Answer Key

Study Guide for Test on Friday Dec. 2nd

Learning Target M.3: I can identify and give examples of physical and chemical properties. I can describe evidence for a chemical change.

Resources:

- **Discovery Education website:** http://www.discoveryeducation.com/ (login with Gmail on Chrome)
  Science Techbook→Physical Science→Matter→Properties of Matter
  Science Techbook→Physical Science→ Physical & Chemical Changes→Chemical Reactions

- **Chemical Building Blocks textbook: Chapter 1, Section 1 (pp. 4-11); Chapter 1, Section 3 (pp. 22-24). *You may check out the book from the library if you don't have internet access at home**
  Online text: www.pearsonsuccessnet.com username: bridger15-16 password: buffalo1 code: **BC4436A5FF03A5A1EDEE

Basic: Level 7- Define the words below.
Proficient/Advanced: Levels 9 & 10- Label each term below as a physical property (PP) or chemical property (CP).

shape- **PP, describes the form or shape**

color- **PP, identifies the color of a material or substance**

texture- **PP, how something feels (rough, smooth)**

density- **PP, amount of mass per unit of volume (how compact something is)**

rusting- **CP, iron combines with oxygen to make iron oxide (rust)**

tarnishing- **CP, metal combines with sulfur to make a dark coating**

flammability- **CP, how easily something burns**

flexibility- **PP, how easily something bends without breaking**

conductivity- **PP, how easily something transfers heat or electricity**

ductility- **PP, how easily something stretches into a wire**

reactivity- **CP, how easily a substance can turn into a new substance (chemically change/react)**

new substances with new properties-(example: before and after cooking a pancake or baking a cake) **CP**

Proficient/Advanced: Levels 9 & 10- Identify the following as a physical change or chemical change (pp.22-24).

burning a match **chemical**
cutting paper **physical**
silver tarnishing **chemical**
inflating a balloon **physical**
a bicycle rusting **chemical**
fireworks exploding **chemical**
wrapping a present **physical**
painting a picture **physical**

Proficient/Advanced: Levels 9 & 10- Answer the following.

1. What is the difference between when a physical property can be observed and when a chemical property can be observed? (pp. 8 & 9)

Physical properties are always observable but chemical properties are only seen during a chemical change.

2. List the things that can be observed for evidence of a chemical change (Remember "C FARTS"):

Color change, Fizzing/bubbles, Aroma/odor, Reaction (flashes of light, smoke), Temperature change, new Substances

3. What must be produced in order for a chemical change to have occurred? (p. 24)

A new substance must be made.

This is a reference page.

Properties of Matter

Physical

a characteristic of a substance that can be observed without changing it into another substance

Examples

- Melting point
- Viscosity
- Solubility (dissolves in water)
- Hardness
- State of matter (solid, liquid, gas)
- Texture (hard, soft, rough, smooth)
- Color
- Ductility
- Thermal conductivity (ability to conduct heat)
- Magnetism (attracted by magnet)
- Boiling point
- Electrical Conductivity (ability to conduct electricity)
- Odor
- Density
- Malleability
- Luster (shiny)

Chemical

a characteristic of a substance that describes its ability to change into different substances

Examples

- Reactivity (ability to combine or react)
- Corrosion (deterioration of metal)
- pH (acidic or basic)
- Tarnish
- Forms rust
- Radioactivity
- Oxidation (ability to react with oxygen)
- Flammability (ability to burn)

Name _____ Date _____ Class _____

Describing Matter

Guide for Reading

- What kinds of properties are used to describe matter? physical + chemical properties.
- ~~What are elements, and how do they relate to compounds?~~
- ~~What are the properties of a mixture?~~

Study This

Matter is anything that has mass and takes up space. **Chemistry** is the study of the properties of matter and how matter changes. In chemistry, a **substance** is a single kind of matter that is pure.

Every form of matter has two kinds of properties—physical properties and chemical properties. A **physical property** is observed without changing the substance into another substance. Examples of physical properties are hardness, texture, color, and ability to dissolve in water. A **chemical property** is the ability of a substance to change into different substances. Some chemical properties are burning and rusting.

All matter is made up of elements. An **element** is a pure substance that cannot be broken down into any other substance. **Elements are the simplest substances.** Each element is identified by its specific physical and chemical properties. An **atom** is the basic particle that makes up an element. Atoms of most elements can combine with other atoms. A **chemical bond** is the force that holds two atoms together. Atoms often combine to form **molecules**, which are groups of two or more atoms held together by chemical bonds.

When elements are chemically combined, they form compounds having properties that are different from those of the uncombined elements. A **compound** is a pure substance made of two or more elements chemically combined in a set ratio. A compound may be represented by a **chemical formula**. A chemical formula shows the elements in the compound and the ratio of atoms. For example, the chemical formula for carbon dioxide is CO_2. In carbon dioxide, there are always two oxygen atoms and one carbon atom.

Elements and compounds are pure substances, but most of the materials you see every day are not. Instead, they are mixtures. A **mixture** is made of two or more substances that are together in the same place, but are not chemically combined. Mixtures differ from compounds in two ways. **Each substance in a mixture keeps its individual properties. Also, the parts of a mixture are not combined in a set ratio.**

A mixture can be heterogeneous or homogeneous. In a **heterogeneous mixture**, you can see the different parts. The substances in a **homogeneous mixture** are so evenly mixed that you cannot see the different parts. A **solution** is an example of a homogeneous mixture. Air is a solution of nitrogen gas, oxygen gas, plus small amounts of other gases. Unlike compounds, mixtures are easily separated into their components. For example, iron filings can be easily removed from salt with a magnet.

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Changes in Matter

Guide for Reading

- What is a physical change? Any change that alters the form or appearance of matter but doesn't make a new substance.
- What is a chemical change? Also called a chemical reaction, it's a change that makes one or more new substances.
- ~~How are changes in matter related to changes in energy?~~

Study This

Chemistry is the study of changes in matter. Matter can change in two ways. In a **physical change**, matter changes its appearance but does not change into a different substance. **A substance that undergoes a physical change is still the same substance after the change.** One example of a physical change is a change in state. Changing from a solid to a liquid or from a liquid to a gas is a change in state. Other kinds of physical changes are dissolving, bending, crushing, and filtering.

The other way that matter can change is a chemical change. In a **chemical change**, matter changes into one or more new substances. **Unlike a physical change, a chemical change produces new substances with different properties from those of the original substances.** Combustion, or burning, is one chemical change. When natural gas burns, it combines with oxygen in the air to produce carbon dioxide gas and water. Other examples of chemical change are electrolysis, oxidation, and tarnishing.

Although it may seem like matter disappears when it burns, that is not what is really happening. It has long been proven that mass is not lost or gained when matter changes. The **law of conservation of mass** states that matter is not created or destroyed in any chemical or physical reaction.

Any time that matter changes, energy is involved. **Energy** is the ability to do work or cause change. **Every chemical or physical change in matter includes a change in energy.** When ice melts, it absorbs energy from the surrounding matter.

One kind of energy is thermal energy. **Thermal energy** is the total energy of all the particles in an object. Thermal energy always moves from warm matter to cool matter. Thermal energy is different from temperature. Temperature does depend on the amount of thermal energy an object has. **Temperature** is a measure of the average energy of motion of the particles in an object.

Thermal energy is the most common form of energy released or absorbed when matter changes. When ice absorbs thermal energy from its surroundings, it melts. The melting of ice is an endothermic change. An **endothermic change** is a change in which energy is taken in, or absorbed. When wood burns, energy is given off in the form of heat and light. An **exothermic change** releases, or gives off, energy.