Name _____ Class _____ Date _____

Chapter 2 Properties of Matter

Summary

2.1 Classifying Matter

Every sample of a given substance has the same properties because a substance has a fixed, uniform composition.

An element has a fixed composition because it contains only one type of atom.

- Matter that always has exactly the same makeup is classified as a **pure substance.**
- An **element** is a substance that cannot be broken down into simpler substances.
- An **atom** is the smallest particle of an element.

A compound always contains two or more elements joined in a fixed proportion.

- A **compound** is a substance that is made from two or more simpler substances. It can be broken down into those simpler substances.
- The properties of a compound differ from those of the substances from which it is made.

The properties of a mixture can vary because the composition of a mixture is not fixed.

- In a **heterogeneous mixture,** the parts of the mixture are noticeably different from one another.
- A **homogeneous mixture** appears to contain only one substance.

Based on the size of its largest particles, a mixture can be classified as a solution, a suspension, or a colloid.

- A **solution** forms when substances dissolve and form a homogeneous mixture.
- A **suspension** is a heterogeneous mixture that separates into layers over time.
- A **colloid** contains some particles that are intermediate in size between the small particles in a solution and the larger particles in a suspension.

2.2 Physical Properties

Viscosity, conductivity, malleability, hardness, melting point, boiling point, and density are examples of physical properties.

- A **physical property** is any characteristic of a material that can be observed or measured without changing the composition of the substances in the material.

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- **Viscosity** is the tendency of liquid to keep from flowing.
- A material's ability for allowing heat to flow through it is called **conductivity.**
- **Malleability** is the ability of a solid to be hammered without shattering.
- The temperature at which a substance changes from solid to liquid is its **melting point.**
- The temperature at which a substance boils is its **boiling point.**
- Density is the ratio of the mass of a substance to its volume.

Physical properties are used to identify a material, choose a material for a specific purpose, or to separate the substances in a mixture.

Filtration and distillation are two common separation methods.

- **Filtration** is a process that separates materials based on the size of their particles.
- **Distillation** is a process that separates substances in a solution based on their boiling points.
- Filtration and distillation are physical changes. A **physical change** occurs when some of the properties of a material change, but the substances in the material remain the same.

2.3 Chemical Properties

Chemical properties can be observed only when the substances in a sample of matter are changing into different substances.

- A **chemical property** is any ability to produce a change in the composition of matter.
- **Flammability** is a material's ability to burn in the presence of oxygen.
- **Reactivity** is the property that describes how readily a substance combines chemically with other substances.

Three common types of evidence for a chemical change are a change in color, the production of a gas, and the formation of a precipitate.

- A **chemical change** occurs when a substance reacts and forms one or more new substances.
- A **precipitate** forms when a solid separates from a liquid during a chemical change.

When matter undergoes a chemical change, the composition of the matter changes. When matter undergoes a physical change, the composition of the matter remains the same.

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