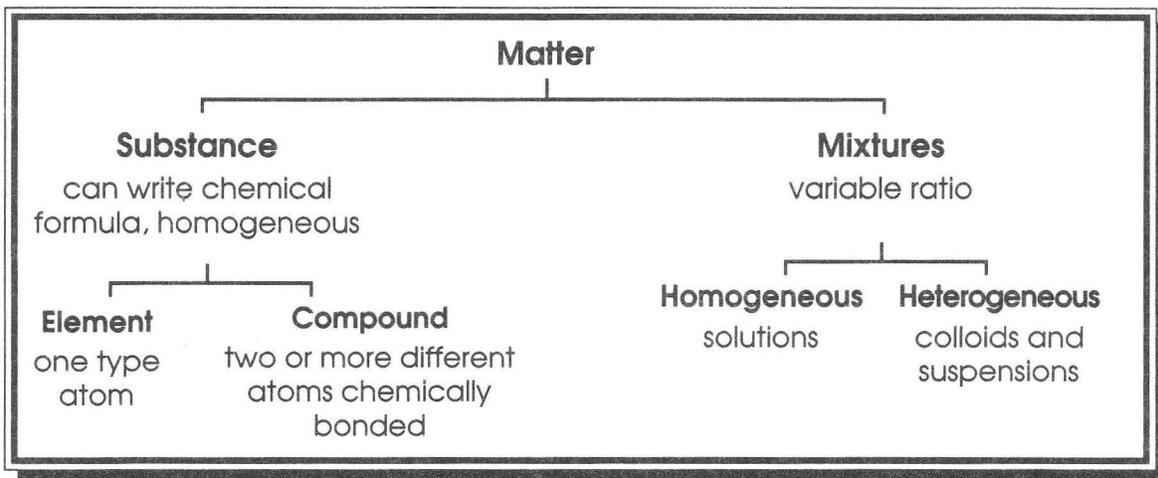


MATTER—SUBSTANCES VS. MIXTURES

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		
2. water		
3. soil		
4. sugar water		
5. oxygen		
6. carbon dioxide		
7. rocky road ice cream		
8. alcohol		
9. pure air		
10. iron		

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. _____
2. Hydrochloric acid reacts with potassium hydroxide to produce a salt, water and heat. _____
3. A pellet of sodium is sliced in two. _____
4. Water is heated and changed to steam. _____
5. Potassium chlorate decomposes to potassium chloride and oxygen gas.

6. Iron rusts. _____
7. When placed in H_2O , a sodium pellet catches on fire as hydrogen gas is liberated and sodium hydroxide forms. _____
8. Evaporation _____
9. Ice melting _____
10. Milk sours. _____
11. Sugar dissolves in water. _____
12. Wood rotting _____
13. Pancakes cooking on a griddle _____
14. Grass growing in a lawn _____
15. A tire is inflated with air. _____
16. Food is digested in the stomach. _____
17. Water is absorbed by a paper towel. _____

ELEMENT SYMBOLS

Name _____

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

Write the symbol for the following elements.

- | | |
|-------------------|---------------------|
| 1. oxygen _____ | 11. plutonium _____ |
| 2. hydrogen _____ | 12. americium _____ |
| 3. chlorine _____ | 13. radium _____ |
| 4. mercury _____ | 14. germanium _____ |
| 5. fluorine _____ | 15. zinc _____ |
| 6. barium _____ | 16. arsenic _____ |
| 7. helium _____ | 17. lead _____ |
| 8. uranium _____ | 18. iron _____ |
| 9. radon _____ | 19. calcium _____ |
| 10. sulfur _____ | 20. cobalt _____ |

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

- | | |
|--------------|--------------|
| 21. Kr _____ | 31. Cu _____ |
| 22. K _____ | 32. Ag _____ |
| 23. C _____ | 33. P _____ |
| 24. Ne _____ | 34. Mn _____ |
| 25. Si _____ | 35. I _____ |
| 26. Zr _____ | 36. Au _____ |
| 27. Sn _____ | 37. Mg _____ |
| 28. Pt _____ | 38. Ni _____ |
| 29. Na _____ | 39. Br _____ |
| 30. Al _____ | 40. Hg _____ |