

Chapter 6 Chemical Bonds

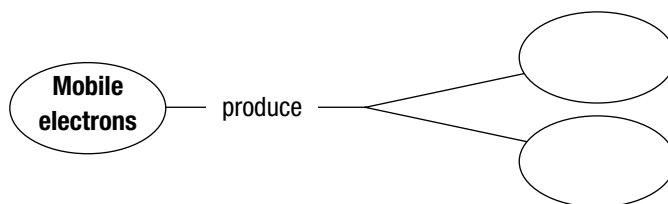
Section 6.4 The Structure of Metals

(pages 176–181)

This section discusses metallic bonds and the properties of metals. It also explains how the properties of an alloy are controlled.

Reading Strategy (page 176)

Relating Cause and Effect As you read, complete the concept map to relate the structure of metals to their properties. For more information on this Reading Strategy, see the **Reading and Study Skills** in the **Skills and Reference Handbook** at the end of your textbook.



- Circle the letter of the metal with the highest melting point.
 - gold
 - vanadium
 - titanium
 - tungsten
- Is the following sentence true or false? The properties of a metal are related to bonds within the metal. _____

Metallic Bonds (pages 176–177)

- Describe a metallic bond. _____

- The cations in a metal form a lattice. What holds the lattice in place? _____

- Is the following sentence true or false? The more valence electrons a metal has, the stronger its metallic bonds will be. _____

Explaining Properties of Metals (page 177)

- Some of the properties of metals can be explained by the _____ of the electrons within a metal lattice.
- Name two important properties of metals that can be explained by metallic bonding.
 - _____
 - _____

Alloys (pages 178–181)

- Circle the letter of the percentage of gold in jewelry that is labeled 18-karat gold.
 - 18 percent
 - 50 percent
 - 75 percent
 - 100 percent

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9. Is the following sentence true or false? When a metal such as copper is mixed with gold, the gold becomes softer.

10. Describe an alloy. _____

11. How do the hardness and strength of bronze compare to the hardness and strength of copper alone and tin alone? _____

12. Name two factors that scientists can vary to design alloys with specific properties.

a. _____

b. _____

13. Complete the following table.

Comparing Bronze and Brass			
Alloy	Component Metals	Comparative Hardness of Bronze and Brass	Comparative Speed of Weathering
Bronze	Copper, tin		Weathers more slowly
Brass		Softer	

14. When carbon is added to iron, the lattice becomes _____ than a lattice that contains only iron.

15. Circle the letters of the elements that all types of steel contain.

- a. carbon b. chromium
c. iron d. manganese

16. Circle the letters of each correct description of stainless steel.

- a. Stainless steel contains more carbon than chromium.
b. Chromium forms an oxide that protects stainless steel from rusting.
c. Stainless steel is more brittle than steels that contain more carbon.
d. Stainless steel contains more than 3 percent carbon by mass.

17. Explain why pure aluminum is not the best material for the body of a plane.

18. What type of alloy is used to make airplane parts that need to be extremely lightweight? _____