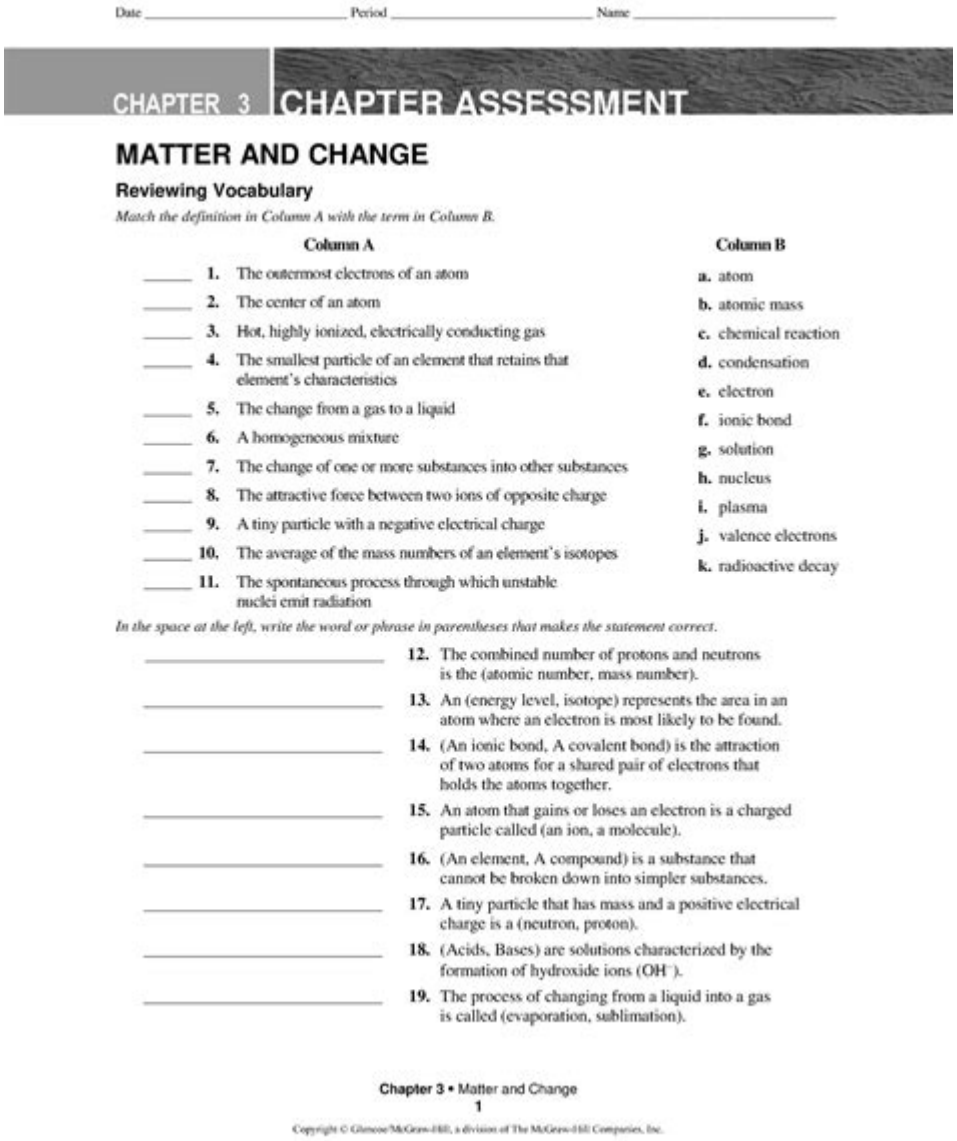
Chapter 3 Matter And Change Answer Key



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CHAPTER 3 CHAPTER ASSESSMENT

MATTER AND CHANGE

Reviewing Vocabulary

Match the definition in Column A with the term in Column B.

Column A	Column B
_____ 1. The outermost electrons of an atom	a. atom
_____ 2. The center of an atom	b. atomic mass
_____ 3. Hot, highly ionized, electrically conducting gas	c. chemical reaction
_____ 4. The smallest particle of an element that retains that element's characteristics	d. condensation
_____ 5. The change from a gas to a liquid	e. electron
_____ 6. A homogeneous mixture	f. ionic bond
_____ 7. The change of one or more substances into other substances	g. solution
_____ 8. The attractive force between two ions of opposite charge	h. nucleus
_____ 9. A tiny particle with a negative electrical charge	i. plasma
_____ 10. The average of the mass numbers of an element's isotopes	j. valence electrons
_____ 11. The spontaneous process through which unstable nuclei emit radiation	k. radioactive decay

In the space at the left, write the word or phrase in parentheses that makes the statement correct.

_____ 12. The combined number of protons and neutrons is the (atomic number, mass number).

_____ 13. An (energy level, isotope) represents the area in an atom where an electron is most likely to be found.

_____ 14. (An ionic bond, A covalent bond) is the attraction of two atoms for a shared pair of electrons that holds the atoms together.

_____ 15. An atom that gains or loses an electron is a charged particle called (an ion, a molecule).

_____ 16. (An element, A compound) is a substance that cannot be broken down into simpler substances.

_____ 17. A tiny particle that has mass and a positive electrical charge is a (neutron, proton).

_____ 18. (Acids, Bases) are solutions characterized by the formation of hydroxide ions (OH^-).

_____ 19. The process of changing from a liquid into a gas is called (evaporation, sublimation).

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Chapter 3: Matter and Change Answer Key

Understanding the concepts of matter and its changes is fundamental to the study of chemistry. Chapter 3 of many chemistry textbooks typically delves deep into these topics, providing students with a comprehensive understanding of the various states of matter, the properties of substances, and the changes they undergo. This article will provide an overview of the main concepts from Chapter 3, along with a detailed answer key to common questions and problems presented in this chapter.

Key Concepts of Matter

Before diving into the answer key, let's summarize some key concepts related to matter and change.

Definition of Matter

Matter is defined as anything that has mass and occupies space. This includes:

- Solids
- Liquids
- Gases
- Plasmas

Each state of matter has distinct properties and behaviors, which are influenced by the arrangement and energy of its particles.

States of Matter

1. Solids: In solids, particles are closely packed together, resulting in a fixed shape and volume. The particles vibrate but do not move freely.

2. Liquids: Liquids have a definite volume but take the shape of their container. The particles are less tightly packed than in solids, allowing them to flow.

3. Gases: Gases have neither a definite shape nor volume. The particles are far apart and move freely, filling the entire space of their container.

4. Plasmas: Plasmas are ionized gases that conduct electricity and are affected by magnetic fields. They are found naturally in stars, including the sun.

Physical and Chemical Properties

Understanding the differences between physical and chemical properties is essential:

- Physical Properties: Characteristics that can be observed without changing the substance's identity, such as color, melting point, boiling point, and density.

- Chemical Properties: Describes a substance's ability to undergo changes that transform it into different substances. Examples include reactivity with acids, oxidation states, and flammability.

Changes in Matter

Changes in matter can be classified as physical changes or chemical changes:

1. Physical Changes: Changes that affect one or more physical properties of a substance without altering its chemical composition. Examples include melting, freezing, and dissolving.

2. Chemical Changes: Changes that result in the formation of new chemical substances. Indicators of a chemical change include color change, gas production, and temperature change during the reaction.

Answer Key for Chapter 3 Questions

The following answer key addresses common questions and problems typically found at the end of Chapter 3. This key is designed to help students understand the material better and clarify any misconceptions.

Section 3.1: Basic Concepts of Matter

1. Question: Define matter and give three examples.
- Answer: Matter is anything that has mass and occupies space. Examples include water, air, and a rock.

2. Question: List the four states of matter.
- Answer: The four states of matter are solid, liquid, gas, and plasma.

Section 3.2: Properties of Matter

3. Question: Differentiate between physical and chemical properties.
- Answer: Physical properties can be observed without changing the substance (e.g., melting point), while chemical properties describe a substance's ability to change into a different substance (e.g., reactivity with oxygen).

4. Question: What is density, and how is it calculated?
- Answer: Density is a physical property defined as mass per unit volume. It is calculated using the formula: Density = Mass/Volume.

Section 3.3: Changes in Matter

5. Question: Describe a physical change and provide an example.
- Answer: A physical change affects the form of a substance but not its chemical composition. An example is the melting of ice into water.

6. Question: What are the signs of a chemical change?
- Answer: Signs of a chemical change include color change, gas production, formation of a precipitate, and temperature change.

Section 3.4: Classification of Matter

7. Question: What is the difference between an element and a compound?
- Answer: An element is a pure substance that cannot be broken down into simpler substances, while a compound is formed when two or more elements chemically bond together.

8. Question: Provide examples of homogeneous and heterogeneous mixtures.
- Answer: A homogeneous mixture is uniform in composition (e.g., saltwater), while a heterogeneous mixture consists of visibly different substances or phases (e.g., salad).

Section 3.5: Conservation of Mass

9. Question: Explain the law of conservation of mass.
- Answer: The law of conservation of mass states that in a closed system, mass is neither created nor destroyed during a chemical reaction; it is conserved.

10. Question: How does this law apply to chemical reactions?
- Answer: During a chemical reaction, the total mass of the reactants is equal to the total mass of the products, meaning that atoms are rearranged but not lost or gained.

Conclusion

Chapter 3 on matter and change is pivotal for students embarking on their chemistry education. By understanding the definitions and properties of matter, the different states it can exist in, and the various changes it can undergo, students lay a strong foundation for more advanced topics in chemistry.

This answer key provides a clear and structured reference for students as they navigate through the complexities of this chapter. Mastery of these concepts will not only enhance their academic performance but also encourage a deeper appreciation for the science of chemistry and its relevance to the world around them.

By grasping these essential ideas and principles, students are better equipped to tackle more complicated chemical interactions and phenomena in subsequent chapters.

Frequently Asked Questions

What are the key concepts covered in Chapter 3 of Matter and Change?

Chapter 3 covers the classification of matter, properties of substances, changes in matter, and the significance of the periodic table.

How does Chapter 3 define elements and compounds?

Elements are pure substances that cannot be broken down into simpler substances, while compounds are substances formed when two or more elements chemically combine.

What types of mixtures are discussed in Chapter 3?

Chapter 3 discusses homogeneous mixtures (solutions) and heterogeneous mixtures, outlining their properties and examples.

What are physical and chemical changes according to Chapter 3?

Physical changes alter the form of a substance without changing its identity, while chemical changes result in the formation of new substances.

How does Chapter 3 explain the importance of the periodic table?

The periodic table organizes elements based on atomic number and properties, helping to predict chemical behavior and relationships between elements.

What are some examples of physical properties mentioned in Chapter 3?

Examples of physical properties include color, melting point, boiling point, density, and solubility.

What is the significance of energy changes in matter as discussed in Chapter 3?

Energy changes indicate whether a physical or chemical change is occurring, with exothermic and endothermic reactions illustrating the absorption or release of energy.

Chapter 3 Matter And Change Answer Key

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