



**ELEMENTS, COMPOUNDS, AND MIXTURES**

1. **Matter** is anything that has a mass and takes up space. An **element** is the simplest form of matter, which cannot be broken down any further. Elements are listed on Table S and the periodic table. Their symbols start with an uppercase letter.

a. Which of the following is not matter? \_\_\_\_\_

Magnesium

Calcium Carbonate

Salt water

Heat

b. Which of the above is an element? \_\_\_\_\_

2. **Compounds** are composed of two or more elements. They can only be decomposed chemically. Elements and compounds are also known as **substances**.

a. Which of the choices in number one was a compound? \_\_\_\_\_

b. How can compound be broken down? \_\_\_\_\_

c. Which of the choices in question one are substances? \_\_\_\_\_

3. **Mixtures** are physical combinations of two or more substances (elements and/or compounds). Mixtures can be **homogeneous** (completely mixed, cannot see the parts) or **heterogeneous** (unevenly mixed, can see the parts). Mixtures can be separated by physical means. Label each as homogeneous or heterogeneous:

Sand: \_\_\_\_\_

Brass: \_\_\_\_\_

Milk: \_\_\_\_\_

Oil and water: \_\_\_\_\_

4 Compounds must be separated chemically but mixtures can be separated easily using physical methods.

a. Match each method with its name.

Distillation

Separates by differences in particle size

Filtration

Separates a soluble solid and a liquid

Evaporation

Separates by differences in boiling point.

Chromatography

Separates mixture of solid and liquid

b. Which of the above processes only work if the mixture is heterogeneous? \_\_\_\_\_

5. Mixtures are composed of **solutes** that dissolve and **solvents** that do the dissolving. The solute should be the smaller quantity.

- In iced tea, what is the solute? \_\_\_\_\_ solvent? \_\_\_\_\_
- In air, name a solute: \_\_\_\_\_
- Do all solvents have to be water? Explain. \_\_\_\_\_

### SOLIDS, LIQUIDS, AND GASES

6. A **solid** has a definite shape and volume. Solids are arranged in a geometric pattern. **Liquids** have a definite volume but take the shape of the container they are in. **Gases** have an indefinite shape and volume; they take the shape and volume of the container. Gases are easily compressed.

- Draw particle diagrams for a solid, liquid, and a gas using at least 5 particles:



- Which has a definite shape?



- Which has a definite volume?



7. **Vapors** are the gas phase of substances that are normally solid or liquid at room temperature. Which can be a vapor?

Carbon dioxide \_\_\_\_\_ Water \_\_\_\_\_ Oxygen \_\_\_\_\_

### CHANGES IN THE LAB

8. **Physical changes** are changes where the substance retains its properties. **Chemical changes** will make substances change into new substances and change properties.

- Label the following as physical (P) or chemical (C) properties:

Texture \_\_\_\_\_

flammability \_\_\_\_\_

boiling point: \_\_\_\_\_

Odor \_\_\_\_\_

color \_\_\_\_\_

chemical composition: \_\_\_\_\_

- Label the following as physical (P) or chemical (C) changes:

Corrosion: \_\_\_\_\_

melting: \_\_\_\_\_

mixing: \_\_\_\_\_

Freezing: \_\_\_\_\_

cutting: \_\_\_\_\_

decaying: \_\_\_\_\_

Name the following compounds:

- |                       |       |                                    |       |
|-----------------------|-------|------------------------------------|-------|
| 1. LiF                | _____ | 5. KH                              | _____ |
| 2. CaCl <sub>2</sub>  | _____ | 6. K <sub>3</sub> N                | _____ |
| 3. FeBr <sub>2</sub>  | _____ | 7. NiF <sub>3</sub>                | _____ |
| 4. NH <sub>4</sub> Br | _____ | 8. Li <sub>2</sub> CO <sub>3</sub> | _____ |

Write the chemical formula for the following compounds:

- |                          |       |                       |       |
|--------------------------|-------|-----------------------|-------|
| 1. Potassium fluoride:   | _____ | 3. Calcium sulfide:   | _____ |
| 2. Sodium Sulfide:       | _____ | 4. Aluminum bromide:  | _____ |
| 1. Chromium (VI) sulfide | _____ | 3. Nickel (III) oxide | _____ |
| 2. Potassium hydroxide   | _____ | 4. Lithium Phosphate  | _____ |