Chapter 6 Review

Make Your Own Summary

Summarize the key concepts of this chapter using a graphic organizer. The Chapter Summary on the previous page will help you identify the key concepts. Refer to Study Toolkit 4 on pages 566–567 to help you decide which graphic organizer to use.

Reviewing Key Terms

Match each key term listed below to its definition.

a. covalent bond
b. ionic bond
c. molecule
d. ionic compound
e. molecular compound
f. ion
g. chemical bond

1. a positively or negatively charged atom (6.1)

2. a chemical link between two atoms, which holds the atoms together (6.1)

3. a chemical bond in which one or more pairs of electrons are shared by two atoms (6.2)

4. the smallest discrete particle of a pure substance, which has one of more shared pairs of electrons (6.2)

5. a chemical bond that forms between oppositely charged ions (6.1)

6. a compound formed when atoms of two or more different elements share electrons (6.2)

7. a compound made of oppositely charged ions (6.1)

Knowledge and Understanding K/U

8. Why are some atoms more stable when they gain or lose an electron?

9. Indicate whether the formation of each ion involved a loss or gain of electrons, and state the number of electrons that were lost or gained.

a. Mg^{2+}
b. Al^{3+}
c. S^{2-}
d. I^{-}

10. Identify the types of elements that make up an ionic compound and the types of elements that make up a molecular compound.

11. Give two examples of ionic compounds.

12. Give two examples of molecular compounds.

13. Write formulas for the following compounds, and identify each compound as ionic or molecular.

a. water
b. carbon dioxide
c. sodium chloride
d. oxygen difluoride

14. Identify each compound as ionic or molecular.

a. $SrBr_2$
b. CS_2

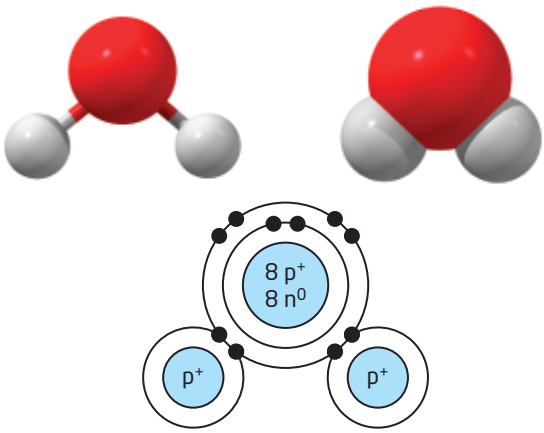
15. Use a table to list the similarities and differences between carbon dioxide and sodium chloride.

16. Describe how electrons are involved in forming the bonds in ionic and molecular compounds.

17. State the number that each prefix represents.

a. di-
b. penta-
c. hexa-
d. nona-

18. The following models represent molecules of water.



a. Write the name of each type of model.
b. Identify the model(s) that represent(s) water in three dimensions.
c. Which model clearly shows that four valence electrons are not part of the covalent bonds?

19. Salt is used on many Ontario roads to make the roads safe for driving in icy conditions.

a. What kind of salt is used? What are the properties of this salt that make it valuable for de-icing?

b. What are some of the negative consequences of using road salt?

Thinking and Investigation T/I

20. How does the total positive charge in an ionic compound compare with the total negative charge in the compound? Explain your reasoning.

21. Why do most ionic compounds have very high melting points?

22. Why is it incorrect to say that the low melting point of a molecular compound is due to its weak covalent bonds?

Communication C

23. Draw a Bohr-Rutherford model for each of the following.

a. KCl

b. NaF

c. O_2

d. $SiCl_4$

24. BIG IDEAS Elements and compounds have specific physical and chemical properties that determine their practical uses. You see an advertisement in a newspaper that claims a new product, which is a molecular compound, can replenish electrolytes when dissolved in water. Write a brief letter to the Better Business Bureau, explaining why this is likely to be false advertising.

25. BIG IDEAS The use of elements and compounds has both positive and negative effects on society and the environment. Make a table to summarize the positive and negative effects of the use of plastics on society.

Application A

26. To prevent excess fertilizer from being washed into nearby bodies of water, your friend suggests creating a fertilizer that does not dissolve in water.

a. Why would this be an ineffective fertilizer?

b. What could be some social, economic, and environmental effects associated with using an ineffective fertilizer?

27. Which compound would you expect to have a higher melting point: sulfur dichloride or calcium chloride? Explain your reasoning.

28. The table below contains information about three common molecular compounds.

Bond Angles in Molecular Compounds

Compound	Formula	Bond angle
Methane (main component of natural gas)	CH_4	109.5°
Ammonia (used as a fertilizer)	NH_3	107.0°
Water (necessary for living organisms)	H_2O	104.5°

a. Draw a Bohr-Rutherford model for each compound in this table.

b. Based on your models, complete a table like the one below.

Electron Arrangements and Bond Angles

Compound	Formula	Number of Valence Electrons in Covalent Bonds	Number of Valence Electrons Not in Covalent Bonds	Bond Angle

c. Describe the relationship between the bond angle and the number of pairs of valence electrons around the central atom that are not in covalent bonds.