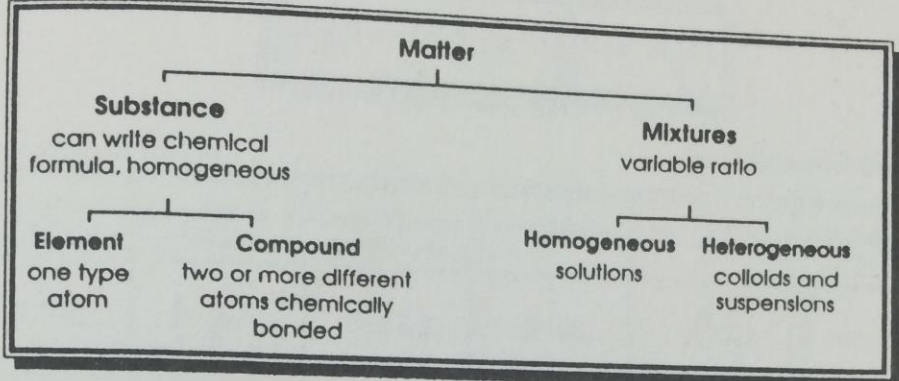


# MATTER—SUBSTANCES VS. MIXTURES

Name \_\_\_\_\_

All matter can be classified as either a substance (element or compound) or a mixture (heterogeneous or homogeneous).



Classify each of the following as to whether it is a substance or a mixture. If it is a substance, write Element or Compound in the substance column. If it is a mixture, write Heterogeneous or Homogeneous in the mixture column.

Type of Matter	Substance	Mixture
1. chlorine	element	
2. water	compound	
3. soil		heterogeneous
4. sugar water		homogeneous
5. oxygen	element	
6. carbon dioxide	compound	
7. rocky road ice cream		heterogeneous
8. alcohol	compound	
9. pure air		homogeneous
10. iron	element	

## PHYSICAL VS. CHEMICAL PROPERTIES

Name \_\_\_\_\_

A physical property is observed with the senses and can be determined without destroying the object. For example, color, shape, mass, length and odor are all examples of physical properties.

A chemical property indicates how a substance reacts with something else. The original substance is fundamentally changed in observing a chemical property. For example, the ability of iron to rust is a chemical property. The iron has reacted with oxygen, and the original iron metal is changed. It now exists as iron oxide, a different substance.

Classify the following properties as either chemical or physical by putting a check in the appropriate column.

	Physical Property	Chemical Property
1. blue color	✓	
2. density	✓	
3. flammability		✓
4. solubility	✓	
5. reacts with acid to form $H_2$		✓
6. supports combustion		✓
7. sour taste	✓	
8. melting point	✓	
9. reacts with water to form a gas		✓
10. reacts with a base to form water		✓
11. hardness	✓	
12. boiling point	✓	
13. can neutralize a base		✓
14. luster	✓	
15. odor	✓	

**PHYSICAL VS. CHEMICAL CHANGES**

Name \_\_\_\_\_

In a physical change, the original substance still exists, it has only changed in form. In a chemical change, a new substance is produced. Energy changes always accompany chemical changes.

Classify the following as being a physical or chemical change.

1. Sodium hydroxide dissolves in water. physical
2. Hydrochloric acid reacts with potassium hydroxide to produce a salt, water and heat. chemical
3. A pellet of sodium is sliced in two. physical
4. Water is heated and changed to steam. physical
5. Potassium chlorate decomposes to potassium chloride and oxygen gas. chemical
6. Iron rusts. chemical
7. When placed in  $H_2O$ , a sodium pellet catches on fire as hydrogen gas is liberated and sodium hydroxide forms. chemical
8. Evaporation physical
9. Ice melting physical
10. Milk sours. chemical
11. Sugar dissolves in water. physical
12. Wood rotting chemical
13. Pancakes cooking on a griddle chemical
14. Grass growing in a lawn chemical
15. A tire is inflated with air. physical
16. Food is digested in the stomach. chemical
17. Water is absorbed by a paper towel. physical

## ELEMENT SYMBOLS

Name \_\_\_\_\_

An element symbol can stand for one atom of the element or one mole of atoms of the element. (One mole =  $6.02 \times 10^{23}$  atoms of an element.)

Write the symbol for the following elements.

- |             |      |               |      |
|-------------|------|---------------|------|
| 1. oxygen   | — O  | 11. plutonium | — Pu |
| 2. hydrogen | — H  | 12. americium | — Am |
| 3. chlorine | — Cl | 13. radium    | — Ra |
| 4. mercury  | — Hg | 14. germanium | — Ge |
| 5. fluorine | — F  | 15. zinc      | — Zn |
| 6. barium   | — Ba | 16. arsenic   | — As |
| 7. helium   | — He | 17. lead      | — Pb |
| 8. uranium  | — U  | 18. iron      | — Fe |
| 9. radon    | — Rn | 19. calcium   | — Ca |
| 10. sulfur  | — S  | 20. cobalt    | — Co |

Write the name of the element that corresponds to each of the following symbols.

- |        |                  |        |                   |
|--------|------------------|--------|-------------------|
| 21. Kr | <u>Krypton</u>   | 31. Cu | <u>copper</u>     |
| 22. K  | <u>potassium</u> | 32. Ag | <u>silver</u>     |
| 23. C  | <u>carbon</u>    | 33. P  | <u>phosphorus</u> |
| 24. Ne | <u>neon</u>      | 34. Mn | <u>manganese</u>  |
| 25. Si | <u>silicon</u>   | 35. I  | <u>iodine</u>     |
| 26. Zr | <u>zirconium</u> | 36. Au | <u>gold</u>       |
| 27. Sn | <u>tin</u>       | 37. Mg | <u>magnesium</u>  |
| 28. Pt | <u>platinum</u>  | 38. Ni | <u>nickel</u>     |
| 29. Na | <u>sodium</u>    | 39. Br | <u>bromine</u>    |
| 30. Al | <u>aluminum</u>  | 40. Hg | <u>mercury</u>    |