

Introduction to Matter

I. Describing Matter

- A. Every form of matter has two kinds of properties--physical properties and chemical properties
- B. Elements are the simplest substances.
- C. When elements are chemically combined, they form compounds having properties that are different from those of the uncombined elements.
- D. Each substance in a mixture keeps its individual properties. Also, the parts of a mixture are not combined in a set ratio.
- E. Key Terms
 - 1. Matter
 - 2. Chemistry
 - 3. Substance
 - 4. Physical properties
 - 5. Chemical properties
 - 6. Element
 - 7. Atom
 - 8. Chemical bond
 - 9. Molecule
 - 10. Compound
 - 11. Chemical formula
 - 12. Mixture
 - 13. Heterogeneous mixture
 - 14. Homogeneous mixture
 - 15. Solution

II. Measuring Matter

- A. Unlike weight, mass does not change with location, even when the force of gravity on an object changes.
- B. Common units of volume include the liter (L), milliliter (mL), and cubic centimeter (cc or cm³).
- C. $\text{Volume} = \text{Length} \times \text{Width} \times \text{Height}$
- D. You can determine the density of a sample of matter by dividing its mass by its volume.
- E. $\text{Density} = \text{Mass} / \text{Volume}$
- F. Key Terms
 - 1. Weight
 - 2. Mass
 - 3. International System of Units
 - 4. Volume
 - 5. Density

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III. Changes in Matter

- A. A substance that undergoes a physical change is still the same substance after the change.
- B. Unlike a physical change, a chemical change produces new substances with properties different from those of the original substances.
- C. Every chemical or physical change in matter includes a change in energy.
- D. Key Terms
 - 1. Physical change
 - 2. Chemical change
 - 3. Law of conservation of mass
 - 4. Energy
 - 5. Temperature
 - 6. Thermal energy
 - 7. Endothermic change
 - 8. Exothermic change

IV. Energy and Matter

- A. Forms of energy related to changes in matter include kinetic, potential, chemical, electromagnetic, electrical, and thermal energy.
- B. During a chemical change, chemical energy may be changed to other forms of energy. Other forms of energy may also be changed to chemical energy.
- C. Key Terms
 - 1. Kinetic energy
 - 2. Potential energy
 - 3. Chemical energy
 - 4. Electromagnetic energy
 - 5. Electrical energy
 - 6. Electrode