. Which of the following is the end product of photosynthesis?
 - a. water
 - b. carbon dioxide
 - c. glucose
 - d. oxygen
4. Which of the following organisms performs cellular respiration?
 - a. a maple tree
 - b. a rattlesnake
 - c. certain bacteria
 - d. all of the above
5. Which molecule has the most energy?
 - a. carbon dioxide
 - b. glucose
 - c. oxygen
 - d. ATP
6. Which organisms form the basis of food chains?
 - a. producers
 - b. consumers
 - c. decomposers
 - d. All are necessary in a food chain.
7. In terms of the photosynthesis process, which of the following is considered to be “food”? (1) ATP, (2) water, (3) sunlight, (4) glucose.

- a. 4 only
 - b. 1 and 4
 - c. 2 and 4
 - d. 1, 2, 3, and 4
8. Recycled energy goes
- a. to decomposers.
 - b. to heterotrophs.
 - c. back into the soil.
 - d. Energy is not recycled.
9. Which of the following is a heterotroph?
- a. a rattlesnake
 - b. a pine tree
 - c. a grass lawn
 - d. all of the above
10. In living organisms, energy is needed
- a. for life processes.
 - b. to transport molecules.
 - c. to make molecules.
 - d. all of the above

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Photosynthesis can occur at night.
- _____ 12. All living things need energy to carry out all life processes, and they get this energy from sunlight.
- _____ 13. As most autotrophs perform photosynthesis, bacteria cannot be autotrophs.
- _____ 14. $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$ is the basic chemical formula for photosynthesis.
- _____ 15. Without photosynthesis, there would be no oxygen in the atmosphere.
- _____ 16. Glucose is the “food” produced by photosynthesis.
- _____ 17. Photosynthesis takes place in the chloroplast.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Through photosynthesis, most autotrophs use the energy in _____ to make their own food.
19. The chemical formula of glucose is _____.
20. Photosynthesis takes place in the _____, and cellular respiration takes place in the _____.
21. _____ is the energy-carrying molecule that cells use for energy.
22. Autotrophs are also known as _____, as they make food not only for themselves but for all other living things.
23. _____ are organisms that cannot make their own food.
24. During _____, the energy in glucose is transferred to ATP.
25. _____ may be the single most important life process on Earth.

Short Answer

Answer each question in the space provided.

26. Describe how autotrophs and heterotrophs obtain energy.

27. What do you think would happen to consumers if all producers were to vanish from Earth?

4.2 Photosynthesis: Sugar as Food

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- The light reactions of photosynthesis require
 - water.
 - sunlight.
 - NADP⁺.
 - all of the above.
- Which steps of the light reactions of photosynthesis involve the absorption of energy from the sun?
 - steps 1 and 2
 - steps 2 and 4
 - steps 1 and 6
 - steps 1 and 4
- The product(s) of the Calvin cycle is (are)
 - ATP and NADPH.
 - glucose and oxygen.
 - just glucose.
 - ATP and glucose.
- The difference in ion concentration and charge across the thylakoid membrane created during the light reactions is called a(n)
 - chemiosmotic gradient.
 - hydrogen ion gradient.
 - ATP synthase gradient.
 - electron transport gradient.
- The light reactions of photosynthesis occur in the
 - stroma.
 - photosystem.
 - chloroplast inner membrane.
 - thylakoid membrane.
- During the light reactions of photosynthesis, why is a molecule of water split?
 - to provide energy for the electron transport chain
 - to produce electrons that replace the two electrons that were lost from the chlorophyll molecule
 - to assist in the process that produces ATP
 - to form NADPH
- Energy from the electrons that pass through the electron transport chain is used

- a. to pump hydrogen ions into the thylakoid interior space.
 - b. to excite electrons as they move through the electron transport chain.
 - c. to split water into H^+ and an atom of oxygen.
 - d. to form ATP and NADPH.
8. Chlorophyll is found in
- a. the photosystem in the thylakoid membrane of the chloroplast.
 - b. the thylakoid membrane in the stroma of the chloroplast
 - c. the grana of the thylakoid membrane of the stroma.
 - d. the stroma of the thylakoid membrane of the chloroplast.
9. The second stage of photosynthesis is known as (1) the Calvin cycle, (2) light-independent reactions, or (3) the dark reactions?
- a. 1 only
 - b. 1 and 2
 - c. 2 and 3
 - d. 1, 2, and 3
10. Chemosynthesis
- a. is a process some autotrophs use to make their food.
 - b. is a process that uses chemical energy.
 - c. does not need sunlight.
 - d. all of the above
11. The ultimate product(s) of photosynthesis is (are)
- a. oxygen.
 - b. glucose.
 - c. water and oxygen.
 - d. oxygen and glucose.
12. ATP synthase is a(n)
- a. active transport pump.
 - b. channel protein.
 - c. enzyme.
 - d. enzyme and a channel protein.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. The Calvin cycle is the second stage of photosynthesis.
- _____ 14. In photosynthetic bacteria, photosynthesis occurs in their chloroplasts.
- _____ 15. Like photosynthesis, chemosynthesis also depends on sunlight.
- _____ 16. The oxygen we breathe is a waste product of the photosynthesis process.
- _____ 17. To start photosynthesis, light is absorbed by a chlorophyll molecule in a photosystem in the thylakoid membrane of the chloroplast.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The ultimate product of photosynthesis is _____.
19. _____ and _____ from the light reactions are used in the Calvin cycle.
20. In plants, photosynthesis takes place in the _____.

21. During the light reactions, _____ is split and _____ is released.
22. The enzyme _____ uses energy to add a phosphate group to a molecule of ADP, producing a molecule of ATP.
23. The beginning of the Calvin cycle is a process called carbon _____.
24. During the light reactions, electrons flow down an electron _____.
25. A stack of sac-like _____ membranes is a granum.

Short Answer

Answer each question in the space provided.

26. Starting with carbon dioxide and water, summarize the process of photosynthesis.

27. Describe how ATP is made during the light reactions of photosynthesis.

4.3 Powering the Cell: Cellular Respiration

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- The correct order of the stages of cellular respiration is:
 - electron transport - Krebs cycle - glycolysis.
 - glycolysis - Krebs cycle - electron transport.
 - Krebs cycle - glycolysis - electron transport.
 - glycolysis - electron transport - Krebs cycle.
- For each glucose molecule that starts glycolysis, the Krebs cycle occurs
 - once.
 - twice.
 - three times.
 - four times.
- The products of glycolysis include
 - two pyruvates.
 - two ATPs.
 - two NADHs.
 - all of the above.
- The electron transport chain of cellular respiration is located in
 - the thylakoid membrane of the chloroplast.
 - the matrix of the mitochondria.
 - the mitochondria inner membrane.
 - the chloroplast stroma.
- How many NADH are produced with each turn of the Krebs cycle?
 - two
 - four
 - eight
 - ten
- The final electron acceptor of cellular respiration is
 - oxygen.
 - hydrogen.
 - water.
 - ATP.
- The earliest life forms probably produced ATP through
 - ATP synthase.

- b. cellular respiration.
 - c. photosynthesis and cellular respiration.
 - d. glycolysis only.
8. The two electron carriers of cellular respiration are
- a. NADH and NADPH.
 - b. NADH and FAD_2 .
 - c. NADH and $FADH_2$.
 - d. NADPH and $FADH_2$.
9. The Krebs cycle is also known as
- a. the citric acid cycle.
 - b. oxidative phosphorylation.
 - c. chemiosmosis.
 - d. the Calvin cycle.
10. The most ATP molecules that can be made from one glucose molecule is
- a. 2.
 - b. 4.
 - c. 38.
 - d. 83.
11. Which of the following are located in mitochondria? (1) DNA (2) ribosomes (3) nucleus.
- a. 1 only
 - b. 1 and 2
 - c. 3 only
 - d. 1, 2, and 3

True or False

Write true if the statement is true or false if the statement is false.

- _____ 12. During cellular respiration, before ATP can be made, ATP must be used.
- _____ 13. Glycolysis means “glucose splitting.”
- _____ 14. During the Krebs cycle energy is transferred to NADPH.
- _____ 15. Cellular respiration occurs in both the chloroplast and the mitochondria.
- _____ 16. The electron transport chain of cellular respiration only occurs in the presence of oxygen.
- _____ 17. One molecule of glucose has much more energy than one molecule of ATP.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The first stage of cellular respiration is _____.
19. The last two stages of cellular respiration occur in the _____.
20. Cellular respiration in the presence of oxygen is called _____ respiration.
21. _____ is needed at the start of glycolysis to split the glucose molecule into two pyruvate molecules.
22. During glycolysis, glucose is split into two molecules of _____.
23. During electron transport, energy from _____ and _____ is used to make many molecules of ATP.
24. ATP synthase is both a channel protein and a(n) _____.

25. At the end of the electron transport chain, the electrons combine with _____ and hydrogen ions to make water.

Short Answer

Answer each question in the space provided.

26. Describe how one molecule of glucose can result in up to 38 molecules of ATP produced.

27. Describe the mitochondrion and its role in aerobic respiration.

4.4 Anaerobic Respiration

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Which process was probably the first to evolve?
 - anaerobic respiration
 - aerobic respiration
 - cellular respiration
 - the Krebs cycle
- In the absence of oxygen, what is the most ATP molecules that can be produced from one glucose molecule?
 - 1
 - 2
 - 4
 - 38
- Which of the following are types of fermentation? (1) lactic acid, (2) cellular, (3) alcoholic, (4) aerobic.
 - 1 and 2
 - 2 and 4
 - 3 and 4
 - 1 and 3
- Complete the following sentence: _____ respiration produces more ATP, but _____ respiration occurs faster.
 - Anaerobic, aerobic
 - Aerobic, anaerobic
 - Cellular, aerobic
 - Alcoholic, lactic acid
- In alcoholic fermentation, pyruvic acid changes to
 - ethanol and carbon dioxide.
 - ethanol and NAD^+ .
 - carbon dioxide and NAD^+ .
 - ethanol, carbon dioxide, and NAD^+ .
- In lactic acid fermentation, pyruvic acid changes to
 - lactic acid and NAD^+ .
 - lactic acid, carbon dioxide, and NAD^+ .
 - ethanol and NAD^+ .
 - lactic acid only.
- Fermentation

- a. is a way of making ATP without oxygen.
 - b. is used to make yogurt and bread.
 - c. can occur in our muscle cells.
 - d. all of the above
8. Fermentation involves which stage(s) of cellular respiration?
- a. glycolysis
 - b. the Krebs cycle
 - c. electron transport
 - d. all three stages
9. Which of the following can make ATP without oxygen? (1) some plants, (2) many bacteria, (3) some fungi.
- a. 1 only
 - b. 2 only
 - c. 1 and 3
 - d. 1, 2, and 3
10. When muscle cells cannot get oxygen fast enough to meet their energy needs,
- a. carbon dioxide is released.
 - b. lactic acid accumulates.
 - c. ethanol is made.
 - d. all of the above

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. During alcoholic fermentation, lactic acid can accumulate in muscle cells.
- _____ 12. Wine is made when alcoholic fermentation.
- _____ 13. Anaerobic respiration produces much more ATP than aerobic respiration.
- _____ 14. Most living organisms use oxygen to make ATP from glucose.
- _____ 15. Fermentation occurs in a wide variety of organisms, including us.
- _____ 16. Anaerobic respiration is not a fast process.
- _____ 17. Fermentation recycles NAD^+ .

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Fermentation is a way of making _____ from glucose without oxygen.
19. In lactic acid fermentation, pyruvic acid from glycolysis changes to _____.
20. A by-product of alcoholic fermentation is _____ gas.
21. Anaerobic respiration lets organisms live in places where there is little or no _____.
22. Some plants, fungi and many _____ can use anaerobic respiration when oxygen absent.
23. Fermentation recycles NAD^+ , allowing _____ to continuously repeat.
24. Aerobic respiration evolved after _____ was added to Earth's atmosphere.
25. _____ respiration produces much more ATP than _____ respiration.

Short Answer

Answer each question in the space provided.

26. Compare the advantages of aerobic and anaerobic respiration.

27. Define fermentation.

4.5 Photosynthesis and Cellular Respiration

Chapter Test

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- All organisms that make their own food are classified as
 - photosynthesizers.
 - consumers.
 - autotrophs.
 - heterotrophs.
- What is a product of cellular respiration?
 - glucose
 - ATP
 - oxygen
 - all of the above
- The light reactions of photosynthesis occur in the
 - thylakoid membranes.
 - mitochondria.
 - matrix.
 - stroma.
- Products of the light reactions include
 - glucose and carbon dioxide.
 - NADPH and ATP.
 - water and carbon dioxide.
 - glucose and ATP.
- What is the correct sequence of steps in the Calvin cycle?
 - regeneration→reduction→carbon fixation
 - reduction→regeneration→carbon fixation
 - regeneration→carbon fixation→reduction
 - carbon fixation→reduction→regeneration
- Cellular respiration begins with the stage called
 - the Krebs cycle.
 - the citric acid cycle.
 - glycolysis.
 - electron transport.
- Within a mitochondrion, the Krebs cycle takes place in the
 - stroma.

- b. matrix.
 - c. nucleus.
 - d. intermembrane space.
8. In aerobic respiration, a single molecule of glucose may produce up to
- a. 4 molecules of chlorophyll.
 - b. 8 molecules of pyruvic acid.
 - c. 14 molecules of oxygen.
 - d. 38 molecules of ATP.
9. The process of making ATP without oxygen is called
- a. photosynthesis.
 - b. respiration.
 - c. fermentation.
 - d. chemosynthesis.
10. Organisms that may make use of anaerobic respiration include
- a. human beings.
 - b. bacteria.
 - c. yeast.
 - d. all of the above.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Only plants can make food using the energy in sunlight.
- _____ 12. Organisms use glucose to store and transport energy.
- _____ 13. Organisms that cannot make their own food are called consumers.
- _____ 14. The molecule that cells use for energy is ATP.
- _____ 15. The Calvin cycle takes place in the stroma of chloroplasts.
- _____ 16. The stage of photosynthesis that uses water is the Krebs cycle.
- _____ 17. Scientists think that electron transport was the first stage of cellular respiration to evolve.
- _____ 18. The Krebs cycle begins with two molecules of glucose.
- _____ 19. The first step of fermentation is glycolysis.
- _____ 20. A product of fermentation in wine making is lactic acid.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. The ability to do work is the definition of _____.
22. In food chains, autotrophs play the role of _____.
23. The molecule with the chemical formula $C_6H_{12}O_6$ is _____.
24. _____ are groups of molecules in thylakoid membranes that capture light energy.
25. The final product of the Calvin cycle is _____.
26. The process in which organisms use chemical energy to make food is called _____.
27. The process in which glucose is split into two smaller molecules is known as _____.
28. During the Krebs cycle, _____ is released as a waste product.

29. The final stage of aerobic respiration is _____.

30. Two types of fermentation are lactic acid and _____ fermentation.

Short Answer

Answer each question in the space provided.

31. Outline the stages of photosynthesis.

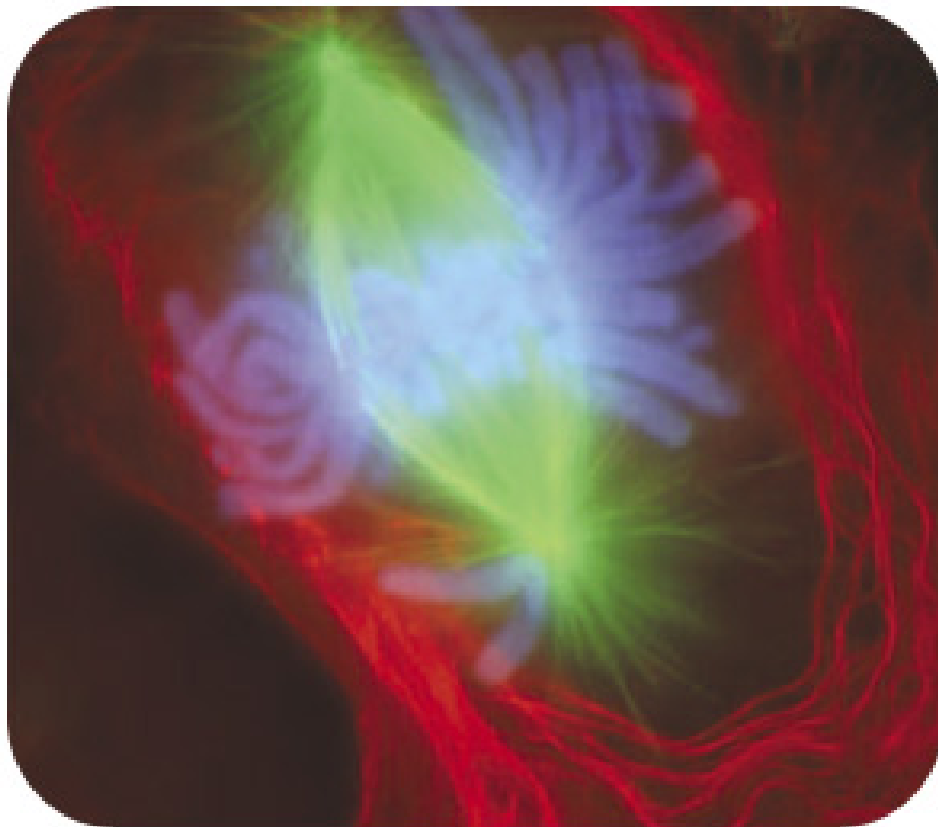
32. Describe the mitochondrion and its role in cellular respiration.

33. Compare and contrast aerobic and anaerobic respiration.

CHAPTER **5** The Cell Cycle, Mitosis, and Meiosis Assessments

Chapter Outline

- 5.1 CELL DIVISION AND THE CELL CYCLE
 - 5.2 CHROMOSOMES AND MITOSIS
 - 5.3 REPRODUCTION AND MEIOSIS
 - 5.4 THE CELL CYCLE, MITOSIS, AND MEIOSIS
-



5.1 Cell Division and the Cell Cycle

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Which cells undergo cell division?
 - bacterial cells
 - blood cells
 - broccoli cells
 - all of the above
- Cell division in prokaryotic cells
 - is relatively simple.
 - results in two daughter cells with identical chromosomes.
 - is called binary fission.
 - all of the above
- Complete this sentence: Mitosis is the division of the _____, and cytokinesis is the division of the _____.
 - nucleus, cytoplasm
 - cytoplasm, nucleus
 - DNA, cytoplasm
 - nucleus, organelles
- The correct order of phases of the eukaryotic cell cycle is
 - M - G1 - S - G2.
 - G1 - M - G2 - S.
 - G1 - S - G2 - M.
 - M - G2 - S - G1.
- Cell division in eukaryotic cells is a complex process because of
 - the single chromosome.
 - the nucleus.
 - the many ribosomes.
 - all of the above.
- What events may occur during the G1 phase of the cell cycle?
 - cellular respiration
 - DNA replication
 - additional endoplasmic reticulum is produced
 - all of the above
- The cell cycle includes which of the following events?

- a. growth
 - b. cell division
 - c. DNA synthesis
 - d. all of the above
8. The correct order of prokaryotic cell division is
- a. growth - DNA replication - mitosis.
 - b. DNA replication - mitosis - cytokinesis.
 - c. DNA replication - chromosome segregation - cytokinesis.
 - d. cytokinesis - DNA replication - chromosome segregation.
9. Why is the cell's DNA copied prior to cell division?
- a. So each daughter cell will have a nucleus.
 - b. So each daughter cell will have a complete set of the cell's DNA.
 - c. So each daughter cell will have a proper S phase.
 - d. all of the above
10. What is cancer?
- a. Cancer is a disease that occurs when the cell cycle is no longer regulated.
 - b. Cancer is a disease that occurs when mitosis does not occur.
 - c. Cancer is a disease that occurs when cytokinesis occurs improperly.
 - d. Cancer is a disease that occurs when binary fission is incomplete.
11. Which cell cycle checkpoint makes the key decision of whether the cell should divide?
- a. the G1 checkpoint
 - b. the DNA synthesis checkpoint
 - c. the mitosis checkpoint
 - d. All the checkpoints make this decision.
12. Mitosis
- a. ensures that each daughter cell receives a complete set of chromosomes.
 - b. comes after cytokinesis.
 - c. occurs in prokaryotic cells after DNA replication.
 - d. none of the above

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Cell division in prokaryotes includes mitosis.
- _____ 14. The cell cycle in prokaryotes includes DNA replication.
- _____ 15. Interphase consists of the G1, S, and M phases of the cell cycle.
- _____ 16. The first phase of cell division is the G1 phase.
- _____ 17. The cell cycle has three checkpoints: the G1 checkpoint, the S checkpoint, and the G2 checkpoint.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Most prokaryotic cells divide by the process of binary _____.
19. The M phase of the cell cycle includes _____ and cytokinesis.
20. Interphase consists of the _____, _____, and G2 phases of the cell cycle.
21. The cell cycle in prokaryotes can be described as follows: the cell grows, its _____ replicates, and the cell divides.

22. During the _____ phase of the cell cycle, the cell's DNA is copied.
23. During the M phase, the _____ and then the cytoplasm divide.
24. Cell division is more complicated in _____ cells than in _____ cells.
25. _____ may result when the cell cycle loses its regulation.

Short Answer

Answer each question in the space provided.

26. Compare and contrast cell division in prokaryotes and eukaryotes.

27. Identify the phases of the eukaryotic cell cycle.

5.2 Chromosomes and Mitosis

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- The correct order of phases during mitosis is
 - anaphase → metaphase → prophase → telophase
 - prophase → metaphase → anaphase → telophase
 - prophase → metaphase → telophase → anaphase
 - prophase → anaphase → metaphase → telophase
- In which phase of mitosis do chromosomes form?
 - They form before mitosis begins.
 - prophase
 - metaphase
 - anaphase
- In which phase of mitosis do chromatids separate?
 - prophase
 - telophase
 - anaphase
 - metaphase
- Which of the following is the best description of a chromosome?
 - a condensed piece of DNA
 - the coiled form of DNA during the cell cycle
 - a grainy form of DNA
 - the coiled form DNA assumes at the start of mitosis
- Which of the following statements about homologous chromosomes is true?
 - Humans have 23 pairs of homologous chromosomes.
 - Homologous chromosomes are of the same size and shape.
 - Homologous chromosomes contain the same genes.
 - All of the above statements are true.
- Place the following steps in the correct order: (1) sister chromatids separate, (2) chromosomes line up at the equator of the cell, (3) chromosomes form, (4) cytoplasm separates.
 - 1 → 2 → 3 → 4
 - 3 → 1 → 2 → 4
 - 3 → 2 → 1 → 4
 - 3 → 1 → 4 → 2
- Which statement is the best description of mitosis?

- a. Mitosis is the division of the chromosomes.
 - b. Mitosis is the division of the cytoplasm.
 - c. Mitosis is the division of the nucleus.
 - d. Mitosis is the division of the cell.
8. Which of the following happens prior to prophase of mitosis? (1) DNA replication, (2) coiling of chromatin into chromosomes, (3) nuclear envelope disappears.
- a. 1 only
 - b. 2 and 3
 - c. 1 and 3
 - d. 1, 2, and 3
9. How many chromosomes are in a normal human cell?
- a. 23
 - b. 32
 - c. 46
 - d. 64
10. Which of the following best describes the role of the spindle fibers?
- a. The sister chromosomes are pulled apart by the shortening of the spindle fibers.
 - b. The spindle fibers ensure that sister chromatids will separate and go to different daughter cells when the cell divides.
 - c. The spindle fibers act like a fishing line.
 - d. all of the above

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. During telophase, the nuclear membrane reforms and the cytoplasm divides.
- _____ 12. During cytokinesis in animal cells, a new plasma membrane and cell wall form along each side of the cell plate.
- _____ 13. Chromosomes must form right at the beginning of mitosis so they can distributed properly.
- _____ 14. Mitosis proceeds as follows: prophase - metaphase - telophase - anaphase.
- _____ 15. An "X"-shaped chromosome is made from two identical chromatids.
- _____ 16. In eukaryotic cells, the nucleus and cytoplasm divide at the same time.
- _____ 17. Cytokinesis is the final stage of cell division in both prokaryotes and eukaryotes.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Human cells usually have _____ pairs of homologous chromosomes.
19. _____ is the division of the nucleus.
20. During interphase, the genetic material exists as a grainy material known as _____.
21. A _____ is the genetic instructions for making a protein.
22. When a chromosome first forms, it actually consists of two sister _____.
23. During _____ of mitosis, the chromosomes line up at the center of the cell.
24. The two chromatids are attached at the _____ of a chromosome.
25. In eukaryotic cells, the _____ divides before the cell itself divides.

Short Answer

Answer each question in the space provided.

26. Discuss the main differences between chromatin, chromatid, and chromosome.

27. Why does the cell have chromosomes made of two chromatids?

5.3 Reproduction and Meiosis

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

1. What is the type of cell division that reduces the number of chromosomes in a cell by half?
 - a. mitosis
 - b. cytokinesis
 - c. meiosis
 - d. crossing-over
2. Which best completes the following sentence? Human gametes have _____ chromosomes. (1) 23, (2) 46, (3) a haploid number of, (4) a diploid number of
 - a. 1 only
 - b. 2 only
 - c. 1 and 3
 - d. 2 and 4
3. The random distribution of homologous chromosomes during cell division is known as
 - a. crossing-over.
 - b. independent assortment.
 - c. genetic variation.
 - d. meiosis.
4. What type of life cycle do humans have?
 - a. a haploid life cycle
 - b. a diploid life cycle
 - c. an alternation of generations life cycle
 - d. a meiotic life cycle
5. Because of when the chromosomes pair up during meiosis, crossing-over must occur during
 - a. prophase I.
 - b. metaphase I.
 - c. prophase II.
 - d. metaphase II.
6. During which phase of meiosis do homologous chromosomes separate?
 - a. metaphase I
 - b. anaphase I
 - c. metaphase II
 - d. anaphase II
7. What type of reproduction occurs when a parent cell splits into two identical daughter cells of the same size?

- a. binary fission
 - b. fragmentation
 - c. budding
 - d. sexual
8. What process does not occur between meiosis I and meiosis II?
- a. DNA replication does not occur.
 - b. Cytokinesis does not occur.
 - c. Nuclear membranes do not form.
 - d. All of the above do not occur.
9. Fertilization in humans produces
- a. a haploid gamete.
 - b. a diploid gamete.
 - c. a haploid zygote.
 - d. a diploid zygote.
10. Which of the following is true about crossing-over? (1) It results in new combinations of genes on each chromosome. (2) It is the exchange of genetic material between homologous chromosomes. (3) It accounts for genetic variation during binary fission. (4) It results in gametes that have unique combinations of chromosomes.
- a. 1 only
 - b. 1 and 2
 - c. 1, 2, and 3
 - d. All four statements are true.
11. Which of the following is true concerning sexual reproduction? (1) Sexual reproduction always involves two parents. (2) In sexual reproduction, gametes unit to form offspring. (3) In humans, one gamete is much larger than the other. (4) Gametes are formed through mitosis.
- a. 1 and 2
 - b. 1, 2, and 3
 - c. 1, 2, and 4
 - d. All four statements are true.
12. Meiosis begins with one cell, and ends with _____ cells.
- a. 2 diploid
 - b. 2 haploid
 - c. 4 diploid
 - d. 4 haploid

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Reproduction is one of the defining characteristics of living things.
- _____ 14. Meiosis has eight phases.
- _____ 15. Meiosis begins with one haploid cell and ends with four diploid cells.
- _____ 16. Independent assortment is the exchange of genetic material between homologous chromosomes.
- _____ 17. A human zygote has 46 chromosomes.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Haploid cells contain half the number of _____ found in other cells of the organism.

19. _____ is the exchange of genetic material during meiosis I.
20. In a diploid life cycle, diploid parents produce _____ gametes.
21. Homologous chromosomes from each pair separate during _____.
22. Asexual reproduction includes binary fission, _____, and _____.
23. The development of haploid cells into gametes is called _____.
24. _____ reproduction always involves two parents.
25. _____ is a type of cell division in which the number of chromosomes is reduced by half.

Short Answer

Answer each question in the space provided.

26. What is one of the main differences between mitosis and meiosis?

27. Describe crossing-over.

5.4 The Cell Cycle, Mitosis, and Meiosis

Chapter Test

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

1. What is the correct sequence of steps in binary fission?
 - a. DNA replication → chromosome segregation → cytokinesis
 - b. DNA replication → meiosis → interphase
 - c. prophase → metaphase → anaphase
 - d. none of the above
2. Nuclear division in eukaryotes occurs by
 - a. gametogenesis.
 - b. mitosis.
 - c. cytokinesis.
 - d. replication.
3. A eukaryotic cell spends most of its life in the stage called
 - a. mitosis.
 - b. synthesis.
 - c. growth phase 1.
 - d. growth phase 2.
4. During interphase, a eukaryotic cell
 - a. grows.
 - b. divides.
 - c. undergoes mitosis.
 - d. produces gametes.
5. When cells are not dividing, their DNA exists as
 - a. chromosomes.
 - b. chromatids.
 - c. chromatin.
 - d. proteins.
6. Which statement is true about homologous chromosomes?
 - a. They have the same genes.
 - b. They are inherited from the same parent.
 - c. They always go to the same gamete.
 - d. They have different sizes and shapes.
7. The first and longest phase of mitosis is
 - a. anaphase.

- b. metaphase.
 - c. telophase.
 - d. prophase.
8. Which statement is true about gametes?
- a. They are reproductive cells.
 - b. They are diploid cells.
 - c. They are produced by mitosis.
 - d. They form by budding.
9. A zygote is a cell that results from
- a. meiosis.
 - b. fertilization.
 - c. gametogenesis.
 - d. crossing-over.
10. What happens during meiosis?
- a. The number of chromosomes doubles.
 - b. Homologous chromosomes separate.
 - c. Two identical daughter cells form.
 - d. Two gametes join together.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Cell division is simpler in eukaryotes than prokaryotes.
- _____ 12. The eukaryotic cell cycle includes two just phases: mitosis and cytokinesis.
- _____ 13. The cell cycle of eukaryotes is controlled mainly by regulatory proteins.
- _____ 14. Most chromosomes consist of a single gene.
- _____ 15. Sister chromatids separate during telophase of mitosis.
- _____ 16. Cytokinesis occurs in the same way in all cells.
- _____ 17. Budding is a form of asexual reproduction.
- _____ 18. Meiosis II is essentially the same as mitosis.
- _____ 19. Independent assortment reduces genetic variation of gametes.
- _____ 20. The cell cycle is the sequence of stages an organism goes through from one generation to the next.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. Most prokaryotic cells divide by the process of _____.
22. The process in which DNA is copied is called _____.
23. The stage of cell division in which the cytoplasm divides is _____.
24. Cancer cells may form a mass of abnormal cells called a(n) _____.
25. Sister chromatids are attached at a region known as the _____.
26. The final stage of mitosis is _____.
27. The process in which two gametes unite is _____.
28. The exchange of genetic material between homologous chromosomes is called _____.

CHAPTER 6

Gregor Mendel and Genetics Assessments

Chapter Outline

- 6.1 MENDEL'S INVESTIGATIONS
- 6.2 MENDELIAN INHERITANCE
- 6.3 GREGOR MENDEL AND GENETICS



6.1 Mendel's Investigations

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Genetics is
 - the science of life.
 - the science of heredity.
 - the science of reproduction.
 - the science of genes.
- A Dd individual
 - has a homozygous genotype.
 - has a heterozygous phenotype.
 - has a heterozygous genotype.
 - has a homozygous phenotype.
- When Mendel crossed plants with yellow, round pods with plants with green, wrinkled pods, he observed
 - that the F_1 plants all had green, wrinkled pods.
 - that the F_1 plants all had yellow, round pods.
 - that the F_2 plants all had green, wrinkled pods.
 - that the F_2 plants all had yellow, round pods.
- When Mendel cross-pollinated purple- and white-flowered parent plants, what did he observe?
 - Purple-flowered plants disappeared in the F_1 generation.
 - White-flowered plants disappeared in the F_2 generation.
 - White-flowered plants disappeared in the F_1 generation.
 - Purple-flowered plants disappeared in the F_2 generation.
- Mendel's two laws are
 - the law of segregation and the law of assortment.
 - the law of segregation and the law of independence.
 - the law of independent segregation and the law of assortment.
 - the law of segregation and the law of independent assortment.
- Having blonde hair and blue eyes describes a person's
 - genotype.
 - phenotype.
 - recessive alleles.
 - dominant alleles.
- When Mendel cross-pollinated purple- and white-flowered parent plants, what did he observe?
 - The F_2 generation was 75% purple-flowered plants and 25% white-flowered plants.

- b. The F1 generation was 75% purple-flowered plants and 25% white-flowered plants.
 - c. The F2 generation was 75% white-flowered plants and 25% purple-flowered plants.
 - d. The F2 generation was 75% white-flowered plants and 25% purple-flowered plants.
8. When Mendel crossed plants with yellow, round pods with plants with green, wrinkled pods, he observed
- a. that some of the F2 had green, round pods and some had yellow, wrinkled pods.
 - b. that some of the F1 had green, round pods and some had yellow, wrinkled pods.
 - c. that all the F2 looked like the P generation.
 - d. that the F2 generation had plants with either yellow, round pods or plants with green, wrinkled pods.
9. Which of the following statements is correct?
- a. Pea plants can only have tall or short stems.
 - b. A dark brown dog describes part of its phenotype.
 - c. A *bb* individual has two recessive alleles.
 - d. All of the statements are correct.
10. From Mendel's first set of experiments, he concluded that
- a. there are two factors controlling each characteristic he studied.
 - b. of the two factors, one of the factors dominates the other factor.
 - c. the two factors separate and go to different gametes.
 - d. all of the above
11. Mendel chose the pea plant to work with because
- a. they are fast growing and easy to raise.
 - b. they have easily recognizable characteristics with many different forms.
 - c. he really liked peas.
 - d. all of the above
12. Which sentence is correct?
- a. Different alleles of the same gene are located at the same locus on different homologous chromosomes.
 - b. Different alleles of the same gene are located at different loci on different homologous chromosomes.
 - c. Different genes of the same alleles are located at the same locus on different homologous chromosomes.
 - d. Different alleles of the same gene are located at different loci on the same chromosome.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Through his studies, Gregor Mendel was able to prove the blending theory of inheritance.
- _____ 14. In Mendel's first experiments, the F1 consisted of all white-flowered plants.
- _____ 15. Mendel's law of segregation states that factors controlling different characteristics are inherited independently of each other.
- _____ 16. Mendel published his work at the same time Darwin published his work on evolution.
- _____ 17. Mendel's two laws of inheritance are fundamental concepts of genetics.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The _____ refers to the organism's characteristics.
19. The _____ refers to the organism's inherited genes.
20. In Mendel's first set of experiments, the F2 generation showed _____% purple-flowered plants and _____% white-flowered plants.

21. The offspring that result from cross-pollination are called _____.
22. In pea plants, each visible characteristic has _____ common forms, such as tall and short stem length.
23. _____ is commonly referred to as the “father of genetics.”
24. In a heterozygous individual, the _____ allele is expressed.
25. In a heterozygous individual, the _____ allele is not expressed.

Short Answer

Answer each question in the space provided.

26. Why is Gregor Mendel referred to as the “father of genetics”?

27. Describe the findings from Mendel’s first set of experiments.

6.2 Mendelian Inheritance

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

For questions 1 - 4, use the following information: Purple color (P) is dominant over white color (p), and tall plants (T) are dominant over short (t) plants.

- If a $PPTT$ plant is crossed with a $pptt$ plant, what are the potential phenotypes of the offspring?
 - purple-tall plants and white-short plants
 - purple-tall plants only
 - purple-short plants and white-tall plants
 - white-short plants only
- What are the expected genotypes from a $PPtt$ and $PPTt$ cross?
 - half purple-tall and half purple-short plants
 - all purple-tall plants
 - all $PPtt$
 - half $PPTt$ and half $PPtt$
- If a Pp plant is crossed with another Pp plant, what is (are) the expected genotype(s) in the offspring?
 - 100% Pp
 - 25% PP , 50% Pp , 25% pp
 - 50% PP , 50% pp
 - 75% purple, 25% white
- In a cross involving two heterozygous parents, $PpTt$, what will be the phenotypes of the offspring?
 - 9 purple-tall plants, 3 purple-short plants, 3 white-tall plants, 1 white-short plant
 - 4 purple-tall plants, 4 purple-short plants, 4 white-tall plants, 4 white-short plants
 - 9 white-short plant, 3 purple-short plants, 3 white-tall plants, 1 purple-tall plants
 - 3 purple-tall plants, 1 white-short plant
- If a parent cell has an Rr genotype, what gametes will be produced?
 - 1 R cell and 1 r cell
 - 4 Rr cells
 - 2 R cells and 2 r cells
 - 2 Rr cells
- What is the likelihood of a heterozygous genotype from a homozygous dominant and a homozygous recessive parent?
 - 25%
 - 50%
 - 75%

- d. 100%
7. A cross involving two heterozygous parents will likely result in
- 50% heterozygous offspring.
 - 75% of their offspring with the dominant phenotype.
 - 25 % homozygous dominant offspring.
 - all of the above.
8. If a parent cell has a $BbCc$ genotype, what gametes will be produced?
- 1 BC cell, 1 Bc cell, 1 bC cell, and 1 bc cell
 - 4 BC cells
 - 2 BC cells and 2 bc cells
 - 1 BC cell and 1 bc cell
9. A red and white flower probably occurs because of
- incomplete dominance.
 - codominance.
 - multiple alleles.
 - polygenic characteristics.
10. An adult's height is determined by
- multiple alleles.
 - incomplete dominance.
 - genes and the environment.
 - polygenic inheritance.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. All the traits Mendel studied were controlled by one gene that had only two possible alleles.
- _____ 12. In a cross of two heterozygous parents, 25% of the offspring should have the recessive phenotype.
- _____ 13. The same rules of probability in coin tossing apply to the main events that determine the genotypes of offspring.
- _____ 14. In a cross of two homozygous parents, 25% of the offspring should be homozygous recessive.
- _____ 15. Incomplete dominance occurs when both alleles are expressed equally in the phenotype of the heterozygote.
- _____ 16. The gene for ABO blood type in humans has multiple alleles.
- _____ 17. All genetics follow Mendelian inheritance.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. _____ is the likelihood, or chance, that a certain event will occur.
19. Paired alleles always separate and go to different gametes during _____.
20. A _____ square allows you to determine the expected percents of different genotypes in the offspring of two parents.
21. Mendel had only phenotypes to work with; he knew nothing about _____ and genotypes.
22. If a parent has an AA genotype, the probability of their child inheriting an a allele from that parent is _____.

23. If two parents are each heterozygous, the probability of their child being homozygous recessive is _____ - _____.
24. If one parent is homozygous dominant and the other parent is recessive, the probability that their child will be heterozygous is _____.
25. A flower may have _____ petals because of incomplete dominance of a red-petal allele and a recessive white-petal allele.

Short Answer

Answer each question in the space provided.

26. Using a Punnett square, determine the likelihood of a $AaBb$ genotype from a $AABB \times aabb$ cross.

27. Describe the differences between incomplete dominance and codominance. Provide examples.

6.3 Gregor Mendel and Genetics

Chapter Test

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Genetics is the science of
 - pea plants.
 - heredity.
 - pollination.
 - probability.
- Which theory was disproved by Mendel's first set of experiments?
 - evolutionary theory
 - genetic theory
 - blending theory
 - none of the above
- When Mendel crossed a purple-flowered plant with a white-flowered plant, the F_2 generation had
 - only purple flowers.
 - only white flowers.
 - purple flowers and white flowers.
 - pink flowers.
- For each trait Mendel studied, why did one form of the trait seem to disappear in the F_1 generation?
 - The allele for that form of the trait is recessive.
 - The trait is controlled by multiple alleles.
 - That form of the trait is codominant.
 - The trait is a polygenic trait.
- Mendel's second set of experiments led to the law of
 - independent assortment.
 - segregation.
 - inheritance.
 - codominance.
- How many possible genotypes are there in the offspring of a $RrYy \times RrYy$ cross?
 - three
 - four
 - eight
 - sixteen
- Darwin knew nothing of Mendel's work because Mendel
 - lived after Darwin.

- b. lived in another country.
 - c. failed to publish his work.
 - d. published his work only in German.
8. Incomplete dominance occurs when
- a. both alleles are completely dominant.
 - b. both alleles are completely recessive.
 - c. both alleles are expressed equally in the phenotype.
 - d. the dominant allele is not entirely dominant.
9. The ABO blood type gene has three common alleles. How many possible genotypes are there?
- a. three
 - b. four
 - c. six
 - d. nine
10. A polygenic trait is controlled by
- a. one gene with two alleles.
 - b. one gene with multiple alleles.
 - c. one gene with codominant alleles.
 - d. more than one gene.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Mendel studied the ABO blood type.
- _____ 12. Offspring always have a blend of their parents' characteristics.
- _____ 13. Seeds are the male gametes in plants.
- _____ 14. In his first set of experiments, Mendel observed a 75:25 phenotype ratio in the F₁ generation.
- _____ 15. In his second set of experiments, Mendel studied two traits at a time.
- _____ 16. Mendel's work was virtually unknown until 1900.
- _____ 17. All traits have the simple inheritance patterns studied by Mendel.
- _____ 18. An example of codominance occurs with the ABO blood type.
- _____ 19. Skin color is an example of a polygenic trait.
- _____ 20. The environment can affect how the genotype is expressed.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. The "father of genetics" was _____.
22. Fertilization in plants is known as _____.
23. Offspring from a cross between two different plants are called _____.
24. The law of _____ states that factors controlling the same characteristic go to different offspring.
25. The law of _____ states that factors controlling different characteristics are inherited independently of each other.
26. The position of a gene on a chromosome is its _____.
27. Different versions of the same gene are called _____.

28. Phenotype is the expression of an organism's _____.
29. The chance that a certain event will occur is its _____.
30. A(n) _____ is a chart for predicting genotypes of offspring.

Short Answer

Answer each question in the space provided.

31. How did Mendel combine math and science to develop his laws of heredity?

32. Make a Punnett square showing a cross between a homozygote and heterozygote for a trait controlled by a single gene with two alleles.

33. Two genes are located very close together on the same chromosome. Does the law of independent assortment apply to them? Why or why not?

CHAPTER **7** Molecular Genetics: From DNA to Proteins Assessments

Chapter Outline

- 7.1 DNA AND RNA
 - 7.2 PROTEIN SYNTHESIS
 - 7.3 MUTATION
 - 7.4 REGULATION OF GENE EXPRESSION
 - 7.5 MOLECULAR GENETICS: FROM DNA TO PROTEINS
-



7.1 DNA and RNA

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- The central dogma of molecular biology can be summarized as
 - DNA + RNA = Protein.
 - DNA → RNA → Protein.
 - RNA → DNA → Protein.
 - DNA - RNA - Protein.
- Frederick Griffith showed that
 - a substance could be transferred to harmless bacteria and make them deadly.
 - DNA can bring heat-killed bacteria back to life.
 - DNA is the genetic material.
 - all of the above
- A double helix most closely resembles
 - a ladder.
 - a red vine licorice.
 - a spiral staircase.
 - all of the above.
- Erwin Chargaff proved that
 - the concentration of adenine was always about the same as the concentration of thymine.
 - the concentration of adenine was always about the same as the concentration of guanine.
 - the concentration of guanine was always about the same as the concentration of thymine.
 - the concentration of cytosine was always about the same as the concentration of thymine.
- How does RNA differ from DNA?
 - RNA contains the sugar ribose instead of deoxyribose.
 - RNA can move into the cytoplasm, whereas DNA cannot.
 - RNA contains the nitrogen base uracil instead of thymine.
 - all of the above
- Which of the following statements about DNA replication are true? (1) DNA replication is the process in which DNA is copied. (2) DNA replication occurs during the synthesis phase of the eukaryotic cell cycle. (3) DNA replication begins when an enzyme breaks the hydrogen bonds between complementary bases in DNA. (4) The two new DNA molecules that result after DNA replication each contain one strand from the parent molecule and one new strand that is complementary to it.
 - statements 1 and 2
 - statements 2 and 3
 - statements 1, 2, and 4

- d. All four statements are true.
7. Which of the following statements is correct?
- Oswald Avery's group confirmed the work of Hershey and Chase.
 - Hershey and Chase confirmed the work of Frederick Griffith.
 - Frederick Griffith proved the work of Oswald Avery.
 - Oswald Avery's group extended the work of Frederick Griffith.
8. Which of the following statements about DNA are true? (1) The DNA double helix consists of two polynucleotide chains. (2) Each DNA nucleotide consists of a sugar, a phosphate group, and a nitrogen-containing base. (3) The DNA backbone is composed of the sugar and base of each nucleotide.
- 1 only
 - 3 only
 - 1 and 2 only
 - 1, 2, and 3
9. The scientist(s) most often associated with determining the structure of DNA is (are)
- Rosalind Franklin.
 - Erwin Chargaff.
 - James Watson and Francis Crick.
 - James Crick and Francis Watson.
10. The "copy" of genetic instructions which takes the instructions to the cytoplasm is the
- messenger RNA.
 - transfer RNA.
 - ribosomal RNA.
 - nuclear RNA.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Hershey and Chase confirmed that DNA is the genetic material.
- _____ 12. Rosalind Franklin determined the structure of DNA.
- _____ 13. RNA carries the information from DNA in the nucleus to a ribosome in the cytoplasm.
- _____ 14. Griffith determined that DNA is the genetic material.
- _____ 15. A, C, G, and T represent the bases in RNA.
- _____ 16. The two nucleotide chains of RNA twist into a double helix shape.
- _____ 17. Adenine always binds to thymine and cytosine always binds to guanine.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The central _____ of molecular biology is: DNA → RNA → Protein.
19. Hershey and _____ confirmed that DNA is the genetic material.
20. After DNA replication, the two daughter molecules are _____ to the parent molecule.
21. RNA contains the nitrogen base _____ instead of thymine.
22. Watson and Crick are usually given credit for discovering that DNA has a _____ shape.
23. _____ RNA copies the genetic instructions from DNA in the nucleus, and carries them to the cytoplasm.
24. Transfer RNA brings amino acids to _____, where they are joined together to form proteins.

25. Rosalind _____ used X rays to learn more about DNA's structure.

Short Answer

Answer each question in the space provided.

26. Discuss how the structure of DNA helped scientists understand how DNA replicates.

27. Explain the importance of Chargaff's findings.

7.2 Protein Synthesis

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- The process in which cells make proteins is called
 - gene synthesis.
 - protein synthesis.
 - protein expression.
 - gene expression.
- Transcription can be described as
 - the transfer of the instructions from the nucleus to the cytoplasm.
 - the process in which the genetic code in mRNA is read to make a protein.
 - the transfer of genetic instructions in DNA to mRNA.
 - the process of making a protein in the ribosome.
- Processing of mRNA includes which of the following?
 - Editing, which changes some of the nucleotides in mRNA.
 - Polyadenylation, which adds a “tail” to the mRNA.
 - Splicing, which removes introns from mRNA.
 - all of the above
- The genetic code consists of _____ letter “words.”
 - one-
 - two-
 - three-
 - four-
- Initiation occurs when
 - RNA polymerase binds to the promoter.
 - the mRNA binds to a ribosome.
 - RNA polymerase reads the mRNA in a ribosome.
 - DNA polymerase reads the bases in one of the DNA strands and makes a complementary strand of bases.
- Which of the following statements is correct? (1) Translation always begins with an AUG start codon. (2) The start codon establishes the reading frame of mRNA. (3) The mRNA molecule is read one codon at a time until a stop codon is reached.
 - 1 only
 - 2 only
 - 2 and 3
 - 1, 2, and 3

7. The genetic code is
- unique in each species.
 - universal.
 - uncommon.
 - ambiguous.
8. Complete the following: Introns are _____, exons are _____.
- regions that do not code for proteins; regions that do code for proteins
 - regions that do code for proteins; regions that do not code for proteins
 - regions that do not code for mRNA; regions that do code for mRNA
 - regions that do code for mRNA; regions that do not code for mRNA
9. How many codons comprise the genetic code?
- 3
 - 20
 - 46
 - 64
10. *The genetic code is redundant.* This statement means that
- all known living things have the same genetic code.
 - each codon codes for just one amino acid or is a start or stop codon.
 - most amino acids are encoded by more than one codon.
 - all of the above
11. Which statement best describes an anticodon?
- An anticodon is a tRNA sequence that is complementary to the codon for an amino acid.
 - An anticodon is a mRNA sequence that forms a three-letter genetic “word.”
 - An anticodon is a tRNA sequence that defines the amino acid to bring to the ribosome.
 - An anticodon is a rRNA sequence used to position the tRNA in the ribosome.
12. Translation can be described as
- the transfer of the instructions from the nucleus to the cytoplasm.
 - the process in which the genetic code in mRNA is read to make a protein.
 - the transfer of genetic instructions in DNA to mRNA.
 - the process of making a protein in the ribosome.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Protein synthesis consists of two processes: transcription and translation.
- _____ 14. Transcription is the transfer of genetic instructions in DNA to tRNA.
- _____ 15. Transcription begins when RNA polymerase binds to the promoter of a gene.
- _____ 16. During translation, the mRNA is read in groups of three bases.
- _____ 17. Exons are regions that do not code for proteins.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. _____ is RNA → Protein.
19. Transcription takes place in three steps: initiation, _____, and termination.
20. A _____ is a group of three letters in the genetic code.

21. Processing the new mRNA may include splicing, editing, and _____.
22. The codon AUG codes for the amino acid methionine and is also the start codon that begins _____.
23. The genetic code is _____, unambiguous and redundant.
24. Splicing removes _____ from mRNA.
25. The process in which cells make proteins is called protein _____.

Short Answer

Answer each question in the space provided.

26. What might be an advantage of having more than one codon for the same amino acid?

27. Describe what occurs in each of the three stages of transcription.

7.3 Mutation

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Which of the following statements are correct concerning mutations?
 - Mutations are essential for evolution to occur.
 - A mutation is a change in the sequence of bases in DNA or RNA.
 - Most mutations have no effect on the organisms in which they occur.
 - all of the above
- Which of the following types of mutations can result in a genetic disorder?
 - a deletion
 - an insertion
 - a duplication
 - all of the above
- A frameshift mutation can be the result of a(n)
 - chromosomal alteration.
 - point mutation.
 - inversion.
 - missense mutation.
- Types of chromosomal alterations include
 - translocations.
 - frameshift mutations.
 - point mutations.
 - all of the above.
- A silent mutation
 - results in a premature stop codon.
 - codes for a different amino acid.
 - codes for the same amino acid.
 - results in a frameshift mutation.
- Cancer may result
 - from beneficial mutations.
 - from silent mutations.
 - from deletion mutations.
 - all of the above
- Examples of potentially dangerous mutagens include which of the following? (1) cigarette smoke (2) chemicals in processed meats (3) too much sunlight (4) certain viruses.

- a. 1 only
 - b. 1 and 3
 - c. 2 and 4
 - d. 1, 2, 3, and 4
8. Examine the following mutation: $ACGGGCAAACGATTG \rightarrow ACGGGCAACGATTG$. The mutation is
- a. a frameshift mutation.
 - b. an insertion of a single nucleotide.
 - c. a nonsense mutation.
 - d. a duplication mutation.
9. Beneficial mutations
- a. are silent mutations, which code for the same amino acid.
 - b. help organisms adapt to changes in their environment.
 - c. may only cause mild genetic disorders.
 - d. are only caused by beneficial mutagens, like barbecuing and tanning.
10. Examples of neutral mutations include
- a. silent point mutations.
 - b. beneficial mutations.
 - c. deletions of just 3 nucleotides, maintaining the reading frame.
 - d. all of the above.
11. Chromosomal alterations include duplications and
- a. transfer mutations.
 - b. doubling mutations.
 - c. removal mutations.
 - d. translocation mutations.
12. Types of point mutations include
- a. missense mutations.
 - b. nonsense mutations.
 - c. silent mutations.
 - d. all of the above.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. A change in the sequence of bases in DNA or RNA is called a mutation.
- _____ 14. Somatic mutations occur in gametes.
- _____ 15. The majority of mutations have negative effects on the organisms in which they occur.
- _____ 16. Mutations are essential for evolution to occur.
- _____ 17. Mutations in many bacteria that allow them to survive in the presence of antibiotic drugs.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Anything in the _____ that can cause a mutation is known as a mutagen.
19. A _____ disorder is a disease caused by a mutation in one or a few genes.
20. Chromosomal alterations are mutations that change chromosome _____.
21. A silent mutation codes for the same _____.

22. A _____ mutation changes the reading frame of the mRNA.
23. Mutations increase genetic _____ and the potential for individuals to differ.
24. Germline mutations occur in _____.
25. A point mutation is a change in a _____ nucleotide in DNA.

Short Answer

Answer each question in the space provided.

26. Compare and contrast point mutations and chromosomal alterations.

27. Why can germline mutations be especially dangerous?

7.4 Regulation of Gene Expression

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Gene expression is regulated
 - to ensure that all cells make the same proteins.
 - to ensure that the correct proteins are made in the cells in which they are needed.
 - to ensure that the correct proteins are made from the right genes.
 - to ensure that all cells only use some genes.
- If genes were not regulated, then
 - all your proteins would be transcribed from the same gene.
 - all your genes would be translated at once.
 - all your cells would make the same proteins.
 - all of the above
- Which of the following statements is correct?
 - After regulatory proteins bind to regulatory elements, the proteins can interact with RNA polymerase.
 - After regulatory elements bind to regulatory proteins, the proteins can interact with RNA polymerase.
 - After regulatory proteins bind to regulatory elements, the proteins can interact with DNA polymerase.
 - After activators bind to enhancers, the activators can interact with RNA polymerase.
- Which statement best describes an operon?
 - An operon is a region of eukaryotic DNA that consists of genes that encode the proteins needed for a specific function, and their regulatory elements.
 - An operon is a region of prokaryotic DNA that consists of genes that encode the proteins needed for a specific function, and their regulatory elements.
 - An operon is a region of prokaryotic DNA that consists of a promoter, an operator and their genes.
 - An operon is a segment of eukaryotic DNA that consists of a promoter, an operator and their genes.
- Homeobox genes are an example of genes that regulate
 - eukaryotic enhancers.
 - operons.
 - development.
 - most eukaryotic genes.
- The TATA box can best be described as
 - a regulatory element that is part of the promoter of most eukaryotic genes.
 - a regulatory protein that binds to the promoter of most eukaryotic genes.
 - a regulatory element that is part of the promoter of most prokaryotic genes.
 - a regulatory protein that binds to the promoter of most prokaryotic genes.

7. Which sentence is correct?
- Repressors prevent transcription by impeding the progress of DNA polymerase along the DNA strand.
 - Activators promote transcription by enhancing the interaction of RNA polymerase with the enhancer.
 - Repressors prevent transcription by impeding the progress of RNA polymerase along the mRNA.
 - Activators promote transcription by enhancing the interaction of RNA polymerase with the promoter.
8. Which statement is true concerning the lac operon?
- When lactose is present, a repressor protein binds to the operator.
 - When lactose is absent, a repressor protein binds to the operator.
 - When lactose is absent, a repressor protein binds to the promoter.
 - When lactose is present, a repressor protein binds to the promoter.
9. Gene regulation in prokaryotes and eukaryotes is similar in that
- both involve regulatory proteins.
 - both involve the TATA box.
 - both regulate the binding of RNA polymerase to the mRNA strand.
 - all of the above
10. Which of the following statements is correct? (1) All of your cells have the same genes. (2) Using a gene to make a protein is called protein synthesis. (3) In general, prokaryotic regulation is simpler than eukaryotic regulation.
- 1 only
 - 2 and 3
 - 1 and 3
 - 1, 2, and 3
11. Cancer may result from mutations in
- tumor suppressor genes.
 - homeobox genes.
 - oncogenes.
 - all of the above.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 12. Gene regulation in eukaryotic cells involves unique regulatory elements in different types of cells.
- _____ 13. In your body, different types of cells use different genes.
- _____ 14. In eukaryotic gene regulation, regulatory proteins must bind to the regulatory elements before RNA polymerase binds to the promoter.
- _____ 15. The TATA box is a regulatory element that is part of the promoter of most prokaryotic genes.
- _____ 16. Activators promote transcription by impeding the progress of RNA polymerase along the DNA strand.
- _____ 17. All your cells have the same genes.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Regulatory proteins bind to regions of DNA, called regulatory _____.
19. Using a _____ to make a protein is called gene expression.
20. In prokaryotic genes, the _____ is a region of the operon where regulatory proteins bind.
21. _____ genes regulate development.

22. Transcription is mainly controlled by regulatory _____.
23. When lactose is _____, a repressor protein binds to the operator of the lac operon.
24. Repressors prevent _____ by impeding the progress of RNA polymerase along the DNA strand.
25. Mutations in proto-oncogenes genes can cause _____.

Short Answer

Answer each question in the space provided.

26. Why might it be beneficial to express genes only when they are needed?

27. Discuss the TATA box and its involvement in gene regulation.

7.5 Molecular Genetics: From DNA to Proteins

Chapter Test

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- The central dogma of molecular biology can be summed up by
 - DNA + RNA = Protein.
 - DNA → RNA → Protein.
 - RNA → DNA → Protein.
 - RNA + DNA = Protein.
- Scientists who first determined that DNA is the genetic material were led by
 - Oswald Avery.
 - Erwin Chargaff.
 - James Watson.
 - Francis Crick.
- The two polynucleotide chains of DNA are held together by bonds between
 - amino acids.
 - sugars and phosphates.
 - complementary bases.
 - adenine and uracil.
- DNA replication results in
 - two DNA molecules that are identical to the original DNA molecule.
 - one mRNA molecule that is complementary to the DNA molecule.
 - one chain of amino acids that is complementary to the DNA molecule.
 - none of the above.
- How does RNA differ from DNA?
 - RNA contains the sugar deoxyribose instead of ribose.
 - RNA contains the nitrogen base thymine instead of uracil.
 - RNA consists of one nucleotide chain instead of two.
 - all of the above
- The first step of transcription is
 - promotion.
 - elongation.
 - initiation.
 - splicing.
- The genetic code is
 - unique in each species.

- b. ambiguous.
 - c. uncommon.
 - d. redundant.
8. Translation involves all of the following types of molecules except
- a. amino acids.
 - b. mRNA.
 - c. tRNA.
 - d. DNA.
9. A frameshift mutation is caused by an insertion or
- a. deletion.
 - b. translocation.
 - c. inversion.
 - d. diversion.
10. The transcription of genes is controlled by
- a. rRNA.
 - b. introns.
 - c. anticodons.
 - d. regulatory proteins.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Concentrations of nitrogen bases are the same in all species.
- _____ 12. The structure of DNA was discovered by Hershey and Chase.
- _____ 13. Messenger RNA brings the correct amino acids to a ribosome.
- _____ 14. The final step of transcription is termination.
- _____ 15. Translation occurs at a Golgi apparatus.
- _____ 16. A ribosome consists of tRNA and proteins.
- _____ 17. Germline mutations occur in gametes.
- _____ 18. All mutations are harmful.
- _____ 19. The lac operon regulates genes expression in eukaryotes.
- _____ 20. The TATA box is a type of mutation that causes cancer.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

- 21. The molecule that copies the genetic instructions from DNA is _____.
- 22. _____ is the first part of the central dogma of molecular biology.
- 23. The addition of nucleotides to a growing mRNA strand is called _____.
- 24. Introns are removed from mRNA by the process of _____.
- 25. _____ are the code “words” of the genetic code.
- 26. Anything in the environment that causes a mutation is a(n) _____.
- 27. A point mutation that does not change the encoded amino acid is known as a(n) _____ mutation.
- 28. A chromosomal alteration that involves two nonhomologous chromosomes is called a(n) _____.

29. A disease caused by a mutation in one or a few genes is referred to as a(n) _____.
30. The region of an operon where regulatory proteins bind is the _____.

Short Answer

Answer each question in the space provided.

31. Describe the structure of RNA. Identify the three main types of RNA and their functions.

32. Give an overview of translation.

33. Describe how gene regulation occurs in prokaryotes.

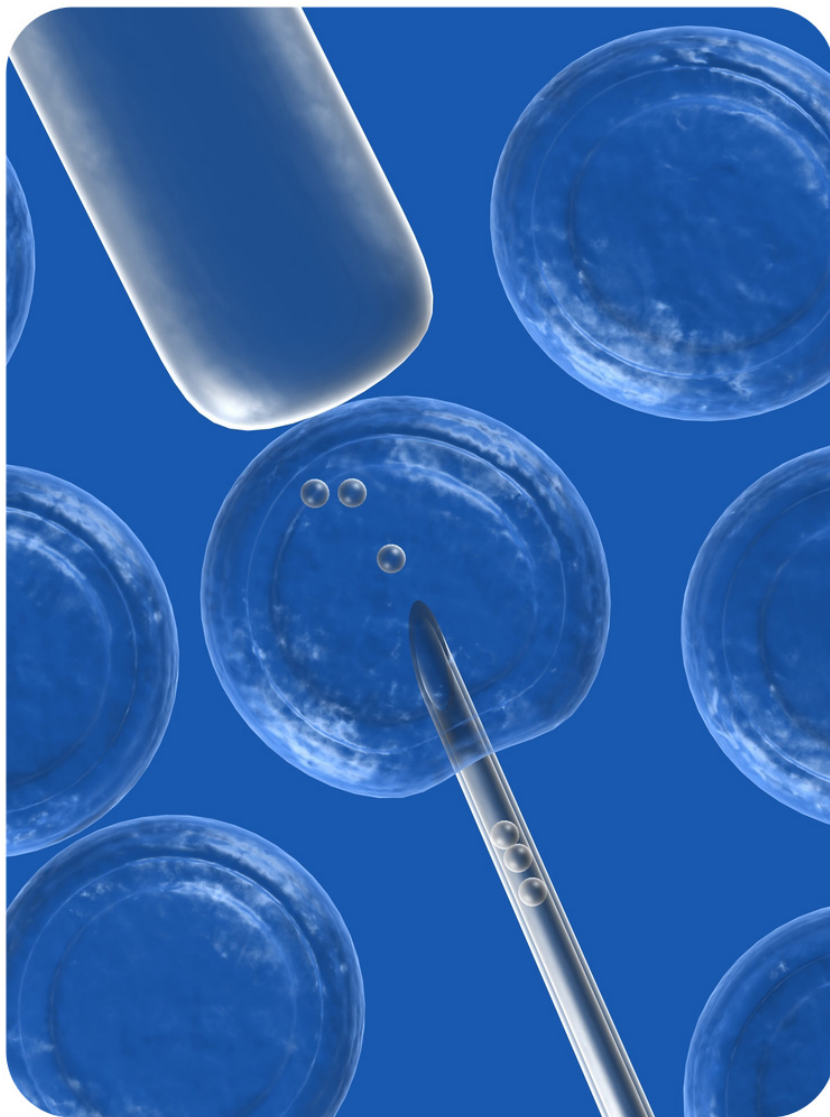
CHAPTER

8

Human Genetics and Biotechnology Assessments

Chapter Outline

- 8.1 HUMAN CHROMOSOMES AND GENES
- 8.2 HUMAN INHERITANCE
- 8.3 BIOTECHNOLOGY
- 8.4 HUMAN GENETICS AND BIOTECHNOLOGY



8.1 Human Chromosomes and Genes

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- A normal human cell has
 - 22 autosomes and 2 sex chromosomes.
 - 22 pairs of autosomes and at least one X chromosome.
 - 22 autosomes and at least one X chromosome.
 - 22 pairs of autosomes and at least one Y chromosome.
- The goal of the Human Genome Project was to
 - identify all the genes in the human genome.
 - sequence all the bases in a human genome.
 - identify all the proteins in the human genome.
 - all of the above
- The X and Y chromosomes are known as the
 - sex chromosomes.
 - male and female chromosomes.
 - sex determining chromosomes.
 - non-autosomal chromosomes.
- Most of the human genome is composed of
 - genes.
 - regulatory regions.
 - chromosomes.
 - sequences of unknown function.
- Linked genes
 - are located on the same chromosome.
 - can segregate together during meiosis.
 - can be close together on the same chromosome.
 - all of the above
- Which of the following statements is true? (1) Most sex-linked genes are on the X chromosome. (2) The X chromosome has about 200 genes. (3) The X chromosome has the SRY gene that determines the sex of a human.
 - 1 only
 - 1 and 2
 - 2 and 3
 - 1, 2, and 3

7. Genes on non-homologous chromosomes have a _____ percent chance of ending up in different gametes.
- zero
 - 25
 - 50
 - 100
8. A linkage map shows
- the locations of genes on a chromosome.
 - all the human chromosomes arranged by size.
 - the location of crossing-over events of a chromosome.
 - the percent of cells with two XX chromosomes and the percent with one X chromosome and one Y chromosome.
9. Which of the following statements is correct?
- The higher the frequency of crossing-over, the closer together on the same chromosome the genes are presumed to be.
 - The lower the frequency of crossing-over, the closer together on the same chromosome genes are presumed to be.
 - The lower the frequency of crossing-over, the farther apart on the same chromosome the genes are presumed to be.
 - With a high frequency of crossing-over, genes are presumed to be on different chromosomes.
10. Which statement concerning autosomes is correct?
- Autosomes may be different in males and females.
 - Humans have 23 pairs of autosomes.
 - Autosomes are chromosomes that contain genes for characteristics that are unrelated to sex.
 - all of the above

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Unless you have an identical twin, no one else on Earth has exactly the same genes as you.
- _____ 12. Of the 3 billion base pairs in the human genome, about 50 percent make up genes and their regulatory elements.
- _____ 13. Females = XY
- _____ 14. In humans, chromosome 1 is the largest.
- _____ 15. Genes located on homologous chromosomes are linked.
- _____ 16. Most human genetic variation is the result of sequence differences within alleles.
- _____ 17. Approximately 20,000 human genes make more than 20,000 proteins.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The human genome consists of about _____ billion base pairs and is divided into _____ pairs of chromosomes.
19. Human cells use splicing to make multiple _____ from the instructions encoded in a single gene.
20. Genes that are located on the same _____ are called linked genes.
21. A single Y chromosome gene, called _____, triggers an embryo to develop into a male.

22. _____ are chromosomes that contain genes for characteristics that are unrelated to sex.
23. Differences in _____ account for the considerable genetic variation among people.
24. A linkage map shows the _____ of genes on a chromosome.
25. Most sex-linked genes are on the _____ chromosome.

Short Answer

Answer each question in the space provided.

26. Can you think of a reason why the Y chromosome is so much smaller than the X chromosome?

27. Explain linkage and linkage maps.

8.2 Human Inheritance

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Which of the following statements is correct concerning autosomal traits? (1) Autosomal traits are controlled by genes on one of the 22 autosomes. (2) Earlobe attachment is an autosomal trait. (3) Red-green color blindness is an autosomal trait.
 - 1 only
 - 2 only
 - 1 and 2
 - 1, 2, and 3
- Which of the following are dominant traits controlled by a single autosomal gene?
 - widow's peak
 - hitchhiker's thumb
 - both a and b
 - neither a and b
- Why are recessive X-linked alleles always expressed in males?
 - Because males have just one X chromosome.
 - Because males have just one Y chromosome.
 - Because the dominant X chromosome is silent in males.
 - Because females have two X chromosomes.
- Which disorder results from an abnormal hemoglobin protein in red blood cells?
 - Vitamin D-resistant rickets
 - Hemophilia A
 - Marfan syndrome
 - Sickle cell anemia
- Which of the following is an example of a multiple allele trait?
 - adult height
 - ABO blood type
 - skin color
 - all of the above
- Down syndrome may result from
 - failure to replicate chromosome 21.
 - nondisjunction of chromosome 21.
 - failure of sister chromatids of chromosome 21 to separate.
 - having only 1 chromosome 21.

7. Mutations in a collagen gene affect bones, the ears and the eyes. This is an example of
- epistasis.
 - a polygenic trait.
 - pleiotropy.
 - multiple phenotype trait.
8. A mother has red-green color blindness. Her husband is not affected.
- All of their daughters will have red-green color blindness.
 - All of their sons will have red-green color blindness.
 - Half of their sons will have red-green color blindness.
 - All of their children will have red-green color blindness.
9. Human skin color and weight are both polygenic traits. A graph of these traits would have
- a bell-shaped distribution.
 - two main peaks.
 - a relatively even distribution.
 - an uneven distribution, skewed towards one extreme.
10. ABO blood type is a multiple allele trait. Which of the following is NOT a blood type phenotype?
- A
 - B
 - AB
 - BO

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Characteristics that are encoded in DNA are called genetic traits.
- _____ 12. ABO blood type is an example of a polygenic trait.
- _____ 13. Most human traits are controlled by a single gene with two alleles.
- _____ 14. A recessive X-linked allele will always be expressed in a male.
- _____ 15. Many genetic disorders are controlled by dominant alleles.
- _____ 16. Down syndrome results from an extra copy of chromosome 2 or 1.
- _____ 17. Gene therapy involves inserting mutant genes into cells with normal genes.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Autosomal traits are controlled by _____ on one of the 22 human autosomes.
19. A recessive X-linked allele is always expressed in _____.
20. Traits controlled by a single gene with more than _____ alleles are called multiple allele traits.
21. _____ traits are controlled by more than one gene.
22. _____ syndrome results from a defective protein in connective tissue.
23. Nondisjunction is the failure of replicated _____ to separate during meiosis.
24. Epistasis is when one gene affects the expression of _____.
25. Individuals with Triple X syndrome have three _____ chromosomes.

Short Answer

Answer each question in the space provided.

26. Define nondisjunction. Discuss the results of nondisjunction and give an example.

27. Compare and contrast multiple allele traits and polygenic traits.

8.3 Biotechnology

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Biotechnology
 - is the use of technology to change the genetic makeup of living things for human purposes.
 - has raised many ethical questions.
 - can make food taste better.
 - all of the above
- Gene cloning could be used to
 - isolate and make copies of a normal gene.
 - cure genetic diseases.
 - diagnose genetic conditions.
 - isolate mutations in the DNA.
- PCR involves which of the following? (1) Denaturing, which results in two single strands of DNA. (2) Extension, which adds nucleotides to primers. (3) Annealing, which mixes the single stranded DNA with primers.
 - 1 only
 - 1 and 2
 - 2 and 3
 - 1, 2, and 3
- Primers are used during the PCR process. These primers are
 - sequences of DNA made by Taq polymerase.
 - short segments of DNA that serve as a starting point for Taq polymerase.
 - involved in the denaturation process.
 - also used in gene cloning to place the gene into the plasmid.
- Which of the following is true concerning PCR? (1) Denaturation occurs around 95°C. (2) Annealing occurs around 55°C. (3) Extension occurs around 72°C.
 - 1 only
 - 2 only
 - 2 and 3
 - 1, 2, and 3
- The steps of gene cloning are, in order,
 - isolation, transformation, ligation, and selection.
 - isolation, ligation, transformation, and selection.
 - ligation, transformation, isolation, and selection.
 - selection, transformation, ligation, and isolation.

7. Transgenic crops
 - a. include insects modified to resist infecting plants.
 - b. include a purple tomato that has been genetically modified to contain a cancer-fighting compound.
 - c. include a cow that no longer needs to feed on grass.
 - d. all of the above
8. Recombinant DNA
 - a. results from the ligation of an isolated gene and plasmid DNA.
 - b. is inserted into a living cell in the transformation process.
 - c. is screened for in the selection process.
 - d. all of the above
9. Biotechnology can be used to
 - a. develop crops that are resistant to insects.
 - b. create organisms that are useful to humans.
 - c. free innocent people from jail.
 - d. all of the above
10. Ethical, legal, and social issues raised by biotechnology include
 - a. the ownership and safety of genetically modified organisms and crops.
 - b. the ownership and safety of genetically modified animals and people.
 - c. the creation of mutations for serious genetic disorders.
 - d. all of the above.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Taq polymerase is an enzyme that can function at very high temperatures.
- _____ 12. Biotechnology has been used to free innocent people from jail.
- _____ 13. DNA ligase is an enzyme that joins together pieces of DNA.
- _____ 14. Denaturing yields two single strands of DNA.
- _____ 15. Annealing involves heating the single strands of DNA and mixing them with short DNA segments called primers.
- _____ 16. In ligation, the recombinant DNA is inserted into a living cell.
- _____ 17. Extension occurs when an enzyme, Taq DNA ligase, adds nucleotides to the primers.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Biotechnology is the use of technology to change the genetic makeup of living things for _____.
19. The last step of gene cloning is _____.
20. PCR stands for the _____ chain reaction.
21. _____ is the process of isolating and making copies of a gene.
22. _____ DNA results from the ligation of an isolated gene and plasmid DNA.
23. _____ involves heating DNA to break the bonds holding together the two DNA strands.
24. PCR makes many copies of a _____ or other DNA segment.
25. The use of biotechnology has raised a number of ethical, _____, and social issues.

Short Answer

Answer each question in the space provided.

26. Identify three ethical, legal, and social issues associated with biotechnology.

27. Describe gene cloning and the polymerase chain reaction.

8.4 Human Genetics and Biotechnology

Chapter Test

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- The goal of the Human Genome Project was to determine the
 - total number of alleles in the human genome.
 - DNA sequence of the entire human genome.
 - number of mutations in the human genome.
 - pattern of inheritance of the human genome.
- Except for gametes, all normal human cells contain
 - at least one Y chromosome.
 - at least one X chromosome.
 - an X or a Y chromosome.
 - an X and a Y chromosome.
- A linkage map shows
 - the locations of genes on a chromosome.
 - all the human chromosomes arranged by size.
 - the pattern of inheritance of an autosomal trait.
 - the frequencies of phenotypes for a polygenic trait.
- An example of a sex-linked trait is
 - widow's peak.
 - hitchhiker's thumb.
 - red-green color blindness.
 - earlobe attachment.
- Which statement is true about ABO blood type?
 - There are three common alleles for this trait.
 - There are three possible genotypes for this trait.
 - The A allele is dominant to the B allele.
 - The A and O alleles are codominant.
- A boy with a widow's peak becomes bald by middle age. The gene for baldness "dominates" the gene for widow's peak. This is an example of
 - pleiotropy.
 - dominance.
 - epistasis.
 - nondisjunction.
- An example of an autosomal recessive disorder is

- a. Marfan syndrome.
 - b. sickle cell anemia.
 - c. vitamin D-resistant rickets.
 - d. hemophilia A.
8. The disorder caused by nondisjunction of chromosome 21 is known as
- a. Down syndrome.
 - b. Turner's syndrome.
 - c. Klinefelter's syndrome.
 - d. Triple X syndrome.
9. The process that makes multiple copies of a gene or other DNA segment is called
- a. polymerase chain reaction.
 - b. genetic engineering.
 - c. isolation.
 - d. ligation.
10. Practical uses of biotechnology include
- a. medicine.
 - b. agriculture.
 - c. forensics.
 - d. all of the above.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. The human genome has 23 pairs of autosomes.
- _____ 12. Normal human females have one X chromosome in each cell.
- _____ 13. The Y chromosome is much smaller than the X chromosome.
- _____ 14. Autosomal traits are always dominant.
- _____ 15. X-linked traits occur only in females.
- _____ 16. ABO blood type is a multiple-allele trait.
- _____ 17. Few genetic disorders are controlled by dominant alleles.
- _____ 18. Nondisjunction causes chromosomal disorders.
- _____ 19. Ligation combines an isolated gene with plasmid DNA.
- _____ 20. Human insulin can be produced only by human cells.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. Chromosomes with genes for traits unrelated to sex are called _____.
22. Genes located on the same chromosome are referred to as _____ genes.
23. A diagram that shows the inheritance of a trait in a family is a(n) _____.
24. Traits controlled by a single gene with more than two alleles are called _____ traits.
25. Traits controlled by more than one gene are called _____ traits.
26. _____ occurs when a single gene affects more than one trait.
27. _____ occurs when one gene affects the expression of another gene.

CHAPTER **9** Life: From the First Organism Onward Assessments

Chapter Outline

- 9.1 EARTH FORMS AND LIFE BEGINS
 - 9.2 THE EVOLUTION OF MULTICELLULAR LIFE
 - 9.3 CLASSIFICATION
 - 9.4 LIFE: FROM THE FIRST ORGANISM ONWARD
-



9.1 Earth Forms and Life Begins

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

1. Earth formed _____ years ago, and life first appeared about _____ years ago.
 - a. 4.6 million, 4 million
 - b. 4.6 billion, 4 billion
 - c. 4.6 billion, 4 million
 - d. 4 billion, 4 million
2. Much of what we know about the history of life on Earth is based
 - a. on the history of organisms.
 - b. on the geologic time scale.
 - c. on the fossil record.
 - d. on the analysis of stardust.
3. The best examples of fossils would be from
 - a. bones, teeth, and shells.
 - b. bones, teeth, and skin.
 - c. bones, hair, and skin.
 - d. bones, teeth, hair, skin, and shells.
4. The main difference between relative dating and absolute dating is that
 - a. relative dating determines which of two fossils is older or younger than the other and absolute dating determines about how long ago a fossil organism lived.
 - b. absolute dating determines which of two fossils is older or younger than the other and relative dating determines about how long ago a fossil organism lived.
 - c. relative dating determines when an organism lived and absolute dating determines about how long ago a fossil lived.
 - d. relative dating determines about how long ago a fossil lived and absolute dating determines when an organism lived.
5. A molecular clock uses _____ to estimate how long it has been since related species diverged from a common ancestor.
 - a. fossil evidence
 - b. geologic time lines
 - c. DNA sequences
 - d. all of the above
6. During the early years of the planet, Earth
 - a. eventually formed an atmosphere that had little oxygen.
 - b. was molten and lacked an atmosphere and oceans.

- c. formed a solid crust as the planet cooled.
 - d. all of the above
7. The RNA world hypothesis states that RNA may have been the first organic molecule to evolve because
- a. RNA is less complex than DNA so it must have evolved first.
 - b. RNA is needed for both transcription and translation.
 - c. RNA can encode genetic instructions and some can carry out chemical reactions.
 - d. nucleotides evolved before amino acids.
8. The geologic time scale divides Earth's history into divisions that are based on major changes in
- a. climate.
 - b. geology.
 - c. evolution.
 - d. all of the above.
9. LUCA
- a. probably existed around 3.5 million years ago.
 - b. was one of the earliest eukaryotic cells.
 - c. gave rise to all subsequent life on Earth.
 - d. all of the above
10. The endosymbiotic theory
- a. explains how eukaryotic cells evolved.
 - b. explains how prokaryotic cells evolved.
 - c. explains how the first cells evolved.
 - d. explains how bacteria evolved.
11. The first cells may have been
- a. lipid membranes around DNA.
 - b. lipid membranes around RNA.
 - c. lipid membranes around DNA and RNA.
 - d. lipid membranes around proteins and RNA.
12. DNA sequence comparison demonstrates that humans are most closely related to
- a. insects.
 - b. birds.
 - c. rodents.
 - d. apes.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Earth formed about 4.6 million years ago.
- _____ 14. The solar system began as a rotating cloud of stardust.
- _____ 15. Photosynthesis evolved before eukaryotic cells.
- _____ 16. Some scientists speculate that RNA evolved prior to DNA.
- _____ 17. The first cells were probably RNA and protein surrounded by a lipid coat.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. _____ occurs when a species completely dies out.

19. _____ dating determines about how long ago a fossil organism lived.
20. A molecular clock uses DNA _____ sequences to estimate how long it has been since related species diverged from a common ancestor.
21. _____ are the preserved remains of organisms that lived in the past.
22. Miller and Urey demonstrated that _____ molecules could form under simulated conditions on early Earth.
23. It is thought that one early cell gave rise to all subsequent life on Earth. That one cell is called the _____.
24. The early atmosphere contained ammonia, methane, water vapor, and carbon dioxide, but only a small amount of _____.
25. The first eukaryotic cells probably evolved about _____ billion years ago.

Short Answer

Answer each question in the space provided.

26. Explain how eukaryotes are thought to have evolved.

27. Outline how the first organic molecules arose.

9.2 The Evolution of Multicellular Life

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- How much of Earth's history passed before multicellular life evolved?
 - 90%
 - 80%
 - 70%
 - 55%
- During the late Precambrian,
 - continental drift changed climates worldwide.
 - there was intense volcanic activity.
 - there was a severe ice age that completely covered the planet.
 - all of the above
- Adaptations during the late Precambrian included
 - the development of sexual reproduction.
 - the ability to live on land, seen with the evolution of plants.
 - the ability to move independently, seen in the evolution of animals.
 - all of the above.
- The Precambrian extinction refers to
 - the mass extinction that paved the way for the Cambrian explosion.
 - the biggest mass extinction the world had ever seen.
 - a spectacular burst of new life.
 - the mass extinction that allowed dinosaurs to flourish.
- The Permian extinction refers to
 - the mass extinction that paved the way for the Cambrian explosion.
 - the biggest mass extinction the world had ever seen.
 - a spectacular burst of new life.
 - the mass extinction that allowed dinosaurs to flourish.
- The Cambrian explosion refers to
 - the eruption of supervolcanoes during the Cambrian.
 - the biggest mass extinction the world had ever seen.
 - a spectacular burst of new life.
 - the mass extinction that allowed dinosaurs to flourish.
- The Mesozoic Era is known as the
 - age of dinosaurs.

- b. the era of “old life.”
 - c. age of mammals.
 - d. none of the above
8. During the Mesozoic Era
- a. there was lots of volcanic activity.
 - b. Pangaea broke up and the continents drifted apart.
 - c. there were two mass extinctions.
 - d. all of the above
9. The Jurassic Period
- a. started with a mass extinction.
 - b. saw Pangaea start to separate.
 - c. was the golden age of dinosaurs.
 - d. all of the above
10. During the Cenozoic Era,
- a. mammals took advantage of the extinction of the dinosaurs.
 - b. the earliest birds evolved from reptile ancestors.
 - c. dinosaurs reached their peak in size and distribution.
 - d. the continents continued to move apart.
11. During the Quaternary Period,
- a. Earth’s climate was generally warm and humid.
 - b. Earth’s climate cooled, leading to a series of ice ages.
 - c. primates evolved.
 - d. modern rain forests and grasslands appeared.
12. During the Tertiary Period,
- a. the dinosaurs went extinct.
 - b. mammals adapted to the cold by evolving very large size and thick fur.
 - c. there were a series of ice ages.
 - d. mammals evolved to fill virtually all niches vacated by dinosaurs.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Sexual reproduction increased the speed at which evolution could occur.
- _____ 14. In a mass extinction, it is possible for all species to abruptly disappear from Earth.
- _____ 15. The Cambrian explosion is the biggest mass extinction the world had ever seen.
- _____ 16. The mass extinction that ended the Triassic allowed dinosaurs to flourish in the Jurassic.
- _____ 17. A mass extinction 65 million years ago killed off the dinosaurs.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The Cenozoic Era is the age of _____.
19. The Mesozoic Era is the age of _____.
20. In a mass _____, many or even most species abruptly disappear from Earth.
21. The Paleozoic Era began with the Cambrian _____.
22. During the late Precambrian, continents drifted and _____ levels in the atmosphere rose and fell.

23. The Mesozoic began with the supercontinent called _____.
24. The Paleozoic Era ended with the Permian _____.
25. Nearly _____ of Earth's history passed before multicellular life evolved.

Short Answer

Answer each question in the space provided.

26. Explain why the Mesozoic Era is called the age of the dinosaurs.

27. Describe the Cambrian explosion.

9.3 Classification

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- The evolution of life on Earth has resulted in
 - a number of mass extinctions.
 - a huge variety of species.
 - the formation and break-up of supercontinents.
 - all of the above.
- The science of classifying organisms is called
 - taxonomy.
 - phylogeny.
 - evolution.
 - organizing.
- The correct order of taxa, from largest to smallest is
 - species - genus - family - order.
 - kingdom - family - order - species.
 - kingdom - class - family - genus.
 - phylum - order - class - family.
- A domain is
 - a family of related organisms.
 - the largest taxon.
 - taxon that divides the kingdoms into more specific subclasses.
 - all of the above.
- The Eukaryota domain includes
 - the Protista kingdom.
 - the Plantae kingdom.
 - the Fungi kingdom.
 - all of the above.
- Which of the following would be placed into a clade of primates? (1) gorillas, (2) monkeys, (3) humans, (4) mice.
 - 1 only
 - 1 and 2
 - 1, 2, and 3
 - 1, 2, 3, and 4
- Which of the following would be placed into a clade of mammals? (1) mice, (2) rabbits, (3) birds, (4) snakes.

- a. 1 only
 - b. 1 and 2
 - c. 1, 2, and 3
 - d. 1, 2, 3, and 4
8. The “father of taxonomy” is
- a. Swedish botanist Carolus Linnaeus.
 - b. Austrian monk Gregor Mendel.
 - c. English naturalist Charles Darwin.
 - d. American scientist Thomas T. Taxon.
9. Which two domains consist only of single-celled prokaryotes?
- a. Bacteria and Archaea
 - b. Bacteria and Eukaryota
 - c. Archaea and Eukaryota
 - d. Prokaryota and Bacteria
10. An example of binomial nomenclature would be
- a. *Homo sapiens*
 - b. *Panthera tigris*
 - c. *Tyrannosaurus rex*
 - d. all of the above.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. The science of classifying organisms is called cladistics.
- _____ 12. Primates are mammals with collar bones and grasping fingers.
- _____ 13. The species is the largest and most inclusive grouping.
- _____ 14. The two domains are Prokaryota and Eukaryota.
- _____ 15. Animals are organisms that are able to move on their own.
- _____ 16. Closely related species are grouped together in a genus.
- _____ 17. A kingdom is a taxon that is larger and more inclusive than the domain.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The science of classifying organisms is called _____.
19. _____ range from the kingdom to the species.
20. A species consists of organisms that are similar enough to produce fertile _____ together.
21. _____ nomenclature, gives each species a unique, two-word Latin name.
22. A _____ is a taxon that is larger and more inclusive than the kingdom.
23. _____ is the evolutionary history of a group of related organisms.
24. A clade is a group of organisms that includes an _____ and all of its descendants.
25. The Linnaean system is based on similarities in obvious _____ traits.

Short Answer

Answer each question in the space provided.

26. Describe Linnaean classification.

27. Discuss the differences between a domain and a kingdom.

9.4 Life: From the First Organism Onward

Chapter Test

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Relative dating can be used to determine
 - how old a fossil is in years.
 - how long ago a fossil organism lived.
 - how long since two species diverged.
 - which of two fossils is older than the other.
- Molecular clocks are based on
 - DNA or protein sequences.
 - eons, eras, and periods.
 - major events in geology.
 - positions of fossils in rock layers.
- The longest units of time in the geologic time scale are
 - eras.
 - eons.
 - periods.
 - supereons.
- The Precambrian lasted from the origin of Earth until about
 - half a million years ago.
 - 1 million years ago.
 - 100 million years ago.
 - half a billion years ago.
- Miller and Urey's famous experiment showed that
 - the atmosphere of early Earth contained mostly oxygen.
 - the first cells could have evolved from inorganic molecules.
 - organic molecules could form under conditions on early Earth.
 - Earth's early atmosphere would have been toxic to life.
- The RNA world hypothesis states that RNA
 - was the last organic molecule to evolve.
 - evolved before DNA or proteins.
 - evolved from DNA.
 - evolved from proteins.
- Major adaptations that evolved during the Precambrian include
 - sexual reproduction.

- b. specialization of cells.
 - c. multicellularity.
 - d. all of the above.
8. The Mesozoic Era is known as the age of
- a. mammals.
 - b. dinosaurs.
 - c. birds.
 - d. fishes.
9. The Linnaean system of classification consists of a hierarchy of groups called
- a. species.
 - b. taxa.
 - c. domains.
 - d. clades.
10. What does a phylogenetic tree represent?
- a. the evolutionary history of a group of related organisms
 - b. the pedigree of individuals within a particular family
 - c. the most inclusive taxon of Linnaean classification
 - d. the three-domain classification system

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. The chance of an organism being preserved as a fossil is very low.
- _____ 12. Fossils always consist of mineralized bones or teeth.
- _____ 13. When Earth first formed, it was completely covered by oceans.
- _____ 14. The last universal common ancestor (LUCA) probably lived about 3.5 billion years ago.
- _____ 15. The earliest cells were probably autotrophs that made food by photosynthesis.
- _____ 16. Plants first colonized the land during the Mesozoic Era.
- _____ 17. The dinosaurs went extinct at the end of the Cretaceous Period.
- _____ 18. The science of classifying organisms is called taxonomy.
- _____ 19. Binomial nomenclature is Linnaeus' method of naming species.
- _____ 20. Cladistics is a method of determining the age of fossils

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. Preserved remains or traces of organisms that lived in the past are known as _____.
22. Carbon-14 dating is a type of _____ dating.
23. The most recent era of the geologic time scale is the _____ Era.
24. Endosymbiotic theory explains how _____ evolved organelles.
25. An event in which most species on Earth abruptly go extinct is called a(n) _____.
26. The Paleozoic Era began with a burst of new life called the _____.
27. Mammals became the dominant animals on Earth during the _____ Era.
28. The last ice ages ended during the _____ Period.

29. The most exclusive taxon of the Linnaean system is the _____.
30. A(n) _____ is a group of organisms that includes an ancestor species and all of its descendant species.

Short Answer

Answer each question in the space provided.

31. Explain how eukaryotes are thought to have evolved.
32. Give an overview of the evolution of life during the Paleozoic Era.
33. How does phylogenetic classification differ from Linnaean classification?

CHAPTER

10

The Theory of Evolution Assessments

Chapter Outline

- 10.1 DARWIN AND THE THEORY OF EVOLUTION
 - 10.2 EVIDENCE FOR EVOLUTION
 - 10.3 MICROEVOLUTION AND THE GENETICS OF POPULATIONS
 - 10.4 MACROEVOLUTION AND THE ORIGIN OF SPECIES
 - 10.5 THE THEORY OF EVOLUTION
-



10.1 Darwin and the Theory of Evolution

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- _____ developed the theory of evolution by natural selection.
 - Alfred Russel Wallace
 - Charles Darwin
 - Jean Baptiste Lamarck
 - Thomas Malthus
- While on the *Beagle*, Darwin's observations included
 - rock ledges that had clearly once been beaches.
 - fossils of gigantic living mammals.
 - rocks containing mountain fossil found in the sea.
 - all of the above.
- Charles Lyell
 - argued that Earth must be far older than most people believed.
 - said that human populations grow faster than their resources.
 - developed the idea of the inheritance of acquired characteristics.
 - none of the above
- The inheritance of acquired characteristics states that
 - traits an organism develops during its own lifetime are determined by nature.
 - traits an organism develops during its own lifetime are not passed on to offspring.
 - traits an organism develops during its own lifetime are passed on to offspring.
 - traits an organism develops during its own lifetime are determined by evolution.
- Artificial selection
 - occurs naturally in pigeons.
 - is based on the inheritance of acquired characteristics.
 - is when nature selects for beneficial traits.
 - is when humans select form beneficial traits.
- The Galápagos Islands
 - differ from one another in important ways.
 - are where Darwin made some of his most important discoveries.
 - each have some distinct plant and animal life.
 - all of the above
- Darwin's reasoning included which of the following?
 - Darwin assumed that species can change over time.

- b. Darwin knew that resources could grow faster than populations.
 - c. Darwin inferred that artificial selection could change species over time.
 - d. all of the above
8. The Galápagos tortoises
- a. evolved as the Galápagos islands separated from each other.
 - b. are able to swim between islands to eat any available food.
 - c. have differently shaped shells depending on which island they inhabit.
 - d. all of the above
9. Jean Baptiste Lamarck
- a. was one of the first scientists to propose that species evolve over time.
 - b. developed a widely accepted theory of evolution.
 - c. determined that Earth must be far older than most people believed.
 - d. said that famine and disease keep populations in check by killing off their weakest members.
10. Darwin's theory explains
- a. why some organisms have better fitness than others.
 - b. why species face a *struggle for existence*.
 - c. why giraffes have such long necks.
 - d. all of the above.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. The work of Lamarck motivated Darwin to finish his work.
- _____ 12. Darwin had developed his ideas of evolution prior to the voyage of the *Beagle*. He just used the voyage to collect evidence of his ideas.
- _____ 13. Fitness refers to an organism's relative ability to survive and produce fertile offspring.
- _____ 14. It took Darwin over 20 years to compile his findings, develop his theory, and publish his book.
- _____ 15. Lamarck convinced Darwin that populations could grow faster than their resources.
- _____ 16. Artificial selection is when nature chooses the traits beneficial for survival.
- _____ 17. Darwin was the first to provide convincing arguments and evidence to evolution.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Darwin spent five years collecting information while on a voyage aboard the _____.
19. Darwin discovered _____ of extinct mammals, providing hard evidence that organisms looked very different in the past.
20. Lyell determined that _____ must be far older than most people believed.
21. Darwin's most important observations were made on the _____ Islands.
22. Darwin determined that _____ selects the variations among organisms that are most useful for survival.
23. The theory of evolution by _____ states that living things with beneficial traits produce more offspring than others do.
24. Darwin saw that tortoises have differently shaped _____ depending on which island they live.
25. Darwin's theory of evolution explains and unifies all of _____.

Short Answer

Answer each question in the space provided.

26. State Darwin's theory of evolution by natural selection.

27. Describe two observations Darwin made on the voyage of the *Beagle*.

10.2 Evidence for Evolution

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Fossils are
 - the most significant evidence of evolutionary relationships between species.
 - distinct and direct evidence of evolution.
 - a complete record of evolution.
 - all of the above.
- Examples of homologous structures include
 - the wings of a bat and bird.
 - the wings of a bat and the limbs of a cat.
 - the limbs of a cat and limbs of a tortoise.
 - none of the above.
- Examples of analogous structures include
 - the wings of a bat and bird.
 - the wings of a bat and the limbs of a cat.
 - the limbs of a cat and limbs of a tortoise.
 - all of the above.
- An example of a vestigial structure is
 - the forelimb of a whale.
 - the wings of an eagle.
 - the pelvic bone of a whale.
 - the tail bone of a monkey.
- Comparison of DNA sequences shows that we are most closely related to
 - monkeys.
 - baboons.
 - gorillas.
 - chimpanzees.
- Peter and Rosemary Grant
 - observed evolution by natural selection actually taking place.
 - studied Darwin's finches on the Galápagos Islands.
 - spent more than 30 years studying the same thing.
 - all of the above
- Biogeography
 - has taught of us the migration patterns of certain species.

- b. is the science of studying maps.
 - c. was developed by Darwin during his voyage on the *Beagle*.
 - d. proves that all camels came from Egypt and North Africa.
8. The discovery of dinosaur bones would probably be made by
- a. paleontologists.
 - b. evolutionists.
 - c. biologists.
 - d. bone doctors.
9. Darwin's book *On the Origin of Species* included
- a. lots of evidence to show that evolution had taken place.
 - b. an analysis of the anatomy of analogous structures.
 - c. an analysis of the DNA sequences of closely related animals.
 - d. all of the above.
10. Island biogeography
- a. describes camel migration across the planet.
 - b. describes the reasons for finch evolution in the Galápagos.
 - c. was developed by Peter and Rosemary Grant.
 - d. all of the above
11. The strongest evidence for evolution from a common ancestor is
- a. similar DNA sequences.
 - b. similar body structures.
 - c. similar fossils.
 - d. all of the above.
12. Which of the following is true about horse evolution? (1) Early horses were about the size of a fox. (2) Early horses had toes. (3) During evolution, their molars became covered with cement. (4) Like the whale, horses also moved from the land into the sea.
- a. 1 only
 - b. 1 and 2
 - c. 1, 2, and 3
 - d. 1, 2, 3, and 4

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Fossils provide clear evidence that evolution has occurred.
- _____ 14. Early horses had toes and were small.
- _____ 15. Homologous structures are structures that are similar in unrelated organisms.
- _____ 16. The hands of different mammals are vestigial structures.
- _____ 17. Biogeography shows that camels originated in Asia.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. In his book called *On _____ Species*, Darwin included lots of evidence to show that evolution had taken place.
19. _____ anatomy is the study of the similarities and differences in the structures of different species.
20. Fossils provide clear evidence that _____ has occurred.

21. Similar _____ are the strongest evidence for evolution from a common ancestor.
22. The earliest _____ were about the size of a fox, and they had four long toes.
23. The hands of different mammals are _____ structures.
24. Biogeography shows that all camels came from ancestors in _____.
25. The wings of bats and birds are _____ structures.

Short Answer

Answer each question in the space provided.

26. Explain one way evidence from living species gives clues about evolution.

27. Provide an example of how fossils help us understand the past.

10.3 Microevolution and the Genetics of Populations

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- The conditions for Hardy-Weinberg equilibrium include that
 - only a few individuals move into or out of the population.
 - no new alleles are being created.
 - non-random mating is occurring.
 - all of the above
- Which statement best describes directional selection?
 - Directional selection occurs when phenotypes at both extremes of the phenotypic distribution are selected against.
 - Directional selection occurs when one of two extreme phenotypes is selected against.
 - Directional selection occurs when one of two extreme phenotypes is selected for.
 - Directional selection occurs when phenotypes in the middle of the range are selected against.
- Which statement is correct concerning natural selection?
 - Natural selection occurs when there are differences in fitness among members of a population.
 - Natural selection occurs when there are differences in gene flow among members of a population.
 - Natural selection occurs when there are differences in genetic drift among members of a population.
 - all of the above
- Gene flow
 - occurs when individuals move into or out of a population.
 - must not occur for a population to be at Hardy-Weinberg equilibrium.
 - is a force of evolution.
 - all of the above
- Genetic drift
 - can occur due to the bottleneck effect, when a few individuals start a new population.
 - can occur due to the bottleneck effect, which may happen after a forest fire.
 - can occur due to the founder effect, which may happen after a forest fire.
 - is the non-random change in allele frequencies that occurs in a small population.
- Mutations
 - have a great effect on allele frequencies.
 - can always be passed to offspring.
 - are how all new alleles first arise.
 - all of the above
- The main difference between macroevolution and microevolution is

- a. the species that evolve during each.
 - b. the time frame of the evolutionary process.
 - c. that microevolution is only for small organisms, and macroevolution is for large organisms.
 - d. all of the above.
8. In a population with 200 members, the total number of copies of each gene in the population is
- a. 100.
 - b. 200.
 - c. 300.
 - d. 400.
9. In a population with 200 members, if there are 300 dominant alleles, how many recessive alleles are there?
- a. 25
 - b. 50
 - c. 100
 - d. 200
10. In a population with 100 members, if 81 individuals are homozygous dominant, how many individuals have the recessive phenotype?
- a. 1
 - b. 2
 - c. 18
 - d. 19

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Microevolution occurs over a relatively long period of time within a population.
- _____ 12. Allele frequency refers to how often a gene occurs in a population.
- _____ 13. Genetic drift occurs when people move into or out of a population.
- _____ 14. Stabilizing selection occurs when phenotypes at both extremes of the phenotypic distribution are selected against.
- _____ 15. The founder effect can result in severe genetic phenotypes.
- _____ 16. Darwin knew that heritable variations are needed for evolution to occur.
- _____ 17. Darwin knew about Mendel's laws of genetics and inheritance.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. _____ occurs over geologic time above the level of the species.
19. _____ selection occurs when there are differences in fitness among members of a population.
20. The founder effect is prevalent among the _____ population in the U.S. and Canada.
21. A _____ effect occurs when a population suddenly gets much smaller.
22. The _____ consists of all the genes of all the members of the population.
23. Evolution occurs in a population when allele _____ change over time.
24. Gene _____ occurs when people move into or out of a population.
25. _____ selection occurs when phenotypes in the middle of the range are selected against.

Short Answer

Answer each question in the space provided.

26. Hardy and Weinberg used mathematics to describe an equilibrium population (p = frequency of allele A , q = frequency of allele a): $p^2 + 2pq + q^2 = 1$. If $p = 0.4$, what is the frequency of the AA genotype?

27. Explain why the conditions for Hardy-Weinberg equilibrium are unlikely to be met in real populations.

10.4 Macroevolution and the Origin of Species

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- For a new species to arise,
 - members usually first become geographically isolated.
 - members usually first stop interbreeding.
 - members usually first stop evolving with each other.
 - none of the above
- Which statement best describes sympatric speciation?
 - Sympatric speciation is speciation without genetic separation.
 - Sympatric speciation is speciation without reproductive separation.
 - Sympatric speciation is speciation without geographic separation.
 - Sympatric speciation is speciation without any separation.
- Coevolution is best demonstrated by the evolution of
 - a lion and its prey.
 - a flower and its pollinator.
 - a caterpillar and its butterfly.
 - a crocodile and the alligator.
- The main difference between gradualism and punctuated equilibrium is that
 - gradualism occurs relatively quickly and punctuated equilibrium does not.
 - punctuated equilibrium occurs relatively quickly and gradualism does not.
 - punctuated equilibrium occurs when geologic and climatic conditions are stable.
 - gradualism occurs when geologic and climatic conditions are changing.
- The best definition of a species is
 - a group of organisms that can breed and produce infertile offspring together in nature.
 - a group of species that can breed and produce fertile offspring together in nature.
 - a group of organisms that can breed together.
 - a group of organisms that can breed and produce fertile offspring together in nature.
- Which best describes the relationship between speciation and evolution?
 - Evolution results in speciation.
 - Speciation results in evolution.
 - Speciation is evolution.
 - Evolution is speciation.
- Allopatric speciation

- a. may result from genetic differences among members of a species that have become geographically separated.
 - b. may result from genetic differences among members of a species that have become reproductively separated.
 - c. results from members of a species that can no longer mate.
 - d. all of the above
8. Which of the following statements makes the most convincing argument?
- a. After a major environmental change, evolution through gradualism will quickly occur.
 - b. After a major environmental change, evolution through punctuated equilibrium will replace extinct species.
 - c. After a major environmental change, evolution through gradualism will fill in available niches.
 - d. After a major environmental change, evolution through punctuated equilibrium will fill in available niches.
9. The hawthorn fly
- a. is undergoing allopatric speciation.
 - b. can live on either hawthorn trees or apple trees.
 - c. has been geographically separated by the planting of new tree species.
 - d. all of the above
10. The Kaibab squirrel
- a. is undergoing allopatric speciation.
 - b. is undergoing sympatric speciation.
 - c. were geographically separated from Abert's squirrels by the formation of the Grand Canyon.
 - d. both a and c.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Evolution and speciation are the same process.
- _____ 12. If the environment never changes, evolution may not occur.
- _____ 13. Microevolution is evolution over geologic time above the level of the species.
- _____ 14. Sympatric speciation can occur in the same habitat.
- _____ 15. Coevolution can occur during allopatric speciation.
- _____ 16. Darwin thought evolution occurred in a punctuated equilibrium type process.
- _____ 17. For speciation to occur, members of a population must become reproductively isolated.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. New species arise in the process of _____.
19. Hawthorn flies lay eggs in _____ trees and their larvae feed on _____ fruits.
20. If members of a species remain separated long enough, they may evolve _____ differences.
21. Speciation through geographic separation is called _____ speciation.
22. The hummingbird has _____ with the tubular flower it pollinates.
23. Darwin thought that _____ occurs gradually.
24. Evolution occurs in response to a change in the _____.

25. A _____ is a group of organisms that can breed and produce fertile offspring together in nature.

Short Answer

Answer each question in the space provided.

26. Distinguish between gradualism and punctuated equilibrium.

27. The very long mouth part of the hummingbird has coevolved with the tubular flower it pollinates. Only this species of bird can reach the nectar deep in the flower. What might happen to the flower if the bird species went extinct?

10.5 The Theory of Evolution

Chapter Test

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- A theory that helps to explain and unify all of biology is the theory of
 - selection.
 - speciation.
 - evolution.
 - adaptation.
- The idea that acquired characteristics can be inherited is most closely associated with
 - Charles Darwin.
 - Jean Baptiste Lamarck.
 - Charles Lyell.
 - Thomas Malthus.
- Comparative anatomy is the study of
 - fossils of organisms that have gone extinct.
 - embryos of unrelated living organisms.
 - similarities and differences in the structures of different species.
 - sexual dimorphism of sexually reproducing species.
- The forelimbs of mammals all have the same basic bone structure. This is an example of a(n)
 - homologous structure.
 - analogous structure.
 - vestigial structure.
 - acquired structure.
- Darwin's finches evolved many new species to fill available niches on the Galápagos Islands. This is an example of
 - artificial selection.
 - adaptive radiation.
 - acquired inheritance.
 - geologic change.
- The type of evolution observed by Peter and Rosemary Grant on the Galápagos Islands is referred to as
 - macroevolution.
 - comparative evolution.
 - microevolution.
 - stabilizing evolution.
- A gene pool consists of all the genes in a(n)

- a. species.
 - b. population.
 - c. individual.
 - d. genome.
8. All of the following are forces of evolution **except**
- a. genetic drift.
 - b. mutation.
 - c. gene flow.
 - d. gradualism.
9. The evolution of sexual dimorphism comes about through
- a. directional selection.
 - b. artificial selection.
 - c. disruptive selection.
 - d. none of the above.
10. The evolution of Kaibab squirrels is an example of
- a. coevolution.
 - b. sympatric speciation.
 - c. symbiotic evolution.
 - d. allopatric speciation.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Charles Lyell argued that human populations grow faster than the resources they depend on.
- _____ 12. Alfred Russel Wallace developed a theory of evolution very similar to Charles Darwin's theory.
- _____ 13. Embryos of different vertebrates look much less similar than the adults.
- _____ 14. Similarities in DNA sequences are the strongest evidence for evolution from a common ancestor.
- _____ 15. Individuals evolve as their genes change through time.
- _____ 16. Conditions for Hardy-Weinberg equilibrium include very large population size.
- _____ 17. Bottleneck effect is a type of natural selection.
- _____ 18. Stabilizing selection occurs when one of two extreme phenotypes is selected for.
- _____ 19. Sympatric speciation occurs without geographic isolation.
- _____ 20. Gradualism is better supported by the fossil record than is punctuated equilibrium.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. The type of selection that occurs when people select which organisms reproduce is called _____ selection.
22. _____ refers to an organism's relative ability to survive and produce fertile offspring.
23. A scientist who finds and studies fossils is known as a(n) _____.
24. Similar structures in unrelated organisms are called _____.
25. The study of how and why organisms live where they do is termed _____.
26. A change in allele frequencies that occurs when individuals move into or out of a population is called _____.

27. A random change in allele frequencies that occurs in a small population is known as _____.
28. The type of evolution that takes place over geologic time above the level of the species is called _____.
29. The general process by which a new species evolves is known as _____.
30. _____ refers to the evolution of two species in a symbiotic relationship.

Short Answer

Answer each question in the space provided.

31. Identify influences on Darwin's development of evolutionary theory.
32. What is the Hardy-Weinberg theorem? How does it help scientists understand evolution?
33. Compare and contrast gradualism and punctuated equilibrium.

CHAPTER **11** The Principles of Ecology Assessments

Chapter Outline

- 11.1 THE SCIENCE OF ECOLOGY
 - 11.2 RECYCLING MATTER
 - 11.3 BIOMES
 - 11.4 THE PRINCIPLES OF ECOLOGY
-



11.1 The Science of Ecology

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Ecology is
 - the study of how living things interact with each other.
 - the study of how living things interact with their environment.
 - the study of how living things interact with each other and with their environment.
 - the study of how living things and their niche.
- Examples of abiotic factors include
 - trees, soil, and sunlight.
 - sunlight, soil, and water.
 - the living aspects of the environment.
 - all of the above.
- Which of the following mainly determine a habitat's features?
 - temperature and rainfall
 - animals in the habitat
 - plants and animals
 - soil and water
- Energy enters most ecosystems in the form of
 - soil and water.
 - food.
 - water.
 - sunlight.
- Examples of producers include
 - plants, algae, and cyanobacteria.
 - plants and photosynthetic insects.
 - lions, bears, and eagles.
 - mice, rabbits, and deer.
- Which statement best explains the relationship between decomposers and producers?
 - Decomposers use the molecules that producers release back to the environment.
 - Producers use the molecules that decomposers extract from the environment.
 - Producers use the molecules that decomposers release back to the environment.
 - Decomposers use the molecules that producers extract from the environment.
- Which statement best explains the relationship between a food chain and a food web?
 - A food web includes many intersecting food chains.

- b. A food chain includes many intersecting food webs.
 - c. A food chain leads into a food web.
 - d. A food web and food chain begin and end with the same organisms.
8. Which organism would occupy the fourth trophic level?
- a. phytoplankton
 - b. sea duck
 - c. tundra swan
 - d. bald eagle
9. Approximately how much energy is passed between trophic levels?
- a. 1%
 - b. 10%
 - c. 25%
 - d. 50%
10. Which group of organisms would have the greatest biomass?
- a. All the producers in an ecosystem.
 - b. The largest organisms in an ecosystem, such as elephants.
 - c. The trillions of insects in an ecosystem.
 - d. all of the above

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. The first trophic level is usually occupied by herbivores.
- _____ 12. It is possible for a plant to be a carnivore.
- _____ 13. A habitat refers to the role of a species in its ecosystem.
- _____ 14. Biotic factors include sunlight, soil, temperature, and water.
- _____ 15. A food web can be represented by many interconnected food chains.
- _____ 16. There are rarely more than four trophic levels in an ecosystem.
- _____ 17. Like water, energy is also recycled through an ecosystem.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Abiotic factors are the _____ aspects of the environment.
19. A _____ refers to the role of a species in its ecosystem.
20. The competitive _____ principle states that two different species cannot occupy the same niche for very long.
21. Producers are organisms that produce _____ for themselves and other organisms.
22. _____ include lions, polar bears, hawks, and spiders.
23. Decomposers break down the _____ of dead organisms.
24. _____ levels represent the feeding positions in a food chain or web.
25. _____ is the study of how living things interact with each other and with their environment.

Short Answer

Answer each question in the space provided.

26. Distinguish between abiotic and biotic factors. Give examples of each.

27. Describe how energy flows through ecosystems.

11.2 Recycling Matter

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Which of the following best describes biogeochemical cycles?
 - They cycle elements through the biotic and abiotic components of an ecosystem.
 - They cycle elements through the plants and trees of an ecosystem.
 - They cycle elements through the plants and soil of an ecosystem.
 - all of the above
- Which of the following are part of the water cycle? (1) transpiration (2) precipitation (3) sedimentation.
 - 1 only
 - 1 and 2
 - 2 and 3
 - 1, 2, and 3
- Which is the correct order of events of the water cycle?
 - transpiration - condensation - precipitation - runoff
 - transpiration - runoff - condensation - precipitation
 - runoff - precipitation - condensation - transpiration
 - none of the above
- In the carbon cycle, autotrophs
 - remove carbon from the atmosphere during cellular respiration.
 - release carbon to the atmosphere during photosynthesis.
 - remove carbon from the atmosphere during photosynthesis.
 - remove oxygen from the atmosphere during photosynthesis.
- Nitrogen
 - is needed to make proteins and nucleic acids.
 - makes up most of the Earth's atmosphere.
 - must be changed to a form which plants can absorb through their roots.
 - all of the above
- Nitrogen fixation
 - is carried out by certain types of bacteria.
 - cannot be done by plants.
 - changes nitrogen to a form called nitrates.
 - all of the above
- Which statement is correct about the carbon cycle? (1) Cellular respiration releases carbon into the atmosphere. (2) Ocean water can dissolve carbon from the atmosphere. (3) Volcanic eruptions release carbon into the atmosphere. (4) Burning fossil fuels release carbon into the atmosphere.

- a. 1 and 4
 - b. 1, 2, and 4
 - c. 1, 3, and 4
 - d. All four statements are correct.
8. Carbon is stored in the ecosystem (1) in the atmosphere, (2) in living organisms, or (3) as fossil fuel deposits.
- a. 2 only
 - b. 3 only
 - c. 2 and 3
 - d. 1, 2, and 3

True or False

Write true if the statement is true or false if the statement is false.

- _____ 9. The deep ocean can store carbon for thousands of years or more.
- _____ 10. Fossil fuels store carbon from dead organisms.
- _____ 11. Precipitation that flows over the surface of the ground is called groundwater.
- _____ 12. Condensation is the process in which water falls as rain, sleet, or snow.
- _____ 13. Part of a cycle that holds an element for a short period of time is an exchange pool.
- _____ 14. Water on Earth is billions of years old.
- _____ 15. Transpiration occurs when plants release water vapor.
- _____ 16. Most of the Earth's atmosphere is made of oxygen.
- _____ 17. Nitrogen fixation is carried out by nitrogen-fixing plants and fungi.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The chemical elements and water that are needed by organisms continuously _____ in ecosystems.
19. The deep ocean is a reservoir that may hold _____ for thousands of years.
20. Carbon is stored for varying lengths of time as fossil _____ deposits.
21. Cellular respiration releases _____ into the atmosphere as carbon dioxide.
22. Photosynthesis removes _____ from the atmosphere and uses it to make organic compounds.
23. _____ is an important part of living things; it is found in proteins, nucleic acids, and chlorophyll.
24. _____ cannot use nitrogen gas from the air to make organic compounds.
25. Nitrogen-fixing _____ live in soil and roots of legumes, such as peas.

Short Answer

Answer each question in the space provided.

26. Describe the role of organisms in the carbon cycle.

27. Explain the three processes by which water changes to a gas.

11.3 Biomes

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Which statement best describes a biome?
 - A biome is a group of similar ecosystems with the same general abiotic factors and primary producers and consumers.
 - A biome is a group of similar ecosystems with the same general abiotic factors and primary producers.
 - A biome is a group of similar ecosystems with the same general abiotic factors.
 - A biome is a group of similar ecosystems with the same general biotic factors.
- Examples of terrestrial biomes include (1) tundras, (2) temperate forests and grasslands, (3) tropical forests and grasslands, (4) lakes and ponds.
 - 1 only
 - 2 and 3
 - 1, 2, and 3
 - 1, 2, 3, and 4
- Climate is usually described in terms of
 - temperature and moisture.
 - temperature and weather.
 - precipitation and temperature.
 - precipitation and weather.
- Which relationship is correct?
 - Both precipitation and evaporation increase moisture.
 - Both precipitation and evaporation decrease moisture.
 - Precipitation increases moisture, evaporation decreases moisture.
 - Evaporation increases moisture, precipitation decreases moisture.
- Which biome has the highest biodiversity?
 - a temperate broadleaf forest
 - a temperate hardwood forest
 - a tropical grassland
 - a tropical rainforest
- Plants have five basic needs, which are
 - air, warmth, sunlight, water, and nutrients.
 - air, carbon, sunlight, water, and nitrogen.
 - oxygen, carbon, sunlight, water, and nutrients.
 - air, warmth, sunlight, water, and carbon.

7. Plants grow best in soil that contains plenty of
 - a. oxygen and nutrients.
 - b. nutrients and organic matter.
 - c. oxygen and carbon.
 - d. oxygen and water.
8. The relationship between climate and biodiversity can best be described as
 - a. a direct relationship: climate effects biodiversity.
 - b. an indirect relationship: climate only has a small effect on biodiversity.
 - c. no relationship: climate does not affect biodiversity.
 - d. a direct relationship: biodiversity affects climate.
9. Which statement is true?
 - a. Organisms evolve adaptations that help them survive in the weather of the biome where they live.
 - b. Organisms evolve adaptations that help them survive in the climate of the biome where they live.
 - c. Organisms evolve adaptations that help them survive in the weather of the niche where they live.
 - d. Organisms evolve adaptations that help them survive in the climate of the niche where they live.
10. The main limiting factors in an aquatic biome are
 - a. the availability of sunlight.
 - b. the concentration of dissolved oxygen and nutrients in the water.
 - c. the availability of sunlight and the concentration of dissolved oxygen and nutrients in the water.
 - d. the availability of sunlight and the concentration of dissolved carbon and nutrients in the water.
11. Which statement about aquatic organisms is correct?
 - a. Plankton are tiny aquatic organisms that cannot move on their own.
 - b. Phytoplankton feed on zooplankton.
 - c. Benthos include fish and shrimp.
 - d. all of the above
12. The aphotic zone
 - a. extends to a maximum depth of 200 meters.
 - b. is water deeper than 200 meters.
 - c. is water deeper than 200 feet.
 - d. extends to a maximum depth of 200 feet.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Terrestrial biomes include all the land and water areas on Earth where organisms live.
- _____ 14. Climate is the average weather in an area over a long period of time.
- _____ 15. Zooplankton are tiny animals that feed on phytoplankton.
- _____ 16. Running freshwater biomes include ponds and lakes.
- _____ 17. A wetland provides a safe, lush habitat for many species of animals, so they have high biodiversity.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Terrestrial biomes are determined mainly by _____.
19. _____ biomes are determined mainly by sunlight and dissolved oxygen and nutrients in the water.
20. A _____ is an area that is saturated with water or covered by water for at least one season of the year.

21. _____ freshwater biomes include streams and rivers.
22. Organisms that live deep in the _____ must be able to withstand complete darkness.
23. The _____ zone extends to a maximum depth of 200 meters.
24. Organisms evolve _____ that help them survive in the climate of the biome where they live.
25. Terrestrial biomes include tundras, temperate forests and grasslands, chaparral, temperate and tropical deserts, and tropical forests and _____.

Short Answer

Answer each question in the space provided.

26. Describe climate and weather. How do they differ from each other?

27. How does climate influence plant growth?

11.4 The Principles of Ecology

Chapter Test

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

1. A species' role in its ecosystem is called its
 - a. biomass.
 - b. trophic level.
 - c. niche.
 - d. habitat.
2. Which statement about producers is true?
 - a. All producers use energy to make food.
 - b. All producers make food by photosynthesis.
 - c. All producers are plants.
 - d. All producers need sunlight.
3. A necessary link between autotrophs and carnivores is filled by
 - a. detritivores.
 - b. herbivores.
 - c. scavengers.
 - d. decomposers.
4. A given food web includes hawks, grasses, foxes, and rabbits. Which organisms are primary consumers in this food web?
 - a. hawks
 - b. rabbits
 - c. foxes
 - d. grasses
5. Higher trophic levels of a food web generally have
 - a. more organisms.
 - b. larger organisms.
 - c. more energy.
 - d. greater biomass.
6. Reservoirs in the water cycle include
 - a. the atmosphere.
 - b. living things.
 - c. the ocean.
 - d. all of the above.
7. Human actions that release carbon into the atmosphere include

- a. breathing.
 - b. making cement.
 - c. burning fossil fuels.
 - d. all of the above.
8. A rain shadow occurs on the
- a. windward side of a mountain range.
 - b. leeward side of a mountain range.
 - c. north side of a lake or ocean.
 - d. south side of an intertidal zone.
9. Biodiversity is usually greater
- a. in drier climates.
 - b. in colder climates.
 - c. at the poles.
 - d. where it is humid.
10. Which type of biome occurs at high latitudes and high altitudes?
- a. chaparral
 - b. taiga
 - c. tundra
 - d. savanna

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Biotic factors are the nonliving aspects of the environment.
- _____ 12. Saprotrophs are the final step in decomposition.
- _____ 13. Most food chains have at least five trophic levels.
- _____ 14. Transpiration is the process in which water vapor changes to liquid water.
- _____ 15. Cold ocean water dissolves carbon from the atmosphere.
- _____ 16. Carbon cycles quickly through geological processes.
- _____ 17. Climate is the average weather in an area over a long period of time.
- _____ 18. Phytoplankton consists of tiny animals that swim through ocean water.
- _____ 19. The intertidal zone is a difficult environment for organisms because it has few nutrients.
- _____ 20. All tropical biomes are rainforests.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. _____ is the study of how living things interact with each other and with their environment.
22. The physical environment in which a species lives and to which it is adapted is its _____.
23. Organisms that consume both plants and animals are referred to as _____.
24. The base of all food webs consists of _____.
25. _____ occurs when ice and snow change directly to water vapor.
26. An underground layer of rock that stores water is called a(n) _____.
27. The process of changing nitrogen gas to nitrates is called _____.

28. The top 200 meters of a body of water is known as the _____ zone.

29. _____ are aquatic organisms that live at the bottom of a body of water.

30. An area that is saturated with or covered by water for at least one season of the year is a(n) _____.

Short Answer

Answer each question in the space provided.

31. Describe how energy flows through ecosystems.

32. Give an overview of the carbon cycle.

33. Explain why the distinguishing features of terrestrial biomes are determined mainly by climate.

CHAPTER

12

Communities and Populations Assessments

Chapter Outline

- 12.1 COMMUNITY INTERACTIONS
 - 12.2 CHARACTERISTICS OF POPULATIONS
 - 12.3 HUMAN POPULATION GROWTH
 - 12.4 THE BIODIVERSITY CRISIS
 - 12.5 NATURAL RESOURCES AND CLIMATE CHANGE
 - 12.6 COMMUNITIES AND POPULATIONS
-



12.1 Community Interactions

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

1. What is a community?
 - a. all the individuals of a species in the same area
 - b. the interactions between the species and non-living aspects of an area
 - c. all the populations of all the species in the same area
 - d. all of the above
2. Which would lead to specialization?
 - a. When predators of different species compete for the same prey.
 - b. When two male birds of the same species compete for the same mates.
 - c. When two male deer fight to lead their herd.
 - d. all of the above
3. Which two animals have a mutualistic relationship?
 - a. mites and larger flying insects
 - b. roundworms and mammals
 - c. the goby fish and shrimp
 - d. mosquitoes and humans
4. Which is an example of commensalism?
 - a. The shrimp and the goby fish spending most of their time together.
 - b. Hermit crabs using the shells of dead snails for homes.
 - c. The roundworm producing eggs inside its host.
 - d. Mites getting a “free ride” on larger flying insects.
5. Which would be an example of primary succession?
 - a. The regrowth of a forest after a fire.
 - b. The first growth on land uncovered when a glacier retreats.
 - c. The growth of wild plants on an abandoned farm.
 - d. all of the above
6. Which would make the best pioneer species during primary succession?
 - a. bacteria and lichens
 - b. grasses and birch trees
 - c. lichens and grasses
 - d. bacteria, lichens, and grasses
7. Why is it thought that there are very few climax communities today?
 - a. Because it is believed that continual change is normal in most ecosystems.

- b. Because a community must be undisturbed for 10,000 years to be considered a climax community.
 - c. Because a climax community can only be a completely developed forest ecosystem.
 - d. all of the above
8. Common to all biomes is (are)
- a. the primary producers.
 - b. the way decomposers break down wastes.
 - c. the basic dependence on sunlight, water, and nutrients.
 - d. the basic ways species interact.
9. Which of the following statements is true about interspecific competition? (1) It occurs between members of different species. (2) It occurs between members of the same species. (3) It often leads to extinction. (4) It is a basic factor in natural selection.
- a. 1 and 3
 - b. 2 and 4
 - c. 1, 3, and 4
 - d. 2, 3, and 4
10. An example of predation is
- a. a buffalo eating a lion.
 - b. a lion eating a buffalo.
 - c. a buffalo and a lion eating the grass
 - d. a lion eating a buffalo, and a buffalo eating a zebra
11. Which of the following is a parasite?
- a. a praying mantis
 - b. a zebra
 - c. a roundworm
 - d. all of the above
12. Which is an example of a predator-prey relationship?
- a. The relationship between a bee and a flower.
 - b. The relationship between a hen and a rooster.
 - c. The relationship between a lion and a zebra.
 - d. The relationship between a duck and a pond of water.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. A community is the abiotic part of an ecosystem.
- _____ 14. All biomes have some species that prey on others for food.
- _____ 15. Parasitism is a relationship in which members of one species consume members of another species.
- _____ 16. Specialization occurs when competing species evolve different adaptations.
- _____ 17. Mutualism is a symbiotic relationship in which one species benefits.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. A predator-_____ relationship tends to keep the populations of both species in balance.
19. Both predators and prey have adaptations to predation that evolve through _____ selection.
20. The first species to colonize a new area is the _____ species.

21. _____ is a close relationship between two species in which at least one species benefits.
22. _____ competition occurs between members of the same species.
23. _____ is a symbiotic relationship in which one species benefits while the other species is harmed.
24. A _____ species is one that plays an especially important role in its community.
25. _____ succession occurs in an area that has never before been colonized.

Short Answer

Answer each question in the space provided.

26. Explain why interspecific competition leads to extinction or greater specialization.

27. Compare and contrast mutualism, commensalism, and parasitism.

12.2 Characteristics of Populations

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Which is the best definition of a population?
 - The unit of natural selection and evolution.
 - All the species that live in the same area.
 - A group of species that live in the same area.
 - A group of organisms of the same species that live in the same area.
- A random population distribution pattern usually forms
 - among individuals of a species with individuals that live together in groups.
 - among individuals of a species with individuals that compete for a scarce resource.
 - among individuals of a species with individuals who do not strongly interact.
 - none of the above
- Which of the following would be an example of population density?
 - 100 caterpillars
 - 100 caterpillars per maple tree
 - 100 caterpillars clumped into 5 specific areas
 - all of the above
- Which of the following is true about a population pyramid?
 - Births add individuals only to the base of the pyramid.
 - Deaths only remove individuals from the top of the pyramid.
 - Births can add individuals to any level of the pyramid, depending on the age of the mother.
 - Births add individuals only to the base of the pyramid, and deaths only remove individuals from the top of the pyramid.
- A type II survivorship curve
 - has many individuals that live to an old age.
 - has a high death rate in young individuals.
 - has a high death rate in older individuals.
 - shows an even decline in survivors as the population ages.
- Population growth can be represented by the equation $r =$
 - $(b + d) - (i + e)$
 - $(b + e) - (d + i)$
 - $(d + i) - (b + e)$
 - $(b + i) - (d + e)$
- The best definition for migration is

- a. the regular movement of individuals or populations each year during certain seasons.
 - b. the movement of regular individuals or populations each year during certain seasons.
 - c. the certain movement of individuals or populations each year during regular seasons.
 - d. the irregular movement of individuals or populations each year during certain seasons.
8. Exponential growth
- a. is characteristic of most species under ideal conditions.
 - b. is a fast growth rate with a large population.
 - c. begins with a slowly growing population.
 - d. all of the above
9. The carrying capacity
- a. occurs at the end of exponential growth.
 - b. is the largest population size that can be supported without harming the environment.
 - c. can only be surpassed with significant harm to the population.
 - d. all of the above.
10. *K*-selected species
- a. live in stable environments.
 - b. population growth is controlled by density-independent factors.
 - c. have the potential for rapid population growth.
 - d. usually have a population size well below the carrying capacity.
11. Logistic growth
- a. is characteristic of populations that do not live under ideal conditions.
 - b. levels off at the carrying capacity.
 - c. is characteristic of *K*-selected species.
 - d. all of the above
12. A population's age-sex structure influences population growth because
- a. older people are more likely to reproduce, while younger people have higher rates of dying.
 - b. younger people are more likely to reproduce, while older people have higher rates of dying.
 - c. parents produce relatively few offspring and provide them with a lot of care.
 - d. in many populations, parents produce moderate numbers of offspring and provide some parental care.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Population growth rate depends on the birth rate, death rate, immigration and emigration.
- _____ 14. Population size is the average number of individuals in a population per unit of area or volume.
- _____ 15. Dispersal refers to offspring moving away from their parents.
- _____ 16. Populations of most species can grow at exponentially at times.
- _____ 17. *K*-selected population growth is controlled by density-dependent factors, such as climate.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Age-sex structure influences _____ growth.
19. Most populations do not live under ideal conditions, so they demonstrate _____ growth patterns.
20. _____ is the regular movement of individuals or populations each year during certain seasons.
21. The _____ is the largest population size that can be supported in an area without harming the environment.

22. Populations gain individuals through births and _____.
23. In a _____ distribution pattern, organisms are clustered together in groups.
24. A type _____ survivorship curve has a high death rate.
25. Under ideal conditions, populations can grow at _____ rates.

Short Answer

Answer each question in the space provided.

26. Compare and contrast exponential and logistic growth.

27. Define population size, density, and dispersion.

12.3 Human Population Growth

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- In what year did the human population reach 1 billion people?
 - 1000
 - 1700
 - 1800
 - 1900
- About how long did it take the human population to double in size to 2 billion people?
 - about 20 years
 - about 50 years
 - about 100 years
 - about 200 years
- Currently the human population is exhibiting what type of growth?
 - logistic
 - doubling every 20 years
 - exponential
 - logarithmic
- Stage 2 of the demographic transition is represented by
 - slow population growth.
 - fast population growth.
 - a high death rate with fast population growth.
 - a birth rate equal to the death rate, so population growth slows to zero.
- Stage 4 of the demographic transition is represented by
 - a birth rate lower than the death rate, so there is slow population growth.
 - a death rate lower than the birth rate, so there is fast population growth.
 - high birth and death rates, so there is slow population growth.
 - a birth rate equal to the death rate, so population growth slows to zero.
- Most developed nations are in which stage of the demographic transition?
 - stage 1
 - stage 2
 - stage 3
 - stage 4
- Which of the following is characteristic of poor countries?
 - A fast population growth due to a high death rate but higher birth rate.

- b. A fast population growth due to a high birth rate but falling death rate.
 - c. A slow population growth due to a low birth rate and falling death rate.
 - d. A slow population growth due to a low birth rate and low death rate.
8. Potential solutions in dealing with the world's future population include
- a. distributing resources more fairly among all the world's people.
 - b. using technology to make better use of resources to support more people.
 - c. changing behaviors to reduce how much humans consume.
 - d. all of the above.
9. A stage 5 population can be dangerous, as
- a. a younger population must support an older population.
 - b. there is a high death rate.
 - c. the birth rate is too large for the population to support.
 - d. none of the above
10. During the time when humans moved from Africa throughout the world,
- a. birth and death rates were both fairly low.
 - b. population growth was slow.
 - c. there was exponential population growth.
 - d. the population was close to its carrying capacity.
11. The invention of agriculture
- a. led to a decrease in birth rate and death rate.
 - b. resulted in unreliable food supplies, based on water availability.
 - c. allowed people to settle down in villages.
 - d. all of the above
12. Lower death rates in 17th and 18th century Europe and North America resulted from
- a. new scientific knowledge of the causes of disease.
 - b. better farming techniques.
 - c. the Industrial Revolution.
 - d. all of the above

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. During the 1700s in Europe and North America, new scientific knowledge of the causes of disease led to improved water supplies, sewers, and personal hygiene.
- _____ 14. During the 1700s in Europe and North America, better farming techniques and machines increased the food supply.
- _____ 15. The Industrial Revolution of the 1900s led to new sources of energy
- _____ 16. In some areas, because children had to go to school, birth rates fell.
- _____ 17. A stage 5 population has a shrinking population, such as in many poor countries.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The human population has had a pattern of _____ growth.
19. The human population is now growing by more than _____ people a day.
20. The human population may well be close to its _____ capacity.

21. The people of the world need to use technology to make better use of _____ to support more people.
22. Stage 1 of the demographic transition: high birth and death rates lead to _____ population growth.
23. Stage 2 of the demographic transition: the death rate falls but the birth _____ remains high, leading to faster population growth.
24. Stage 3 of the demographic transition: the birth rate starts to fall, so population growth starts to _____ .
25. Stage 4 of the demographic transition: the birth rate reaches the same low level as the death rate, so population growth slows to _____ .

Short Answer

Answer each question in the space provided.

26. Describe early human population growth.

27. Outline the stages of the demographic transition.

12.4 The Biodiversity Crisis

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Biodiversity refers to
 - the variety of life and its processes, including the variety of living organisms.
 - the genetic differences among living organisms.
 - the communities and ecosystems of living organisms.
 - all of the above
- Scientists believe there are _____ species on this planet.
 - 1.9 million
 - 1.9 billion
 - between 5 and 30
 - between 5 and 30 million
- Economic benefits of biodiversity include
 - warning us of toxins in the environment.
 - providing inspiration for engineering and technology.
 - providing people with fibers, adhesives, dyes, and rubber.
 - all of the above.
- Wild plants and animals maintain a valuable pool of genetic variation.* This is important because
 - most household plants have little genetic variation.
 - it allows wild plants to interbreed more.
 - it allows wild animals to live healthier lives.
 - all of the above.
- Ecosystem services of biodiversity include
 - recycling the carbon from organic wastes.
 - removing nutrients from soil.
 - improving soil quality.
 - all of the above.
- Plants and algae maintain the atmosphere by
 - adding carbon dioxide and remove oxygen.
 - adding oxygen and remove carbon dioxide.
 - adding oxygen and carbon dioxide.
 - removing oxygen and carbon dioxide.
- Over _____ percent of all species that ever lived on Earth are now extinct.
 - 50

- b. 90
- c. 95
- d. 99

8. The current sixth mass extinction is caused by
- a. major geologic and climatic events.
 - b. humans.
 - c. the greenhouse effect.
 - d. exotic species and habitat loss.
9. To help protect biodiversity you could
- a. unplug electronic equipment and turn off lights when not in use.
 - b. use plastic containers instead of aluminum or glass.
 - c. go organic, as organically grown food use special *good* fertilizers.
 - d. all of the above
10. The single biggest cause of extinction today is
- a. over-harvesting of fish.
 - b. exotic species.
 - c. habitat loss.
 - d. global climate change.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Most species have yet to be studied for their medical potential.
- _____ 12. Global climate change, due to the burning of fossil fuels, is raising Earth's air and ocean temperatures.
- _____ 13. Scientists have identified about 1.9 billion species alive today.
- _____ 14. There is evidence that the fifth mass extinction is occurring right now.
- _____ 15. Exotic species may carry disease, prey on native species, and disrupt food webs.
- _____ 16. Most mass extinctions are caused by major geologic and climatic events.
- _____ 17. About 50 percent of all species that ever lived on Earth have gone extinct.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Wild plants and animals maintain a valuable pool of genetic _____.
19. Certain species may warn us of _____ in the environment.
20. More than half of the most important prescription _____ come from wild species.
21. Plants and algae maintain the _____.
22. _____ purify water in rivers and lakes.
23. Insects and birds _____ flowering plants, including crop plants.
24. Natural predators control insect _____.
25. The single biggest cause of extinction today is _____.

Short Answer

Answer each question in the space provided.

26. Define biodiversity.

27. Identify an economic benefit and an ecosystem service of biodiversity.

12.5 Natural Resources and Climate Change

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

1. Nonrenewable resources include
 - a. wind and sunlight.
 - b. metals and other minerals.
 - c. nuclear power.
 - d. all of the above.
2. Renewable resources include
 - a. wind and sunlight.
 - b. fossil fuels.
 - c. nuclear power.
 - d. all of the above.
3. An algal bloom forms
 - a. from a lack of nutrients in the water.
 - b. from a dead zone.
 - c. from an excessive growth of algae, killing many other aquatic organisms.
 - d. all of the above
4. The greenhouse effect
 - a. occurs when gases in the atmosphere direct the sun's heat into the atmosphere.
 - b. occurs when gases in the atmosphere reflect the sun's heat back down to Earth's surface.
 - c. occurs when gases in the atmosphere direct extra heat out into the atmosphere.
 - d. none of the above
5. The relationship between the greenhouse effect and global warming is best described by which statement?
 - a. The increase in the greenhouse effect has led to global warming.
 - b. The increase in global warming has led to the greenhouse effect.
 - c. The decrease in global warming has led to the greenhouse effect.
 - d. The decrease in the greenhouse effect has led to global warming.
6. Problems associated with the ozone hole include
 - a. more skin cancer in people.
 - b. disruption of the water cycle.
 - c. disruption of terrestrial food webs.
 - d. all of the above.
7. Soil
 - a. is the foundation of terrestrial ecosystems.

- b. is essentially a nonrenewable resource.
 - c. takes hundreds of millions of years to form.
 - d. all of the above.
8. The atmosphere is important, as it
- a. refills the oceans with freshwater.
 - b. provides organisms with gases needed for life.
 - c. contains oxygen for photosynthesis and carbon dioxide for cellular respiration.
 - d. all of the above
9. Examples of natural resources include which of the following? (1) ecosystems, (2) biodiversity, (3) fossil fuels, (4) water.
- a. 1 and 2
 - b. 3 only
 - c. 3 and 4
 - d. 1, 2, 3, and 4
10. Effects of climate change include
- a. melting of glaciers and rising sea levels.
 - b. less droughts and water shortages, due to increased precipitation.
 - c. decrease in the severity of storms, due to less evaporation.
 - d. all of the above.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Air pollution is mainly caused by human actions.
- _____ 12. Acid rain can disrupt protein structure and function.
- _____ 13. Nonrenewable resources can be replenished by natural processes as quickly as humans use them.
- _____ 14. The greenhouse effect is an unnatural feature of Earth's atmosphere - it is caused by humans.
- _____ 15. The total loss of the ozone layer would be devastating to most life.
- _____ 16. Of all the water on Earth, only 1 percent is fresh, liquid water.
- _____ 17. Nonrenewable resources include fossil fuels such as petroleum, coal, and natural gas.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. A _____ resource is something supplied by nature that helps support life.
19. _____ use is the use of resources in a way that meets the needs of the present and also preserves the resources for future generations.
20. Soil is the foundation of _____ ecosystems.
21. Excess _____ from fertilizer in runoff can cause algal blooms.
22. The atmosphere contains _____ for cellular respiration and carbon dioxide _____ for photosynthesis.
23. All life relies on a relatively narrow range of _____, or acidity.
24. The _____ layer shields Earth from most of the sun's harmful UV radiation.
25. Just _____ is the difference between an ice-free and an ice-covered Earth.

Short Answer

Answer each question in the space provided.

26. Distinguish between renewable and nonrenewable resources.

27. Describe three effects of climate change.

12.6 Communities and Populations

Chapter Test

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- In ecology, a community is defined as all the organisms in a(n)
 - population.
 - species.
 - ecosystem.
 - succession.
- Most energy transfers in food chains and webs occur through
 - mutualistic relationships.
 - predator-prey relationships.
 - symbiotic relationships.
 - intraspecific relationships.
- Hermit crabs use the shells of dead snails for homes. This is an example of a
 - commensal relationship.
 - predator-prey relationship.
 - parasitic relationship.
 - mutualistic relationship.
- A population pyramid represents a population's
 - trophic levels.
 - age-sex structure.
 - growth rate.
 - dispersal pattern.
- In the logistic model, as a population approaches the carrying capacity, its growth rate
 - increases.
 - slows to zero.
 - becomes exponential.
 - doubles.
- Which statement about the demographic transition is true?
 - Death rates fell first and birth rates fell later.
 - The population growth rate remained low.
 - Death rates remained high.
 - Birth rates remained low.
- If a population pyramid has a broad base, you can infer that the population has a
 - low rate of growth.

- b. large proportion of males.
 - c. large proportion of old people.
 - d. high rate of births.
8. The sixth mass extinction is caused by
- a. human actions.
 - b. ice ages.
 - c. meteors.
 - d. volcanoes.
9. Examples of nonrenewable resources include
- a. trees.
 - b. metals.
 - c. soils.
 - d. fossil fuels.
10. Acid rain is caused by
- a. air pollution.
 - b. global warming.
 - c. the greenhouse effect.
 - d. the ozone hole.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. When a prey population increases, the population of its predator is likely to increase.
- _____ 12. Interspecific competition occurs between members of the same species.
- _____ 13. Most parasites kill their host.
- _____ 14. How fast a population grows depends only on its birth rate.
- _____ 15. Most populations grow exponentially.
- _____ 16. *K*-selected species are likely to live in stable environments.
- _____ 17. Until recently, the human population grew slowly.
- _____ 18. Over 99 percent of all the species that ever lived on Earth are still alive.
- _____ 19. Habitat loss is the single biggest cause of extinctions today.
- _____ 20. Dead zones are the cause of algal blooms.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. A species that plays an especially important role in its community is called a(n) _____ species.
22. _____ occurs when competing species evolve different adaptations.
23. The first species to colonize an area of bare rock are called _____ species.
24. Population _____ is the average number of individuals per unit of area or volume.
25. _____ refers to the number of different species in an ecosystem or the biosphere.
26. Species introduced into new habitats by humans are called _____ species.
27. Something supplied by nature that helps support life is known as a(n) _____.
28. The use of resources in a way that meets present and future needs is called _____.

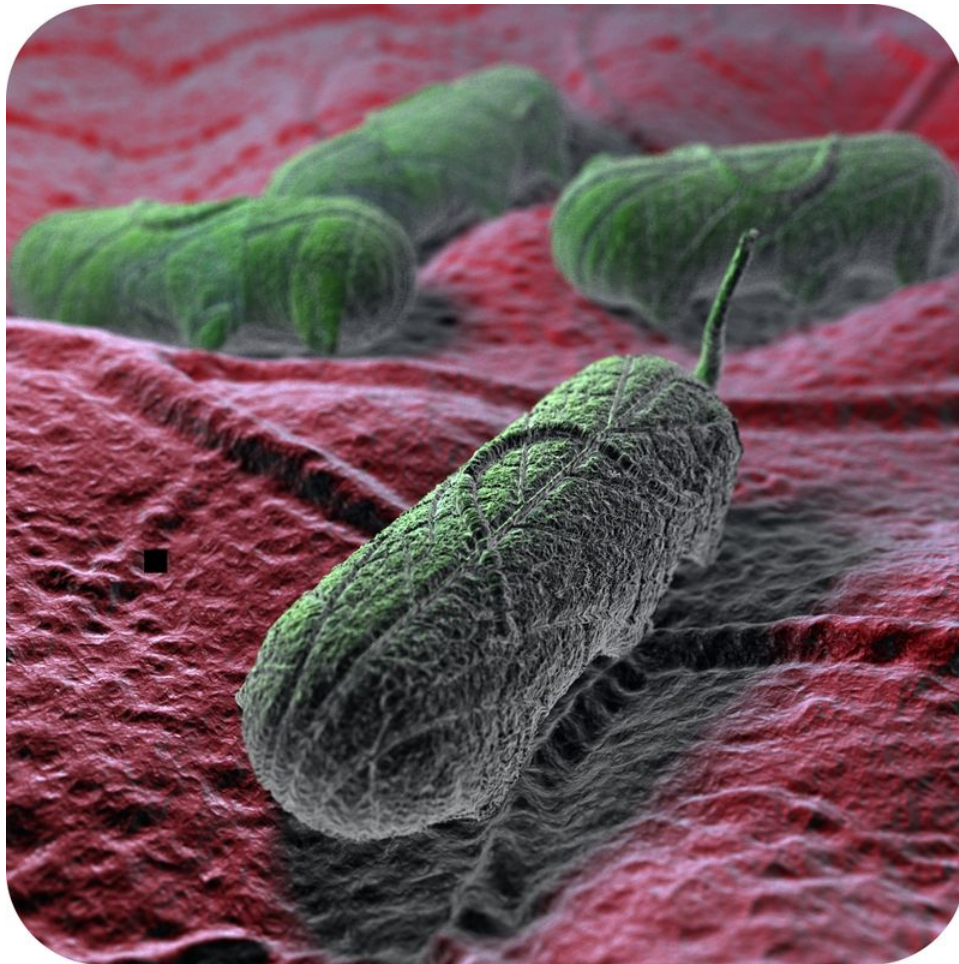
CHAPTER **13** **Microorganisms:
Prokaryotes and Viruses Assessments**

Chapter Outline

13.1 PROKARYOTES

13.2 VIRUSES

13.3 MICROORGANISMS: PROKARYOTES AND VIRUSES



13.1 Prokaryotes

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Which statement best describes a prokaryote?
 - All single-celled organisms are prokaryotes.
 - Prokaryotes are single-celled organisms that lack a nucleus.
 - Prokaryotes are single-celled organisms that lack organelles.
 - all of the above
- Bacteria and Archaea each have which of the following?
 - cell membrane
 - ribosomes
 - genetic material
 - all of the above
- Which is the most diverse and abundant group of organisms on Earth?
 - Bacteria
 - Eukarya
 - Archaea
 - Prokaryotes
- Examples of Archaeal extremophiles include
 - the acidophiles, which love salt.
 - the extreme halophiles, which live in an acidic environment.
 - the hyperthermophiles, which live in a very hot environment.
 - all of the above.
- Why are cyanobacteria considered to be important?
 - Cyanobacteria are photosynthetic bacteria that contributed oxygen to early Earth.
 - Cyanobacteria were the first prokaryotes.
 - Ancient cyanobacteria probably evolved into the chloroplasts of animal cells.
 - all of the above
- The most common prokaryotic shapes include
 - helices, circles, and rods.
 - helices, spheres, and rods.
 - double helices, spheres, and rods.
 - flagella, helices, spheres, and rods.
- Which statement best summarizes protein synthesis in prokaryotes?
 - The mRNA moves from the nucleus to the cytoplasm, where it is translated on ribosomes.

- b. The mRNA, which is made in the cytoplasm, is translated on ribosomes.
 - c. The process does not involve mRNA.
 - d. The process does not involve ribosomes, as prokaryotic cells do not have organelles.
8. Reproduction in prokaryotes
- a. occurs when a parent cell splits into two identical daughter cells.
 - b. is called binary fission.
 - c. is a type of asexual reproduction.
 - d. all of the above
9. *Most prokaryotes are chemoheterotrophs.* This means
- a. they get energy from chemical compounds and carbon from other living things.
 - b. they get energy from light and carbon from other living things.
 - c. they get energy from light and carbon from carbon dioxide.
 - d. they get energy from chemical compounds and carbon from carbon dioxide.
10. If a bacterial population doubles in size every 20 minutes, starting with a single cell, how big is the population just 8 hours later?
- a. about 256 cells.
 - b. about 1000 cells.
 - c. more than 16 million cells.
 - d. more than 1 billion cells.
11. Genetic transfer in bacteria
- a. increases genetic variation.
 - b. is when cells exchange stray pieces of DNA directly with the environment.
 - c. is when cells grab DNA from other cells.
 - d. all of the above
12. Benefits of bacteria to humans include which of the following? (1) killing plant pests, (2) cleaning up oil spills, (3) making certain drugs, (4) gene therapy.
- a. 1 and 2
 - b. 2 and 3
 - c. 2, 3, and 4
 - d. 1, 2, 3, and 4

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. The prokaryote domains are Bacteria and Prokarya.
- _____ 14. Archaea are the most diverse and abundant group of organisms on Earth, living in high salt, high heat or high acid environments.
- _____ 15. All prokaryotic cells have a plasma membrane, ribosomes, a cytoskeleton, and genetic material.
- _____ 16. Plasmids are “extra” pieces of DNA in prokaryotic cells.
- _____ 17. Bacteria lack a nucleus, but Archaea have a nucleus.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Cyanobacteria make food through _____.
19. Archaea were first discovered in _____ environments.
20. The most common prokaryotic shapes are helices, _____, and rods.

21. Prokaryotes increase genetic variation through _____ transfer.
22. By spinning, _____ help prokaryotes move.
23. Most prokaryotes are chemoheterotrophs; they depend on other _____ for both energy and carbon.
24. Bacterial infections in people can be treated with _____ drugs.
25. You have ten times as many _____ as human cells in your body.

Short Answer

Answer each question in the space provided.

26. Describe the structure of prokaryotes. List three structures found in all prokaryotic cells.

27. Under ideal conditions, bacterial populations can double every 20 minutes. Such rapid population growth is an adaptation to an unstable environment. Explain why.

13.2 Viruses

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Are viruses considered living? Why?
 - No, as they do not meet the characteristics of living organisms.
 - Yes, viruses do meet the characteristics of living organisms.
 - Yes, viruses are just smaller version of prokaryotes.
 - Scientists are not sure.
- Which statement is true of viruses?
 - Viruses do not consist of cells, but they have cell membranes, cytoplasm, ribosomes, and other cell organelles.
 - Viruses do not consist of cells; they lack cell membranes, but do have cytoplasm, ribosomes, and other cell organelles.
 - Viruses do not consist of cells; they also lack cell membranes, cytoplasm, ribosomes, and other cell organelles.
 - Viruses are cells with cell membranes, cytoplasm, ribosomes, and other cell organelles.
- A virus particle consists of DNA or RNA within
 - a protective protein coat called an envelope.
 - a protective protein coat called a capsid.
 - a protective protein coat called a virion.
 - a protective protein coat called a membrane.
- The shapes of viruses include
 - rods, spheres, and helices.
 - helical, rods, and spheres.
 - helical, rods, spheres, icosahedral, and complex.
 - helical, icosahedral, and complex.
- Viruses were seen for the first time
 - in the 1930s, when light microscopes were invented.
 - in the 1930s, when electron microscopes were invented.
 - in the 1950s, when electron microscopes were invented.
 - Viruses are so small, they have never been seen.
- Where did viruses come from?* One hypothesis states that
 - small viruses started as runaway pieces of nucleic acid that originally came from living cells such as bacteria.
 - large viruses started as runaway pieces of nucleic acid that originally came from single-celled organisms.
 - small viruses were once parasitic cells inside bigger host cells.

- d. large viruses were once mutualistic cells inside bigger host cells.
7. To replicate, a virus must
- infect a host cell and use the cell's ribosomes, enzymes, DNA, and other components.
 - infect a host cell and use the cell's ribosomes, enzymes, ATP, and other components.
 - infect a host cell and use the viral enzymes, ATP, and other components.
 - infect a host cell and use the viral DNA and ribosomes, but the cell's enzymes, ATP, and other components.
8. The common cold is caused by a
- bacteria.
 - RNA virus with a complex shape.
 - DNA virus with a complex shape.
 - RNA virus with a helical shape.
9. Latency refers to
- the process of viral replication inside a host.
 - the process of making a viral envelope from portions of the host's cell membrane.
 - the process of viral disease formation inside a host.
 - a dormant state of the virus inside a host's body.
10. Which of the following statements is true? (1) HIV causes cancer of the cervix in females. (2) HPV causes cancer of the liver. (3) Many viral diseases can be prevented with proper vaccination. (4) Antibiotics have no effect on viruses.
- 1 and 2
 - 3 and 4
 - 1, 2, and 3
 - 1, 2, 3, and 4

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Viruses do have some traits of living organisms.
- _____ 12. Viral diseases can be difficult to treat, however many viral diseases can be prevented by being vaccinated.
- _____ 13. Viruses are members of the Archaea domain.
- _____ 14. An individual virion is called a virus.
- _____ 15. Viruses do not grow through cell division because they are not cells.
- _____ 16. The virus that causes chicken pox may reemerge decades later as the disease called shingles.
- _____ 17. Viral diseases can be treated with antibiotics.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Viruses are so small that they can be seen only with an _____.
19. A virus particle consists of DNA or RNA within a protective protein coat called a _____.
20. Viruses depend on a _____ cell to synthesize their proteins and to make copies of themselves.
21. Viruses with _____ shapes may have extra structures, such as protein tails.
22. One way viruses cause disease is by causing host cells to burst open and _____.

13.3 Microorganisms: Prokaryotes and Viruses

Chapter Test

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- How do Archaea resemble Eukarya?
 - They have introns.
 - They lack a cell membrane.
 - Their cell walls contain peptidoglycan.
 - all of the above
- What role do cyanobacteria play in food webs?
 - They are producers.
 - They are decomposers.
 - They are primary consumers.
 - They are secondary consumers.
- Archaea called hyperthermophiles “love”
 - salt.
 - acid.
 - deep water.
 - high temperatures.
- In prokaryotic cells, cellular respiration takes place in the
 - ribosomes.
 - nucleus.
 - mitochondria.
 - plasma membrane.
- In prokaryotes, endospores enclose and protect
 - DNA.
 - sperm.
 - gametes.
 - pollen.
- A prokaryote that gets carbon from other living things and energy from light is a
 - photoautotroph.
 - chemoautotroph
 - photoheterotroph.
 - chemoheterotroph.
- A prokaryote that prefers a cold temperature is classified as a
 - thermophile.

- b. mesophile.
 - c. halophile.
 - d. psychrophile.
8. A virus consists of DNA in a protein coat called a
- a. virion.
 - b. capsid.
 - c. plasmid.
 - d. biofilm.
9. Diseases caused by viruses include
- a. chicken pox.
 - b. the common cold.
 - c. influenza.
 - d. all of the above.
10. What role do vaccines play in medicine?
- a. They cure bacterial diseases.
 - b. They prevent some infectious diseases.
 - c. They treat genetic disorders.
 - d. They diagnose cancer.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Prokaryotes are placed in three domains.
- _____ 12. Bacteria are the least diverse organisms in the world.
- _____ 13. Archaea play important roles in cycles of matter.
- _____ 14. Most prokaryotes have a cell wall.
- _____ 15. Anaerobic prokaryotes need oxygen.
- _____ 16. Prokaryotes increase genetic variation with sexual reproduction.
- _____ 17. All viruses have the same shape.
- _____ 18. Viruses multiply through binary fission.
- _____ 19. Some viruses can cause cancer.
- _____ 20. Viruses are used in gene therapy.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. Any single-celled organism without a nucleus is called a(n) _____.
22. The domain that includes *Salmonella* is named _____.
23. Extremophiles that “love” salt are called _____.
24. _____ are small circular pieces of DNA in prokaryotes.
25. A colony of prokaryotes that is stuck to a surface is called a(n) _____.
26. Thin protein structures called _____ help prokaryotes move by spinning.
27. _____ is the process in which prokaryotic cells directly exchange DNA.
28. An organism that spreads pathogens from host to host is known as a(n) _____.

29. Drugs used to cure bacterial infections are called _____.

30. An individual virus is referred to as a(n) _____.

Short Answer

Answer each question in the space provided.

31. Outline the evolution and classification of prokaryotes.

32. Describe the structure of viruses.

33. Explain how viruses cause human disease

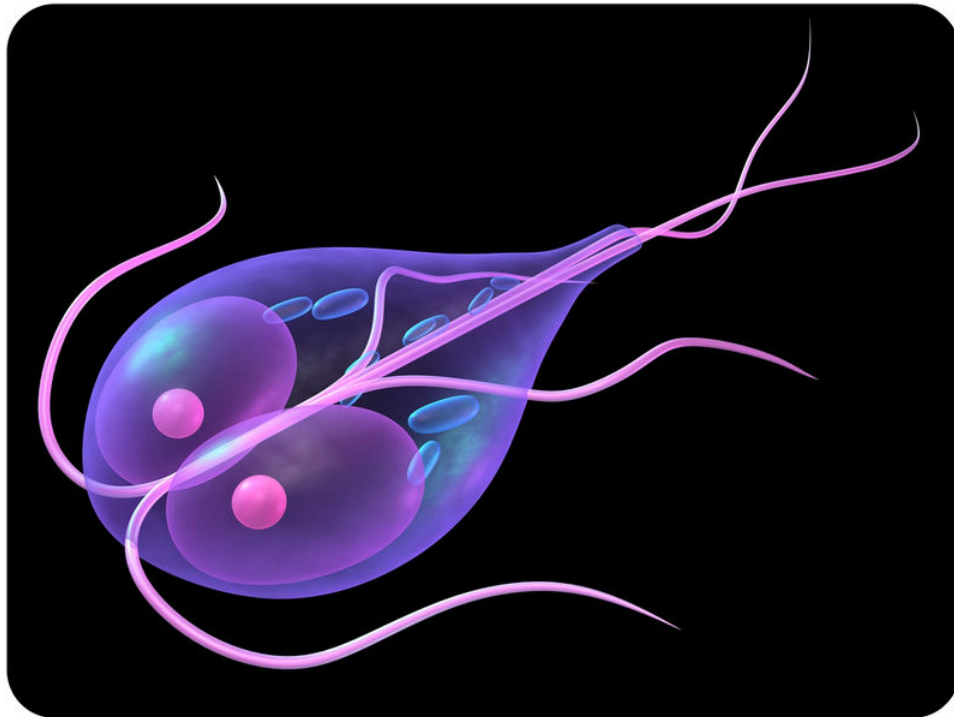
CHAPTER

14

Eukaryotes: Protists and Fungi Assessments

Chapter Outline

- 14.1 INTRODUCTION TO PROTISTS
- 14.2 TYPES OF PROTISTS
- 14.3 INTRODUCTION TO FUNGI
- 14.4 ECOLOGY OF FUNGI
- 14.5 PROTISTS, FUNGI, AND HUMAN DISEASE
- 14.6 EUKARYOTES: PROTISTS AND FUNGI



14.1 Introduction to Protists

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Protists are classified as
 - prokaryotes.
 - eukaryotes.
 - fungi.
 - b and c.
- All of the following evidence supports the endosymbiotic theory **except**:
 - mitochondria and chloroplasts have no DNA, just like bacteria have no DNA.
 - mitochondria and chloroplasts have circular DNA similar to bacterial circular DNA.
 - mitochondrial and chloroplasts are bounded by membranes similar to bacterial membranes.
 - reproduction by binary fission is common to bacteria, mitochondria, and chloroplasts.
- According to the endosymbiotic theory, chloroplasts evolved from
 - aerobic bacteria engulfed by fungi.
 - a eukaryotic cell that lost its nucleus.
 - cyanobacteria that were engulfed by larger prokaryotes.
 - cyanobacteria that were engulfed by fungi.
- Protists are best defined as
 - unicellular bacteria.
 - multicellular fungi.
 - all organisms that are heterotrophs.
 - simple eukaryotes that are neither plants, animals, nor fungi.
- Environments where protists live include
 - marshes.
 - damp soil.
 - oceans.
 - all of the above.
- Protists can use which of the following appendages for motility?
 - cilia
 - flagella
 - pseudopods
 - all of the above
- The protist *Tetrahymena thermophila* uses _____ for motility.
 - cilia

- b. flagella
 - c. muscles
 - d. centrifugal force
8. Many protists can reproduce by
- a. asexual reproduction only.
 - b. sexual reproduction only.
 - c. asexual or sexual reproduction.
 - d. none of the above
9. The protist *Spirogyra* is
- a. a fungus.
 - b. a protozoan.
 - c. an algae.
 - d. a water mold.
10. One round of binary fission produces _____ from a single haploid cell.
- a. two diploid cells
 - b. two haploid cells
 - c. one diploid cell
 - d. two haploid cells and two diploid cells
11. In protists, spores are produced
- a. to help the organism survive in unfavorable environmental conditions.
 - b. to help the protist switch to being a prokaryote.
 - c. to engulf amoeba.
 - d. only in the summer, when days are long.
12. When a diploid zygote completes meiosis, _____ is (are) produced
- a. two diploid cells
 - b. two haploid cells
 - c. four haploid cells
 - d. one diploid cell

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Mitochondria likely evolved from aerobic bacteria that were engulfed by a larger prokaryotic cell.
- _____ 14. Mitochondria, but not chloroplasts, contain DNA.
- _____ 15. Protists cannot survive in water.
- _____ 16. A pseudopodia is a long, whip-like extension used by some protists as a reproductive cell.
- _____ 17. *Spirogyra* is an animal-like protist.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The fusion of two *Spirogyra* spores to form a diploid zygote is an example of _____.
19. Absorptive protists get nutrition by _____.
20. _____ protists use light energy, water, and carbon dioxide to make food.
21. _____ bacteria use oxygen for cellular respiration.
22. Kingdom _____ contains the protists.

23. Scientists think that the first eukaryotes to evolve were the _____.
24. The _____ theory explains how eukaryotes evolved from prokaryotes.
25. Nuclear membranes surround a protist's _____.

Short Answer

Answer each question in the space provided.

26. How does the ability to produce spores benefit *Spirogyra*?

27. How do ingestive protists obtain nutrients?

14.2 Types of Protists

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

1. Protozoa can get their food by being all of the following **except**
 - a. a predator
 - b. a photosynthesizer
 - c. an herbivore
 - d. a decomposer
2. Which of the following protozoa moves using pseudopods?
 - a. amoeba
 - b. ciliate
 - c. sporozoan
 - d. flagellate
3. The type of protozoan that does not move as an adult is
 - a. a ciliate protozoan
 - b. an amoeboid protozoan
 - c. a sporozoan
 - d. an algae
4. Algae are considered plant-like because
 - a. they have roots, stems, and leaves.
 - b. they are often unicellular.
 - c. they eat dead organic matter.
 - d. they have chloroplasts and carry out photosynthesis.
5. Which of the following groups carries out photosynthesis?
 - a. dinoflagellates
 - b. euglenids
 - c. green algae
 - d. all of the above
6. In algae, gametic meiosis involves
 - a. production of gametes by meiosis.
 - b. production of gametes by mitosis.
 - c. asexual reproduction.
 - d. none of the above.
7. In algae, asexual reproduction
 - a. doesn't increase genetic variation.

- b. increases genetic variation a lot.
 - c. involves sperm and egg fusion.
 - d. all of the above
8. Fungus-like protists are
- a. prokaryotes.
 - b. plants.
 - c. molds.
 - d. none of the above
9. Swarming is a characteristic of
- a. algae.
 - b. sporozoans.
 - c. slime molds.
 - d. all organisms.
10. Water molds are
- a. a type of fungus-like protist.
 - b. are found in water and the surface and in moist soil.
 - c. include some that are crop-destroying pathogens.
 - d. all of the above.
11. Most animal-like protists
- a. are extinct.
 - b. consist of a single cell.
 - c. live at high altitude.
 - d. are photosynthetic.
12. Plant-like protists are called
- a. amoeba.
 - b. ciliates.
 - c. slime molds.
 - d. algae.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Kelp are fungus-like protists.
- _____ 14. Protozoa are animal-like protists.
- _____ 15. Diatoms are a type of algae.
- _____ 16. Slime molds are a kind of algae.
- _____ 17. Protists are often classified based on how similar they are to animals, fungi, or plants.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The organism that causes malaria is a(n) _____ protist.
19. The _____ protozoa use cilia to move.
20. Fungus-like protists are called _____.
21. Plant-like protists are called _____.
22. Animal-like protists are called _____.

14.3 Introduction to Fungi

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- _____ are the thread-like filaments of fungi
 - spores
 - hyphae
 - flagella
 - cilia
- In terms of size, fungi
 - are always very small.
 - are always very large.
 - can be large or small.
 - none of the above
- When environmental conditions are changing, _____ is generally more beneficial for a fungal species.
 - asexual reproduction
 - sexual reproduction
 - speeding up metabolism
 - all of the above
- Asexual reproduction of fungi involves
 - fusion of two tetraploid parent cells.
 - fusion of three haploid parent cells to form one giant cell.
 - fusion of two haploid parent cells to form a diploid zygospore.
 - production of genetically identical offspring.
- Fungal spores
 - result directly from sexual reproduction.
 - is a synonym for sperm.
 - can be dispersed by water or wind.
 - are found exclusively in the guts of animals.
- Fungi first colonized the land
 - not yet - all fungi still live in the water.
 - at least 600 billion years ago.
 - at least 460 million years ago.
 - after the first humans appeared on the earth.
- One way that fungi are different from plants is that
 - they have a cell wall, but plants do not have a cell wall.

- b. plants carry out photosynthesis, and fungi do not.
 - c. they both move rapidly from place to place.
 - d. fungi and plants have virtually identical characteristics.
8. Lichens contain
- a. protozoa.
 - b. tunicates.
 - c. water molds.
 - d. fungi.
9. Fungi that are mainly terrestrial, live in soil and compost and on foods like bread are the
- a. Ascomycota.
 - b. Basidiomycota.
 - c. Merimycota.
 - d. Zygomycota.
10. Fungi that often participate in symbiotic relationships and live in all land ecosystems, including Antarctica, are the
- a. Ascomycota.
 - b. basidiomycota.
 - c. Merimycota.
 - d. Zygomycota.
11. Fungi of many different shapes that vary considerably even within the same species are the
- a. Ascomycota.
 - b. Basidiomycota.
 - c. Merimycota.
 - d. Zygomycota.
12. Chitin is found in
- a. fungal cell walls.
 - b. fungal nuclei.
 - c. plant cell walls.
 - d. all of the above.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Fungi spend most of their life cycle in the haploid state.
- _____ 14. Hyphae are long, thin structures of fungi.
- _____ 15. Protozoans are fungi.
- _____ 16. Fungi are a kingdom in the domain Eukarya.
- _____ 17. A yeast cell produced by budding off of a parent cell is very genetically different the parent cell.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. A mass of hyphae is called a _____.
19. A diploid cell is said to have _____ number of chromosomes.
20. A haploid cell is said to have _____ number of chromosomes.
21. _____ makes up the cell wall of fungi.

14.4 Ecology of Fungi

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Fungi are _____ which means that they _____.
 - autotrophs, make their own food
 - autotrophs, get their food by ingesting organisms or organic matter
 - heterotrophs, make their own food
 - heterotrophs, get their food by ingesting organisms or organic matter
- _____ get their food by absorbing decaying organic matter.
 - autotrophs
 - saprotrophs
 - algae
 - parasites
- Fungi are decomposers that can break down _____ and _____, which are indigestible by almost all other organisms.
 - cellulose, starch
 - cellulose, lignin
 - starch, protein
 - protein, fat
- Which of the following is **not** true of fungal hyphae?
 - They are long filaments that aid in absorption of water and minerals.
 - They can penetrate deep into organic matter.
 - They release enzymes that can digest organic matter such as cellulose and lignin.
 - They are the dead portions of a fungus.
- _____ fungi harm their host.
 - parasitic
 - photosynthetic
 - symbiotic
 - mutualistic
- _____ are a mutualistic relationship between a plant and a fungus.
 - lichens
 - mushrooms
 - yeast
 - mycorrhizae
- A lichen is

- a. a mutualistic relationship between a fungus and a photosynthetic organism.
 - b. a parasitic relationship between a plant and a fungus.
 - c. a mutualistic relationship between an animal and a fungus.
 - d. a parasitic relationship between a plant and an animal.
8. An antibiotic produced by a fungus is
- a. aspirin.
 - b. penicillin.
 - c. acetaminophen.
 - d. all of the above.
9. Examples of food fermented by fungi are
- a. tempeh.
 - b. soy sauce.
 - c. cheese.
 - d. all of the above.
10. Some breads rise because of the action of
- a. yeast.
 - b. lichens.
 - c. mycorrhizae.
 - d. water molds.
11. Other uses of fungi include
- a. to make blue cheese.
 - b. to brew beer.
 - c. to control crop pests.
 - d. all of the above.
12. An example of a mutualistic relationship between a fungus and a plant is
- a. saprotrophs.
 - b. chitin.
 - c. mycorrhizae.
 - d. none of the above.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Fungi are autotrophs.
- _____ 14. Most fungi consume live organisms.
- _____ 15. Fungi secrete enzymes from the tips of their hyphae.
- _____ 16. A mycorrhizae is a mutualistic relationship between a photosynthetic organism (such as a cyanobacterium) and a fungus.
- _____ 17. Lichens are never found on rocks.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Mutualism is a relationship between two organisms that _____ both organisms.
19. Some _____ get their organic compounds by eating other organisms.
20. _____ get their organic matter from decaying organic matter.

21. A lichen is a mutualistic relationship between a _____ and a _____.
22. A mycorrhiza is a mutualistic relationship between a _____ and a _____.
23. A relationship between two organisms in which one is helped and the other is harmed is called _____.
24. Yeast is used by humans to make _____ rise.
25. _____ secrete digestive enzymes from their tips.

Short Answer

Answer each question in the space provided.

26. Name some foods that are made using fungi, or that are fungi. Have you eaten any of these foods?

27. Why are fungi classified as heterotrophs?

14.5 Protists, Fungi, and Human Disease

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Giardiasis is spread by
 - the air.
 - contaminated blankets.
 - contaminated water.
 - all of the above.
- Humans who live in _____ are at low risk for getting malaria.
 - Norway
 - Africa
 - India
 - China
- Some mushrooms
 - are not fungi.
 - are autotrophs.
 - are photosynthetic.
 - are highly toxic, even though they look similar to edible mushrooms.
- Candida* infects
 - all people at all times.
 - the mouth or vagina.
 - the fingernails.
 - none of the above.
- The skin infection characterized by a red, ring-shaped rash is
 - athlete's foot.
 - ringspot virus.
 - ringworm.
 - all of the above.
- Coughing, trouble breathing, and sneezing are symptoms of
 - mold allergy.
 - ringworm.
 - athlete's foot.
 - all of the above.
- Allergies to mold
 - are very common in humans.

- b. occur in animals, but not humans.
 - c. disappeared from humans after 1911.
 - d. are very rare in humans.
8. A common skin infection between the toes is
- a. ringworm.
 - b. athlete's foot.
 - c. malaria.
 - d. none of the above.
9. Angel mushrooms can
- a. allow the blood to carry more oxygen.
 - b. cause kidney or liver failure.
 - c. cause ringworm.
 - d. all of the above
10. Some fungi protect themselves by
- a. making toxins
 - b. moving away from predators
 - c. stopping reproduction
 - d. all of the above
11. Malaria is caused by
- a. yeast
 - b. trypanosomes
 - c. giardia
 - d. *Plasmodium* protozoa
12. Malaria is spread by
- a. beetles
 - b. mosquitoes
 - c. ants
 - d. fungi

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Sleeping sickness is a disease caused by a *Trypanosoma* protozoan.
- _____ 14. Chagas disease is spread to humans by insects.
- _____ 15. Giardia are flagellate protozoans.
- _____ 16. Symptoms of malaria are fever, joint pain, anemia, and fatigue.
- _____ 17. All poisonous mushrooms look very different from edible mushrooms and it is easy to tell them apart.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. _____ are the vector that transmits the *Plasmodium* protozoa that causes malaria.
19. A "kissing bug" spreads _____ via an insect vector.
20. Ringworm is a common skin disease typified by a _____.
21. *Candida* is a common _____ infection.
22. Protozoa are _____ protists.

23. *Plasmodium* protozoans cause _____.
24. _____ is a fungal infection of skin in between the toes.
25. A mushroom is classified as a _____.

Short Answer

Answer each question in the space provided.

26. What are some possible strategies people could use to reduce the incidence of malaria?

27. What is ringworm? What causes it?

14.6 Eukaryotes: Protists and Fungi

Chapter Test

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Which of the following provides evidence for endosymbiotic theory?
 - Mitochondria do not have DNA.
 - Chloroplasts have their own plasma membranes.
 - Mitochondria are sites of protein synthesis.
 - Chloroplasts are found in all eukaryotic cells.
- Which statement is true about protists?
 - They are motile.
 - They have a nucleus.
 - They have complex life cycles.
 - all of the above
- Protozoa are
 - plant-like protists.
 - fungi-like protists.
 - animal-like protists.
 - none of the above.
- Which type of protozoa cannot move as adults?
 - amoeboid
 - ciliate
 - flagellate
 - sporozoan
- What is kelp?
 - a multicellular seaweed
 - a plant-like protozoan
 - a species of tree
 - a component of zooplankton
- Red and green algae are thought to have evolved from endosymbiotic relationships with
 - euglenids.
 - chloroplasts.
 - cyanobacteria.
 - protozoa.
- Fungi include
 - water mold.

- b. slime mold.
 - c. bread mold.
 - d. all of the above.
8. What makes fungi unique?
- a. They reproduce asexually.
 - b. They are multicellular.
 - c. They have cell walls made of chitin.
 - d. They produce spores.
9. Most fungi are consumers called
- a. carnivores.
 - b. herbivores.
 - c. omnivores.
 - d. saprotrophs.
10. Mycorrhiza is a mutualistic relationship between a fungus and a(n)
- a. ant.
 - b. plant.
 - c. beetle.
 - d. bacterium.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. The oldest eukaryotes are the fungi.
- _____ 12. Most protists are aquatic organisms.
- _____ 13. All protists obtain food in the same way.
- _____ 14. Protozoa include diatoms and seaweed.
- _____ 15. Some fungi exist as single cells.
- _____ 16. Yeasts reproduce with spores.
- _____ 17. Fungi are classified as plants.
- _____ 18. All decomposers can break down wood.
- _____ 19. A lichen is a type of mold.
- _____ 20. Malaria is a disease caused by protozoa.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. The simplest eukaryotes belong to the _____ kingdom.
22. The ability of an organism to move is referred to as _____.
23. Any protozoan with pseudopods is classified as a(n) _____.
24. Plant-like protists are called _____.
25. Fungus-like protists are called _____.
26. The filaments of fungi are known as _____.
27. The body of a fungus is called a(n) _____.
28. Leafcutter ants and fungi have a(n) _____ relationship.

29. A mosquito is a(n) _____ of malaria.

30. Athlete's foot is a skin infection caused by organisms in the _____ kingdom.

Short Answer

Answer each question in the space provided.

31. Outline the evolution of protists.

32. Describe reproduction in fungi.

33. Explain how protists cause human disease.

CHAPTER

15

**Plant Evolution and
Classification Assessments**

Chapter Outline

- 15.1 INTRODUCTION TO THE PLANT KINGDOM
- 15.2 FOUR TYPES OF MODERN PLANTS
- 15.3 PLANT EVOLUTION AND CLASSIFICATION



15.1 Introduction to the Plant Kingdom

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- The earliest plants had
 - chloroplasts.
 - nuclei.
 - distinct male and female reproductive structures.
 - all of the above.
- Adaptations of land plants include
 - flowers.
 - seeds.
 - vascular tissues.
 - all of the above.
- Evidence supports the idea that plants evolved most directly from
 - aquatic green algae.
 - unicellular bacteria.
 - fungi.
 - protozoa.
- Which of the following is not directly needed by plants for photosynthesis?
 - carbon dioxide
 - bacteria
 - light
 - water
- The earliest plants lived
 - on land.
 - in outer space.
 - in the ocean.
 - none of the above
- In vascular plants, _____ transports water and minerals from the roots to the rest of the plant.
 - xylem
 - phloem
 - cotyledons
 - sepals
- In vascular plants _____ transports sugars from photosynthetic tissues to the rest of the plant.
 - xylem

- b. phloem
 - c. cotyledons
 - d. sepals
8. _____ is a hydrophobic molecule that gives structural support to vascular tissues and helps protect vascular plants from herbivores because it cannot be digested by them.
- a. chloroplasts
 - b. carbon dioxide
 - c. lignin
 - d. radicle
9. Plants transfer large volumes of water from the soil into the air by
- a. sepals.
 - b. red eyed tree frogs.
 - c. transpiration.
 - d. using bacteria.
10. The dominant generation in a typical fern is the
- a. gametophyte.
 - b. prothallus.
 - c. mature sporophyte.
 - d. spore.
11. Pollen contains
- a. the egg.
 - b. the female reproductive cell.
 - c. the seed coat.
 - d. the male gametophyte.
12. In seed plants, sperm can be transferred directly from the pollen grain to the egg cell via a
- a. pollen tube.
 - b. chloroplast.
 - c. rhizoid.
 - d. none of the above

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Early vascular plants needed to live near a source of sufficient water to reproduce sexually.
- _____ 14. In spermatophytes, the plant embryo is encased in a seed.
- _____ 15. Many types of seeds do not germinate until conditions are favorable.
- _____ 16. In seed plants, the female gametophyte produces an egg cell.
- _____ 17. Pollen can be spread by wind and by animals.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. A _____ is a seed-containing, ripened ovary.
19. _____ are haploid individuals produced by asexual reproduction.
20. _____ are diploid individuals produced by sexual reproduction.
21. _____ are plants existing today whose seeds are contained within cones.

22. Alternation of generations refers to a life cycle in which the organism cycles between _____ and _____ generations.
23. In tracheophytes, _____ tissue is responsible for transporting water, minerals, and sugars throughout the plant.
24. When a plant reproduces asexually using either stems, roots, or leaves, it is called _____.
25. _____ contains the male gametes in seed plants.

Short Answer

Answer each question in the space provided.

26. What advantage does sexual reproduction have over asexual reproduction in plants?

27. Plants are defined by what main characteristics?

15.2 Four Types of Modern Plants

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

1. An example of a nonvascular plant is a
 - a. moss.
 - b. hornwort.
 - c. liverwort.
 - d. all of the above
2. Which of the following is **not** a vascular plant?
 - a. fern
 - b. cycad
 - c. avocado tree
 - d. liverwort
3. The water-absorbing structure in nonvascular plants is the
 - a. root.
 - b. vascular bundle.
 - c. rhizoid.
 - d. sperm.
4. Most bryophytes are
 - a. well-adapted to dry climates.
 - b. extremely tall.
 - c. small in size compared to trees.
 - d. unable to absorb minerals because they lack roots.
5. In bryophytes, sperm are produced by the
 - a. female gametophyte.
 - b. male gametophyte.
 - c. pollen grain.
 - d. stigma.
6. When plants living in a moist environment lack vascular tissue, they cannot easily
 - a. grow very tall.
 - b. reproduce.
 - c. obtain water.
 - d. photosynthesize.
7. _____ is a series of living cells arranged end to end and connected by end perforations in the plant cell walls.

- a. Petal
 - b. Phloem
 - c. Xylem
 - d. Lignin
8. A unique feature of xylem is that
- a. functional xylem is made of dead cells.
 - b. is it the only photosynthetic tissue that has no chloroplasts.
 - c. it evolved before nonvascular plants.
 - d. it transports water only in a downward direction.
9. _____ are the type of photosynthetic structure capable of collecting the greatest amount of light.
- a. Pine needles
 - b. The green parts of moss
 - c. Underground roots
 - d. Broad, flat maple leaves
10. _____ seeds are surrounded by an ovary.
- a. Gymnosperm
 - b. Clubmoss
 - c. Angiosperm
 - d. Algal
11. An adaptation of gymnosperms to reduce water loss is
- a. a waxy cuticle on their leaves.
 - b. they remain extremely small.
 - c. they reproduce by binary fission.
 - d. none of the above.
12. The _____ depend most on abundant water for fertilization of the egg by the sperm.
- a. seed plants
 - b. gymnosperms
 - c. hornworts
 - d. magnolia trees

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Seed plants evolved 200 million years after the Age of the Dinosaurs ended.
- _____ 14. Liverworts are well adapted to living in water-abundant climates.
- _____ 15. The first leaf of a plant, which develops inside the seed, is called a radicle.
- _____ 16. Cycads are a class of bryophytes.
- _____ 17. Sepals are the main way flowers attract pollinators.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. _____ is a name for vascular plants.
19. The _____ of a flower is made up of an anther and filament.
20. The _____ contains food for a plant embryo in a seed.
21. _____ transports sugars long distances in a vascular plant.

22. _____ transports water and minerals long distances in a vascular plant.
23. _____ is a sugary liquid produced by flowers to attract pollinators.
24. The female reproductive structure in a flower is the _____ and contains the stigma, style, and ovary.
25. The _____ covers the flower bud to protect it against predators.

Short Answer

Answer each question in the space provided.

26. What advantages do stems give vascular plants?

27. What advantages do roots give vascular plants?

15.3 Plant Evolution and Classification

Chapter Test

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Which statement about plants is true?
 - All plants are eukaryotes.
 - Some plants are unicellular.
 - All plants grow from seeds.
 - All plants are producers.
- The great majority of plants get all the following from their environment **except**
 - carbon dioxide.
 - nutrients.
 - water.
 - organic compounds.
- All plants have a life cycle that alternates between
 - haploid and diploid generations.
 - male and female generations.
 - endosperm and zygospERM generations.
 - bryophyte and tracheophyte generations.
- Plants are thought to have evolved from
 - green algae.
 - diatoms.
 - fungi.
 - none of the above.
- Instead of roots, the earliest plants had
 - pistils.
 - sepals.
 - rhizoids.
 - sporophytes.
- The earliest seed plants formed seeds in
 - fruits.
 - flowers.
 - cones.
 - ovaries.
- Which statement is true about modern nonvascular plants?
 - They have leaves.

- b. They have roots.
 - c. They produce seeds.
 - d. They need a moist habitat.
8. Examples of nonvascular plants include
- a. mosses.
 - b. ferns.
 - c. clubmosses.
 - d. conifers.
9. Plants that form seeds in ovaries are called
- a. cycads.
 - b. gnetae.
 - c. gymnosperms.
 - d. angiosperms.
10. Flowering plants are classified in three major groups (monocots, eudicots, or magnoliids) on the basis of their
- a. first leaves.
 - b. flower colors.
 - c. pollinators.
 - d. seed shapes.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. A diploid plant is called a gametophyte.
- _____ 12. Plants were one of the last groups of organisms to colonize the land.
- _____ 13. Most vascular plants are spermatophytes.
- _____ 14. The ovule of a seed plant contains a female gametophyte.
- _____ 15. Pollen grains are released into the air through a pollen tube.
- _____ 16. The first seed plants were like modern angiosperms.
- _____ 17. Fruits develop from cones.
- _____ 18. Liverworts and hornworts are tracheophytes.
- _____ 19. Ginkgoes are classified as gymnosperms.
- _____ 20. Sepals are the female reproductive structures of flowers.

Fill in the Blank

Fill in the blank with the term that best completes the sentence.

21. Plants have cell walls made of _____.
22. Plants growing where people do not want them are called _____.
23. Reproducing with roots, stems, or leaves is called _____ reproduction.
24. A plant's _____ tissues make up its "plumbing" system.
25. A seed contains a food source and a(n) _____.
26. The early growth and development of a seed is called _____.
27. Vascular tissue that transports water from roots to leaves is _____.
28. Stored food in a seed is called _____.

29. _____ is a sweet, sugary liquid that plants use to attract insect pollinators.

30. The male reproductive structure of a flower is the _____.

Short Answer

Answer each question in the space provided.

31. Give an overview of plant evolution.

32. Describe how plants are classified.

33. Compare and contrast nonvascular and vascular plants.

CHAPTER 16 Plant Biology Assessments

Chapter Outline

- 16.1 PLANT TISSUES AND GROWTH
 - 16.2 PLANT ORGANS: ROOTS, STEMS, AND LEAVES
 - 16.3 VARIATION IN PLANT LIFE CYCLES
 - 16.4 PLANT ADAPTATIONS AND RESPONSES
 - 16.5 PLANT BIOLOGY
-



16.1 Plant Tissues and Growth

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- A plant structure made up of more than one kind of tissue is
 - an organ.
 - a tissue.
 - a chloroplast.
 - a meristem.
- Plant cells walls are surrounded by
 - a plasma membrane only.
 - a plasma membrane, outside of which is the cell wall.
 - a plasma membrane, inside of which is the cell wall.
 - a cell wall only.
- Structures found in plant cells, but not animal cells, include
 - a large central vacuole.
 - plastids.
 - a cell wall.
 - all of the above.
- Which of the following is **not** true about the central vacuole?
 - It helps give the cell its shape.
 - It is surrounded by its own membrane.
 - It is always smaller than the mitochondria.
 - It contains water and dissolved materials.
- The _____ keeps the cell from bursting by absorbing too much water.
 - plasma membrane
 - cell wall
 - central vacuole
 - nucleus
- The _____ is made of cellulose and lignin.
 - nucleus
 - mitochondria
 - smooth endoplasmic reticulum
 - cell wall
- The organelle that makes and stores pigments other than chlorophyll is the
 - cell wall.

- b. nucleus.
 - c. chromoplast.
 - d. xylem.
8. The type of plant cell with an elongated shape and irregularly thickened cell walls is a _____ cell.
- a. collenchymal
 - b. sclerenchymal
 - c. parenchymal
 - d. chlorothymol
9. The type of plant cell with thin cell walls, a cube shape, that may contain chloroplasts is
- a. collenchymal.
 - b. sclerenchymal.
 - c. parenchymal.
 - d. chlorothymol.
10. Rope can be made fibers containing a lot of _____ cells.
- a. collenchymal
 - b. sclerenchymal
 - c. parenchymal
 - d. chlorothymol
11. A plant's _____ helps protect a plant against infections and toxin damage, and helps prevent excessive water loss.
- a. xylem
 - b. phloem
 - c. cuticle
 - d. ground tissue
12. Which of the following is **not** a characteristic of a plant meristem?
- a. Its cells can no longer divide.
 - b. It contains undifferentiated cells.
 - c. It is found at the tips of stems and roots.
 - d. It contains cells that can undergo cell division.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Both plant cells and animal cells contain mitochondria.
- _____ 14. Celery strings are made of collenchymal cells.
- _____ 15. Ground tissue covers the outside of a plant.
- _____ 16. Plants most often grow by a combination of cell division and cell growth.
- _____ 17. Cell division in the meristem helps plant stems grow taller.

Fill in the Blanks

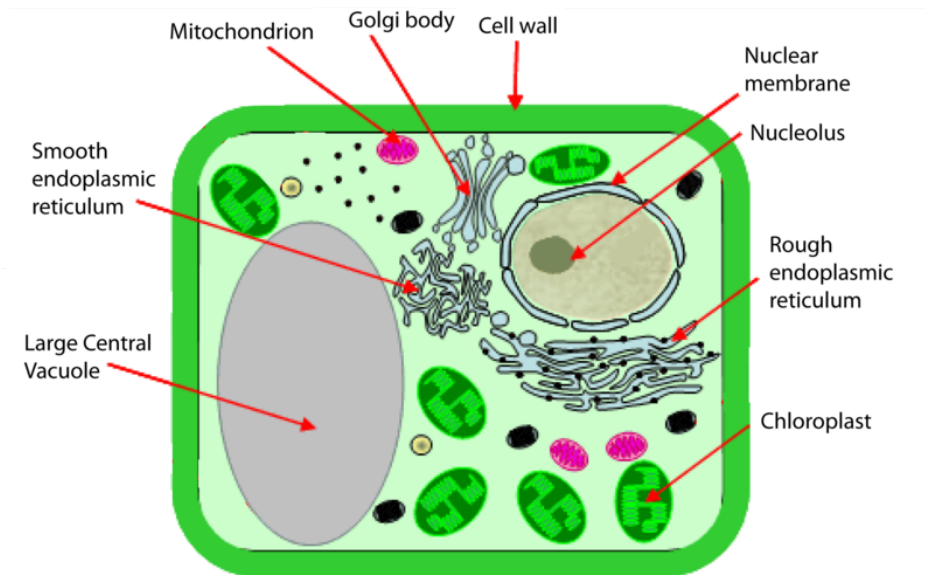
Fill in the blank with the term that best completes the sentence.

18. _____ in roots stores food in some plants.
19. _____ cells provide wind resistance and help support cells.
20. The single layer of cells that covers the outside of a plant forms the _____.
21. _____ cells have thin cell walls and make up most of the interior space in a plant.

22. Bundles of xylem and phloem form a plant's _____.
23. _____ cells provide support to the plant and have thick, lignin-containing cell walls.
24. The _____ is a waxy waterproofing coating on the surface of the above-ground parts of a plant.
25. A plant's _____ is a source of new cells for plant growth.

Short Answer

Answer each question in the space provided.



26. What cell structures/organelles are shared by both animal cells and plant cells? Why do both types of cells have these structures?

27. Name and describe the structure/function of the cell structures in the figure above that are unique to plants and are not found in animals.

16.2 Plant Organs: Roots, Stems, and Leaves

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

1. A plant with a taproot
 - a. has only secondary roots.
 - b. has many small, branching roots and no main root.
 - c. grows deeply and can access water sources far under the ground.
 - d. topples over easily.
2. _____ help the plant efficiently absorb water and minerals.
 - a. Parenchyma
 - b. Root hairs
 - c. Bark
 - d. Starches
3. Food from photosynthesis can be stored by some plants in
 - a. the xylem.
 - b. the cuticle.
 - c. the taproot.
 - d. fibrous roots.
4. Roots grow down instead of up because
 - a. of gravity-sensing cells in their root cap.
 - b. they have meristems, and the stems do not.
 - c. they are repelled by air.
 - d. all of the above
5. Some plants increase their capacity to absorb water by
 - a. having no root hairs.
 - b. growing only in the winter.
 - c. having very little ground tissue.
 - d. mycorrhizae, which is a symbiotic relationship between a plant and a fungus.
6. Secondary stems and leaves grow off of _____ of the stem
 - a. nodes
 - b. blades
 - c. internodes
 - d. none of the above
7. A dead portion of the plant stem that provides protection, strength and support is the
 - a. xylem.

- b. bark.
 - c. phloem.
 - d. petiole.
8. The secondary meristem is responsible for _____ in the plant
- a. primary growth
 - b. growth in length
 - c. growth in width
 - d. storing food
9. Leaves can vary in all of the following characteristics **except**
- a. shape.
 - b. size.
 - c. main function.
 - d. their arrangement on stems.
10. The first true leaves that evolved were
- a. pine needles.
 - b. fronds.
 - c. microphylls.
 - d. doubly compound.
11. Some leaves consist of many smaller leaflets in order to
- a. decrease their resistance to wind.
 - b. capitalize on the warmer temperatures near the ground.
 - c. maximize photosynthesis.
 - d. increase water loss.
12. A main function of stomata is to
- a. photosynthesis.
 - b. attract pollinators.
 - c. waterproof the leaf surface.
 - d. regulate exchange of gases with the air and control transpiration.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Cell division in the secondary meristem increases the thickness of a stem.
- _____ 14. Because the main function of the leaf is photosynthesis, leaves do not need any xylem or phloem.
- _____ 15. The main function of guard cells is to protect the plant against disease-causing organisms.
- _____ 16. Needle-like leaves have a greater rate of water loss compared to leaves with large, flat blades.
- _____ 17. Evergreen plants lose all their leaves in the fall, and grow new ones in the spring.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

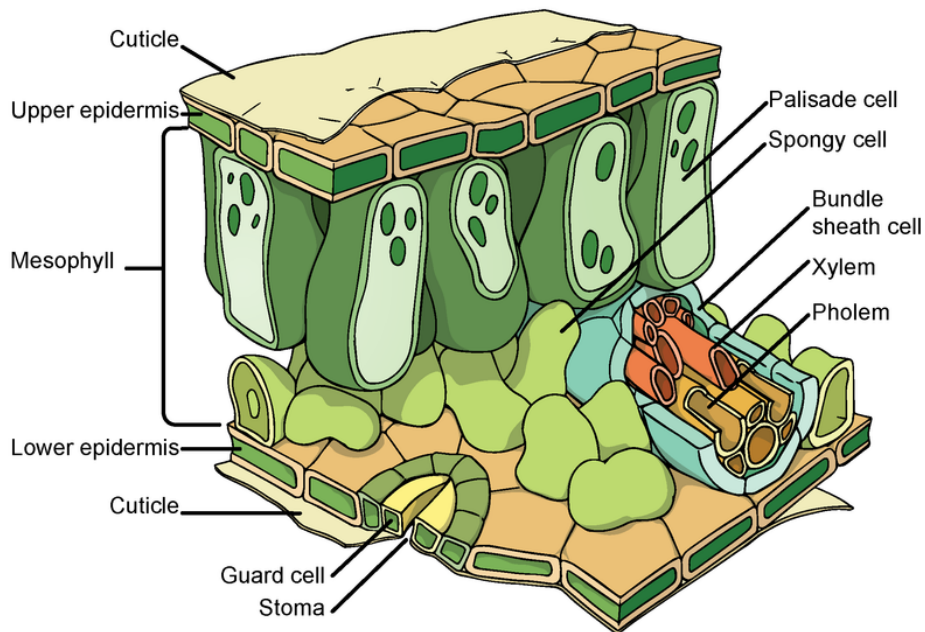
18. _____ roots grow downward, while _____ branch sideways.
19. The surface area for water and mineral absorption is increased in plants with a _____ root system.
20. The tip of a root is called the _____.
21. _____ anchor plants to the ground.
22. Secondary stems, leaves, flowers, and cones grow out of _____ on the stem.

23. _____ plants lose their leaves in the fall, and grow new ones in the spring.
24. _____ are the very thin, pointed leaves of conifers such as pine trees.
25. Much of the interior space of a leaf is occupied by photosynthetic parenchymal cells, known as the _____ of the leaf.

Short Answer

Answer each question in the space provided.

Refer to the diagram below and answer the following questions.



26. Name and define the main functions of a leaf.

27. How is the internal structure of a leaf optimized for a leaf's main functions?

16.3 Variation in Plant Life Cycles

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- The gametophyte phase of a plant life cycle is
 - the dominant phase in all plants.
 - the minor phase in all plants.
 - haploid.
 - none of the above.
- Fertilization of an egg by a sperm produces
 - a haploid spore.
 - a gametophyte.
 - a haploid zygote.
 - a diploid zygote.
- The dominant part of the life cycle of a moss is
 - the sperm.
 - the egg.
 - the sporophyte.
 - the gametophyte.
- Which of the following plants spends most of its life cycle as a gametophyte?
 - pine tree
 - liverwort
 - apple tree
 - fern
- Spores from a moss plant germinate to form
 - a gametophyte.
 - a sporophyte.
 - an egg.
 - a sperm.
- The underside of fern fronds is sometimes covered with
 - clusters of sporangia.
 - flowers.
 - cones.
 - rhizoids.
- An example of a gymnosperm is a
 - fern.

- b. spruce tree.
 - c. oak tree.
 - d. hornwort.
8. The female cones of gymnosperms can contain
- a. antheridia.
 - b. seeds.
 - c. archegonia.
 - d. flowers.
9. In gymnosperms, pollen and ovules are produced
- a. in the same cone.
 - b. in different cones.
 - c. in flowers.
 - d. in needles.
10. The definition of pollination is
- a. when pollen is transferred to the stigma and sticks.
 - b. when pollen is produced by the stamen.
 - c. when the pistil forms.
 - d. none of the above.
11. In angiosperms, the egg is
- a. transferred via water to pollen in the stamen.
 - b. contained within an eight-celled haploid gametophyte.
 - c. always in a separate flower than the pollen.
 - d. contained in the stamen.
12. After fertilization in angiosperms,
- a. a fruit may develop from the ovary surrounding the seed.
 - b. the scales fall off the cones.
 - c. the embryo is haploid.
 - d. none of the above

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. The dominant generation in seedless nonvascular plants is the diploid sporophyte.
- _____ 14. Fertilization of egg and sperm produces a diploid zygote.
- _____ 15. Gymnosperms have male and female cones.
- _____ 16. Angiosperms are flowering vascular plants.
- _____ 17. Alternation of generations involves both haploid and diploid phases of the life cycle.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. In nonvascular plants, _____ are the male reproductive organs.
19. In nonvascular plants, _____ are the female reproductive organs.
20. The dominant generation in seedless vascular plants is the _____.
21. _____ is a type of cell division in which the offspring cells have the same number of chromosomes as the parent cell.

22. _____ is a type of cell division in which the offspring cells have half the number of chromosomes as the parent cell.
23. Fruit forms in _____ plants.
24. Water, minerals, and sugars are transported by the _____ in gymnosperms and angiosperms.
25. The dominant generation in angiosperms is the diploid _____.

Short Answer

Answer each question in the space provided.

26. What are the key events in sexual reproduction in angiosperms?

27. What are advantages of reproduction using seeds?

16.4 Plant Adaptations and Responses

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Plants with extensive root systems, thick cuticles, and well-developed vascular tissues are best adapted to living
 - in the water.
 - in the air.
 - in a climate in which there may be dry periods.
 - all of the above
- The flowers of aquatic plants
 - are underneath the water.
 - are above the water.
 - are key to asexual reproduction.
 - do not need any water to survive.
- Cattails are well-adapted to living in
 - the air.
 - dry climates.
 - the water.
 - the arctic.
- In general, xerophytes are specialized for all of the following **except**
 - living in a climate with abundant rainfall year-round.
 - storing water.
 - increasing absorption of water when it is available.
 - reducing water loss.
- Rain that falls rarely and for a short time is best captured by
 - a taproot.
 - a thick cuticle.
 - thorns.
 - a shallow root system spreading out from the stem.
- Which of the following is **not** true of epiphytes?
 - They live independently, away from all other plants.
 - They live in the air.
 - They photosynthesize.
 - They have a good chance of being wind-pollinated.
- The best definition of an epiphyte is

- a. a plant with no leaves.
 - b. a plant that grows on another plant.
 - c. a non-photosynthetic plant.
 - d. a plant that flowers at night.
8. Epiphytes
- a. are not plants.
 - b. have extensive, deep-growing root systems.
 - c. do not grow in the soil.
 - d. do not depend on other plants.
9. Bromeliads with insects or amphibians living in them
- a. are less able to survive.
 - b. benefit from getting minerals excreted by the insects and amphibians.
 - c. live in the ocean only.
 - d. none of the above
10. Plants' roots grown down because
- a. they grow toward the sun.
 - b. they always live in the air.
 - c. they detect gravity and grow toward the force of gravity.
 - d. they detect gravity and are repelled by it.
11. Phototropism is regulated by
- a. gravity.
 - b. the roots.
 - c. the lunar cycle.
 - d. the growth hormone auxin.
12. Dormancy in plants can be defined as
- a. stopping growth and development.
 - b. a period of rapid growth and development.
 - c. growing toward the earth.
 - d. growing toward the sun.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Water lily leaves are broad and flat so they can maximize their absorption of sunlight for photosynthesis.
- _____ 14. Geotropism is growing opposite to the force of gravity.
- _____ 15. Seeds are adapted to germinate when environmental conditions are unfavorable.
- _____ 16. Some plants open their leaves in the day and close them up at night to conserve water.
- _____ 17. Plants respond to disease-causing organisms with a burst of rapid cell division and growth so they can battle the pathogen.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. A plant that lives on another plant is an _____.
19. Plants that live in the water are _____ plants.
20. _____ are well-adapted for surviving in very dry climates like the desert.

16.5 Plant Biology

Chapter Test

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Structures found in plant cells but not animal cells include
 - ribosomes.
 - mitochondria.
 - plastids.
 - Golgi bodies.
- The type of plant cell that contains chloroplasts is
 - collenchymal.
 - cuticle.
 - sclerenchymal.
 - none of the above.
- Which type of plant tissue consists of undifferentiated cells?
 - dermal
 - ground
 - vascular
 - meristem
- Functions of plant roots include
 - absorbing water.
 - anchoring the plant.
 - storing food.
 - all of the above.
- Rhizomes are stems that are specialized for
 - climbing and clinging.
 - reproducing.
 - protecting the plant.
 - storing food.
- Which type of leaf occurs on ferns?
 - microphylls
 - fronds
 - needles
 - petioles
- A function of stomata is to control
 - photosynthesis.

- b. transpiration.
 - c. protein synthesis.
 - d. plant growth.
8. The diploid generation of a general plant life cycle is known as a
- a. sporophyte.
 - b. sporangium.
 - c. gametophyte.
 - d. gametangium.
9. Xerophytes are plants that are adapted to
- a. cold.
 - b. water.
 - c. dryness.
 - d. salt.
10. A plant growing toward the light is an example of a(n)
- a. adaptation.
 - b. genotype.
 - c. phenotype.
 - d. tropism.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Chromoplasts give plant petals their bright colors.
- _____ 12. Clubmosses have leaves called mesophylls.
- _____ 13. Deciduous plants lose their leaves each year.
- _____ 14. A fibrous root system anchors a plant very securely in the ground.
- _____ 15. Dermal tissue forms the interior of a plant's stem.
- _____ 16. Leaf veins are made primarily of vascular tissues.
- _____ 17. The dominant generation in nonvascular plants is diploid.
- _____ 18. Conifers are common angiosperms.
- _____ 19. Epiphytes are plants that grow on rocks.
- _____ 20. A tropism involves a stimulus in the environment.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. Epidermal cells of plants secrete a waxy substance called _____.
22. All the roots of a plant make up its _____.
23. Growth in width of a root is an example of _____ growth.
24. _____ is the tough woody covering on the stems of trees.
25. _____ on plant leaves control gas exchange with the air.
26. A single, thick primary root is referred to as a(n) _____.
27. _____ are rigid, pointed stems that protect a plant from herbivores.
28. The thin, pointed leaves of conifers are called _____.

29. The wide, flat part of angiosperm is known as the _____.
30. _____ plants have green leaves all year long.

Short Answer

Answer each question in the space provided.

31. Explain how plants grow.

32. Relate root structure to function.

33. Describe a general plant life cycle.

CHAPTER **17**

Introduction to Animals Assessments

Chapter Outline

- 17.1 OVERVIEW OF ANIMALS
 - 17.2 OVERVIEW OF INVERTEBRATES
 - 17.3 INTRODUCTION TO ANIMALS
-



17.1 Overview of Animals

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Animal cells and bacterial cells both have all of the following cell structures **except**
 - cytoplasm.
 - DNA.
 - a plasma membrane.
 - a cell wall.
- Which of the following are animals?
 - gorilla
 - jellyfish
 - coral
 - all of the above
- Which of the following is **not** a characteristic shared by almost all animals?
 - the ability to swim
 - the ability to move, at least at some stage of their life
 - digestion of food internally
 - detection of stimuli
- An example of an animal cell that has long extensions called axons, which help the cell transmit signals is a
 - bacterial cell.
 - skin cell.
 - nerve cell.
 - bone cell.
- In general, reproduction in animals is most often
 - sexual reproduction.
 - asexual reproduction.
 - in the water.
 - in the air.
- A zygote is
 - a haploid spore of sponges.
 - a haploid gametophyte of a clam.
 - a diploid stage results from fusion of an egg cell and a sperm cell.
 - a diploid cell that results from meiosis of a swimming sperm cell.
- Which group of animals belongs to the phylum Annelida?
 - flukes

- b. earthworms
 - c. tapeworms
 - d. all of the above
8. Which group of animals belongs to the phylum Arthropoda?
- a. crustaceans
 - b. spiders
 - c. insects
 - d. all of the above
9. Vertebrates include
- a. mammals, birds, reptiles, fish, and amphibians
 - b. mammals, tunicates, and reptiles
 - c. fish, amphibians, and sea cucumbers
 - d. amphibians, centipedes, and marine worms
10. Some scientists hypothesize that early animals evolved from
- a. colonial algae that could survive on land.
 - b. colonial protists that lived in the ocean.
 - c. unicellular mammals.
 - d. multicellular fishes.
11. _____ typically have an exoskeleton.
- a. mammals
 - b. dinosaurs
 - c. birds
 - d. arthropods
12. Which of the following is **not** a typical characteristic of a chordate?
- a. an asymmetrical body
 - b. a tail
 - c. gill slits
 - d. a hollow nerve cord running along the top of the body

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Almost all animals are autotrophs.
- _____ 14. Animals can reproduce sexually.
- _____ 15. All animal phyla contain only invertebrates.
- _____ 16. Animals likely evolved from multicellular colonial protists.
- _____ 17. Arthropods have an exoskeleton.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. _____ are animals with a notochord.
19. _____ have their DNA in a nucleus.
20. Crustaceans support their body with a(n) _____.
21. _____ have a backbone.
22. Another name for backbone is _____.

23. A hollow nerve tube running the length of the animal's body is the _____.
24. _____ have eggs with internal membranes.
25. _____ organisms live in the ocean.

Short Answer

Answer each question in the space provided.

26. What are the common features of a typical animal life cycle?

27. What is the relationship between chordates and vertebrates?

17.2 Overview of Invertebrates

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Which organism cannot control the directions in which it moves?
 - house fly
 - fish
 - earthworm
 - jellyfish
- The system mainly responsible for detecting sensory information and responding to it is the
 - nervous system.
 - digestive system.
 - muscle cells.
 - coelom.
- In an invertebrate with a complete digestive system,
 - food enters and wastes leave the body from the same single complete opening.
 - food enters one opening, and wastes are expelled from a different opening.
 - the food is digested outside the body.
 - food enters the anus, and wastes leave from the mouth.
- All invertebrates are able to move
 - and control their direction of movement.
 - but have no control of the direction of movement.
 - during one or more phases of their life cycle.
 - during all phases of their life cycle.
- An invertebrate larva typically _____ in structure compared with the adult invertebrate.
 - is the same
 - differs
 - is much more complex
 - is always much larger
- The type of symmetry a spider has is
 - no symmetry.
 - radial symmetry.
 - bilateral symmetry.
 - polar symmetry.
- Muscle is formed from _____.
 - endoderm

- b. ectoderm
 - c. protoderm
 - d. mesoderm
8. Most invertebrates reproduce
- a. in the water.
 - b. asexually.
 - c. sexually.
 - d. by spontaneous generation.
9. A jellyfish has _____ symmetry
- a. no
 - b. radial
 - c. bilateral
 - d. segmented
10. A big advantage of having body segments is
- a. the animal can eat less food.
 - b. the animal doesn't need a coelom.
 - c. the body doesn't need to move from place to place.
 - d. a body made of multiple segments is more flexible.
11. Which of the following is **not** an invertebrate phylum?
- a. primates
 - b. cnidaria
 - c. echinodermata
 - d. platyhelminthes
12. Classification of an invertebrate as either a protostome or a deuterostome is determined by
- a. whether it has an incomplete or complete digestive system.
 - b. whether it is segmented or not.
 - c. how the coelom and mouth are formed during embryonic development.
 - d. all of the above.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Currently, most living animals on earth are invertebrates.
- _____ 14. While a sponge is an invertebrate, a butterfly is a vertebrate.
- _____ 15. Most invertebrates have bony skeletons like humans.
- _____ 16. Fission is a type of asexual reproduction.
- _____ 17. Arthropods and chordates are deuterostomes, and echinoderms and mollusks are protostomes.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. A _____ supports the invertebrate's body via pressure from fluid in the body cavity.
19. The inner cell layer of a developing embryo is the _____.
20. The juvenile, immature stage of an invertebrate's life is called the _____ stage.
21. Concentration of nerve tissue at one end of the body is called _____.
22. A _____ is a body cavity filled with fluid, and is located in between the digestive system and the body wall.

23. A partial body cavity filled with fluid is called a _____.
24. Jointed appendages are typical of invertebrates called _____.
25. The _____ is the outer cell layer of an embryonic invertebrate.

Short Answer

Answer each question in the space provided.

26. What is a coelom? Describe its structure, function, and advantages.

27. List three notably characteristics of the phylum Echinodermata?

17.3 Introduction to Animals

Chapter Test

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- All animals are
 - eukaryotic.
 - heterotrophic.
 - multicellular.
 - all of the above.
- What can animals do that most other living things cannot?
 - sense stimuli
 - absorb nutrients
 - fight pathogens
 - all of the above
- Which animal phylum includes insects?
 - Porifera
 - Chordata
 - Arthropoda
 - Cnidaria
- The first animals to colonize the land were
 - amphibians.
 - reptiles.
 - birds.
 - invertebrates.
- All animals that produce eggs with internal membranes are called
 - amniotes.
 - synapsids.
 - sauropsids.
 - reptiles.
- The majority of animals today are
 - vertebrates.
 - mammals.
 - invertebrates.
 - humans.
- A complete digestive system has a separate mouth, digestive cavity, and
 - anus.

- b. intestine.
 - c. colon.
 - d. all of the above.
8. Which of the following traits evolved first in animals?
- a. tissues
 - b. symmetry
 - c. mesoderm
 - d. multicellularity
9. Invertebrates with a true coelom include
- a. sponges.
 - b. corals.
 - c. flatworms.
 - d. earthworms.
10. All of the following animals have a brain except
- a. insects.
 - b. spiders.
 - c. crustaceans.
 - d. roundworms.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Animal cells have a cell wall.
- _____ 12. All animals are capable of movement at some stage of life.
- _____ 13. Most animals reproduce asexually.
- _____ 14. The phylum Chordata includes only vertebrates.
- _____ 15. Some invertebrates have a complete digestive system.
- _____ 16. Amphibians evolved from lobe-finned fish.
- _____ 17. Only vertebrates have a nervous system.
- _____ 18. A symmetrical organism can be divided into two identical halves.
- _____ 19. The coelom is a digestive cavity.
- _____ 20. The first step in the evolution of the brain was segmentation.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. Scientists think that the earliest animals evolved from organisms in the _____ kingdom.
22. The _____ is a non-bony skeleton on the outside of the body of some animals.
23. The _____ is a rigid rod that runs the length of the body in chordates.
24. All animals with a backbone are classified as _____.
25. An immature stage of an animal that differs from the adult form is called a(n) _____.
26. The outer embryonic cell layer of animals is the _____.
27. The first type of symmetry to evolve was _____ symmetry.
28. The division of an animal body into multiple segments is called _____.

29. The animal phylum that includes human beings is the _____.
30. Roundworms have a partial, fluid-filled body cavity called a(n) _____.

Short Answer

Answer each question in the space provided.

31. Outline major trends in animal evolution.

32. Describe general characteristics of invertebrates.

33. Give an overview of invertebrate classification.

CHAPTER 18**From Sponges to Invertebrate Chordates Assessments****Chapter Outline**

- 18.1 SPONGES, CNIDARIANS, FLATWORMS, AND ROUNDWORMS**
 - 18.2 MOLLUSKS AND ANNELIDS**
 - 18.3 ARTHROPODS AND INSECTS**
 - 18.4 ECHINODERMS AND INVERTEBRATE CHORDATES**
 - 18.5 FROM SPONGES TO INVERTEBRATE CHORDATES**
-



18.1 Sponges, Cnidarians, Flatworms, and Roundworms

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Water and wastes flow out of sponges primarily through the
 - collar cells.
 - osculum.
 - nematocysts.
 - spicules.
- Most flatworms reproduce by
 - budding.
 - asexual reproduction.
 - egg and sperm production during the larval stage.
 - sexual reproduction, often with the same individual producing both male and female gametes.
- The collar cell of sponges
 - produces poison for protection.
 - are made of silica.
 - trap and digest food.
 - are made of spongin.
- The nematocyst
 - contains poison.
 - is a characteristic feature of jellyfish and corals.
 - helps protect the animals that have it from predators.
 - all of the above
- The coelenteron
 - is a digestive cavity in jellyfish.
 - is another name for tentacle.
 - protects coral from predators.
 - is not present in Cnidarians.
- Which of the following is true about corals?
 - They are Cnidarians.
 - They have a mutually beneficial relationship with algae.
 - They spend all of their adult lives as polyps.
 - all of the above
- Flatworms take in oxygen and excrete carbon dioxide via
 - diffusion through cells.

- b. fully developed lungs.
 - c. a symbiotic relationship with algae.
 - d. none of the above.
8. The animal group characterized by having muscles, cephalization, bilateral symmetry, three embryonic cell layers, and no coelom is the
- a. sponges.
 - b. corals.
 - c. roundworms.
 - d. flatworms.
9. The _____ of roundworms constrains the worm's size and enables fluid pressure to build up in the psuedocoelom.
- a. cuticle
 - b. radicle
 - c. mouth
 - d. digestive system
10. The sheep liver fluke lives in a snail during the _____ phase of its life cycle.
- a. unfertilized egg
 - b. adult
 - c. larval
 - d. sperm
11. Roundworms are in the phylum
- a. Annelida.
 - b. Nematoda.
 - c. Porifera.
 - d. Chordata.
12. A common roundworm parasite in humans in the United States is
- a. tapeworms.
 - b. pinworms.
 - c. flukes.
 - d. earthworms.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. All sponges are about the same size and shape.
- _____ 14. The medusa body plan of Cnidarians is typically sessile.
- _____ 15. Flatworms have an incomplete digestive system.
- _____ 16. Hookworms are mostly free-living.
- _____ 17. The internal skeleton of sponges consists of spicules.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Food vacuoles in _____ of sponges digest food.
19. Jellyfish and corals are in the phylum _____.
20. A _____ is a long, thin, poison-containing stinger.

21. The best known body plan of a jellyfish is the _____.
22. Cnidarians have a _____ that detects touch.
23. Flukes, tapeworms and flatworms belong to the phylum _____.
24. Roundworms belong to the phylum _____.
25. When the adult form of an animal does not move from place to place, it is said to be _____.

Short Answer

Answer each question in the space provided.

26. Describe how sponges obtain and digest food.

27. What is a possible advantage of some Cnidarians being able to switch between medusa and polyp body plans?

18.2 Mollusks and Annelids

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Which of the following is **not** a mollusk?
 - scallop
 - squid
 - snail
 - coral
- The hard outer shell of mollusks is made by the
 - stomach.
 - mantle.
 - gills.
 - nerve fibers.
- Carbon dioxide is excreted from mollusks via the
 - stomach.
 - mantle.
 - gills.
 - nephridia.
- Which of the following classes of mollusks has an open circulatory system?
 - bivalves
 - cephalopods
 - gastropods
 - a and c
- The unique larval form of mollusks is called the
 - trochophore.
 - mantle.
 - radula.
 - spermatophore.
- The class of mollusks that generally contains sessile filter feeders is the
 - bivalves.
 - cephalopods.
 - gastropods.
 - segmented worms.
- Regeneration can be defined as
 - the ability to come to life after death.

- b. the ability of segmented worms to replace broken off segments by growing new ones.
 - c. reproduction in the absence of females.
 - d. none of the above.
8. An example of a filter feeder is _____.
- a. an octopus
 - b. a cephalopod
 - c. a clam
 - d. a parasitic gastropod
9. Annelids do **not** have which of the following?
- a. brain
 - b. complete digestive system
 - c. gills
 - d. open circulatory system
10. The excretory system of annelids consists of
- a. tubular nephridia.
 - b. spicules.
 - c. nematocysts.
 - d. trochophore.
11. An advantage of segmentation in annelids is that
- a. the animal is more flexible.
 - b. segments can regenerate if lost.
 - c. different segments can be specialized for different functions.
 - d. all of the above
12. Sexual reproduction in polychaete species
- a. does not occur.
 - b. has a larval stage.
 - c. one individual makes both male and female gametes.
 - d. occurs on the land.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Snails are mollusks.
- _____ 14. The hard outer shell of mollusks is made of calcium carbonate.
- _____ 15. All cephalopods are filter feeders.
- _____ 16. Some annelids live on land.
- _____ 17. The radula is a food-gathering structure in mollusks.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The phylum _____ includes the octopus, squid, and scallop.
19. _____ have a muscular foot that they use to move from place to place, and a snail is an example.
20. _____ use nonliving organic matter and plankton as their food.
21. _____ are the largest of all invertebrates.
22. Predatory mollusks use their _____ to drill holes in the shells of their prey.

23. Polychaetes are in the phylum _____.
24. Polychaetes live _____.
25. Earthworms are _____ feeders.

Short Answer

Answer each question in the space provided.

26. What is the mantle? What is the importance of the mantle in mollusks?

27. What advantage might a closed circulatory system have over an open circulatory system?

18.3 Arthropods and Insects

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Which of the following is **not** an arthropod?
 - crab
 - honeybee
 - mite
 - polychaete
- When arthropods grow, they must
 - stop eating.
 - molt.
 - develop unjointed appendages.
 - none of the above
- Some arthropods have structures called _____ that transport waste from the digestive tract to the anus.
 - coxal glands
 - nephridia
 - Malphigian tubules
 - mandibles
- Which of the following subphyla are not mainly terrestrial?
 - Myriapoda
 - Chelicerata
 - Crustacea
 - Hexapoda
- A member of the phylum Hexapoda is
 - beetle.
 - centipede.
 - krill.
 - spider.
- A member of the phylum Crustacea is
 - centipede.
 - lobster.
 - mite.
 - all of the above
- A member of the phylum Chelicerata is
 - moth.

- b. grasshopper.
 - c. ant.
 - d. spider.
8. A member of the phylum Myriapoda is
- a. scorpion.
 - b. tick.
 - c. millipede.
 - d. shrimp.
9. Arthropods with six legs and a head, thorax, and abdomen are
- a. spiders.
 - b. scorpions.
 - c. insects.
 - d. millipedes.
10. The function of insect antennae is
- a. for propelling flight.
 - b. detecting chemicals.
 - c. reproducing asexually.
 - d. seeing.
11. Which of the following is **not** a typical characteristic of insect flight?
- a. use of wings
 - b. ability to escape predators
 - c. communicate with other insects
 - d. is possible by only a very few insects
12. The pupal stage occurs
- a. after the larval stage and immediately before the adult stage.
 - b. immediately after the adult stage.
 - c. instead of egg laying.
 - d. after the adult stage and immediately before the trochal stage.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. The phylum Arthropoda contains the fewest species of all invertebrate phyla.
- _____ 14. Arthropods were one of the last invertebrates to have terrestrial species.
- _____ 15. Insects have a closed circulatory system.
- _____ 16. All insects have the same structures for mouthparts.
- _____ 17. All human-insect interactions are helpful to humans.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Some arthropods have a fused head and thorax called a _____.
19. Gas exchange in aquatic arthropods occurs through _____.
20. The transformation of a caterpillar into a butterfly is called _____.
21. _____ are the oldest known arthropods.
22. _____ and _____ are feeding structures in insects.

18.4 Echinoderms and Invertebrate Chordates

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Which of the following organisms is **not** in the phylum Echinodermata?
 - tunicate
 - sea urchin
 - sea star
 - sand dollar
- The spines of echinoderms are
 - a chitinous exoskeleton.
 - a calcium carbonate-based endoskeleton.
 - a cellulose-based exoskeleton.
 - none of the above.
- Larval echinoderms have
 - asymmetry.
 - radial symmetry.
 - bilateral symmetry.
 - trilateral symmetry.
- Adult echinoderms have
 - asymmetry.
 - radial symmetry.
 - bilateral symmetry.
 - trilateral symmetry.
- The ability of an echinoderm's tube feet to extend and attach depends upon
 - the time of day.
 - the centralized nervous system.
 - the season.
 - muscular contractions that force water into the tube feet.
- The circulatory system of echinoderms is best described as
 - a closed circulatory system with no heart.
 - a closed circulatory system with a heart.
 - an open circulatory system with a heart.
 - an open circulatory system with no heart.
- Echinoderm reproduction typically is
 - asexual reproduction by budding.

- b. sexual reproduction with internal fertilization.
 - c. sexual reproduction with external fertilization.
 - d. none of the above.
8. The order of the life cycle of echinoderms is best represented by which sequence?
- a. fertilized egg, free-swimming larva, adult
 - b. larva, pupa, fertilized egg, adult
 - c. fertilized egg, adult
 - d. pupa, fertilized egg, adult
9. Chordates have a
- a. coelom and incomplete digestive system.
 - b. coelom and complete digestive system.
 - c. psuedocoelom and open circulatory system.
 - d. all of the above (depends on the species)
10. Chordates have
- a. radial symmetry.
 - b. asymmetry.
 - c. bilateral symmetry.
 - d. all of the above (depends upon the species).
11. A common name for tunicate is
- a. sea star.
 - b. sea urchin.
 - c. sea cucumber.
 - d. sea squirt.
12. Lancelets live
- a. in the desert.
 - b. in shallow freshwater ponds.
 - c. in shallow ocean water.
 - d. at the bottom of deep freshwater ponds.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. All echinoderms live in tropical equatorial regions.
- _____ 14. Echinoderms do not have a respiratory system.
- _____ 15. Echinoderms have a well-developed excretory system.
- _____ 16. The phylum Chordata contains 100% vertebrates.
- _____ 17. Tunicates are members of the phylum Chordata.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The _____ of echinoderms can generate enough force to pry open the shells of prey.
19. The digestive system of echinoderms is a _____ digestive system.
20. Like annelids, echinoderms can _____ a body part that has been removed.
21. Echinoderms have simple light-sensing eyes called _____.
22. Echinoderms use _____ to communicate with other echinoderms.

23. Vertebrates are chordates that have a _____.

24. _____ tunicates are free-swimming.

25. Lancelets are _____ feeders.

Short Answer

Answer each question in the space provided.

26. Name and briefly describe the four defining traits of chordates.

27. Compare and contrast some major features of tunicates and humans.

18.5 From Sponges to Invertebrate Chordates

Chapter Test

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Which statement about invertebrates is false?
 - Invertebrates are the most numerous animals on Earth.
 - Most invertebrates are insects.
 - Many basic animal traits evolved in invertebrates.
 - Invertebrates have a backbone.
- Which invertebrates belong to the phylum Porifera?
 - flukes
 - corals
 - sponges
 - jellyfish
- The two basic body plans of cnidarians are the polyp and
 - nematocyst.
 - pupa.
 - larva.
 - medusa.
- Which evolutionary advance occurred in flatworms?
 - coelom
 - mesoderm
 - radial symmetry
 - complete digestive system
- Mollusks include
 - snails.
 - scallops.
 - squids.
 - all of the above.
- What is the function of gills in mollusks?
 - exchanging gases
 - reproducing
 - swimming
 - absorbing food
- Earthworms belong to the phylum
 - Platyhelminthes.

- b. Nematoda.
 - c. Annelida.
 - d. Hexapoda.
8. The largest phylum of invertebrates is the
- a. insects.
 - b. arthropods.
 - c. cnidarians.
 - d. trilobites.
9. Which statement about echinoderms is **false**?
- a. Adult echinoderms have radial symmetry.
 - b. Echinoderms evolved from an ancestor with bilateral symmetry.
 - c. Larval echinoderms have bilateral symmetry.
 - d. Echinoderms evolved from an ancestor with radial symmetry.
10. Which trait is unique to chordates?
- a. three embryonic cell layers
 - b. complete digestive system
 - c. pharyngeal slits
 - d. tube feet

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Sponges have an exoskeleton.
- _____ 12. Sponges are predators.
- _____ 13. Jellyfish have a brain.
- _____ 14. Tapeworms are human parasites.
- _____ 15. Roundworms reproduce by budding.
- _____ 16. A mollusk uses its mantle for feeding.
- _____ 17. The largest invertebrates are cephalopods.
- _____ 18. Arthropods have an exoskeleton made of cuticle.
- _____ 19. Malpighian tubules are used for reproduction.
- _____ 20. Lancelets belong to the phylum Nematoda.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. An internal skeleton is called a(n) _____.
22. The phylum _____ includes corals.
23. Segmented worms are placed in the phylum _____.
24. The capacity to regrow segments is referred to as _____.
25. The process of a larva changing into an adult form is called _____.
26. The oldest known arthropods are the _____.
27. Insects smell and taste chemicals with head appendages called _____.
28. Metamorphosis in insects occurs during the _____ stage.

29. Only the phylum _____ includes both invertebrates and vertebrates.
30. An animal that is _____ is anchored to a surface and unable to move.

Short Answer

Answer each question in the space provided.

31. Compare and contrast flatworms and roundworms.

32. Identify ways that humans interact with insects.

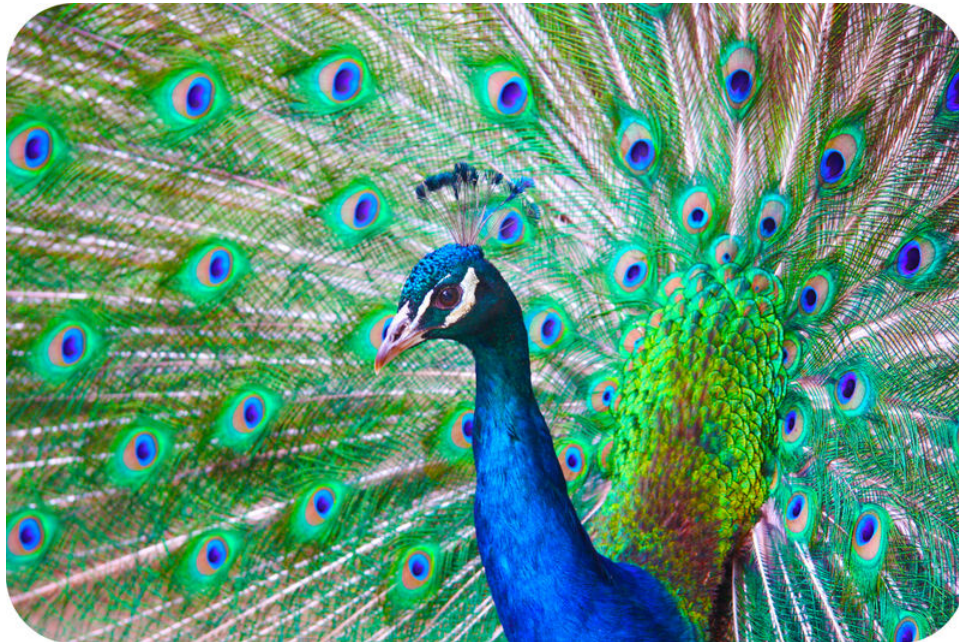
33. Summarize the diversity of chordates.

CHAPTER 19

From Fish to Birds Assessments

Chapter Outline

- 19.1 OVERVIEW OF VERTEBRATES
 - 19.2 FISH
 - 19.3 AMPHIBIANS
 - 19.4 REPTILES
 - 19.5 BIRDS
 - 19.6 FROM FISH TO BIRDS
-



19.1 Overview of Vertebrates

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- The main distinguishing feature of vertebrates is their
 - skeleton.
 - circulatory system.
 - vertebral column.
 - skin.
- Vertebrates have an endoskeleton made of
 - scales, feathers, fur, or hair.
 - bone or cartilage.
 - vertebrae.
 - blood and tissue.
- The vertebrate endoskeleton includes a vertebral column and
 - limb girdles.
 - limbs.
 - cranium.
 - all of the above.
- In addition to the skeletal features, vertebrates have
 - a closed centralized immune system.
 - an excretory system that includes a pair of kidneys.
 - an adaptive circulatory system with a heart.
 - all of the above.
- Ovovivipary refers to
 - the development of an embryo inside an egg within the mother's body until it hatches.
 - the development and nourishment of an embryo within the mother's body.
 - the development of an embryo within an egg outside the mother's body.
 - the development and nourishment of an embryo outside the mother's body.
- There are about _____ vertebrate species, and they are placed in _____ different classes.
 - 50,000; nine
 - 500,000; nine
 - 5,000; nineteen
 - 50,000; nineteen
- The first vertebrates to evolve were the
 - mammals.

- b. fish.
 - c. reptiles.
 - d. amphibians.
8. The correct order of fish evolution is
- a. Lampreys - Hagfish - Cartilaginous Fish - Ray-Finned Fish.
 - b. Hagfish - Lampreys - Ray-Finned Fish - Cartilaginous Fish.
 - c. Hagfish - Cartilaginous Fish - Lampreys - Ray-Finned Fish.
 - d. Hagfish - Lampreys - Cartilaginous Fish - Ray-Finned Fish.
9. Which of the following statements is correct concerning endothermy? (1) Mammals and birds evolved endothermy. (2) All vertebrates are endothermic. (3) Endothermy is regulating body temperature from the inside using metabolic or other physical changes. (4) Endothermy is regulating body temperature from the outside through behavioral changes.
- a. 1 and 3
 - b. 2 and 4
 - c. 1 and 4
 - d. 2 and 3
10. Which statement is correct?
- a. The first amphibians evolved from a reptile ancestor at least 365 million years ago.
 - b. The first amphibians evolved from a reptile ancestor at least 300 million years ago.
 - c. The first mammals appeared about 200 million years ago.
 - d. The first birds appeared about 200 million years ago.
11. After fish,
- a. reptiles then amphibians then birds then mammals evolved.
 - b. amphibians then reptiles then mammals then birds evolved.
 - c. amphibians then reptiles then birds then mammals evolved.
 - d. reptiles then amphibians then mammals then birds evolved.
12. Which vertebrates have a cranium but no backbone?
- a. cartilaginous fish
 - b. lampreys
 - c. hagfish
 - d. lobe-finned fish

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Vertebrates are a phylum of the subphylum Chordata.
- _____ 14. The main distinguishing feature of vertebrates is their backbone.
- _____ 15. Vertebrates have an endoskeleton made of bone or cartilage.
- _____ 16. There are about 500,000 vertebrate species, and they are placed in nine different classes.
- _____ 17. Mammals were the last vertebrates to evolve.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The _____ houses and protects the spinal cord.
19. _____ is less flexible than cartilage but stronger.
20. Most vertebrates have _____ covered with scales, feathers, fur, or hair.

21. _____ refers to the development and nourishment of an embryo within the mother's body.
22. _____ were the first class of vertebrates to evolve.
23. _____ of the classes of vertebrates are fish classes.
24. There are about 50,000 vertebrate species, and they are placed in _____ different classes.
25. _____ is regulating body temperature from the inside through metabolic or other physical changes.

Short Answer

Answer each question in the space provided.

26. List and describe three characteristics of vertebrates.

27. Identify four of the nine classes of vertebrates.

19.2 Fish

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Fish make up about _____ of all vertebrate species.
 - 5%
 - 10%
 - 25%
 - 50%
- Which statements of the traits of fish is correct?
 - Fish are covered in scales, have gills, typically have a long and narrow body, and have several fins for swimming.
 - Fish are covered in scales, have lungs, typically have a long and narrow body, and have several fins for swimming.
 - Fish are covered in hair, have gills, typically have a long and narrow body, and have several fins for swimming.
 - Fish are covered in scales, have gills, typically have a long and narrow body, and have several limbs for swimming.
- A swim bladder
 - allows a fish to store food until it is digested.
 - allows a fish to move up or down through the water column.
 - allows a fish to store urine until it is excreted.
 - allows a fish to store excess water.
- Spawning
 - increases the chances that fertilization will take place.
 - is when a large group of adults releases their gametes at the same time.
 - means that many embryos will form at the same time.
 - all of the above
- There are about _____ existing species of fish, and they are placed into _____.
 - 28,000; five different families
 - 28,000; five different classes
 - 280,000; five different classes
 - 28,000; five different phylums
- The characteristic feature of lampreys is their
 - powerful jaws with multiple rows of sharp, saw-like teeth.
 - large round sucker that surrounds the mouth.
 - lack of scales and fins.

- d. cartilaginous skeleton.
7. The characteristic feature of cartilaginous fish is their
- cartilage notochord instead of a backbone.
 - powerful jaws with multiple rows of sharp, saw-like teeth.
 - large swim bladder.
 - all of the above
8. The characteristic feature of hagfish is their
- multiple dorsal fins.
 - extra layers of scales.
 - powerful jaws with multiple rows of sharp, saw-like teeth.
 - notochord instead of a backbone.
9. Today, the majority of living fish species belong to the
- ray-fined fish.
 - lobe-fined fish.
 - cartilaginous fish.
 - hagfish.
10. The order of fish evolution is:
- lampreys - hagfish - lobe-fined fish - ray-fined fish.
 - hagfish - lobefish - cartilaginous fish - ray-fined fish.
 - hagfish - lampreys - cartilaginous fish - ray-fined fish.
 - lampreys - hagfish - cartilaginous fish - ray-fined fish.
11. Which statement is true about fish food?
- Hagfish will eat dead fish.
 - Lampreys suck blood from larger fish.
 - Cartilaginous fish will eat aquatic mammals.
 - all of the above
12. A fish larva
- is very similar to the adult fish.
 - is born sexually mature.
 - is attached to a large yolk sac, which provides the larva with food.
 - all of the above

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Most fish are ectothermic and covered with scales.
- _____ 14. Fish have a circulatory system with a four-chambered heart.
- _____ 15. Hagfish are known for their large round suckers, lined with teeth, that surround their mouths.
- _____ 16. One of the most important traits of cartilaginous fish is their jaws.
- _____ 17. There are about 280,000 existing species of fish, and they are placed in five different classes.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Fish have gills that allow them to “breathe” _____ in water.
19. _____ is when a large group of adults come together to release their gametes into the water at the same time.

20. Hagfish retain their notochord throughout life rather than developing a _____.
21. _____ fish include sharks, rays, and ratfish.
22. _____ fish include the majority of living fish species.
23. _____ can survive for long periods of time out of water.
24. _____ use their sucker to feed on the blood of other fish species.
25. Fish larvae must go through _____ and change into the adult form.

Short Answer

Answer each question in the space provided.

26. Describe two of the five living classes of fish.

27. List and describe two adaptations of fish for water.

19.3 Amphibians

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Amphibians divide their time between
 - freshwater and saltwater habitats.
 - freshwater and terrestrial habitats.
 - water and desert habitats.
 - all of the above.
- Amphibians are the first true vertebrates
 - with a backbone.
 - with an amniotic egg.
 - with four limbs.
 - with scales.
- Amphibians are ectothermic. This means
 - their body is warmed by the environment.
 - they use their metabolism to warm their body.
 - their high metabolism generates heat that keeps them warm.
 - none of the above.
- Amphibians breathe
 - with gills as larvae and with lungs as adults.
 - with lungs as larvae and with gills as adults.
 - with both lungs and gills as adults.
 - only through their skin.
- As the amphibian tadpole undergoes metamorphosis, many
 - grow legs, grow a tail, and develop lungs.
 - grow legs, lose its tail, and develop lungs.
 - lose legs, lose its tail, and develop lungs.
 - grow legs, lose its tail, and develop gills.
- There are about _____ known species of living amphibians. They are placed in _____.
 - 6,200; three different families
 - 62,000; three different orders
 - 6,200; three different orders
 - 620; three different phylum
- A major difference between frogs and toads is that
 - frogs spend more time in water, and toads spend more time on land.

- b. toads have smoother, moister skin.
 - c. toads have longer back legs, so they can jump farther.
 - d. all of the above
8. Salamanders
- a. have tails as adults.
 - b. are adapted for walking, not jumping like the frog.
 - c. can regenerate lost limbs.
 - d. all of the above
9. Caecilians
- a. have legs that are about the same length, unlike the toad.
 - b. are adapted for walking, not jumping like the frog.
 - c. have a long, worm-like body without legs.
 - d. spend all their time in the water.
10. Which is the best statement concerning amphibian evolution?
- a. Amphibians evolved over 350 million years ago from a lobe-finned lungfish ancestor.
 - b. As the earliest land vertebrates, amphibians evolved about 500 million years ago.
 - c. As reptiles became the dominant land vertebrate, most amphibians went extinct.
 - d. Amphibians evolved over 350 million years ago from a ray-finned lungfish ancestor.
11. Which is the best statement concerning the amphibian niche?
- a. Amphibians are predators for many animals, including birds, snakes, raccoons, and fish.
 - b. Amphibians are an important food source for animals such as birds, snakes, raccoons, and fish.
 - c. As adults, amphibians are omnivores, eating eat worms, snails and insects, as well as the plants in their habitat.
 - d. Most amphibians can dig in the soil to feed on earthworms and other annelids.
12. The only continent without amphibians is
- a. the Arctic Circle.
 - b. Australia.
 - c. Antarctica.
 - d. All continents have amphibians.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Amphibians are the first true vertebrates with four limbs.
- _____ 14. Amphibians generally have moist skin with scales.
- _____ 15. Most amphibians breathe with gills as larvae and with lungs as adults.
- _____ 16. There are about 6,200 known species of living amphibians placed into three different families.
- _____ 17. Amphibians evolved from a lobe-finned lungfish ancestor.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Amphibian organ systems share a body cavity called the _____.
19. Amphibians are _____, so they cannot adjust their body temperature through metabolic processes.
20. Amphibian skin contains _____, a tough, fibrous protein found in vertebrates.
21. The loud croaking of frogs is their _____ call.

22. The amphibian early larval stage, also known as the _____, resembles a fish.
23. Frogs and toads have long back legs adapted for _____.
24. Salamanders have short legs that are adapted for walking and _____.
25. The only continent without amphibians is _____.

Short Answer

Answer each question in the space provided.

26. *Amphibians are vertebrates that exist in two worlds.* What does this statement mean?

27. Describe two amphibian adaptations for life on land.

19.4 Reptiles

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

1. Reptiles are a class of tetrapod vertebrates that
 - a. produce amniotic eggs.
 - b. consists of all amniotes except amphibians and mammals.
 - c. include crocodiles, alligators, lizards, snakes, and toads.
 - d. all of the above
2. Reptile skin
 - a. allows the exchange of gasses, as in amphibians.
 - b. is made from a tough protein called collagen.
 - c. protects the animal from injury, and also prevents water loss.
 - d. all of the above
3. Reptiles need much less food than mammals because
 - a. they are much smaller.
 - b. they are ectotherms.
 - c. they have a fast metabolism.
 - d. all of the above
4. The reptile amniotic egg
 - a. prevents water loss while the embryo grows and develops.
 - b. allows for only short periods of development.
 - c. needs a constant supply of fresh food and water.
 - d. is covered by scales that allow it to absorb oxygen.
5. The amniotic egg
 - a. allows vertebrates to live anywhere on land.
 - b. first evolved in amphibians and then reptiles.
 - c. has either hard or “jelly”-coated shells.
 - d. all of the above
6. There are more than 8,200 living species of reptiles, with the majority being
 - a. crocodiles and alligators.
 - b. snakes and turtles.
 - c. snakes and lizards.
 - d. lizards and turtles.
7. Which reptiles have a hard shell covering most of their body? (1) Crocodilia, (2) Testudines, (3) Squamata, (4) Sphenodontia.

- a. 1 only
 - b. 2 only
 - c. 2 and 3
 - d. 2 and 4
8. Which reptiles have strong jaws and a powerful bite? (1) Crocodylia, (2) Testudines, (3) Squamata, (4) Sphenodontia.
- a. 1 only
 - b. 2 only
 - c. 1 and 4
 - d. 1, 2, and 3
9. Which statement is true of synapsids and sauropsids? (1) Sauropsids were amniotes that evolved into reptiles, dinosaurs, and birds. (2) Synapsids were amniotes that evolved into mammals. (3) The two groups of amniotes differed in their skulls.
- a. 1 only
 - b. 1 and 2
 - c. 2 and 3
 - d. 1, 2, and 3
10. The Triassic takeover refers to
- a. the rise of the dinosaurs.
 - b. when synapsids became more dominant than sauropsids.
 - c. when sauropsids became more dominant than synapsids.
 - d. the evolution of the first reptile.
11. The order of reptile evolution is
- a. crocodiles - turtles - tuataras - lizards.
 - b. turtles - crocodiles - tuataras - lizards.
 - c. lizards - turtles - crocodiles - snakes.
 - d. turtles - snakes - crocodiles - tuataras.
12. Today, reptiles can be found on every continent except
- a. Africa.
 - b. Australia.
 - c. America.
 - d. Antarctica.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Reptiles can lay their eggs in many different environments.
- _____ 14. Like amphibians, reptiles are ectotherms with a fast metabolic rate.
- _____ 15. Most reptiles reproduce sexually with external fertilization.
- _____ 16. Synapsids were the reptiles that eventually gave rise to mammals.
- _____ 17. There are just four orders of reptiles.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The _____ of most reptiles is covered with scales, which prevent water loss.
19. They amniotic _____ keeps the embryo moist and safe while it grows and develops.

19.5 Birds

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Birds
 - are bipedal, which means they fly using two wings.
 - are the most recent class of vertebrates to evolve.
 - lay amniotic eggs with hard, leathery shells.
 - all of the above
- All modern birds have
 - wings, feathers, and gills or lungs.
 - wings, feathers, scales and beaks.
 - wings, feathers, and beaks.
 - wings, feathers, beaks, and teeth.
- Wings
 - are an obvious adaptation for flight.
 - are modified front legs.
 - move using large muscles in the bird's chest.
 - all of the above
- Which is the best statement describing feathers?
 - Down feathers are long, stiff, and waterproof.
 - Down feathers provide lift and air resistance without adding weight.
 - Down feathers trap air next to a bird's skin for insulation.
 - Flight feathers are short and fluffy.
- Bird organ systems adapted for flight include
 - lightweight bones that are filled with air.
 - a relatively large, two-chambered heart.
 - lungs with millions of alveoli to increase gas exchange.
 - all of the above.
- Which statement best describes the relationship between a crop and a gizzard?
 - A gizzard stores and moistens food, and the crop grinds the food to help with digestion.
 - A crop stores and moistens food, and the gizzard grinds the food to help with digestion.
 - A crop stores and moistens food, and the gizzard, which acts like the stomach, digests the food.
 - A gizzard stores and moistens food, and the crop, which acts like the stomach, digests the food.
- Courtship by birds may include
 - singing and dancing by the male.

- b. a display of bravery.
 - c. drinks and dinner.
 - d. dinner and dancing.
8. In most bird species,
- a. parents only mate together.
 - b. parents stay together for life.
 - c. parents stay together for at least the length of the breeding season.
 - d. parents have little interactions with their young.
9. Birds are the most numerous vertebrates on Earth. There are about _____ living species of birds.
- a. 1,000
 - b. 10,000
 - c. 100,000
 - d. 1,000,000
10. Flightless birds include the
- a. ostrich, kiwi, and turkey.
 - b. ostrich, penguin, and turkey.
 - c. rhea, kiwi, chicken, and penguin.
 - d. ostrich, kiwi, and penguin.
11. Birds that are able to fly are divided into _____ orders, with _____ birds being the most common.
- a. 29; perching
 - b. 7, perching
 - c. 29, honeyeater
 - d. 19; honeyeater
12. Birds are thought to have evolved from
- a. flying amphibians.
 - b. dinosaurs.
 - c. small flying mammals.
 - d. none of the above.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. All modern birds have wings, feathers, and beaks.
- _____ 14. Down feathers provide lift and air resistance without adding weight.
- _____ 15. All birds can fly.
- _____ 16. It is believed that birds evolved from dinosaurs.
- _____ 17. Birds are found on all continents except Antarctica.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Raptors such as hawks and owls are _____, they eat mammals and other birds.
19. Birds are _____, and can maintain their body temperature using their metabolism.
20. Penguins are flightless birds adapted for _____.
21. Courtship in birds can involve _____ and dancing.

22. Birds have light-weight _____ that are filled with air.
23. Birds have a sac-like structure called a crop where they store _____.
24. _____ are modified front legs.
25. _____ most numerous vertebrates on Earth.

Short Answer

Answer each question in the space provided.

26. Describe two adaptations in birds for flight.

27. Describe courtship in birds.

19.6 From Fish to Birds

Chapter Test

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Traits of vertebrates include
 - an adaptive immune system.
 - a centralized nervous system.
 - two kidneys.
 - all of the above.
- The reproductive strategy in which an embryo develops within an egg outside the mother's body is called
 - ovipary.
 - incubation.
 - brooding.
 - external fertilization.
- The earliest vertebrates were
 - ray-finned fish.
 - lobe-finned fish.
 - jawed fish.
 - jawless fish.
- Spawning in fish increases the chances of
 - germination.
 - fertilization.
 - brooding.
 - metamorphosis.
- Which features are found in amphibians?
 - lungs and a four-chambered heart
 - eyes and ears
 - scales on the skin
 - all of the above
- Why are amphibians especially sensitive to environmental pollution?
 - They are small in size.
 - They are endothermic.
 - They have permeable skin.
 - They are primary consumers.
- What is the function of the yolk in an amniotic egg?
 - It exchanges gases with the environment.

- b. It provides the embryo with food.
 - c. It provides air to the embryo.
 - d. It cushions the embryo.
8. Reptiles in the order Squamata include
- a. crocodiles.
 - b. turtles.
 - c. tuataras.
 - d. lizards.
9. Which statement about reptiles is true?
- a. All reptiles are terrestrial animals.
 - b. The majority of reptiles are carnivores.
 - c. Reptiles descended from a synapsid ancestor.
 - d. Modern reptiles evolved from dinosaurs.
10. Adaptations for flight in birds include
- a. a beak instead of a jaw.
 - b. a three-chambered heart.
 - c. a slow heart rate.
 - d. cartilage instead of bones.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Vertebrates have an open circulatory system.
- _____ 12. The majority of vertebrate classes are mammals.
- _____ 13. Endotherms raise their body temperature by increasing their metabolic rate.
- _____ 14. Fish urinate from their swim bladder.
- _____ 15. Cartilaginous fish have no bones.
- _____ 16. Amphibians reproduce sexually.
- _____ 17. Reptiles are found on every continent from the equator to the poles.
- _____ 18. Most reptiles must hold their breath while they run.
- _____ 19. Birds have a small brain relative to their body size.
- _____ 20. All birds have the ability to fly.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. _____ refers to the development of an embryo inside an egg within the mother's body.
22. Endothermic vertebrates with jaws belong to the class known as _____.
23. All vertebrates with four limbs are referred to as _____.
24. _____ is a tough, fibrous protein in skin, scales, feathers, hair, and nails.
25. A body cavity in amphibians called the _____ is used for both excretion and reproduction.
26. Newts and salamanders belong to the _____ class.
27. The _____ is a large sheet of muscles below the lungs that controls breathing in many animals.
28. Animals that walk on two legs are said to be _____.

CHAPTER 20

Mammals and Animal Behavior Assessments

Chapter Outline

- 20.1 MAMMALIAN TRAITS
- 20.2 REPRODUCTION IN MAMMALS
- 20.3 EVOLUTION AND CLASSIFICATION OF MAMMALS
- 20.4 OVERVIEW OF ANIMAL BEHAVIOR
- 20.5 MAMMALS AND ANIMAL BEHAVIOR



20.1 Mammalian Traits

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Examples of mammals include
 - humans.
 - sharks.
 - alligators.
 - frogs and toads.
- Two characteristics are used to define the mammal class. These are
 - mammary glands and skin without scales.
 - mammary glands and skin with sweat glands.
 - mammary glands and hair or fur.
 - lungs with alveoli and a four-chamber heart.
- Traits of mammals include which of the following? (1) having four different types of teeth, (2) skin with sweat glands, (3) a large brain with a covering called the cerebrum, (4) an ear with four tiny bones that carry sound vibrations from the outer to inner ear.
 - 1 only
 - 1 and 2
 - 3 and 4
 - 1, 2, and 3
- The cells of mammals have many mitochondria. Why?
 - The mitochondria generate enough energy to keep the rate of metabolism high.
 - The mitochondria generate enough glucose to keep the rate of metabolism high.
 - The mitochondria use most of the energy of the cell, keeping the rate of metabolism high.
 - none of the above
- Mammals lose excess heat by
 - increasing blood flow to the skin.
 - panting.
 - sweating.
 - all of the above.
- The bear, fox, human, rat, and pig diets are classified as
 - carnivorous.
 - omnivorous.
 - herbivorous.
 - any of the above.

7. In terms of oxygen, which of the following statements is correct?
- A lot of oxygen is needed to maintain a high metabolic rate.
 - Cellular respiration, which produces ATP for metabolism, requires oxygen.
 - The lungs of mammals are adapted to supply lots of oxygen to the blood.
 - all of the above.
8. Locomotion in mammals is superior to many other animals because
- mammals have limbs that are specialized for a particular way of moving.
 - the limbs are attached at the sides of the body.
 - their limbs are very mobile and can often be rotated.
 - most mammals are very fast.
9. Social living evolved in mammals because
- it allows the strong young to protect the older adults in a herd.
 - it allows cooperative behavior, such as hunting.
 - it allows the females to hunt and the males to protect, as in herbivorous animals.
 - all of the above
10. The mammalian brain
- has a covering called a neocortex, which controls functions such as memory and learning.
 - has a covering called a cerebrum, which controls mental abilities.
 - has a large cerebrum, which controls functions such as memory and learning.
 - has a large neocortex, which controls functions such as memory and learning.
11. The lungs and hearts of mammals
- keeps plenty of oxygen available to all the cells of the body.
 - are unique in that they both have alveoli.
 - both are able to pump blood throughout the body.
 - all of the above
12. The diaphragm
- covers the skin of many mammals and produces salty fluid that helps cool the body.
 - provide a very large surface area for gas exchange in the lungs.
 - is the largest chamber of the mammalian four-chambered heart, making the heart very efficient and powerful for delivering oxygenated blood to tissues.
 - is a large muscle that helps mammals breathe.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. The mammalian middle ear has two tiny bones that carry sound vibrations from the outer to inner ear.
- _____ 14. Mammals generate heat mainly by keeping their metabolic rate high.
- _____ 15. All mammals have hair or fur.
- _____ 16. Herbivores such as zebras and whales live in herds.
- _____ 17. The skin of many mammals is covered with scales.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Mammals have hair or fur that insulates the body to help conserve body _____.
19. Mammalian _____ have millions of tiny air sacs called alveoli.

20. Female mammals have _____ glands that produce milk after the birth of offspring.
21. Rabbits, mice, elephants and zebras have a _____ diet.
22. The front part of the brain, the _____, is especially large in mammals.
23. Maintaining a high _____ rate takes a lot of energy.
24. Keeping the rate of metabolism high takes a constant and plentiful supply of _____.
25. Because of the structure of the mammalian heart, all of the _____ going to body cells is rich in oxygen.

Short Answer

Answer each question in the space provided.

26. List and describe two characteristics of mammals.

27. Describe how mammals stay warm.

20.2 Reproduction in Mammals

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Most mammals are viviparous. This means
 - they lay eggs.
 - their young are born live.
 - they raise their young after birth.
 - the young develop with the help of a placenta.
- Like other female vertebrates, all female mammals have
 - ovaries.
 - an uterus.
 - a vagina.
 - all of the above.
- Therian mammals are divided into two groups,
 - placental mammals and monotreme mammals.
 - monotreme mammals and marsupial mammals.
 - placental mammals and marsupial mammals.
 - placental mammals and non-placental mammals.
- Which statement best describes the placenta?
 - The placenta passes oxygen, nutrients, and other useful substances from the mother to the fetus.
 - The placenta passes oxygen, nutrients, and other useful substances from the fetus to the mother.
 - All female mammals produce a placenta during development.
 - The placenta is necessary for proper mammal growth and development.
- Because of the placenta,
 - the mother must have strong legs to stay mobile.
 - the mother has to eat more food to nourish the fetus.
 - the mother is able to abandon her fetus if necessary.
 - the fetus can develop independently for a period of time.
- Marsupials have babies
 - that are born in a pouch on the mother's belly.
 - that are nourished inside the uterus by a placenta.
 - that are born fully developed.
 - that are born at an early, immature stage.
- Marsupials include the
 - kangaroo, echidna, and platypus.

- b. kangaroo, koala, and platypus.
 - c. kangaroo, koala, and opossum.
 - d. kangaroo and koala only.
8. A advantage to marsupial reproduction is that
- a. there is a short period of development within the mother's uterus.
 - b. the marsupial mother has to eat extra food, and marsupials love to eat.
 - c. due to their size, newborn marsupials have a very high survival rate.
 - d. all of the above
9. Monotremes
- a. are mammals that reproduce by laying eggs.
 - b. include only the platypus and echidna species.
 - c. lack a uterus and vagina.
 - d. all of the above
10. Among mammals, female monotremes are unique in that they
- a. have a pouch where the fetus completes development.
 - b. have a cloaca with one opening.
 - c. "sweat" milk from a patch on their mammary glands.
 - d. live mainly in Australia.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Most mammals are viviparous.
- _____ 12. All female mammals have a uterus, a pouch-like, muscular organ where the baby develops.
- _____ 13. Most mammals lay eggs instead of giving birth to an infant or embryo.
- _____ 14. The placenta passes oxygen, nutrients, and other useful substances from the fetus to the mother.
- _____ 15. The placenta allows a long period of fetal growth in the uterus.
- _____ 16. The marsupial embryo completes its development in a pouch on the mother's belly.
- _____ 17. Monotremes are mammals that reproduce by laying eggs.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Like other female vertebrates, all female mammals have _____.
19. Placental mammals are therian mammals in which a _____ develops during pregnancy.
20. Marsupials live mainly in _____.
21. A marsupial embryo completes its development outside the mother's body in a _____ on her belly.
22. _____ are mammals that reproduce by laying eggs.
23. The only living monotreme species are the _____ and echidnas.
24. Female monotremes have a _____ with one opening.
25. Mammals that are _____ are called therian mammals.

Short Answer

Answer each question in the space provided.

26. *Most mammals are viviparous.* Describe what this means.

27. What is a placenta? Describe the role of the placenta.

20.3 Evolution and Classification of Mammals

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Which mammalian trait probably evolved first?
 - teeth of different types
 - mammary glands
 - sweat glands
 - hair or fur
- What was the first mammal like? It was most likely
 - large, dinosaur-like, and nocturnal.
 - small, herbivorous, and nocturnal.
 - small, ate insects, and nocturnal.
 - small, lived in trees, and had a relatively large brain.
- Mammalian ancestors evolved
 - the ability to regulate body temperature and a good sense of eyesight.
 - the ability to regulate body temperature and a good sense of hearing.
 - the ability to live in trees and a good sense of hearing and eyesight.
 - the ability to live in trees and the ability to fly.
- The order of mammal evolution was
 - placental mammals, then monotremes, then marsupials.
 - monotremes, then marsupials, then placental mammals.
 - placental mammals, then marsupials, then monotremes.
 - marsupials, then monotremes, the placental mammals.
- Placental mammals are dominant mammals on all continents **except**
 - Alaska.
 - Africa.
 - Antartica.
 - Australia.
- Traditional classification of mammals divides living placental mammals into
 - 17 families.
 - 17 orders.
 - 17 species.
 - 17 kingdoms.
- The mammalian supertree is based on
 - the comparison of DNA sequences of many species of living mammals.

- b. the evolutionary history of many species of living mammals.
 - c. the comparison of body structures and functions of many species of living animals.
 - d. all of the above.
8. The correct order of evolution leading to mammals is
- a. synapsids - pelycosaurs - cynodonts - therapsids.
 - b. sauropsids - pelycosaurs - therapsids - cynodonts.
 - c. synapsids - pelycosaurs - therapsids - cynodonts.
 - d. synapsids - therapsids - cynodonts - pelycosaurs.
9. Cynodonts evolved
- a. ectothermy, three tiny bones in the middle ear, and lactation.
 - b. endothermy, a relatively large brain, and hair and fur.
 - c. ectothermy, a relatively large brain, and lactation.
 - d. endothermy, a relatively large brain, and lactation.
10. Therapsids
- a. evolved legs positioned under the body instead of along the sides.
 - b. lived about 200 million years ago.
 - c. had the ability to regulate body temperature.
 - d. all of the above
11. The most successful mammals are
- a. the marsupials, who practically have a whole continent to themselves.
 - b. the placental mammals, who have become dominant on most continents.
 - c. the monotremes, who have a very specific niche without competitors.
 - d. none of the above.
12. Pelycosaurs
- a. were synapsids.
 - b. had sprawling legs and walked like a lizard.
 - c. were direct ancestors of mammals.
 - d. all of the above

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Ancestors of mammals were amniotes called synapsids.
- _____ 14. Therapsids evolved a number of mammalian traits, such as legs positioned under the body instead of along the sides.
- _____ 15. Placental mammals can be divided into 7 orders.
- _____ 16. The mass extinction of the reptiles opened up many niches for mammals to exploit.
- _____ 17. Mammalian ancestors were probably nocturnal hunters.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Ancestors of mammals evolved close to _____ million years ago.
19. Ancestors of mammals were amniotes called _____.
20. Pelycosaurs were the most common land vertebrates during the first half of the _____ Period.
21. _____ evolved a number of mammalian traits, such as legs positioned under the body instead of along the sides.

22. Cynodonts had the ability to regulate body _____.
23. Cynodonts had a good sense of _____, which was more useful than good vision when hunting in the dark.
24. Cynodonts probably gave rise to mammals about _____ million years ago.
25. _____ mammals, being the most complex, were probably the last group of mammals to evolve.

Short Answer

Answer each question in the space provided.

26. List three traits of cynodonts.

27. Why do you think monotreme mammals were the first mammals to split off from other mammals?

20.4 Overview of Animal Behavior

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

1. The nature-nurture debate asks
 - a. whether behaviors are controlled mainly by social interactions.
 - b. whether behaviors are controlled mainly by childhood events.
 - c. whether behaviors are controlled mainly by genes or by the environment.
 - d. about the role of DNA in behavior.
2. Which statement best describes the evolution of behavior?
 - a. Behaviors evolve when they are necessary for survival.
 - b. Behaviors evolve when they increase the fitness of the animal performing them.
 - c. Behaviors evolve when nature determines what is beneficial.
 - d. Behaviors evolve when genes mutate.
3. Kin selection
 - a. is due to behaviors that help one's close relatives.
 - b. helps to ensure copies of one's own genes will be passed to the next generation.
 - c. can increase the fitness of a group of animals.
 - d. all of the above
4. Innate behaviors
 - a. are closely controlled by genes with little or no environmental influence.
 - b. are behaviors that occur naturally in all members of a species.
 - c. do not have to be learned or practiced.
 - d. all of the above
5. All members of the species perform _____ behaviors in the same way.
 - a. aggressive
 - b. cooperative
 - c. learned
 - d. innate
6. Courtship displays may include
 - a. building an elaborate nest.
 - b. singing and dancing by birds.
 - c. chirping by frogs.
 - d. all of the above.
7. Daily cycles in biology or behavior are known as
 - a. circadian rhythms.

- b. innate behaviors.
 - c. instincts.
 - d. reflexes.
8. Migration
- a. can be for thousands of miles.
 - b. is the seasonal movements of animals from one area to another.
 - c. is done by many birds, fish, insects and whales.
 - d. all of the above
9. Which statement best describes communication?
- a. Animals can communicate with sounds, chemicals, or visual cues.
 - b. Animals can communicate with specific learned behaviors.
 - c. Animals can communicate with reflexes such as aggression.
 - d. Animal communication varies with circadian rhythms.
10. Animals that live in a society
- a. perform cooperative behaviors.
 - b. must be able to communicate.
 - c. are social animals.
 - d. all of the above
11. Insight learning is an example of learned behavior seen in the
- a. rat.
 - b. chimpanzee.
 - c. monkey.
 - d. cat.
12. Examples of innate behavior include
- a. wolves hunting in a pack.
 - b. humans learning to drive.
 - c. a spider spinning a web.
 - d. all of the above.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. The branch of biology that studies animal behavior is called psychology.
- _____ 14. Some behaviors are controlled solely by genes.
- _____ 15. A reflex is a change in behavior that occurs as a result of experience.
- _____ 16. Intraspecific competition occurs between members of the different species.
- _____ 17. In fish, amphibians, and reptiles, parental care is common.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Animal behavior includes all the ways that animals interact with each other and the _____.
19. Common behaviors evolve when they increase the _____ of the animal performing them.
20. _____ behaviors are behaviors that occur naturally.
21. _____ is a change in behavior that occurs as a result of experience.
22. _____ is when animals live and work together for the good of the group.

23. For individuals to cooperate, they need to _____.

24. Blood pressure and body temperature changes are due to a person's _____.

25. _____ is behavior that is intended to cause harm or pain.

Short Answer

Answer each question in the space provided.

26. Explain how animal behaviors evolve.

27. Define and describe innate behavior.

20.5 Mammals and Animal Behavior

Chapter Test

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

1. Traits that are unique to mammals include all of the following **except**
 - a. hair or fur.
 - b. four-chambered heart.
 - c. mammary glands.
 - d. lactation.
2. Shivering helps a mammal stay warm by
 - a. raising the hair to trap heat close to the skin.
 - b. closing pores in the skin to reduce heat loss.
 - c. contracting muscles to generate more heat.
 - d. lowering the metabolic rate to conserve energy.
3. Alveoli help mammals obtain oxygen by
 - a. increasing the surface area for gas exchange.
 - b. increasing the volume of the chest.
 - c. separating oxygenated and nonoxygenated blood.
 - d. keeping the rate of metabolism high.
4. Which reproductive structure is found in all female mammals?
 - a. vagina
 - b. ovary
 - c. cloaca
 - d. uterus
5. Which statement is true about all therian mammals?
 - a. They develop a placenta during pregnancy.
 - b. They give birth to an immature embryo.
 - c. They have a pouch on their belly.
 - d. They do not lay eggs.
6. Which animal is a monotreme mammal?
 - a. kangaroo
 - b. koala
 - c. opossum
 - d. echidna
7. Ancestors of all mammals were therapsids called
 - a. steropodons.

- b. sinodelphys.
 - c. cynodonts.
 - d. eomaians.
8. The mammalian supertree places placental mammals in
- a. 4 superorders.
 - b. 8 classes.
 - c. 12 phyla.
 - d. 17 orders.
9. All the ways that animals interact with each other and the environment are called
- a. play.
 - b. social living.
 - c. animal behavior.
 - d. cooperation.
10. Which statement about innate behaviors is true?
- a. They are learned very quickly.
 - b. They are instinctive.
 - c. They are flexible.
 - d. all of the above

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Mammals have relatively poor hearing.
- _____ 12. Large mammals lose a greater proportion of their body heat than small mammals.
- _____ 13. Mammals are the vertebrates most capable of learning.
- _____ 14. The fastest land animals are mammals.
- _____ 15. Monotremes reproduce by giving birth to an embryo.
- _____ 16. All therapsids went extinct at the end of the Permian Period.
- _____ 17. The earliest mammals evolved about 600 million years ago.
- _____ 18. The earliest mammals were small carnivores.
- _____ 19. Instincts are behaviors that occur without a stimulus.
- _____ 20. All cyclic behaviors are called circadian rhythms.

Fill in the Blanks

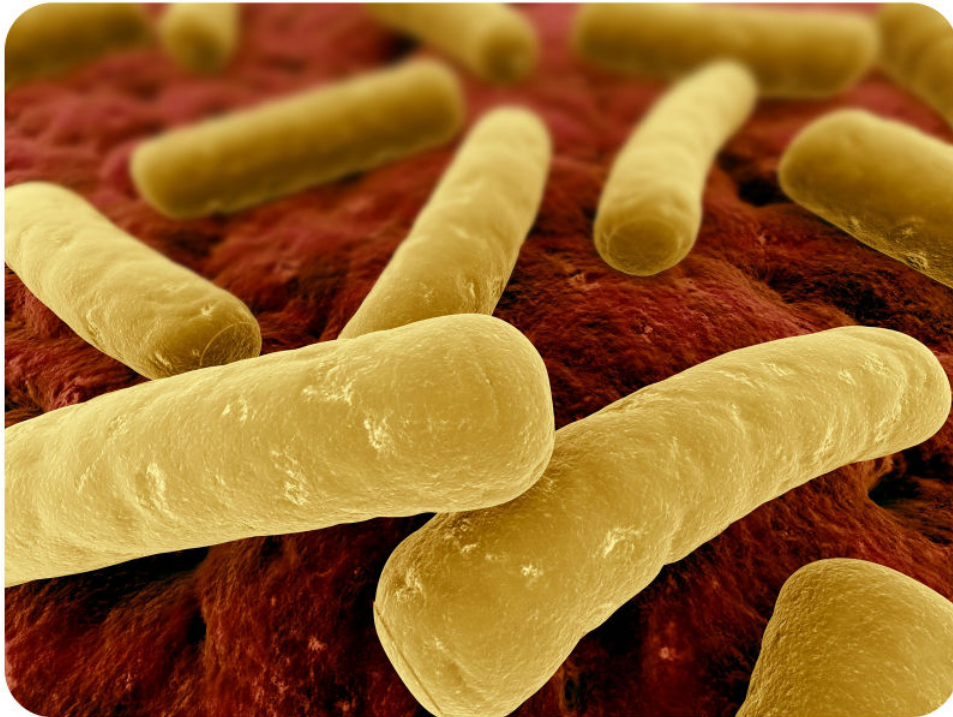
Fill in the blank with the term that best completes the sentence.

21. Producing milk for an offspring is referred to as _____.
22. A(n) _____ diet includes foods from both plants and animals.
23. The sharp front teeth of mammals are called _____.
24. A unique layer of nerve cells covering the cerebrum of the mammalian brain is the _____.
25. Animals that live in trees are said to be _____.
26. The branch of biology that studies animal behavior is _____.
27. The trigger for a behavior is called the _____.
28. Behaviors controlled by genes with little or no environmental influence are called _____ behaviors.

CHAPTER **21** Introduction to the Human Body: Bones, Muscles, and Skin Assessments

Chapter Outline

- 21.1 ORGANIZATION OF THE HUMAN BODY
 - 21.2 THE SKELETAL SYSTEM
 - 21.3 THE MUSCULAR SYSTEM
 - 21.4 THE INTEGUMENTARY SYSTEM
 - 21.5 INTRODUCTION TO THE HUMAN BODY: BONES, MUSCLES, AND SKIN
-



21.1 Organization of the Human Body

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

1. Cartilage is an example of which of the following tissues?
 - a. connective tissue
 - b. epithelial tissue
 - c. muscle tissue
 - d. none of the above
2. The lymphatic system removes which of the following from tissues?
 - a. excess gases
 - b. excess fluids
 - c. excess solids
 - d. none of the above
3. The next highest level after the cell is the
 - a. atom.
 - b. organ.
 - c. tissue.
 - d. organism.
4. Which of the following systems transports oxygen, nutrients, and other substances to cells and carries away wastes?
 - a. respiratory
 - b. circulatory
 - c. endocrine
 - d. nervous
5. A low level of water in the blood triggers retention of water by the
 - a. gall bladder.
 - b. liver.
 - c. pancreas.
 - d. kidneys.
6. Which of the following systems produces gametes?
 - a. circulatory
 - b. reproductive
 - c. muscular
 - d. skeletal
7. What provides muscle cells with the energy they need to move the body?

- a. DNA
 - b. ribosomes
 - c. mitochondria
 - d. cell membrane
8. All of the organs and organ systems of the human body work well together because they are closely regulated by which of the following systems?
- a. lymphatic and nervous
 - b. endocrine and muscular
 - c. nervous and endocrine
 - d. circulatory and lymphatic
9. A high concentration of what in the blood triggers faster breathing?
- a. carbon dioxide
 - b. oxygen
 - c. water
 - d. carbon monoxide
10. Which system secretes hormones that regulate other organs and organ systems?
- a. muscular
 - b. nervous
 - c. respiratory
 - d. endocrine
11. A high concentration of what in the blood triggers secretion of insulin?
- a. salt
 - b. sugar
 - c. oxygen
 - d. water
12. Insulin is secreted by an endocrine gland called the
- a. thyroid.
 - b. pineal body.
 - c. pancreas.
 - d. gall bladder.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Keeping a stable internal environment does not require constant adjustments.
- _____ 14. Muscles attached to bones enable the body to move.
- _____ 15. An organ is a structure that consists of two or more types of tissues that work together to do the same job.
- _____ 16. The lining of the digestive tract is an example of connective tissue.
- _____ 17. The human body consists of three tissue types.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The largest organ of the human body is the _____.
19. At each higher level of organization, there is a greater degree of _____.
20. Nerve cells have long projections that help them carry _____ messages to other cells.

21. A tissue is a group of connected cells that have a similar _____.
22. Muscle tissue is made up of cells that have the unique ability to _____.
23. The muscular system _____ the body and allows it to move.
24. The process in which organ systems work to maintain a stable internal environment is called _____ - _____.
25. Functioning together, the organ systems keep _____, pH, and other conditions at just the right levels to support life processes.

Short Answer

Answer each question in the space provided.

26. Give an example of how the respiratory system helps the body maintain homeostasis.

27. What happens if homeostasis fails?

21.2 The Skeletal System

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

1. What type of tissue does cartilage consist of?
 - a. muscle tissue
 - b. dense connective tissue
 - c. endocrine tissue
 - d. loose epithelial tissue
2. Which of the following is a function of the skeleton?
 - a. protecting internal organs
 - b. providing attachment surfaces for muscles
 - c. producing blood cells
 - d. all of the above
3. Bone matrix consists of tough fibers made of
 - a. carbohydrate.
 - b. fat.
 - c. protein.
 - d. none of the above.
4. The bone matrix fibers become hard and rigid due to mineralization with what kind of crystals?
 - a. calcium
 - b. potassium
 - c. sodium
 - d. none of the above
5. Osteoblasts secrete
 - a. calcium.
 - b. water.
 - c. hormones.
 - d. collagen.
6. Which of the following makes up the dense outer layer of bone?
 - a. compact bone
 - b. spongy bone
 - c. bone marrow
 - d. periosteum
7. Which of the following covers and protects the outer surfaces of bone?
 - a. compact bone

- b. spongy bone
 - c. bone marrow
 - d. periosteum
8. Which of the following produces blood cells?
- a. compact bone
 - b. spongy bone
 - c. bone marrow
 - d. periosteum
9. The ribs and sternum are connected by
- a. immovable joints.
 - b. partly moveable joints.
 - c. movable joints.
 - d. none of the above.
10. The shoulder is an example of which type of joint?
- a. partly moveable
 - b. hinge
 - c. ball-and-socket
 - d. pivot
11. Bone problems include
- a. fractures.
 - b. osteoarthritis.
 - c. rickets.
 - d. all of the above.
12. Fractures heal when which of the following forms new bone?
- a. osteoclasts
 - b. osteoblasts
 - c. osteocytes
 - d. none of the above

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. One of the functions of the skeleton is to produce blood cells.
- _____ 14. There are three types of specialized cells in human bones.
- _____ 15. Periosteum is soft connective tissue.
- _____ 16. The surfaces of bones at joints are covered with a smooth layer of cartilage.
- _____ 17. Rickets is a condition in which cartilage breaks down in joints.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Cartilage is made of tough _____ fibers.
19. A _____ is a band of fibrous connective tissue that holds bones together and keeps them in place.
20. The skeleton maintains _____ homeostasis.
21. When mineral levels in the blood are too high, bones absorb some of the minerals and store them as mineral _____.

21.3 The Muscular System

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Each muscle fiber is a
 - very long, thin cell.
 - very short, thin cell.
 - very long, thick cell.
 - very short, thick cell.
- How many types of muscle tissues are there?
 - two
 - three
 - four
 - five
- Smooth muscle is found in the
 - heart.
 - stomach.
 - upper leg.
 - middle ear.
- Skeletal muscle is attached to
 - other muscles.
 - the heart.
 - bone.
 - the intestines.
- Skeletal muscle fibers are wrapped in
 - fat.
 - bone.
 - connective tissue.
 - none of the above.
- Skeletal muscles need a rich blood supply to provide them with
 - nutrients and oxygen.
 - carbon dioxide.
 - water.
 - nutrients only.
- Cardiac muscle contains a great many mitochondria, which produce what for energy?
 - oxygen

- b. glucose
 - c. carbon dioxide
 - d. ATP
8. The biceps and triceps muscles work in opposition to bend and extend
- a. the leg at the knee.
 - b. the arm at the elbow.
 - c. the neck.
 - d. the ankle.
9. Each myofibril is made up of how many types of protein filaments?
- a. one
 - b. two
 - c. three
 - d. four
10. Actin filaments are anchored to structures called
- a. W lines.
 - b. X lines.
 - c. Y lines.
 - d. Z lines.
11. The strength of the muscular force is determined by
- a. the number of fibers that contract.
 - b. the thickness of the fibers that contract.
 - c. the weight that the muscle bears.
 - d. none of the above.
12. Let's say you decide to raise your hand in class. What's the first thing your body does?
- a. Motor neurons stimulate muscle fibers in your arm and shoulder.
 - b. Muscles in your arm and shoulder contract.
 - c. Your arm rises.
 - d. Your brain sends electrical messages to nerve cells in your arm and shoulder.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Muscles are organs composed mainly of muscle fibers.
- _____ 14. Muscles appear striated, or striped, because their cells are arranged in sheets.
- _____ 15. Involuntary contractions mean they are not under conscious control.
- _____ 16. Contractions of skeletal muscle are involuntary.
- _____ 17. There are well over 600 skeletal muscles in the human body.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Contractions of cardiac muscle are involuntary like those of _____ muscle.
19. When cardiac muscle produces energy, this helps the heart resist _____.
20. Skeletal muscles are attached to the skeleton by tough connective tissues called _____.
21. Many skeletal muscles are attached to the ends of bones that meet at a _____.
22. In exercises such as weight lifting, skeletal muscle contracts against a _____ force.

23. In exercises such as running, the cardiac muscle contracts _____ and the heart pumps more blood.
24. Each muscle fiber contains hundreds of organelles called _____.
25. Within a sarcomere, myosin filaments overlap the _____ filaments.

Short Answer

Answer each question in the space provided.

26. Give an example of how when smooth muscle in an organ contracts, it helps the organ carry out its function.

27. What is the benefit to muscles of continued exercise?

21.4 The Integumentary System

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

1. The average square inch (6.5 cm^2) of skin has how many sweat glands?
 - a. 350
 - b. 450
 - c. 550
 - d. 650
2. The skin has how many pigment-producing cells?
 - a. 20,000
 - b. 40,000
 - c. 60,000
 - d. 80,000
3. How many layers does the skin have?
 - a. two
 - b. three
 - c. four
 - d. five
4. Exposure to UV light stimulates the skin to produce which vitamin?
 - a. A
 - b. B
 - c. C
 - d. D
5. What color is the melanin pigment?
 - a. yellow
 - b. brown
 - c. red
 - d. orange
6. Melanin in the skin blocks
 - a. water.
 - b. incandescent light.
 - c. UV light.
 - d. oxygen.
7. The dermis contains which of the following?
 - a. blood vessels

- b. nerve endings
 - c. hair follicles
 - d. all of the above
8. Acne affects approximately what percent of teens?
- a. 30
 - b. 55
 - c. 75
 - d. 85
9. The underlying cause of acne is excessive secretion of
- a. melanin.
 - b. sebum.
 - c. sweat.
 - d. keratin.
10. Skin cancers
- a. are generally asymmetrical.
 - b. have irregular borders.
 - c. may be very dark in color.
 - d. all of the above
11. The main component of hair is
- a. keratin.
 - b. hemoglobin.
 - c. myoglobin.
 - d. insulin.
12. Which of the following are functions of hair?
- a. prevents dust particles from reaching the lungs
 - b. prevents heat loss from the body
 - c. provides sensory input
 - d. all of the above

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. The average square inch (6.5 cm²) of skin has 20 blood vessels.
- _____ 14. The innermost cells of the epidermis are continuously dividing.
- _____ 15. Melanocytes of people with darker skin produce less melanin.
- _____ 16. Sebaceous glands produce an oily substance called sebum.
- _____ 17. Melanin in the skin allows UV light in.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. There are no nerve endings or blood vessels in the _____.
19. The amount of melanin produced is determined by _____ and exposure to UV light.
20. Sebum is secreted into hair _____.
21. Sweat glands have ducts that pass through the _____.
22. One of the skin's main functions is to prevent water _____ from the body.

23. Blood vessels in the skin _____ when the body is too warm.
24. Acne is a condition in which red bumps called pimples form on the skin due to a(n) _____ - infection.
25. Skin cancer is caused mainly by excessive exposure to _____ light.

Short Answer

Answer each question in the space provided.

26. How do fingernails prevent injury?

27. How does hair help shed water?

21.5 Introduction to the Human Body: Bones, Muscles, and Skin

Chapter Test

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

1. Which type of human tissue lines the digestive tract and absorbs nutrients?
 - a. connective
 - b. epithelial
 - c. muscle
 - d. nervous
2. Which body system transports oxygen to cells?
 - a. endocrine
 - b. lymphatic
 - c. respiratory
 - d. circulatory
3. The process in which organ systems work to maintain a stable internal environment is called
 - a. ossification.
 - b. specialization.
 - c. homeostasis.
 - d. organization.
4. Functions of the skeletal system include
 - a. producing blood cells.
 - b. storing minerals.
 - c. protecting internal organs.
 - d. all of the above.
5. The type of bone tissue that covers and protects the outer surfaces of bone is
 - a. compact bone.
 - b. spongy bone.
 - c. bone marrow.
 - d. periosteum.
6. The most common type of joint in the human body is
 - a. an immovable joint.
 - b. a partly movable joint.
 - c. a synovial joint.
 - d. none of the above.
7. The only type of human cell that can contract is a(n)
 - a. neuron.

- b. muscle fiber.
 - c. osteocyte.
 - d. neutrophil.
8. Where is smooth muscle tissue found?
- a. in the heart
 - b. in the stomach
 - c. attached to bones
 - d. all of the above
9. The sliding filament theory explains how
- a. muscles contract.
 - b. bones grow wider.
 - c. skin cells multiply.
 - d. hairs shed water.
10. The stratum corneum is tough and waterproof because its cells are filled with
- a. melanin.
 - b. sebum.
 - c. collagen.
 - d. keratin.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Connective tissues include skin, hair, and nails.
- _____ 12. Osteocytes regulate mineral homeostasis.
- _____ 13. Blood cells are produced in the heart.
- _____ 14. An example of a hinge joint is the shoulder.
- _____ 15. Lack of calcium in children causes osteoarthritis.
- _____ 16. Striated muscles include smooth muscle and cardiac muscle.
- _____ 17. A muscle fiber shortens when myosin filaments pull actin filaments closer together.
- _____ 18. Most skin structures originate in the epidermis.
- _____ 19. Melanin helps to protect skin from UV light.
- _____ 20. The main component of hair and nails is keratin.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. The dense connective tissue that protects bones at joints is _____.
22. A(n) _____ is a band of fibrous connective tissue that holds bones together.
23. Cells that make new bone cells and take up minerals from the blood are _____.
24. Cells that dissolve minerals in bone matrix and release them back into the blood are _____.
25. The place where two or more bones of the skeleton meet is a(n) _____.
26. Skeletal muscles are attached to the skeleton by tough connective tissues called _____.
27. The _____ is the name given to the outer layer of skin.
28. The brownish pigment that gives skin much of its color is _____.

29. The lower layer of the skin is known as the _____.
30. Glands in the skin that produce sebum are _____ glands.

Short Answer

Answer each question in the space provided.

31. Distinguish between different types of joints and how they move.

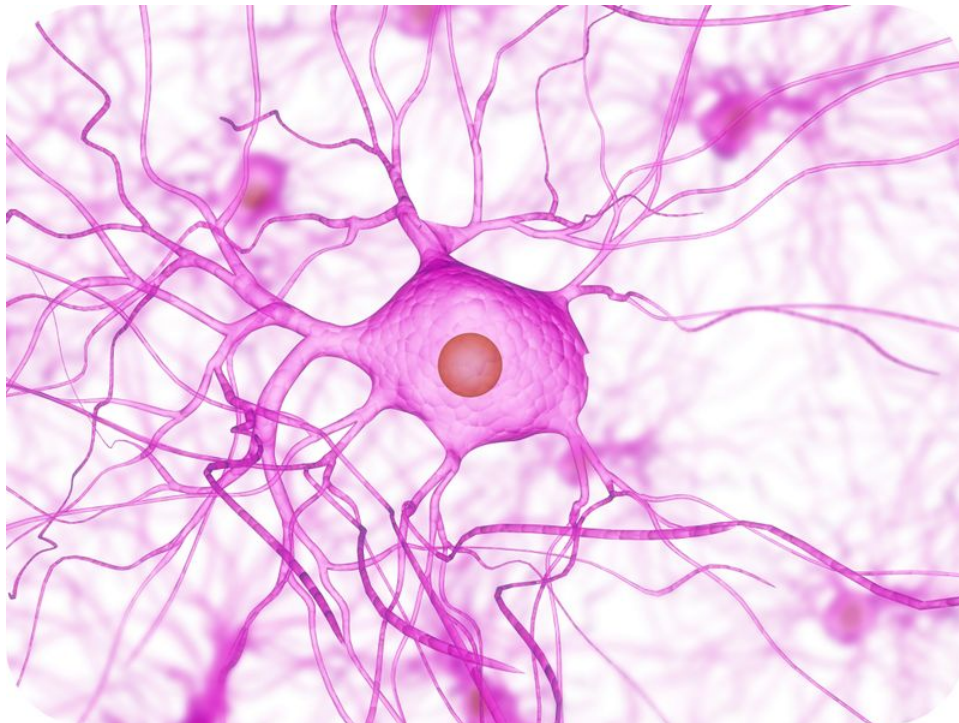
32. Explain how skeletal muscles move bones.

33. Describe the skin and its functions.

CHAPTER **22** The Nervous and Endocrine Systems Assessments

Chapter Outline

- 22.1 THE NERVOUS SYSTEM
 - 22.2 THE ENDOCRINE SYSTEM
 - 22.3 THE NERVOUS AND ENDOCRINE SYSTEMS
-



22.1 The Nervous System

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Parts of a neuron include
 - the axon.
 - the cell body.
 - the dendrites.
 - all of the above.
- Which of the following statements best describes an action potential?
 - a sudden reversal of the electrical charge across the membrane of a resting neuron
 - a difference in electrical charge across the plasma membrane of a neuron
 - a long extension of the cell body that transmits nerve impulses to other cells
 - the structural and functional units of the electrical impulse
- Which of the following can carry nerve impulses from tissues and organs to the spinal cord and brain?
 - interneurons
 - motor neurons
 - sensory neurons
 - all of the above
- Which process maintains the resting potential in a neuron?
 - simple diffusion
 - passive transport involving channel proteins
 - active transport involving the sodium-potassium pump
 - endocytosis and exocytosis
- The role of the axon is to
 - receive nerve impulses from other neurons.
 - transmit nerve impulses to other cells.
 - ravel across the synaptic cleft and bind to receptors on the membrane of the other cell.
 - receive chemical signals from other cells.
- Which statement is true concerning the resting potential?
 - The resting potential is the difference in charge across the membrane when the neuron is not actively transmitting a nerve impulse.
 - The resting potential is maintained by the sodium-potassium pump.
 - At rest, the inside of the neuron is negatively charged, while the fluid surrounding the neuron is positively charged.
 - all of the above

7. The motor division of the peripheral nervous system
 - a. controls mainly voluntary activities that are under conscious control.
 - b. involuntary activities not under conscious control.
 - c. carries impulses that cause glands to secrete hormones.
 - d. all of the above
8. Psychoactive drugs
 - a. generally influence the transmission of nerve impulses.
 - b. cause neurons to degenerate.
 - c. cause abnormal brain functions.
 - d. may cause paralysis and other disabilities.
9. The somatic nervous system
 - a. consists of all the nervous tissue that lies outside the central nervous system.
 - b. consists of nerves connected to glands and internal organs.
 - c. is made up of nerves that are connected to skeletal muscles.
 - d. carries sensory information from the body to the central nervous system.
10. To initiate an action potential,
 - a. potassium ions rush into the cell.
 - b. sodium ions rush into the cell.
 - c. sodium ions are pumped into the cell.
 - d. potassium ions are pumped out of the cell.
11. Which statement is true concerning the brain? (1) The brain contains about 100 million neurons. (2) The brain is the most complex organ of the human body. (3) The brain is the control center of the nervous system. (4) The brain interprets information from the senses. (5) The brain controls breathing and heartbeat.
 - a. 1 and 2
 - b. 2, 3, and 4
 - c. 2, 3, 4, and 5
 - d. All 5 statements are correct.
12. A junction where an axon terminal meets another cell is known as
 - a. the synapse.
 - b. the neurotransmitter junction.
 - c. the axon terminal junction.
 - d. the axon-dendrite junction.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. An action potential is necessary for a nerve impulse to occur.
- _____ 14. The somatic nervous system controls mainly involuntary activities.
- _____ 15. The synapse releases neurotransmitters, which cross the axon terminal and bind to receptors on the next cell.
- _____ 16. Your sense of smell contributes to your sense of taste.
- _____ 17. Coke contains a psychoactive drug.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The brain and spinal cord make up the _____ nervous system.

22.2 The Endocrine System

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- The endocrine system releases
 - electrical messages that travel through neurons.
 - hormones that travel through the bloodstream.
 - proteins that alter gene regulation.
 - all of the above.
- Glands of the endocrine system include
 - the pineal gland.
 - the adrenal glands.
 - the pancreas.
 - all of the above.
- Hormone resistance occurs when
 - target cells do not respond to a hormone.
 - hormones do not reach their target cells.
 - hormones are made incorrectly.
 - all of the above
- Which of the following describes positive feedback? (1) It occurs when a product feeds back to increase its own production. (2) It occurs in milk production by a mother for her baby. (3) It occurs in the thyroid gland. (4) It occurs when a product feeds back to decrease its own production.
 - 1 only
 - 1 and 2
 - 3 and 4
 - 1, 2, and 3
- The pituitary gland
 - is a large gland in the neck.
 - secretes many hormones, such as cortisol and aldosterone.
 - is often called the master gland of the endocrine system.
 - all of the above
- The gonads
 - secrete follicle-stimulating hormone, which stimulates the ovaries to develop mature eggs.
 - include the testes and ovaries, which secrete the sex hormones.
 - are part of the endocrine system, the reproductive system, and the urinary system.
 - all of the above

7. Which of the following are true concerning steroid hormones? (1) They include cortisol and sex hormones. (2) They can directly influence the expression of genes. (3) They bind their receptors in the cell membrane. (4) They include the thyroid hormones.
- 1 only
 - 1 and 2
 - 3 and 4
 - 1, 2, and 3
8. A target cell
- is affected by a particular hormone because it has receptor proteins for that hormone.
 - travels through the blood until it binds to its hormone.
 - produces specific types of hormones.
 - binds its receptor and causes a change in the hormone.
9. The hypothalamus
- acts as a link between the nervous and endocrine systems.
 - releases hormones that travel to the pituitary gland, where they stay until they are needed.
 - is actually part of the brain.
 - all of the above
10. Non-steroid hormones
- binds its receptor in the cell membrane and then diffuses into the cell.
 - binds to DNA and influences gene expression.
 - works through a second messenger inside the cell.
 - include the sex hormones.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. The hypothalamus acts as a link between the nervous system and the endocrine system.
- _____ 12. Thyroid-stimulating hormone stimulates the thyroid gland to secrete sex hormones.
- _____ 13. Hormones must bind to their target receptor to function.
- _____ 14. Steroid hormones cannot enter the cell.
- _____ 15. Non-steroid hormones are made of amino acids, so they are proteins.
- _____ 16. The gonads secrete sex hormones, which control the production of gametes.
- _____ 17. Endocrine hormones can affect many cells and have body-wide effects.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. A _____ cell is the type of cell on which a hormone has an effect.
19. When a hormone binds to its _____, it causes a change within the cell.
20. _____ hormones can diffuse across the plasma membrane of target cells and bind with receptors in the cytoplasm.
21. The steroid hormone and receptor form a complex that moves into the _____ and influences the expression of genes.
22. Negative feedback occurs when a product feeds back to _____ its own production.
23. Type 2 diabetes is an example of a _____ resistance disorder.

24. The regulation of the hormone prolactin is through a _____ feedback mechanism.

25. Non-steroid hormones activate molecules called _____ messengers, which influences processes inside the cell.

Short Answer

Answer each question in the space provided.

26. Explain how hormones work by binding to receptors of target cells.

27. Describe a negative feedback mechanism that regulates hormones.

22.3 The Nervous and Endocrine Systems

Chapter Test

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- The structural and functional units of the nervous system are
 - nerves.
 - axons.
 - neurons.
 - reflexes.
- Nerve cells that carry nerve impulses from tissues and organs to the central nervous system are called
 - tissue neurons.
 - organ neurons.
 - sensory neurons.
 - motor neurons.
- The place where an axon terminal meets another cell is known as a
 - neurotransmitter.
 - dendrite.
 - sensory receptor.
 - synapse.
- The two main divisions of the peripheral nervous system are the
 - brain and spinal divisions.
 - sympathetic and parasympathetic divisions.
 - autonomic and somatic divisions.
 - sensory and motor divisions.
- The lobe of the cerebrum that is associated with sight is the
 - frontal lobe.
 - parietal lobe.
 - occipital lobe.
 - temporal lobe.
- The auditory nerve carries impulses from hair cells in the cochlea to the
 - eyes.
 - brain.
 - skin.
 - eardrum.
- Which statement about psychoactive drugs is true?
 - All psychoactive drugs are illegal.

- b. All psychoactive drugs are stimulants.
 - c. An examples of a psychoactive drug is alcohol.
 - d. Use of psychoactive drugs always leads to addiction.
8. The “master gland” of endocrine system is the
- a. thyroid gland.
 - b. adrenal gland.
 - c. pituitary gland.
 - d. hypothalamus.
9. Steroid hormones
- a. are made of amino acids.
 - b. bind to receptors on cell membranes.
 - c. activate second messengers.
 - d. include sex hormones.
10. Type 1 diabetes is caused by
- a. hyposecretion of insulin.
 - b. hypersecretion of glucose.
 - c. insulin resistance.
 - d. glucose resistance.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Motor neurons carry impulses from muscles to the brain.
- _____ 12. The inside of a resting neuron is negatively charged.
- _____ 13. The parasympathetic division of the ANS controls emergency responses.
- _____ 14. The spinal cord controls basic life processes such as breathing.
- _____ 15. Body movements are coordinated by the cerebellum.
- _____ 16. A nerve is a cable-like bundle of axons.
- _____ 17. The pupil of the eye focuses light on the retina.
- _____ 18. The ears are responsible for the sense of balance.
- _____ 19. The hormone oxytocin is secreted by the pituitary gland.
- _____ 20. Most endocrine glands are controlled by positive feedback.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. The part of a nerve cell that contains the nucleus is known as the _____.
22. A(n) _____ of a neuron receives nerve impulses from other nerve cells.
23. An outer lipid layer called a(n) _____ insulates the axon of many neurons.
24. Nerves that carry impulses between sensory and motor neurons are known as _____.
25. A reversal of charge across the membrane of a resting neuron is called a(n) _____.
26. The largest part of the human brain is the _____.
27. The lowest part of the human brain is the _____.
28. A messenger molecule of the endocrine system is known as a(n) _____.

29. The _____ gland secretes the hormone melatonin.

30. Glands in males and females that secrete sex hormones are called _____.

Short Answer

Answer each question in the space provided.

31. Identify the parts of the central nervous system and their functions.

32. Explain how sensory stimuli are perceived and interpreted.

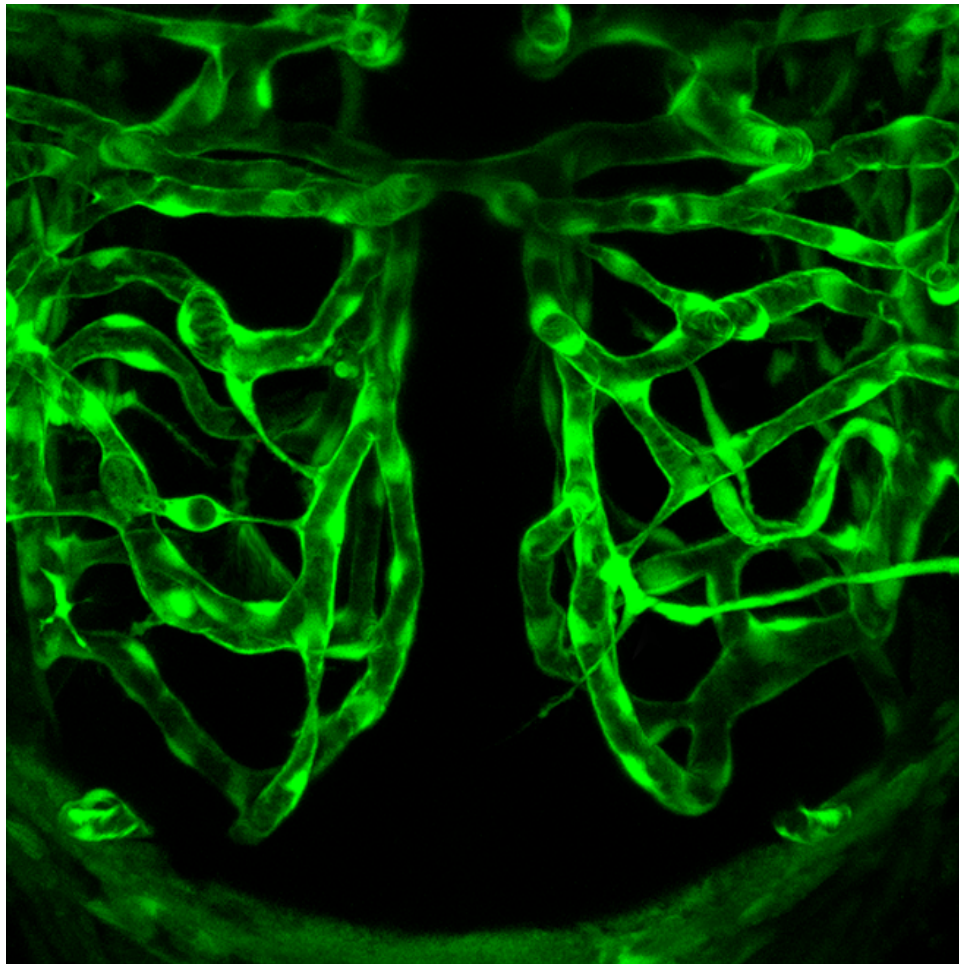
33. Describe how negative feedback regulates hormone secretion.

CHAPTER **23**

The Circulatory, Respiratory, Digestive, and Excretory Systems Assessments

Chapter Outline

- 23.1 THE CIRCULATORY SYSTEM
 - 23.2 THE RESPIRATORY SYSTEM
 - 23.3 THE DIGESTIVE SYSTEM
 - 23.4 THE EXCRETORY SYSTEM
 - 23.5 THE CIRCULATORY, RESPIRATORY, DIGESTIVE, AND EXCRETORY SYSTEMS
-



23.1 The Circulatory System

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Which statement best describes the circulatory system?
 - The circulatory system is like a highway system, moving materials around the body.
 - The circulatory system is like a factory, making materials needed by the body.
 - The circulatory system is like a garbage truck, removing waste from the body.
 - all of the above
- Materials carried by the circulatory system include
 - proteins, oxygen, cellular wastes, and nutrients from digested food.
 - carbon dioxide, oxygen, particles of food, and water.
 - proteins, hormones, waste, and nutrients.
 - hormones, oxygen, cellular wastes, and nutrients from digested food.
- The main components of the circulatory system are
 - the heart, red blood cells, and white blood cells.
 - the heart, blood vessels, and blood.
 - the heart, the veins, and arteries.
 - the heart, blood vessels, blood, and oxygen.
- The flow of blood through the heart is from the
 - right atrium to the right ventricle to the lungs to the left atrium to the left ventricle to the body.
 - left atrium to the left ventricle to the lungs to the right atrium to the right ventricle to the body.
 - left atrium to the left ventricle to the body to the right atrium to the right ventricle to the lungs.
 - right atrium to the right ventricle to the body to the left atrium to the left ventricle to the lungs.
- The major blood vessels include which of the following? (1) capillaries, (2) veins, (3) arteries.
 - 2 and 3
 - 1 and 3
 - 1 and 2
 - 1, 2, and 3
- Which is true concerning the pulmonary circulation? (1) It takes deoxygenated blood out of the heart, (2) it brings oxygenated blood back to the heart, (3) it carries blood between the heart and lungs, (4) it carries blood between the heart and body.
 - 1 and 2
 - 1 and 3
 - 1, 2, and 3
 - 1, 2, and 4

7. Which is true concerning the systemic circulation? 1) It takes deoxygenated blood out of the heart, (2) it brings oxygenated blood back to the heart, (3) it carries blood between the heart and lungs, (4) it carries blood between the heart and body.
- 3 only
 - 4 only
 - 1, 2, and 3
 - 1, 2, and 4
8. Atherosclerosis
- is the buildup of plaque inside arteries.
 - can result from smoking.
 - can lead to a heart attack.
 - all of the above
9. Blood carries
- carbon dioxide and other wastes to all the body's cells.
 - oxygen and nutrients to all the body's cells.
 - oxygen away from the cells to be excreted.
 - none of the above
10. Plasma
- contains many dissolved substances and blood cells.
 - contains platelets.
 - is the fluid part of blood.
 - all of the above
11. Factors that increase the risk of developing coronary heart disease include
- diet.
 - age.
 - smoking.
 - all of the above.
12. The main difference between red blood cells and white blood cells is that
- red blood cells contain hemoglobin and white blood cells carry oxygen.
 - white blood cells contain hemoglobin and red blood cells carry oxygen.
 - red blood cells carry oxygen and white blood cells defend the body.
 - white blood cells carry oxygen and red blood cells defend the body.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. The pulmonary circulation carries blood between the heart and the body.
- _____ 14. There are two major types of blood vessels: arteries and veins.
- _____ 15. Arteries are muscular blood vessels that bring blood to the heart.
- _____ 16. Blood is a connective tissue.
- _____ 17. The trillions of white blood cells in blood plasma carry oxygen.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. _____ are blood vessels that carry blood toward the heart.
19. Atherosclerosis is the buildup of plaque inside _____.

20. Capillaries are the smallest type of _____ vessels.
21. _____ blood cells defend the body.
22. The _____ exerted by circulating blood on the walls of blood vessels is called blood pressure.
23. Pulmonary circulation is the part of the circulatory system that carries blood between the _____.
24. Coronary _____ disease is the leading cause of death of adults in the U.S.
25. The main components of the circulatory system are the _____, blood vessels, and blood.

Short Answer

Answer each question in the space provided.

26. Compare different types of blood vessels and their roles.

27. Describe the three types of cells in the blood.

23.2 The Respiratory System

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Which statement best describes the respiratory system?
 - The body system that brings air containing carbon dioxide into the body and releases oxygen into the atmosphere.
 - The body system that brings air containing oxygen into the body and releases carbon dioxide into the atmosphere.
 - The body system that controls breathing.
 - The body system that controls the exchange of gases between the body and the outside air.
- The main job of the respiratory system is
 - gas exchange.
 - breathing.
 - circulating oxygen throughout the body.
 - all of the above.
- The relationship between respiration and cellular respiration is that
 - respiration supplies the carbon dioxide used in cellular respiration.
 - respiration supplies the oxygen used in cellular respiration.
 - cellular respiration supplies the oxygen used in respiration.
 - cellular respiration supplies the carbon dioxide used in respiration.
- The main muscle(s) involved in breathing is (are)
 - the lungs.
 - the diaphragm.
 - the chest muscles.
 - all of the above.
- The correct order of the steps of respiration is
 - gas transport - pulmonary gas exchange - ventilation - peripheral gas exchange.
 - ventilation - peripheral gas exchange - gas transport - pulmonary gas exchange.
 - ventilation - pulmonary gas exchange - gas transport - peripheral gas exchange.
 - pulmonary gas exchange - ventilation - peripheral gas exchange - gas transport.
- Pulmonary gas exchange take place in your
 - mouth and nose.
 - lungs.
 - blood.
 - capillaries and body cells.

7. Asthma is
- a disease in which the air passages of the lungs periodically become too narrow.
 - a disease in which the air passages of the pharynx and larynx periodically become too narrow.
 - a disease in which the air passages of the alveoli periodically become too narrow.
 - all of the above.
8. Alveoli
- are tiny sacs in the lungs where gas exchange takes place.
 - carry oxygen in the blood.
 - are small passages in the lungs that end in bronchioles.
 - is large, sheet-like muscle below the lungs that controls breathing.
9. The flow of air from your nose proceeds as follows:
- larynx - pharynx - trachea - bronchi - lungs.
 - pharynx - larynx - trachea - bronchi - lungs.
 - pharynx - larynx - bronchi - trachea - lungs.
 - larynx - pharynx - bronchi - trachea - lungs.
10. How does gas exchange help maintain homeostasis?
- It provides cells with the oxygen they need for cellular respiration.
 - It provides cells with the oxygen they need for respiration.
 - It provides cells with the carbon dioxide they need for cellular respiration.
 - It provides cells with the carbon dioxide they need for respiration.
11. Emphysema
- is a disease in which walls of the alveoli break down.
 - is usually caused by smoking and is irreversible.
 - causes shortness of breath.
 - all of the above
12. Which statement is true about the bronchi?
- Cilia that line the bronchi sweep foreign particles toward the throat so they can be expelled from the body.
 - The bronchi connect the digestive tract to the lungs.
 - In the chest, the larynx divides as it enters the lungs to form the right and left bronchi.
 - none of the above

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. The main role of the respiratory system is gas exchange.
- _____ 14. Inhaling is an active movement that results from the contraction of the diaphragm.
- _____ 15. Asthma is a disease in which the air passages of the lungs become too wide.
- _____ 16. The larynx is a long tube that is shared with the digestive system.
- _____ 17. The lungs are the organs in which gas exchange takes place between blood and air.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The exchange of gases between the body and the outside air is called _____.
19. _____ enters the respiratory system through the nose.

20. From the pharynx, air next passes through the _____.
21. Tiny hairs called _____ line the bronchi.
22. When the diaphragm contracts, the _____ expands.
23. Emphysema is usually caused by _____ and is irreversible.
24. Pulmonary gas exchange occurs in the _____ of the lungs.
25. Pulmonary gas exchange is the exchange of gases between inhaled air and the _____.

Short Answer

Answer each question in the space provided.

26. Define respiration, and explain how it differs from cellular respiration.

27. Describe the role of gas exchange in homeostasis.

23.3 The Digestive System

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- The digestive system provides _____ for cellular respiration.
 - oxygen
 - glucose
 - ATP
 - proteins
- The gastrointestinal tract
 - is a long tube that connects the mouth with the anus.
 - includes the esophagus, stomach, and small and large intestines.
 - is about 30 feet long in adults.
 - all of the above
- The digestive system has three main functions, including
 - the digestion of food.
 - the elimination of nutrients.
 - the absorption of solid food waste.
 - all of the above.
- In the mouth,
 - acids kill bacteria and other pathogens found in food.
 - chemical digestion breaks down chunks of food into smaller pieces.
 - amylase starts digesting carbohydrates by breaking down starch into sugar.
 - all of the above
- Foods flows through the GI tract in the following order:
 - mouth - esophagus - stomach - small intestine - large intestine.
 - mouth - stomach - esophagus - small intestine - large intestine.
 - mouth - stomach - esophagus - large intestine - small intestine.
 - mouth - esophagus - stomach - large intestine - small intestine.
- In the stomach,
 - food is ground into smaller pieces.
 - amylase digests carbohydrates and lipase digests lipids.
 - most nutrients from food are absorbed into the blood.
 - food is further digested both mechanically and chemically.
- Digestive enzymes include
 - lipase, which digests lipids.

- b. amylase and maltase, which digest carbohydrates.
 - c. trypsin and peptidase, which digest proteins.
 - d. all of the above.
8. Bile is made by the liver. The main role of bile is
- a. to break up fats into smaller globules.
 - b. to help digest proteins and carbohydrates.
 - c. to use acid to kill bacteria.
 - d. none of the above.
9. Functions of the trillions of bacteria in your GI tract include
- a. breaking down minerals before they can poison the body.
 - b. producing vitamins, such as carbohydrates and lipids.
 - c. breaking down indigestible food components.
 - d. all of the above.
10. Macronutrients include
- a. vitamins and minerals.
 - b. carbohydrates, lipids, and proteins.
 - c. calcium, potassium, and water.
 - d. all of the above.
11. MyPyramid suggests that you
- a. eat green and yellow vegetables.
 - b. eat ice cream every day.
 - c. consume whole fruits and juices.
 - d. include red meat, fish, and beans in your meals.
12. An eating disorder is an illness in which people
- a. cannot digest their food properly.
 - b. cannot absorb nutrients in the small intestine.
 - c. feel compelled to eat in a way that causes harm.
 - d. produce too much stomach acid, leading to extreme discomfort.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. The GI tract is one long tube extending from the mouth to the anus.
- _____ 14. Mechanical digestion is the chemical breakdown of chunks of food into smaller pieces.
- _____ 15. The stomach is full of hydrochloric acid, which kills bacteria in food.
- _____ 16. Lipase digests lipids and peptidase digests proteins.
- _____ 17. MyPyramid tells you that you need to eat ice cream and potato chips daily.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. _____ is a simple sugar that comes from the food we eat.
19. Trillions of _____ normally live in the large intestine.
20. _____ the body needs in relatively large amounts are called macronutrients.
21. _____ shows the relative amounts of foods in different food groups you should eat each day.
22. Any unused energy in _____ is stored in the body as fat.

23. Nutrients include _____ and minerals.
24. Dietary proteins are broken down to provide the _____ needed for protein synthesis.
25. Carbohydrates include _____, starches, and fiber.

Short Answer

Answer each question in the space provided.

26. Explain how digestion and absorption occur in the small intestine.

27. Explain how to use MyPyramid.

23.4 The Excretory System

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Excretion can best be defined as the process of
 - removing solid wastes from the blood.
 - removing wastes and excess water from the body.
 - removing excess wastes from the blood.
 - removing excess wastes from the body.
- The main organ of excretion is the
 - liver.
 - gastrointestinal tract.
 - kidney.
 - large intestine.
- Excretion includes which of the following processes?
 - exhaling water vapor and carbon dioxide
 - sweating away excess water and salts
 - eliminating solid wastes
 - all of the above
- The main function of the urinary system is to
 - filter excess waste products and water from the blood and excrete them from the body.
 - filter waste products and excess water from the blood and excrete them from the body.
 - filter waste products and excess water from the body and excrete them from the blood.
 - filter excess waste products and water and excrete them from the blood.
- The structural and functional unit of the kidney is the
 - nephron.
 - Bowman's capsule.
 - glomerulus.
 - renal artery and tubule.
- Blood enters the kidney through the
 - renal venule.
 - renal tubule.
 - renal artery.
 - collecting duct.
- Urine follows which of the following pathways?
 - collecting ducts of the kidneys, ureters, bladder, urethra.

- b. collecting ducts of the kidneys, bladder, ureters, urethra.
 - c. bladder, collecting ducts of the kidneys, ureters, urethra.
 - d. collecting ducts of the kidneys, urethra, bladder, ureters.
8. Blood enters which part of the nephron first?
- a. Bowman's capsule
 - b. the glomerulus
 - c. a collecting duct
 - d. the renal tubule
9. The kidneys produce how much urine each day?
- a. about 5 liters
 - b. about 1.5 gallons
 - c. about 1.5 liters
 - d. about 1.5 pints
10. Kidney failure
- a. occurs when the kidneys have difficulty filtering blood.
 - b. can only be cured with a transplant.
 - c. can be treated with blood dialysis.
 - d. all of the above

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. The skin is considered an excretory organ.
- _____ 12. The kidneys control the amount of water, ions, and other substances in the blood.
- _____ 13. Excretion is the process of removing wastes and excess water from the body.
- _____ 14. The function of the kidney is to filter urine and form blood.
- _____ 15. Kidney stones are little crystals that can be extremely painful.
- _____ 16. Blood enters the kidney through the renal vein.
- _____ 17. The structural and functional unit of the nephron is the kidney.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The function of the _____ is to filter blood and form urine.
19. Nephrons are the _____ and _____ units of the kidneys.
20. Parts of the kidney include _____ capsule.
21. Parts of the kidney include the _____ tubule of the nephron.
22. Kidney failure results when the kidneys can no longer _____ blood.
23. The bladder is a hollow _____ that stores urine.
24. _____ leaves the body through the process of urination.
25. Dialysis is a medical procedure in which _____ is filtered through a machine.

Short Answer

Answer each question in the space provided.

26. Describe the roles of the kidneys in homeostasis.

27. Define excretion, and identify the main organs of the excretory system.

23.5 The Circulatory, Respiratory, Digestive, and Excretory Systems

Chapter Test

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Blood from the body enters the heart's
 - right atrium.
 - right ventricle.
 - left atrium.
 - left ventricle.
- Electrical impulses that stimulate heart contractions come from
 - the cerebrum.
 - the brain stem.
 - nerves in the spinal cord.
 - specialized cardiac cells.
- Pulmonary circulation carries blood between the
 - heart and body.
 - body and lungs.
 - lungs and heart.
 - heart and head.
- The process of moving air into and out of the lungs is called
 - gas exchange.
 - gas transport.
 - ventilation.
 - respiration.
- What happens when the diaphragm contracts?
 - The volume of the chest decreases.
 - The ribcage expands.
 - The contents of the abdomen move upward.
 - Air rushes out of the lungs.
- Organs of the gastrointestinal tract include
 - the pancreas.
 - the gall bladder.
 - the stomach.
 - all of the above.
- Chemical digestion begins in the
 - small intestine.

- b. stomach.
 - c. esophagus.
 - d. mouth.
8. Which of the following are micronutrients?
- a. minerals
 - b. proteins
 - c. lipids
 - d. carbohydrates
9. Obesity occurs when the body mass index is at least
- a. 10 kg/m^2 .
 - b. 15 kg/m^2 .
 - c. 20 kg/m^2 .
 - d. 30 kg/m^2 .
10. Organs of excretion include
- a. the liver.
 - b. the lungs.
 - c. the large intestine.
 - d. all of the above.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. The heart consists mainly of muscle.
- _____ 12. Blood pressure is highest in veins.
- _____ 13. Atherosclerosis is the buildup of plaque inside arteries.
- _____ 14. Platelets are blood cells that fight infections.
- _____ 15. Peripheral gas exchange takes place in the lungs.
- _____ 16. Food travels from the mouth to the stomach because of gravity.
- _____ 17. Most absorption of nutrients takes place in the stomach.
- _____ 18. For good health, you should never eat lipids.
- _____ 19. The kidneys are the main organs of the excretory system.
- _____ 20. Nephrons carry urine out of the body.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. _____ is blood pressure that is higher than normal.
22. The liquid part of blood is referred to as _____.
23. Blood type is determined by the presence or absence of _____ on blood cells.
24. Tiny sacs in the lungs where gas exchange takes place are called _____.
25. The disease in which air passages of the lungs periodically become too narrow is _____.
26. A wave of involuntary muscle contractions that moves food through the digestive system is called _____.
27. The physical breakdown of chunks of food into smaller pieces is referred to as _____ digestion.

28. The small intestine is lined with tiny finger-like projections named _____.
29. Solid waste that leaves the large intestine is known as _____.
30. _____ are organic compounds needed in small amounts for the body to function properly.

Short Answer

Answer each question in the space provided.

31. Compare and contrast different types of blood vessels and their functions.

32. Describe the role of gas exchange in homeostasis.

33. Explain how digestion and absorption occur in the small intestine.

CHAPTER

24

The Immune System and Disease Assessments

Chapter Outline

- 24.1 NONSPECIFIC DEFENSES
- 24.2 THE IMMUNE RESPONSE
- 24.3 IMMUNE SYSTEM DISEASES
- 24.4 ENVIRONMENTAL PROBLEMS AND HUMAN HEALTH
- 24.5 THE IMMUNE SYSTEM AND DISEASE



24.1 Nonspecific Defenses

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- The body's most important barrier to pathogens is
 - the mucous membranes.
 - the immune response.
 - the skin.
 - the white blood cells.
- Which statement is correct concerning mucous membranes?
 - Mucous membranes have cilia that sweep mucus and pathogens toward body openings.
 - Mucous membranes provide a biological barrier at body openings.
 - The skin is the most important mucous membrane of the body.
 - all of the above
- Chemical barriers include
 - sweat, mucus, tears, and saliva.
 - urine and semen.
 - stomach acid.
 - all of the above.
- The second line of defense
 - is nonspecific and attacks most pathogens that enter the body.
 - includes chemical barriers that destroy pathogens on the outer body surface.
 - includes the bacteria that live in the GI tract.
 - is tailored to a particular pathogen.
- The inflammatory response
 - is triggered by chemicals called cytokines and histamines.
 - involves white blood cells fighting pathogens at the site of injury or infection.
 - is the first reaction of the body to tissue damage or infection.
 - all of the above
- Leukocytes
 - are involved in the first line of defense.
 - are red blood cells.
 - fight infections and get rid of debris.
 - are living organisms that help protect the body.
- Which statement best describes nonspecific defenses?
 - Nonspecific defenses are performed by the trillions of red blood cells in the body.

- b. Phagocytosis, where leukocytes engulf and break down pathogens and debris, is a nonspecific defense.
 - c. Mucous membranes are the most important nonspecific defenses the body has.
 - d. The nonspecific defense used by the body depends on what type of pathogen is involved.
8. The immune system has _____ lines of defense.
- a. four
 - b. three
 - c. two
 - d. five
9. Which statements are true about mechanical barriers? (1) Mechanical barriers physically block pathogens from entering the body. (2) The skin is the most important mechanical barrier. (3) Mucous membranes provide a mechanical barrier at body openings. (4) Mucous membranes secrete mucus, a slimy substance that traps pathogens.
- a. 1 and 2
 - b. 3 and 4
 - c. 1, 2, and 3
 - d. 1, 2, 3, and 4
10. Which statement best describes the immune system?
- a. The immune system produces white blood cells such as leukocytes.
 - b. The immune system exchanges gases between the blood and lungs.
 - c. The immune system protects the body from pathogens.
 - d. The immune system digests food into usable nutrients.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Biological barriers include millions of harmless bacteria live on the human skin.
- _____ 12. The second line of defense attacks pathogens that manage to enter the body.
- _____ 13. Chemical barriers are living organisms that help protect the body.
- _____ 14. Mucous membranes provide a mechanical barrier at body openings.
- _____ 15. The skin is the most important biological barrier.
- _____ 16. An example of a nonspecific defense is phagocytosis.
- _____ 17. Leukocytes are red blood cells.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. _____ are disease-causing agents.
19. Mucous membranes secrete _____, a slimy substance that traps pathogens.
20. Mechanical barriers physically block pathogens from _____ the body.
21. The _____ response is triggered by chemicals called cytokines and histamines.
22. A cut becoming red, warm, and _____ are signs of an inflammatory response.
23. Millions of harmless bacteria live on the human skin are considered _____ barriers.
24. Sweat, mucus, tears, and saliva all contain _____ that kill pathogens.
25. Leukocytes fight _____ and get rid of debris.

Short Answer

Answer each question in the space provided.

26. What is a nonspecific defense?

27. Identify three types of barriers in the body's first line of defense. Give an example of each type of barrier.

24.2 The Immune Response

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- The third line of defense is
 - the immune response.
 - the immune system.
 - the humoral immune response.
 - active immunity.
- The lymphatic system
 - produces leukocytes called lymphocytes.
 - is a major part of the immune system.
 - recognizes and destroys particular pathogens in body fluids and cells.
 - all of the above
- Organs of the lymphatic system include
 - bone marrow, thymus, spleen, and thyroid.
 - bone marrow, thymus, spleen, and tonsils.
 - bone, thymus, spleen, and tonsils.
 - bone marrow, thyroid, spleen, and tonsils.
- There are _____ major types of lymphocytes, called _____.
 - three; B cells, L cells, and T cells.
 - two; B cells and L cells.
 - two; B cells and T cells.
 - two; L cells and T cells.
- Antibodies are
 - large, X-shaped proteins that recognize and bind to antigens.
 - large, Y-shaped proteins that recognize and bind to antigens.
 - large, Y-shaped antigens that recognize and bind to specific proteins.
 - large, Y-shaped antigens that recognize and bind to specific pathogens.
- Memory cells
 - help launch a rapid response against a pathogen if it invades the body again in the future.
 - are long-living plasma cells.
 - can be both B and T cells.
 - all of the above
- The cell-mediated immune response
 - involves mainly B cells.

- b. includes helper, cytotoxic, plasma, and regulatory T cells.
 - c. leads to the destruction of cells that are infected with viruses.
 - d. destroys cells infected by bacteria.
8. Helper T cells
- a. are like the “managers” of the immune response.
 - b. can remain as memory cells, in case they are needed in the future.
 - c. secrete cytokines, which activate or control the activities of other lymphocytes.
 - d. all of the above
9. Cytotoxic T cells
- a. release toxins that form pores in the nucleus of virus infected cells.
 - b. release toxins that form pores in the membrane of virus infected cells.
 - c. serve as memory cells to be used in a future infection.
 - d. can destroy both virus and bacteria infected cells.
10. Active immunity results from
- a. antibodies that are transferred to a person who has never been exposed to the pathogen.
 - b. having memory cells produced from a previous infection.
 - c. the long-term survival of cytotoxic T cells in the body.
 - d. the injection of antibodies.
11. The humoral immune response begins with
- a. the activation of B cells by a specific antigen.
 - b. the activation of T cells by a specific antigen.
 - c. the activation of a helper T cells by a specific antigen.
 - d. any of the above.
12. The human body has as many as _____ lymphocytes.
- a. two million
 - b. two billion
 - c. two trillion
 - d. 200 trillion

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. The third line of defense is referred to as the immune response.
- _____ 14. There are three major types of lymphocytes, B cells, L cells and T cells.
- _____ 15. Antigens trigger the immune system to react against the cells that carry them.
- _____ 16. B cells must be activated by an antigen before they can fight pathogens.
- _____ 17. Antigens are large, Y-shaped proteins that recognize and bind to antibodies.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The body’s third line of defense is referred to as the immune _____.
19. Plasma cells are activated B cells that secrete _____, which are large, Y-shaped proteins.
20. Long-living plasma cells are called _____ cells.
21. Cytotoxic T cells destroy virus-infected cells and some _____ cells.
22. _____ immunity results when an immune response to a pathogen produces memory cells.

24.3 Immune System Diseases

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Which statement best describes the relationship between an allergy and an antigen?
 - An antigen is a disease in which the immune system makes an inflammatory response to a harmless allergy.
 - An allergy is a disease in which the immune system makes an inflammatory response to a harmless antigen.
 - An allergy is a disease in which the immune system makes a cell-mediated response to an antigen.
 - An allergy is a disease in which the immune system makes a humoral response to an antigen.
- Which statement is **false** concerning the immune system?
 - The immune system only protects you from pathogens and keeps you well, so it cannot develop its own problems.
 - Sometimes the immune system responds to harmless foreign substances.
 - The immune system can attack the body's own cells.
 - Certain diseases can attack and damage the immune system.
- Autoimmune diseases
 - result in the inability to fight off pathogens.
 - occur when the immune system fails to recognize the body's own molecules as belonging to the person.
 - occur when the immune system makes an inflammatory response to a harmless antigen.
 - all of the above
- In rheumatoid arthritis, the immune system attacks
 - insulin-producing cells of the pancreas.
 - myelin sheaths.
 - tissues inside joints.
 - joints, the heart and other organs.
- In multiple sclerosis, the results of the attack by the immune system include
 - high blood sugar.
 - joint damage and pain.
 - joint and organ damage.
 - muscle weakness.
- Immunodeficiency may occur
 - when the immune system is damaged by other disorders.
 - naturally as people get older.
 - when the immune system is suppressed by certain medications.
 - all of the above

7. HIV

- a. is the human immunodeficiency virus.
- b. is the result of the AIDS virus.
- c. results from low T cell levels.
- d. all of the above

8. Which statement is true of the relationship between HIV and AIDS?

- a. AIDS causes HIV.
- b. HIV causes AIDS.
- c. HIV and AIDS are not related.
- d. HIV and AIDS are the same disease.

9. HIV can be transmitted

- a. through unprotected sex.
- b. through infected needles.
- c. from mother to baby.
- d. all of the above

10. HIV is able to evade the immune system because

- a. the virus uses the plasma membranes of host cells to hide its own antibodies.
- b. the virus frequently mutates and changes its surface antibodies.
- c. the virus frequently mutates and changes its surface antigens.
- d. the virus hides in host cells, escaping attack by the immune system.

11. Which statement is true concerning AIDS? (1) AIDS is not a single disease but a set of diseases. (2) AIDS occurs when helper T cells fall to a very low level and opportunistic diseases occur. (3) AIDS results from years of damage to the immune system by HIV. (4) AIDS is the main cause of death in the world today.

- a. 1 and 2
- b. 1, 2, and 3
- c. 1, 2, and 4
- d. 1, 2, 3, and 4

12. AIDS occurs

- a. about 3-5 years after an HIV infection.
- b. when HIV levels match the level of helper T cells.
- c. after years of damage to the immune system by helper T cells.
- d. when helper T cells fall to a very low level.

True or False

Write true if the statement is true or false if the statement is false.

_____ 13. An allergy is a disease in which the immune system makes an inflammatory response to a harmless allergen.

_____ 14. Multiple sclerosis is an autoimmune disease.

_____ 15. Immunodeficiency can occur as people get older.

_____ 16. HIV infects and destroys helper B cells.

_____ 17. HIV frequently mutates and changes its surface antigens, making the development of a vaccine difficult.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Any antigen that causes an allergy is called an _____.

24.4 Environmental Problems and Human Health

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Examples of carcinogens include
 - viruses, bacteria, and fungi.
 - viruses, UV radiation, and tobacco smoke.
 - viruses, UV radiation, and hot dogs.
 - all of the above.
- Mutations that lead to cancer usually occur in
 - genes that control DNA replication.
 - genes that control the cell cycle.
 - genes that control mitosis.
 - genes that control meiosis.
- Which statement best describes tumor-suppressor genes?
 - Tumor-suppressor genes normally prevent cells with damaged DNA from dividing.
 - Tumor-suppressor genes normally prevent damaged DNA from replicating.
 - Tumor-suppressor genes normally help control cell division.
 - Tumor-suppressor genes normally prevent damaged DNA from controlling cell division.
- Which statement best describes proto-oncogenes?
 - Proto-oncogenes normally prevent damaged DNA from controlling cell division.
 - Proto-oncogenes normally prevent damaged DNA from replicating.
 - Proto-oncogenes normally prevent cells with damaged DNA from dividing.
 - Proto-oncogenes normally help control cell division.
- The most common cancer among women in the United States is
 - lung cancer.
 - breast cancer.
 - skin cancer.
 - prostate cancer.
- Warning signs of cancer include
 - persistent coughing or hoarseness.
 - a lump in the breast or elsewhere.
 - a sore that does not heal.
 - all of the above.
- Almost _____ people die each year because of air pollution.
 - 50,000

- b. 500,000
 - c. 5,000,000
 - d. 50,000,000
8. Only AQI values below _____ are considered safe.
- a. 50
 - b. 100
 - c. 150
 - d. 250
9. Indoor air pollution
- a. may be even more polluted than outdoor air.
 - b. can contain mold, bacteria, and radon.
 - c. can include deadly gasses.
 - d. all of the above
10. Bioterrorism
- a. is the release or spread of bacteria.
 - b. is the release or spread of agents of disease.
 - c. is the intentional release or spread of agents of disease.
 - d. includes the unintentional release or spread of agents of disease.
11. Air pollution
- a. can cause skin cancer.
 - b. is the leading cause of lung cancer.
 - c. can make asthma and other diseases more severe.
 - d. all of the above
12. More people die of _____ in the United States than any other type of cancer.
- a. skin cancer.
 - b. breast cancer.
 - c. prostate cancer.
 - d. lung cancer.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Air pollution can cause lung cancer.
- _____ 14. A carcinogen is anything that can cause cancer.
- _____ 15. Everyone has proto-oncogenes.
- _____ 16. More cancer deaths in adult females are due to breast cancer than any other type of cancer.
- _____ 17. Bioterrorism includes the natural release or spread of agents of disease.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. A carcinogen is anything that can cause _____.
19. Exposure to _____ is the leading cause of lung cancer.
20. _____ genes normally prevent cells with damaged DNA from dividing.
21. Proto-oncogenes normally help control _____.
22. Almost _____ people die each year because of air pollution. I

23. _____ air may contain harmful substances such as mold, bacteria, and radon.
24. _____ is the intentional release or spread of agents of disease.
25. If inhaled, _____ replaces oxygen in the blood and quickly leads to death.

Short Answer

Answer each question in the space provided.

26. Identify two causes of air pollution and describe their effects on human health.

27. Describe three types of carcinogens.

24.5 The Immune System and Disease

Chapter Test

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Human pathogens include
 - viruses.
 - bacteria.
 - fungi.
 - all of the above.
- The body's second line of defense involves
 - mucus.
 - skin.
 - histamines.
 - cilia.
- The tonsils are organs of the
 - muscular system.
 - lymphatic system.
 - circulatory system.
 - skeletal system.
- Which statement about B cells is false?
 - B cells mature in bone marrow.
 - B cells have receptors for specific antigens.
 - Activated B cells produce antibodies.
 - Activated B cells destroy cancer cells.
- Which cells produce immunity?
 - helper T cells
 - regulatory T cells
 - memory T cells
 - cytotoxic T cells
- Autoimmune diseases include
 - allergies.
 - multiple sclerosis.
 - HIV/AIDS.
 - measles.
- HIV disables the immune system by
 - destroying helper T cells.

- b. stimulating autoimmunity.
 - c. becoming carcinogenic.
 - d. causing opportunistic infections.
8. What is the highest value for the air quality index that is considered “good” in terms of human health?
- a. 0
 - b. 50
 - c. 100
 - d. 150
9. Warning signs of cancer include
- a. a change in bowel or bladder habits.
 - b. a sore that does not heal.
 - c. any unusual bleeding or discharge.
 - d. all of the above.
10. Genes that promote the division of cells with damaged DNA are called
- a. tumor-suppressor genes.
 - b. proto-oncogenes.
 - c. oncogenes.
 - d. carcinogens.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. The body’s single most important defense is the skin.
- _____ 12. The inflammatory response involves B cells and T cells.
- _____ 13. Phagocytosis is a specific type of defense.
- _____ 14. The lymphatic system includes the thymus and spleen.
- _____ 15. Lymphocytes recognize and respond to antibodies.
- _____ 16. The humoral immune response involves mainly T cells.
- _____ 17. All immunizations confer passive immunity.
- _____ 18. Rheumatoid arthritis is an autoimmune disease.
- _____ 19. The chief cause of immunodeficiency in the world today is cancer.
- _____ 20. All tumors are cancerous and likely to spread.

Fill in the Blanks

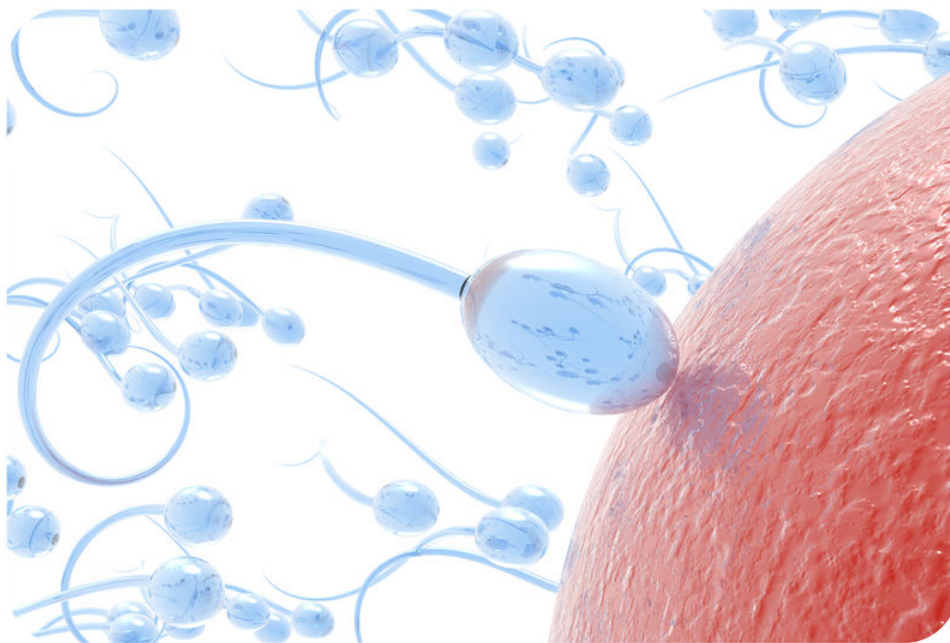
Fill in the blank with the term that best completes the sentence.

21. The general term for disease-causing agent is _____.
22. The lymphatic system circulates the fluid called _____.
23. The lymphatic system produces leukocytes known as _____.
24. Lymphatic cells that mature in the thymus are called _____.
25. _____ are Y-shaped proteins that bind to antigens.
26. An antigen that causes an allergy is called a(n) _____.
27. A(n) _____ disease occurs when the immune system attacks the body’s own cells.
28. The virus that causes acquired immunodeficiency syndrome is _____.

CHAPTER **25** Reproduction and Human Development Assessments

Chapter Outline

- 25.1 MALE REPRODUCTIVE SYSTEM
 - 25.2 FEMALE REPRODUCTIVE SYSTEM
 - 25.3 FROM FERTILIZATION TO OLD AGE
 - 25.4 SEXUALLY TRANSMITTED INFECTIONS
 - 25.5 REPRODUCTION AND HUMAN DEVELOPMENT
-



25.1 Male Reproductive System

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- The reproductive system in both males and females consists of
 - reproductive cells.
 - structures that produce reproductive cells.
 - structures that secrete sex hormones.
 - all of the above.
- Gametes
 - are reproductive cells.
 - are haploid cells.
 - combine during fertilization.
 - all of the above
- Male reproductive structures include
 - two testes, the epididymis, and the vas deferens.
 - the epididymis, the testes, and testosterone.
 - the epididymis, semen, and the vas deferens.
 - all of the above
- What determines if male reproductive organs develop?
 - The absence of a second X chromosome.
 - The presence of a Y chromosome.
 - The presence of one X and one Y chromosome.
 - The presence of two X chromosomes.
- In the United States, boys generally begin puberty at about
 - age 12 and complete it at about age 16.
 - age 12 and complete it at about age 18.
 - age 10 and complete it at about age 18.
 - age 10 and complete it at about age 16.
- Which statement is true concerning spermatogenesis?
 - Sperm are produced in the epididymis of the testes and become mature in the seminiferous tubules.
 - Spermatogenesis takes about 9 to 10 days to complete.
 - Spermatogonia are haploid, sperm-producing cells.
 - Spermatogonia lining the seminiferous tubule undergo mitosis to form primary spermatocytes,
- Which is the correct sequence of events surrounding puberty?

- a. the pituitary gland secretes luteinizing hormone - the testes secrete testosterone - protein synthesis and growth
 - b. protein synthesis and growth - the pituitary gland secretes luteinizing hormone - the testes secrete testosterone
 - c. the pituitary gland secretes luteinizing hormone - protein synthesis and growth - the testes secrete testosterone
 - d. the testes secrete testosterone - protein synthesis and growth - the pituitary gland secretes luteinizing hormone
8. A mature sperm cell has several structures that help it reach and penetrate an egg. These structures include
- a. the tail, the head, and the middle region.
 - b. the tail, the mitochondrial segment, and the acrosome.
 - c. the acrosome, the head, the tail, and the middle region.
 - d. the head, the acrosome, and the region that connects these two segments.
9. Which statement is true?
- a. The epididymis is a coiled tube about 6 meters long lying atop the testis inside the scrotum.
 - b. The epididymis is a coiled tube about 6 feet long lying atop the testis inside the scrotum.
 - c. Each testis contains about 30 feet of seminiferous tubules.
 - d. Each testis contains about 3 feet of seminiferous tubules.
10. How many sperm are released with each ejaculation?
- a. hundreds
 - b. thousands
 - c. millions
 - d. hundreds of millions

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. A sexually mature male produces hundreds of sperm each day.
- _____ 12. The part of the sperm called the acrosome produces enzymes that help the sperm penetrate an egg.
- _____ 13. Sex proteins are chemical messengers that control sexual development and reproduction.
- _____ 14. Sperm are stored in the epididymis.
- _____ 15. In the first several weeks after fertilization, males and females are essentially the same except for their chromosomes.
- _____ 16. In the United States, boys generally begin puberty at about age 9 and complete it at about age 18.
- _____ 17. A mature male produces hundreds of millions of sperm each day.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The male reproductive system consists of structures that secrete the male sex hormone _____.
19. Each testis contains more than _____ meters of seminiferous tubules.
20. In terms of X and Y chromosomes, females have _____ chromosomes, and males have _____ -
_ chromosomes.
21. To begin puberty, the main pituitary hormone involved is _____ hormone.
22. The process of producing mature sperm is called _____.
23. _____ is the fluid that carries sperm out of the body.

24. Spermatogonia lining the seminiferous tubule undergo _____ to form primary spermatocytes.
25. Hundreds of _____ of sperm are released with each ejaculation.

Short Answer

Answer each question in the space provided.

26. Describe a sperm cell. How does each structure contribute to the sperm's function?

27. Incorporating mitosis and meiosis, describe how sperm are produced.

25.2 Female Reproductive System

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Functions of the female reproductive system include
 - delivering a baby during birth.
 - supporting the development of a fetus.
 - breast feeding a baby after birth.
 - all of the above.
- Before birth,
 - FSH starts egg production.
 - a female produces all the eggs she will ever make.
 - LH stimulates the ovaries to store the eggs.
 - all of the above
- Puberty in girls starts when the pituitary gland releases two hormones,
 - estrogen and follicle-stimulating hormone.
 - luteinizing hormone and estrogen-stimulating hormone.
 - luteinizing hormone and follicle-stimulating hormone.
 - luteinizing-stimulating hormone and follicle hormone.
- Which statement is correct?
 - Menarche is the beginning of menstruation.
 - Menstruation is the beginning of menarche.
 - Menarche begins around age 12 in girls and 14 in boys.
 - Menarche is when females begin to produce eggs.
- The process of producing eggs in the ovary is called
 - meiosis.
 - ovulation.
 - menstruation.
 - oogenesis.
- During egg production, the primary oocyte
 - starts to go through the first cell division of mitosis.
 - starts to go through the first cell division of meiosis.
 - completes meiosis and produces a haploid egg.
 - completes mitosis and produces a haploid egg.
- The correct sequence of events in the ovary is

- a. the development of the oocyte - development of the follicle - degeneration of the corpus luteum- ovulation.
 - b. the development of the oocyte - development of the follicle - ovulation - degeneration of the corpus luteum.
 - c. the development of the follicle - development of the oocyte - ovulation - degeneration of the corpus luteum.
 - d. the development of the oocyte - ovulation - development of the follicle - degeneration of the corpus luteum.
8. During menstruation,
- a. the endometrium of the uterus is shed from the body.
 - b. the endometrium of the vagina is shed from the body.
 - c. the oocyte explodes from the ovary.
 - d. the corpus letuem begins to produce another egg.
9. The corpus letuem
- a. is the remains of the ovary after ovulation.
 - b. is the remains of the follicle after ovulation.
 - c. is the remains of the oocyte after ovulation.
 - d. s the remains of the oocyte after menstruation.
10. If fertilization is to take place, it will occur
- a. in the uterus.
 - b. in the vagina.
 - c. in a fallopian tube.
 - d. in an ovary.
11. Menopause
- a. is a period during which a menstrual cycles slow down and eventually stop.
 - b. usually occurs by the early fifties.
 - c. occurs and women can no longer reproduce naturally.
 - d. all of the above
12. Fertilization can occur
- a. only a few days after menstruation.
 - b. only a few days after ovulation.
 - c. only a few days before or after ovulation.
 - d. any time during the monthly cycle.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. The female reproductive system has several other functions including breast-feeding a baby after birth.
- _____ 14. Cells in the egg protect the follicle and help it mature.
- _____ 15. Girls begin puberty at an average age of 10 years and complete puberty at about 18.
- _____ 16. Menstruation is the beginning of menarche, or monthly periods.
- _____ 17. At birth, a girl has all the eggs she will ever produce.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The process of producing eggs in the ovary is called _____.

19. Beginning in puberty, each month one of the _____ and its primary oocyte starts to mature.
20. After _____ days of the monthly cycle, ovulation occurs.
21. Menstruation is the process in which the endometrium of the _____ is shed from the body.
22. If fertilization is to occur, it will take place in the _____.
23. _____ is the primary female sex hormone.
24. Females lack a _____ chromosome.
25. For most women, menstrual cycles continue until their mid- to late _____.

Short Answer

Answer each question in the space provided.

26. Describe how eggs are produced.

27. Outline the phases of the menstrual cycle.

25.3 From Fertilization to Old Age

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- When a sperm penetrates an egg,
 - the egg begins to complete meiosis.
 - the sperm's tail falls off, and its nucleus fuses with the nucleus of the egg.
 - a zygote forms.
 - all of the above
- During cleavage,
 - many cell divisions occur starting from the original zygote.
 - the developing organisms significantly grows in cell number and size.
 - the blastocyst and then the morula form.
 - many cell divisions occur starting from the morula.
- The blastocyst imbeds in the uterus usually _____ days after fertilization.
 - 3, 4, or 5
 - 3 or 4
 - 4 or 5
 - between 3 and 6
- Which is the correct order of events?
 - cleavage - formation of the blastocyst - formation of the morula - implantation
 - implantation - formation of the morula - formation of the blastocyst - cleavage
 - cleavage - formation of the morula - formation of the blastocyst - implantation
 - implantation - formation of the blastocyst - formation of the morula - cleava
- The ectoderm layer develops into
 - skin cells and neurons of the brain.
 - muscle cells and blood cells.
 - lung cells.
 - skin cells and blood cells.
- How does a single cell develop into many different types of cells?
 - Through specialization, the process of cell differentiation.
 - Through differentiation, the process by which unspecialized cells become specialized.
 - Through differentiation, the process by which tissues and organs are made.
 - Through specialization, the process of cells becoming tissues.
- Which organ or structure forms first?
 - blood

- b. the lungs
 - c. the heart
 - d. fingers and toes
8. During pregnancy, nutrients that are especially important include
- a. folic acid, calcium, iron, and omega-3 fatty acids.
 - b. folic acid, potassium, iron, and omega-3 fatty acids.
 - c. folic acid, calcium, iron, and fatty acids.
 - d. vitamin C, calcium, iron, and omega-3 fatty acids.
9. During adolescence, individuals
- a. usually try to be more independent from their parents.
 - b. have mood swings because of surging hormones.
 - c. develop the ability to think abstractly.
 - d. all of the above
10. Why do we decline in various ways as we age?
- a. Because the cell cycle occurs faster.
 - b. Because cells stop dividing and die.
 - c. Because mitosis and cytokinesis take much longer than normal.
 - d. all of the above
11. The blastocyst is
- a. the ball of cells that forms after implantation.
 - b. a ball of cells with a fluid-filled cavity that forms a few days after fertilization.
 - c. the inner cell mass of cells that forms the embryo.
 - d. the initial ball of cells that develops from the zygote.
12. The placenta
- a. mixes the mother's and fetus's blood to exchange substances.
 - b. allows the fetus to move freely.
 - c. is an enclosed membrane that surrounds and protects the fetus.
 - d. is made up of a large mass of blood vessels from both the mother and fetus.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Fertilization can only occur after ovulation.
- _____ 14. A zygote is the cell that results after fertilization.
- _____ 15. A morula forms from the blastocyst.
- _____ 16. After implantation occurs, the blastocyst is called a fetus.
- _____ 17. Differentiation is the process by which unspecialized cells become specialized.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. _____ is the first year of life after birth.
19. _____ is the period of transition between the beginning of puberty and adulthood.
20. In the zygote, half the _____ come from the egg and half from the sperm.
21. The blastocyst reaches the uterus about _____ days after fertilization.
22. Implantation is the process of embedding the blastocyst in the lining of the _____.

23. The three distinct cell layers of the embryo are the _____, mesoderm, and endoderm.
24. The heart begins to beat about _____ weeks after fertilization.
25. Birth typically occurs at about _____ weeks after fertilization.

Short Answer

Answer each question in the space provided.

26. Describe the first 5 days of development.

27. Most organs develop in the embryo during weeks 4 through 8. If the embryo is exposed to toxins during this period, the effects are likely to be very damaging. Why do you think this happens?

25.4 Sexually Transmitted Infections

Lesson Quiz

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- The majority of people infected with an STI are
 - under the age of 20.
 - under the age of 25.
 - over the age of 25.
 - under the age of 35.
- Protozoa cause an STI called
 - genital herpes.
 - chlamydia.
 - trichomoniasis.
 - hepatitis B.
- Most STIs are caused by
 - bacteria or viruses.
 - bacteria or protozoa.
 - protozoa or viruses.
 - bacteria and fungi.
- Most of the pathogens that cause STIs enter the body through
 - the mouth.
 - any mucous membrane.
 - body fluids such as blood, semen, and breast milk.
 - mucous membranes of the reproductive organs.
- The most common STI in the United States is
 - genital herpes.
 - chlamydia.
 - gonorrhea.
 - syphilis.
- Which of the following STIs can be cured with antibiotics? (1) chlamydia, (2) gonorrhea, (3) genital herpes, (4) genital warts.
 - 1 and 2
 - 3 and 4
 - 1 and 4
 - 1, 2, 3, and 4
- Hepatitis B can be a very serious disease. The virus can

- a. cause small, open sores on the genitals.
 - b. damage the liver and increase the risk of liver cancer.
 - c. cause extremely painful urination.
 - d. all of the above.
8. The human papillomavirus can cause
- a. genital herpes.
 - b. cancer of the uterus in females.
 - c. cancer of the cervix in females.
 - d. cancer of the testis in males.
9. Treatments for STIs include
- a. antibiotics for genital herpes.
 - b. antibiotics for genital warts.
 - c. vaccination for cancer of the cervix.
 - d. all of the above.
10. The most likely population to get chlamydia is
- a. 20 - 24 year old males.
 - b. 20 - 24 year old females.
 - c. 15 - 19 year old males.
 - d. 25 - 29 year old females.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. STIs become more common the older a person gets.
- _____ 12. The human papilloma virus can cause cancer of the cervix in females.
- _____ 13. Worldwide, a million people a day become infected with STIs.
- _____ 14. Pubic lice suck the blood of their host.
- _____ 15. Gonorrhea is the most common STI in the U.S.
- _____ 16. More females get chlamydia than males.
- _____ 17. Syphilis can be deadly if left untreated.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Most of the people with STAs are under the age of _____.
19. Most of the pathogens that cause STIs enter the body through _____ of the reproductive organs.
20. The only completely effective way to prevent infection with STIs is to avoid _____ and other risky behaviors.
21. _____ is the most common STI in the United States.
22. Bacterial STIs can be cured with _____.
23. Genital herpes is an STI caused by a _____ virus.
24. _____ may eventually damage the liver and increase the risk of liver cancer, which is usually fatal.
25. There is a vaccine for young women that can prevent infection with _____.

Short Answer

Answer each question in the space provided.

26. Explain what causes STIs and how they can be prevented.

27. Identify and describe two common viral STIs.

25.5 Reproduction and Human Development

Chapter Test

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- The human organs that produce sperm are the
 - epididymis.
 - testes.
 - seminal vesicles.
 - ejaculatory ducts.
- The main pituitary hormone that triggers puberty in boys is
 - LH.
 - FSH.
 - testosterone.
 - growth hormone.
- What is the function of the acrosome of a mature sperm cell?
 - secreting enzymes
 - helping the sperm swim
 - providing energy
 - containing DNA
- A fetus grows and develops until birth in the
 - vagina.
 - Fallopian tube.
 - ovary.
 - uterus.
- Eggs form in human females
 - at puberty.
 - in adulthood.
 - during childhood.
 - before birth.
- The process of shedding the endometrium is known as
 - ejaculation.
 - differentiation.
 - menstruation.
 - ovulation.
- At which stage do the three germ layers form in the human organism?
 - morula

- b. blastocyst
 - c. embryo
 - d. fetus
8. Which statement about the placenta is false?
- a. It contains fetal tissues.
 - b. It contains maternal tissues.
 - c. It consists of a large mass of blood vessels.
 - d. It allows maternal and fetal blood to mix.
9. A sexually transmitted infection caused by a protozoan is
- a. pubic lice.
 - b. gonorrhea.
 - c. syphilis.
 - d. trichomoniasis.
10. Which sexually transmitted organism may cause cervical cancer?
- a. HIV
 - b. HPV
 - c. hepatitis B
 - d. genital herpes

True or False

Write true if the statement is true or false if the statement is false.

- _____ 11. Sperm mature in the prostate gland.
- _____ 12. The ovaries secrete estrogen.
- _____ 13. Eggs travel from the ovaries to the uterus through the vagina.
- _____ 14. An embryo develops into a male unless it is exposed to estrogen.
- _____ 15. Ovulation occurs on the first day of the menstrual cycle.
- _____ 16. Fertilization normally occurs in the uterus.
- _____ 17. The blastocyst consists of two cell layers.
- _____ 18. Most organs develop during the embryonic stage.
- _____ 19. Adolescence is the period of most rapid growth after birth.
- _____ 20. The most common STI in the U.S. is chlamydia.

Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. The fluid that carries sperm out of the body is _____.
22. The period in which humans become sexually mature is called _____.
23. The _____ is the female reproductive organ that receives sperm during sexual intercourse.
24. The beginning of monthly periods in females is termed _____.
25. The process of producing eggs is referred to as _____.
26. The period in middle adulthood when menstrual cycles slow down and eventually stop is known as _____.
27. A human organism from 8 weeks after fertilization until birth is called a(n) _____.
28. The _____ is a fluid-filled membrane that surrounds and protects a fetus.

29. The first year of life after birth is referred to as _____.

30. _____ is the period of transition between the beginning of puberty and adulthood.

Short Answer

Answer each question in the space provided.

31. Describe how sperm are produced.

32. Give an overview of the menstrual cycle.

33. Explain why aging occurs.

CHAPTER **26** Biology Unit Assessments

Chapter Outline

- 26.1 UNIT 1: INTRODUCTION TO BIOLOGY TEST
 - 26.2 UNIT 2: CELL BIOLOGY TEST
 - 26.3 UNIT 3: GENETICS TEST
 - 26.4 UNIT 4: EVOLUTION TEST
 - 26.5 UNIT 5: ECOLOGY TEST
 - 26.6 UNIT 6: MICROORGANISMS AND FUNGI TEST
 - 26.7 UNIT 7: PLANTS TEST
 - 26.8 UNIT 8: INVERTEBRATES TEST
 - 26.9 UNIT 9: ANIMALS TEST
 - 26.10 UNIT 10: HUMAN BIOLOGY TEST
-

26.1 Unit 1: Introduction to Biology Test

Unit 1 chapters: *What is Biology?* and *The Chemistry of Life*

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Which of the following is a basic assumption of science?
 - Science can answer all questions.
 - Scientific ideas are fixed.
 - Nature can never be understood.
 - Scientific ideas are open to revision.
- Criteria used to evaluate a scientific model include
 - its limitations.
 - how well it represents reality.
 - how well its predictions match real-world observations.
 - all of the above.
- To be widely accepted, a scientific theory must
 - be very specific.
 - be well supported by evidence.
 - become a scientific law.
 - be proven conclusively to be true.
- To be classified as a living thing, an object must be able to
 - make its own food.
 - grow and develop.
 - move on its own.
 - do all of the above.
- According to the cell theory, all living things
 - are made of many cells.
 - start life as a single cell.
 - have different types of cells.
 - have cells organized in tissues.
- Human beings normally have many bacteria living in their intestines. The bacteria get what they need from the human digestive tract. In return, they make vitamins that the human body needs. This relationship between human beings and bacteria is an example of
 - symbiosis.
 - competition.
 - reproduction.
 - biodiversity.
- A pure substance that cannot be broken down into other types of substances is a(n)
 - compound.
 - molecule.

- c. element.
 - d. proton.
8. Chemical bonds can be broken only with a(n)
- a. scientific experiment.
 - b. chemical reaction.
 - c. enzyme.
 - d. acid.
9. What principle explains why the reactants and products of a chemical reaction contain the same amount of each element?
- a. homeostasis of cells
 - b. evolution of adaptations
 - c. conservation of matter
 - d. energy of activation
10. The burning of methane is an example of a(n)
- a. catabolic reaction.
 - b. biochemical reaction.
 - c. anabolic reaction.
 - d. exothermic reaction.
11. Pure water has all of the following properties **except**
- a. acidity.
 - b. polarity.
 - c. a relatively high boiling point.
 - d. the ability to form hydrogen bonds.
12. Acids and bases are secreted into the human digestive tract. What role do they play?
- a. They maintain the proper pH for digestive enzymes to work.
 - b. They dissolve food particles and release their energy.
 - c. They soften food so it is easier to digest.
 - d. They absorb energy from digested food.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Scientific experiments should be repeated before their results are accepted.
- _____ 14. If a model makes correct predictions, you can safely assume it is the best model.
- _____ 15. The term “theory” is just another word for hypothesis.
- _____ 16. All living things normally have the ability to reproduce.
- _____ 17. Elements are the basic units of structure and function of living things.
- _____ 18. Natural selection depends on some living things producing more offspring than others do.
- _____ 19. Competition is a relationship between organisms that need the same resources.
- _____ 20. A tissue is a group of organs that work together to do a certain job.
- _____ 21. All of the populations that live in the same area make up a biome.
- _____ 22. Charles Darwin presented his theory of evolution without any evidence to support it.
- _____ 23. Functions of proteins include carrying messages and materials.
- _____ 24. RNA helps assemble proteins.

_____ 25. Anabolic reactions break down molecules and release energy.

Fill in the Blank

Fill in the blank with the term that best completes the sentence.

26. Anything that takes up space and has mass is called _____.
27. The smallest particle of an element that still has the properties of that element is a(n) _____.
28. A substance that consists of two or more elements is called a(n) _____.
29. Both DNA and RNA are the type of organic compounds called _____.
30. Large, complex carbohydrates consist of small repeating units called _____.
31. A nucleotide consists of a base, a phosphate group, and a(n) _____.
32. An example of a complementary base pair is thymine paired with _____.
33. The energy needed to start a chemical reaction is called _____.
34. The sum of all the biochemical reactions in an organism is known as _____.
35. Acidity is measured on a scale called _____.

Short Answer

Answer each question in the space provided.

36. State a pro and a con of doing laboratory experiments to learn about the natural world.

37. How does life on Earth evolve?

38. Outline the role of energy in chemical reactions

39. Why is water essential for life?

40. Use reasoning and information from the unit to support the following statement: *Knowledge of chemistry is important for the study of biology.*

26.2 Unit 2: Cell Biology Test

Unit 2 chapters: *Cellular Structure and Function, Photosynthesis and Cellular Respiration and The Cell Cycle, Mitosis, and Meiosis*

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Bacterial cells were first observed under a microscope by
 - Robert Hooke.
 - Rudolf Virchow.
 - Mattias Jacob Schleiden.
 - Anton van Leeuwenhoek.
- Structures found in all living cells include
 - a nucleus.
 - ribosomes.
 - mitochondria.
 - chloroplasts.
- A cell's cytoskeleton consists of
 - phospholipids.
 - filaments and tubules.
 - cortisol.
 - vesicles.
- The movement of a substance across a membrane from a higher to a lower concentration is called
 - cellular transport.
 - active transport.
 - exocytosis.
 - diffusion.
- All organisms that consume other organisms are referred to as
 - producers.
 - autotrophs.
 - decomposers.
 - heterotrophs.
- Products of photosynthesis include
 - carbon dioxide.
 - oxygen.
 - energy.
 - water.
- The last stage of aerobic respiration is
 - the light reaction.
 - the Krebs cycle.
 - the Calvin cycle.

- d. electron transport.
8. Compared with aerobic respiration, anaerobic respiration
- a. is much faster.
 - b. produces more ATP.
 - c. requires more oxygen.
 - d. occurs in more organisms.
9. Cell division in prokaryotes includes
- a. mitosis.
 - b. meiosis.
 - c. cytokinesis.
 - d. anaphase.
10. During which phase of the cell cycle does DNA form chromosomes?
- a. interphase
 - b. synthesis
 - c. growth phase 1
 - d. cell division
11. The final phase of mitosis is
- a. metaphase.
 - b. telophase.
 - c. prophase.
 - d. none of the above.
12. The cell that forms during fertilization is called a(n)
- a. egg.
 - b. sperm.
 - c. gamete.
 - d. zygote.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. All cells are very small.
- _____ 14. All cells have a cell wall.
- _____ 15. The outside of the plasma membrane is water loving.
- _____ 16. Facilitated diffusion is a type of active transport.
- _____ 17. All autotrophs are plants.
- _____ 18. The light reactions take place in chloroplasts.
- _____ 19. In glycolysis, pyruvic acid breaks down to glucose.
- _____ 20. Anaerobic respiration produces 38 molecules of ATP.
- _____ 21. Fermentation produces lactic acid or alcohol.
- _____ 22. Prokaryotic cells undergo mitosis.
- _____ 23. Fragmentation is a form of asexual reproduction.
- _____ 24. Crossing-over occurs between homologous chromosomes.
- _____ 25. An organism with a haploid life cycle does not have a diploid stage.

Fill in the Blank

Fill in the blank with the term that best completes the sentence.

26. Cells with a nucleus are called _____ cells.
27. Chloroplasts contain the green pigment _____.
28. The idea that eukaryotic organelles evolved from prokaryotic cells is known as _____ theory.
29. In food chains, autotrophs play the role of _____.
30. Cellular respiration takes place in the _____.
31. The process that begins cellular respiration is _____.
32. Cellular respiration in the absence of oxygen is called _____ respiration.
33. The nucleus of a eukaryotic cell divides in the process of _____.
34. Chromosomes are coiled structures made of proteins and _____.
35. Cells that contain half the number of chromosomes as other cells in an organism are called _____ cells.

Short Answer

Answer each question in the space provided.

36. Describe the structure and function of the plasma membrane.

37. What is the Calvin cycle? What is its role in photosynthesis?

38. Outline how living things make and use food.

39. Explain the role of regulatory proteins in the cell cycle.

40. Identify a eukaryotic cell organelle that you think is especially important. Describe its structure and function. Use information from the unit to argue why you think it is important.

26.3 Unit 3: Genetics Test

Unit 3 chapters: *Gregor Mendel and Genetics*, *Molecular Genetics: From DNA to Proteins* and *Human Genetics and Biotechnology*

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Mendel crossed a purple-flowered pea plant with a white-flowered pea plant. What color were the flowers of the first generation of offspring?
 - purple
 - white
 - pink
 - purple and white
- Mendel's first set of experiments led to the law of
 - genetics.
 - segregation.
 - assortment.
 - heredity.
- Codominance occurs when
 - the recessive allele is not completely recessive.
 - the dominant allele is not completely dominant.
 - both alleles are expressed equally in the phenotype.
 - both alleles are completely dominant.
- The ABO blood type gene has three common alleles. How many possible phenotypes are there?
 - three
 - four
 - six
 - nine
- The backbone of a polynucleotide chain of DNA or RNA consists of alternating
 - amino acids.
 - base pairs.
 - sugars and phosphates.
 - codons.
- The process that produces two DNA molecules identical to an original DNA molecule is called DNA
 - synthesis.
 - translation.
 - replication.
 - recombination.
- The last step of transcription is
 - elongation.
 - initiation.

- c. epistasis.
 - d. termination.
8. What type of mutation occurs when a nucleotide is deleted from the genetic material?
- a. translocation
 - b. frameshift
 - c. inversion
 - d. promotion
9. The locations of genes on a chromosome is shown in a
- a. pedigree.
 - b. karyotype.
 - c. Punnett square.
 - d. linkage map.
10. Human skin color and adult height are examples of
- a. pleiotropic traits.
 - b. polygenic traits.
 - c. sex-linked traits.
 - d. dominant traits.
11. A person with Turner's syndrome has the genotype
- a. XX.
 - b. XY.
 - c. XO.
 - d. XXY.
12. The polymerase chain reaction is used to
- a. isolate a gene.
 - b. make recombinant DNA.
 - c. make multiple copies of a gene.
 - d. determine a person's DNA sequence.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Different versions of the same gene are called genotypes.
- _____ 14. Few traits have the simple inheritance patterns studied by Mendel.
- _____ 15. ABO blood type is an example of a polygenic trait.
- _____ 16. Probability is the chance that an event will occur.
- _____ 17. The second part of the central dogma of molecular biology is translation.
- _____ 18. Splicing removes exons from DNA.
- _____ 19. Somatic mutations occur only in gametes.
- _____ 20. Klinefelter's syndrome is caused by a point mutation.
- _____ 21. Each codon consists of three nitrogen bases.
- _____ 22. Red-green color blindness is an example of an autosomal trait.
- _____ 23. An example of a recessive disorder is Marfan syndrome.
- _____ 24. The process of ligation produces recombinant DNA.
- _____ 25. Nondisjunction occurs during protein synthesis.

Fill in the Blank

Fill in the blank with the term that best completes the sentence.

26. _____ is the science of heredity.
27. The male gametes in plants are called _____.
28. The expression of the genotype is the _____.
29. RNA contains _____ instead of deoxyribose.
30. Concentrations of nitrogen bases in DNA are described by the laws of _____.
31. Translation takes place at a(n) _____.
32. For the mRNA codon AGG, the tRNA anticodon is _____.
33. A point mutation that results in a premature stop codon is called a(n) _____ mutation.
34. Each normal human somatic cell has 22 pairs of _____.
35. Crops that have been modified with new genes are called _____ crops.

Short Answer

Answer each question in the space provided.

36. Describe Mendel's second set of experiments and the law it led to.

37. Explain how probability is related to inheritance.

38. Compare and contrast transcription and translation.

39. Explain how linkage maps are constructed.

40. Do you think that biotechnology should be used to change the genetic makeup of the plants and animals that humans consume for food? What might be the benefits and risks? Do you think the benefits outweigh the risks?

26.4 Unit 4: Evolution Test

Unit 4 chapters: *Life: From the First Organism Onward* and *The Theory of Evolution*

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- When did life first appear on Earth?
 - 4 million years ago
 - 4 billion years ago
 - 4.6 billion years ago
 - none of the above
- Which dating method determines only which specimen is older or younger than another?
 - radiometric dating
 - carbon 14 dating
 - absolute dating
 - relative dating
- The Precambrian mass extinction was followed by the
 - Cenozoic mass extinction.
 - Cambrian mass extinction.
 - Precambrian explosion.
 - Cambrian explosion.
- The Cenozoic Era is known as the age of
 - reptiles.
 - dinosaurs.
 - mammals.
 - humans.
- The most inclusive taxon in Linnaeus' original classification system is the
 - population.
 - species.
 - kingdom.
 - domain.
- A group of organisms that includes an ancestor and all its descendants is a
 - genus.
 - family.
 - species.
 - clade.
- Which scientist developed a theory of evolution by natural selection?
 - Charles Lyell
 - Jean Baptiste Lamarck
 - Alfred Russel Wallace
 - none of the above

8. Structures that are similar in unrelated organisms are called
 - a. analogies.
 - b. homologies.
 - c. acquired characteristics.
 - d. vestigial structures.
9. The evolution of Darwin's finches is an example of
 - a. adaptive radiation.
 - b. vestigial selection.
 - c. sympatric speciation.
 - d. coevolution.
10. All the genes in a population make up its
 - a. genotype.
 - b. gene pool.
 - c. phenotype.
 - d. genome.
11. Which genotype has the highest fitness where malaria is a problem?
 - a. AA
 - b. AS
 - c. AO
 - d. AB
12. Natural selection that narrows the range of variation for a polygenic trait is called
 - a. stabilizing selection.
 - b. directional selection.
 - c. disruptive selection.
 - d. dimorphic selection.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. The majority of fossils are completely preserved skeletons.
- _____ 14. Most of Earth's history occurred during the Precambrian.
- _____ 15. Earth has always had the same atmosphere.
- _____ 16. The first fish evolved during the Mesozoic Era.
- _____ 17. The present geologic period is the Quaternary.
- _____ 18. A group of closely related species makes up an order.
- _____ 19. *Homo sapiens* are classified in the domain Archaea.
- _____ 20. Charles Lyell argued that Earth must be very old.
- _____ 21. The human appendix is an example of a vestigial structure.
- _____ 22. The founding principle of population genetics is endosymbiotic theory.
- _____ 23. Punctuated equilibrium is one of the four forces of evolution.
- _____ 24. Founder effect is a special case of genetic drift.
- _____ 25. Darwin thought that evolution occurs in bursts of rapid change.

Fill in the Blank

Fill in the blank with the term that best completes the sentence.

26. The shortest subdivisions of the geologic time scale are _____.
27. The cell that gave rise to all subsequent life on Earth is called _____.
28. The evolution of cells with organelles is explained by _____ theory.
29. Dinosaurs went extinct at the end of the _____ Era.
30. Organisms that can produce fertile offspring together belong to the same _____.
31. Structures that are similar because they were inherited from a common ancestor are called _____.
32. Evolution that occurs within a relatively short period of time is termed _____.
33. The unit of evolution is the _____.
34. The ultimate source of new genetic variation in a species is _____.
35. _____ refers to differences between males and females of the same species.

Short Answer

Answer each question in the space provided.

36. What is the RNA world hypothesis? What evidence supports it?

37. Describe the role of mass extinctions in the evolution of life.

38. What is binomial nomenclature? Why is it considered to be Linnaeus' single greatest contribution to science?

39. What are allele frequencies? How can they be calculated?

40. State Darwin's theory of evolution by natural selection. Make an argument in support of the theory. Include a description of the diversity of types of evidence that support it.

26.5 Unit 5: Ecology Test

Unit 5 chapters: *The Principles of Ecology and Communities and Populations*

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

1. The physical environment in which a species lives and to which it is adapted is its
 - a. niche.
 - b. habitat.
 - c. community.
 - d. trophic level.
2. Detritivores are organisms that consume
 - a. dead animals.
 - b. organic debris.
 - c. plants or algae.
 - d. both plants and animals.
3. Reservoirs in the carbon cycle include
 - a. oceans.
 - b. fossil fuels.
 - c. sedimentary rocks.
 - d. all of the above.
4. Plants with large, hollow leaves and stout, barrel-shaped stems are adapted to live in a
 - a. desert.
 - b. boreal forest.
 - c. temperate rainforest.
 - d. tropical rainforest.
5. In a chaparral biome, the climate is
 - a. temperate and wet.
 - b. tropical and wet.
 - c. tropical and arid.
 - d. temperate and semi-arid.
6. The biotic part of an ecosystem is a
 - a. population.
 - b. community.
 - c. species.
 - d. biome.
7. The most common pattern of population dispersion is
 - a. uniform.
 - b. random.
 - c. clumped.
 - d. logistic.

8. During the demographic transition in Europe, the rate of population growth increased during
 - a. stage 1.
 - b. stage 2.
 - c. stage 3.
 - d. stage 4.
9. A population pyramid with a narrow base represents a population with
 - a. a rapid rate of growth.
 - b. a very high birth rate.
 - c. a large proportion of young people.
 - d. none of the above.
10. Renewable resources include
 - a. soil.
 - b. natural gas.
 - c. petroleum.
 - d. none of the above.
11. Algal blooms are caused by
 - a. acid rain.
 - b. air pollution.
 - c. fertilizer.
 - d. ozone.
12. Ground-level ozone
 - a. absorbs UV rays.
 - b. prevents mutations.
 - c. harms human health.
 - d. occurs naturally in the atmosphere.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Soil is an example of a biotic ecosystem factor.
- _____ 14. The competitive exclusion principle states that one species cannot have two niches.
- _____ 15. All producers are photoautotrophs.
- _____ 16. The atmosphere is an exchange pool in the water cycle.
- _____ 17. Major temperature zones are based on longitude.
- _____ 18. Biodiversity is generally greater in humid climates.
- _____ 19. Competition always involves two different species.
- _____ 20. Any close relationship between two species is called mutualism
- _____ 21. A community consists of populations of different species.
- _____ 22. The human population is growing exponentially.
- _____ 23. Biodiversity is the total mass of species in an ecosystem.
- _____ 24. Iron is considered to be a nonrenewable resource.
- _____ 25. Carbon dioxide causes the ozone hole.

Fill in the Blank

39. Relate human actions to the sixth mass extinction.

40. Using examples and reasoning, make an argument in support of the following statement: *Biodiversity is an important natural resource.*

26.6 Unit 6: Microorganisms and Fungi Test

Unit 6 chapters: *Microorganisms: Prokaryotes and Viruses* and *Eukaryotes: Protists and Fungi*

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

1. Prokaryotes that live in extreme environments belong to the domain
 - a. Bacteria.
 - b. Eukarya.
 - c. Protista.
 - d. Archaea.
2. Organisms classified as halophiles “love”
 - a. acid.
 - b. cold.
 - c. heat
 - d. salt.
3. Prokaryotes that get energy from compounds and obtain carbon from the air are classified as
 - a. photoautotrophs.
 - b. photoheterotrophs.
 - c. chemoautotrophs.
 - d. chemoheterotrophs.
4. A virus consists of a protein coat and
 - a. DNA or RNA.
 - b. a lipid membrane.
 - c. cytoplasm.
 - d. a flagellum.
5. The common cold is caused by a
 - a. bacterium.
 - b. virus.
 - c. protozoan.
 - d. yeast.
6. Endosymbiotic theory is supported by similarities between chloroplasts and
 - a. viruses.
 - b. yeasts.
 - c. cyanobacteria.
 - d. none of the above.
7. Slime molds are
 - a. protists.
 - b. fungi.
 - c. yeasts.
 - d. plants.

8. Which statement about algae is true?
 - a. Algae may be single-celled.
 - b. Algae are plants.
 - c. Algae have leaves.
 - d. Algae cannot move.
9. The cell walls of fungi are made of
 - a. hyphae.
 - b. biofilm.
 - c. chitin.
 - d. kelp.
10. A lichen is a mutualistic relationship between a photosynthetic organism and a(n)
 - a. prokaryote.
 - b. protist.
 - c. fungus.
 - d. insect.
11. Humans consume fungi when they eat
 - a. soy sauce.
 - b. bread.
 - c. blue cheese.
 - d. any of the above.
12. Chagas disease is caused by a
 - a. fungus.
 - b. protist.
 - c. virus.
 - d. bacterium.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Prokaryotes are single-celled organisms that lack a nucleus.
- _____ 14. Scientists think that Archaea evolved from Eukarya.
- _____ 15. Gram-positive bacteria have a thin cell wall with an outer membrane.
- _____ 16. Hyperthermophiles prefer hot environments.
- _____ 17. The plaque that forms on teeth is an example of a capsid.
- _____ 18. Binary fission is a type of sexual reproduction in prokaryotes.
- _____ 19. All bacteria are spread from host to host by vectors.
- _____ 20. Viruses were first discovered with a light microscope.
- _____ 21. Cold sores are caused by bacteria.
- _____ 22. Protists produce reproductive cells called spores.
- _____ 23. Some protists make food by photosynthesis.
- _____ 24. Some protozoa are autotrophs.
- _____ 25. Some seaweeds grow as large as trees.

Fill in the Blank

39. Describe the role of fungi as decomposers.

40. Give three examples of human diseases caused by bacteria, protists, and fungi. Which type of organism do you think is the biggest threat to human health? Use facts and reasoning to support your point of view.

26.7 Unit 7: Plants Test

Unit 7 chapters: *Plant Evolution and Classification* and *Plant Biology*

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

1. A general plant life cycle alternates between
 - a. bryophyte and saprophyte generations.
 - b. tracheophyte and spermatophyte generations.
 - c. gametophyte and sporophyte generations.
 - d. xerophyte and epiphyte generations.
2. The ancestors of plants were
 - a. algae.
 - b. ferns.
 - c. yeast.
 - d. fungi.
3. Seeds form only in
 - a. fruiting plants.
 - b. gymnosperms.
 - c. angiosperms.
 - d. vascular plants.
4. Monocots, eudicots, and magnolids are the major types of
 - a. conifers.
 - b. cycads.
 - c. flowering plants.
 - d. cone-forming plants.
5. The earliest plants had structures called rhizoids instead of
 - a. flowers.
 - b. leaves.
 - c. stems.
 - d. roots.
6. Plants that form seeds in cones are called
 - a. angiosperms.
 - b. gymnosperms.
 - c. flowering plants.
 - d. nonvascular plants.
7. Which structure is found in the cells of plants but not animals?
 - a. cell wall
 - b. cytoplasm
 - c. cytoskeleton
 - d. nuclear membrane

8. In which type of cell does photosynthesis occur?
 - a. parenchymal
 - b. collenchymal
 - c. sclerenchymal
 - d. all of the above
9. Meristem is unique because it is the only plant tissue with cells that
 - a. can divide.
 - b. are undifferentiated.
 - c. lack cell walls.
 - d. can secrete cuticle.
10. Which plant structure is specialized for climbing?
 - a. rhizome
 - b. vine
 - c. taproot
 - d. fibrous root
11. The diploid generation of a plant reproduces by producing
 - a. spores.
 - b. gametes.
 - c. sporophytes.
 - d. sporangia.
12. Geotropism occurs when plant roots grow toward
 - a. light.
 - b. heat.
 - c. gravity.
 - d. moisture.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Some plants are prokaryotes.
- _____ 14. All plants grow from seeds.
- _____ 15. Plants produce carbon dioxide during the day.
- _____ 16. Plant roots absorb water and food from the soil.
- _____ 17. Rhizoids are stems specialized for storage.
- _____ 18. Stomata control gas exchange in leaves.
- _____ 19. Gametophytes have diploid cells.
- _____ 20. Ferns are nonvascular plants.
- _____ 21. Plants were early colonizers of the land.
- _____ 22. Plants have cell walls made of chitin.
- _____ 23. The female reproductive structure of a flower is the stamen.
- _____ 24. Plants form fruits to attract pollinators.
- _____ 25. Phloem transports food from leaves to other parts of a plant.

Fill in the Blank

39. What is phototropism? Why does it occur?

40. Use facts and arguments from the unit to support this statement: *Plants are complex organisms that carry out complex tasks.*

26.8 Unit 8: Invertebrates Test

Unit 8 chapters: *Introduction to Animals* and *From Sponges to Invertebrate Chordates*

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Spiders belong to the phylum
 - Cnidaria.
 - Vertebrata.
 - Chordata.
 - Arthropoda.
- Most animals have
 - a backbone.
 - a very complex life cycle.
 - sensory nerve cells.
 - all of the above.
- Which animal has a complete digestive system?
 - jellyfish
 - roundworm
 - sponge
 - coral
- What gives a hydrostatic skeleton its stiffness?
 - rigid bones
 - fluid pressure
 - muscle tone
 - spiny skin
- Which invertebrates belong to the phylum Platyhelminthes?
 - snails
 - squids
 - earthworms
 - tapeworms
- Which evolutionary advance occurred in cnidarians?
 - radial symmetry
 - pseudocoelom
 - well-developed brain
 - closed circulatory system
- The mantle of a mollusk
 - scrapes algae off rocks.
 - is made of chitin.
 - is used for walking.
 - forms the mollusk's shell.

8. Which sentence about cephalopods is true?
- Cephalopods are filter feeders.
 - Cephalopods have a complex brain.
 - Most cephalopods live in the soil.
 - Cephalopods are chordates.
9. Annelids have tiny chitin bristles called setae that they use for
- movement.
 - reproduction.
 - digestion.
 - predation.
10. An arthropod uses its mandible for
- sensing light.
 - detecting chemicals.
 - excreting waste.
 - grasping food.
11. All of the following are echinoderms **except**
- sea stars.
 - sea lilies.
 - sea urchins.
 - sea squirts.
12. Which feature is found in all chordates during at least some stage of life?
- backbone
 - vertebral column
 - radial symmetry
 - dorsal nerve cord

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. The earliest animals evolved from fungi.
- _____ 14. Most animals spend the majority of their life cycle as haploid organisms.
- _____ 15. Invertebrate animals do not have bones.
- _____ 16. The first animal trait to evolve was segmentation.
- _____ 17. The outer cell layer in most animals is called endoderm.
- _____ 18. Animals with jointed appendages are placed in the phylum Annelida.
- _____ 19. Adult sponges are sessile filter feeders.
- _____ 20. Flatworms were the first animals to have a pseudocoelom.
- _____ 21. The radula is a feeding organ in mollusks.
- _____ 22. Annelids have the capacity to regrow segments.
- _____ 23. Coxal glands of arthropods secrete growth hormone.
- _____ 24. Insects are the only invertebrates that can fly.
- _____ 25. All chordates have a backbone.

Fill in the Blank

39. Describe the traits that define the chordate phylum.

40. List major trends in animal evolution. Identify the trend that you think was most significant and explain why. Provide facts and reasoning to support your choice of trait.

26.9 Unit 9: Animals Test

Unit 9 chapter: *From Fish to Birds and Mammals and Animal Behavior*

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- The main distinguishing feature of vertebrates is
 - vivipary.
 - a backbone.
 - a post-anal tail.
 - endothermy.
- The first vertebrates to evolve were similar to living
 - frogs.
 - lizards.
 - echidnas.
 - hagfish.
- Mouth brooding occurs in some species of
 - fish.
 - amphibians.
 - reptiles.
 - birds.
- Which statement about amphibians is false?
 - They are ectothermic.
 - They have four legs.
 - They lay amniotic eggs.
 - They go through a larval stage.
- As adults, amphibians are
 - omnivorous.
 - herbivorous.
 - carnivorous.
 - parasitic.
- Orders of reptiles include
 - Sphenodontia.
 - Chordata.
 - Vertebrata.
 - Caecilia.
- Dinosaurs were the dominant land vertebrates during the
 - Cenozoic Era.
 - Permian Period.
 - Mesozoic Era.
 - Paleozoic Era.

8. Birds are all of the following **except**
 - a. vertebrates.
 - b. tetrapods.
 - c. amniotes.
 - d. therians.
9. Mammals that are omnivores include
 - a. mice.
 - b. foxes.
 - c. seals.
 - d. raccoons.
10. A marsupial embryo is nourished inside the mother's uterus with a
 - a. yolk.
 - b. placenta.
 - c. nipple.
 - d. pouch.
11. The mammals that evolved most recently are the
 - a. monotremes.
 - b. marsupials.
 - c. placentals.
 - d. cynodonts.
12. Which statement about learned behaviors is true?
 - a. They are instinctive.
 - b. They are innate.
 - c. They are flexible.
 - d. They include reflexes.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. A vertebrate's backbone consists of a single, long bone.
- _____ 14. Vertebrates reproduce sexually.
- _____ 15. Fish use their fins for breathing.
- _____ 16. The majority of living fish are ray-finned fish.
- _____ 17. Amphibians evolved from a reptile ancestor.
- _____ 18. Reptiles have scales made of keratin.
- _____ 19. The only function of feathers in birds is flight.
- _____ 20. Raptors include parrots and parakeets.
- _____ 21. Birds evolved from dinosaurs.
- _____ 22. Mammals have four tiny bones in their middle ear.
- _____ 23. Therian mammals are oviparous.
- _____ 24. The mammalian supertree is based on fossils.
- _____ 25. An example of a cyclic behavior is migration.

Fill in the Blank

39. Describe several ways that mammals control their body temperature.

40. To what extent do you think that the success of mammals is related to their ability to learn? Use evidence and reasoning to support your answer.

26.10 Unit 10: Human Biology Test

Unit 10 chapters: *Introduction to the Human Body: Bones, Muscles, and Skin, The Nervous and Endocrine Systems, The Circulatory, Respiratory, Digestive, and Excretory Systems, The Immune System and Disease and Reproduction and Human Development*

Name _____ Class _____ Date _____

Multiple Choice

Circle the letter of the correct choice.

- Which statement about bone matrix is false?
 - It is crisscrossed by nerves.
 - It contains blood vessels.
 - It consists mainly of collagen.
 - It produces blood cells.
- When all the sarcomeres in a muscle fiber shorten, the fiber
 - extends.
 - grows.
 - contracts.
 - weakens.
- The outer layer of the skin contains
 - melanocytes.
 - nerves.
 - blood vessels.
 - sweat glands.
- What type of neuron carries nerve impulses from the central nervous system to glands?
 - sensory neuron
 - motor neuron
 - glandular neuron
 - interneuron
- The gland that links the endocrine and nervous systems is the
 - pineal gland.
 - thyroid gland.
 - hypothalamus.
 - adrenal gland.
- Systemic circulation carries blood between the
 - body and heart.
 - heart and lungs.
 - lungs and body.
 - body and brain.
- Mechanical digestion is completed by the time food enters the
 - esophagus.
 - stomach.

- c. duodenum.
 - d. pancreas.
8. The liver plays a role in excretion by
- a. breaking down toxins in the blood.
 - b. eliminating excess water from the body.
 - c. decomposing wastes in the large intestine.
 - d. concentrating nitrogen in the urine.
9. Which statement about T cells is **false**?
- a. T cells have receptors for specific antigens.
 - b. Activated T cells produce antibodies.
 - c. T cells mature in the thymus gland.
 - d. Activated T cells destroy infected cells.
10. Which of the following is an autoimmune disease?
- a. mumps
 - b. allergies
 - c. AIDS
 - d. lupus
11. Compared with the adolescent growth spurt in boys, the growth spurt in girls
- a. starts later.
 - b. lasts longer.
 - c. ends sooner.
 - d. has a faster rate of growth.
12. The process in which an embryo develops specialized cells is called
- a. implantation.
 - b. differentiation.
 - c. maturation.
 - d. luteinization.

True or False

Write true if the statement is true or false if the statement is false.

- _____ 13. Epithelial tissues include bone and cartilage.
- _____ 14. Bones are held together by tissues called ligaments.
- _____ 15. The lobe of the cerebrum associated with hearing is the frontal lobe.
- _____ 16. The hormone prolactin is secreted by the mammary glands.
- _____ 17. Non-steroid hormones bind to the membranes of target cells.
- _____ 18. Veins carry blood away from the heart.
- _____ 19. Breathing occurs because of contractions of the diaphragm.
- _____ 20. All chemical digestion takes place in the small intestine.
- _____ 21. Nephrons are the structural and functional units of the kidneys.
- _____ 22. The body's second line of defense is the immune response.
- _____ 23. The injection of antibodies produces active immunity.
- _____ 24. Aging occurs as cells lose their ability to divide.
- _____ 25. STIs are infectious diseases that spread only through sexual contact.

Fill in the Blank

Fill in the blank with the term that best completes the sentence.

26. Cells in bone that regulate mineral homeostasis are _____.
27. The only type of muscle tissue that is under voluntary control is _____ muscle.
28. A(n) _____ is a very rapid motor response that is not directed by the brain.
29. The endocrine gland that secretes insulin is the _____.
30. The long tube that carries air from the larynx to the lungs is the _____.
31. The lung disease in which walls of alveoli break down is _____.
32. Lymphocytes recognize and respond to _____.
33. The cell-mediated immune response involves mainly lymphocytes called _____.
34. The process of producing sperm is called _____.
35. The process in which the endometrium is shed is referred to as _____.

Short Answer

Answer each question in the space provided.

36. Describe the four types of tissues found in the human body and give an example of each tissue type.

37. Outline the divisions and subdivisions of the peripheral nervous system.

38. Explain how the urinary system filters blood and excretes wastes.

39. Identify and describe a viral and a bacterial STI.

40. Discuss how human organ systems interact to maintain homeostasis in the body. Include several examples in your response.