

8. Elements

9. Compounds

10. Using Chemical Symbols

Element	Symbol	Element	Symbol
Hydrogen		Sulfur	
Helium		Chlorine	
Lithium		Argon	
Beryllium		Potassium	
Boron		Calcium	
Carbon		Scandium	
Nitrogen		Titanium	
Oxygen		Vanadium	
Fluorine		Chromium	
Neon		Manganese	
Sodium		Iron	
Magnesium		Cobalt	
Aluminum		Nickel	
Silicon		Copper	
Phosphorus		Zinc	

11. Chemical Reaction

1. Reactants

2. Products

12. Chemical Property

13. The Law of Conservation of Mass

Name \_\_\_\_\_

Date \_\_\_\_\_

Write the correct symbol for the following elements:

Hydrogen

Beryllium

Nitrogen

Oxygen

Fluorine

Sodium

Aluminum

Silicon

Sulfur

Chlorine

Barium

Cadmium

Tungsten

Gold

Iron

Lead

Uranium

Zinc

Cesium

Iodine

Argon

Krypton

Radon

Name \_\_\_\_\_

Date \_\_\_\_\_

Write the correct name for the following element symbols:

Mn

Ag

Sr

B

C

Co

P

B

Ca

Hg

Ni

Cr

Pt

Ti

Sn

Li

K

Cu

He

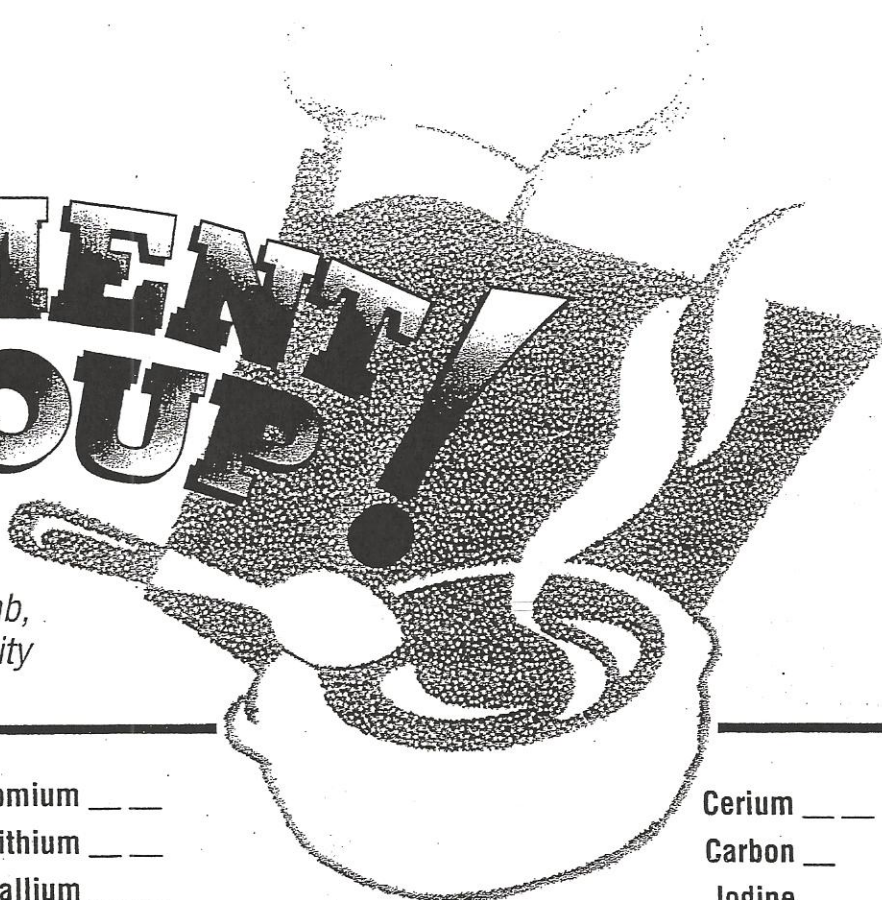
Mg

Ne

Xe

# ELEMENT SOUP!

by Dorothy Mann Lamb,  
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Chromium \_\_\_

Lithium \_\_\_

Gallium \_\_\_



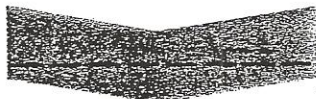
Phosphorus \_\_\_

Astatine \_\_\_

Osmium \_\_\_

Tellurium \_\_\_

Oxygen \_\_\_



Argon \_\_\_

Strontium \_\_\_

Oxygen \_\_\_

Technetium \_\_\_



Argon \_\_\_

Tellurium \_\_\_

Tungsten \_\_\_



Einsteinium \_\_\_

Protactinium \_\_\_

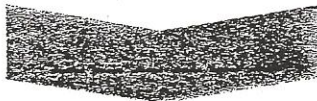


Nickel \_\_\_

Nobelium \_\_\_

Sulfur \_\_\_

Oxygen \_\_\_



Cerium \_\_\_

Carbon \_\_\_

Iodine \_\_\_

Hydrogen \_\_\_

Nitrogen \_\_\_

Potassium \_\_\_



Yttrium \_\_\_

Lanthanum \_\_\_

Selenium \_\_\_

Praseodymium \_\_\_



Thallium \_\_\_

Arsenic \_\_\_





LINGUISTICS

**Origins of Element Names**

Many elements are named for the people who discovered them or the places where they were discovered. Some elements were given descriptive names taken from classical Latin or Greek. Others were named for figures in mythology. Polonium is named for Poland, the native land of Marie Curie, the discoverer of radium. Californium was discovered at the University of California. The word chlorine comes from the Greek *chloros*, meaning greenish-yellow; chlorine is a greenish-yellow gas. The name calcium is derived from the Latin *calx*, meaning lime. Calcium is a major component of limestone. You can find the origins of elements' names by consulting a dictionary or encyclopedia.

Table 2.4

Symbols and Name Origins for Some Elements		
Name	Symbol	Latin or other name
Sodium	Na	<i>natrium</i>
Potassium	K	<i>kalium</i>
Antimony	Sb	<i>stibium</i>
Copper	Cu	<i>cuprum</i>
Gold	Au	<i>aurum</i>
Silver	Ag	<i>argentum</i>
Iron	Fe	<i>ferrum</i>
Lead	Pb	<i>plumbum</i>
Mercury	Hg	<i>hydrargyrum</i> (from Greek)
Tin	Sn	<i>stannum</i>
Tungsten	W	<i>wolfram</i> (from German)

Chemical symbols provide a shorthand way to write the chemical formulas of compounds. The compound water is composed of the elements hydrogen (H) and oxygen (O). The formula for water is H<sub>2</sub>O. The formula for sucrose, or table sugar, is C<sub>12</sub>H<sub>22</sub>O<sub>11</sub>. Sucrose is composed of the elements carbon (C), hydrogen (H), and oxygen (O). The subscript numbers in chemical formulas represent the proportions of the various elements in the compound. The elements that make up a compound are always present in the same proportions. Thus, in the case of water, there are always two parts of hydrogen for each part of oxygen. A specific compound is always made up of the same elements in the same proportions. Thus the formula for a specific chemical compound is always the same.

section review 2.3

- How can you distinguish between an element and a compound?
- Write the chemical symbols for each of the following elements.
  - copper
  - oxygen
  - phosphorus
  - silver
  - sodium
  - helium
- Name the chemical elements represented by the following symbols.
  - Sn
  - Ca
  - S
  - Cd
  - P
  - Cl
- Classify each of these samples of matter as an element, a compound, or a mixture.
  - spaghetti sauce
  - glass
  - table sugar
  - river water
  - cough syrup
  - nitrogen
- What elements make up the pain reliever acetaminophen, chemical formula C<sub>8</sub>H<sub>9</sub>O<sub>2</sub>N? Which element is present in the greatest proportion by number of atoms?



**Chem ASAP! Assessment 2.3** Check your understanding of the important ideas and concepts in Section 2.3.

## Chapter 2 REVIEW

### CONCEPT PRACTICE

24. List three physical properties of an iron nail. 2.1
25. What is the physical state of each of the following items at room temperature? 2.1
- |             |                    |
|-------------|--------------------|
| a. gold     | d. paraffin wax    |
| b. gasoline | e. rubbing alcohol |
| c. helium   | f. mercury         |
26. In which state of matter do the following exist at room temperature? 2.1
- |                |            |
|----------------|------------|
| a. diamond     | d. mercury |
| b. oxygen      | e. clay    |
| c. cooking oil | f. neon    |
27. Fingernail-polish remover (mostly acetone) is a liquid at room temperature. Would you describe acetone in the gaseous state as a vapor or a gas? Explain. 2.1
28. List three substances that you have experienced in at least two physical states. 2.1
29. Use Table 2.1 to identify four substances that undergo a physical change if the temperature is decreased from 50 °C to -50 °C. Describe the nature of the physical change. 2.1
30. Classify each of the following as homogeneous or heterogeneous mixtures. 2.2
- |                                       |
|---------------------------------------|
| a. blood                              |
| b. chocolate-chip ice cream           |
| c. brass (a blend of copper and zinc) |
| d. motor oil                          |
| e. black coffee                       |
31. How many phases does every solution have? Explain. 2.2
32. Classify each of the following as an element or a mixture. 2.3
- |                 |             |
|-----------------|-------------|
| a. silver       | d. oxygen   |
| b. pine tree    | e. iced tea |
| c. orange juice | f. air      |
33. Name the elements found in each of the following compounds. 2.3
- |  |
|--|
| a. ammonium chloride ( $\text{NH}_4\text{Cl}$ )          |
| b. potassium permanganate ( $\text{KMnO}_4$ )            |
| c. isopropyl alcohol ( $\text{C}_3\text{H}_7\text{OH}$ ) |
| d. calcium iodide ( $\text{CaI}_2$ )                     |
34. List four indications that a chemical change has probably taken place. 2.4

35. Classify each of the following as a physical or chemical change. 2.4
- |                            |
|----------------------------|
| a. bending a piece of wire |
| b. burning coal            |
| c. cooking a steak         |
| d. cutting grass           |
36. When powdered iron is left exposed to the air, it rusts. Explain why the rust weighs more than the original powdered iron. 2.4
37. A friend observes a burning candle and comments that the wax is lost as the candle burns. Having recently studied the law of conservation of mass, how would you correct your friend? 2.4

### CONCEPT MASTERY

38. Devise a way to separate sand from a mixture of charcoal, sand, sugar, and water.
39. Imagine first standing in the kitchen of your home and then in the middle of a park. When you view the surroundings in each location do you see mostly elements, compounds, or mixtures?
40. Use Table 2.1 to answer each question.
- |   |
|---|
| a. Which property most easily distinguishes sulfur from the other solid substances? |
| b. How many of these substances are elements?                                       |
| c. Which compound has the highest boiling point?                                    |
| d. The solids are gradually heated. Which one will melt first?                      |
41. Identify each of the following as a mixture or a compound. For the mixtures, classify each as homogeneous or heterogeneous.
- |               |             |
|---------------|-------------|
| a. soda       | e. egg      |
| b. candle wax | f. ice      |
| c. fog        | g. gasoline |
| d. ink        | h. blood    |
42. Classify the following properties of the element silicon as chemical or physical properties.
- |                                    |
|------------------------------------|
| a. blue-gray color                 |
| b. brittle                         |
| c. insoluble in water              |
| d. melts at 1410 °C                |
| e. reacts vigorously with fluorine |