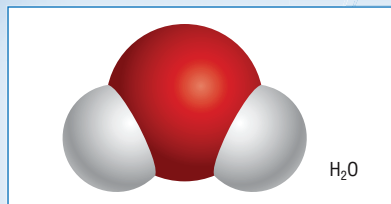


KEY CONCEPTS SUMMARY



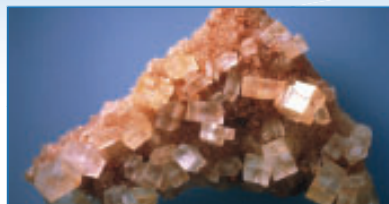
Elements can combine to form compounds.

- Atoms can join together with the same or different atoms to form molecules. (7.1)
- Molecular elements consist of only one type of element. (7.1)
- Molecular compounds consist of two or more different types of elements. (7.1)
- Ionic compounds consist of charged particles called ions. (7.1)
- Rust is an example of an ionic compound. (7.2)



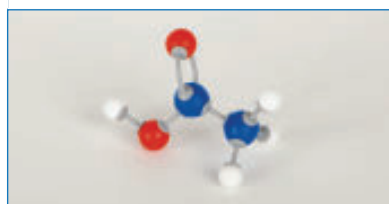
Compounds can break apart into simpler substances.

- Hydrogen peroxide easily decomposes into water (H_2O) and oxygen (O_2). (7.6)
- The oxygen released from the decomposition of hydrogen peroxide reacts with other chemicals, often producing a bleaching effect. (7.6)
- The decomposition of biodegradable materials is an example of compounds breaking down into simpler substances. (7.7)



Metals and non-metals combine to form ionic compounds. Non-metals combine to form molecules.

- Metals lose electrons and become cations. (7.3)
- Non-metals gain electrons and become anions. (7.3)
- Cations and anions have opposite charges, so they attract each other and form ionic compounds. (7.1, 7.3)
- Non-metals form covalent bonds with other non-metals by sharing electrons to form molecular compounds. (7.3)



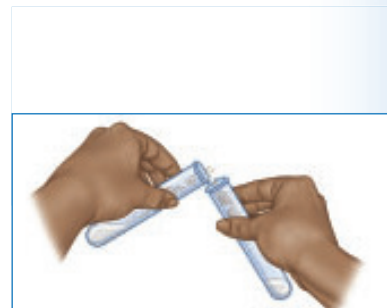
Molecular models are used to represent molecules.

- Models help us visualize the three-dimensional shapes of molecules. (7.4)
- Atoms combine with other atoms to form molecules. (7.3)
- All the atoms of an element form the same number of bonds. (7.4)



Some useful compounds have social, environmental, and economic impacts.

- DDT and PCBs bioaccumulate and cause health problems for humans and animals. (7.8)
- Compounds such as plastics pose disposal problems because they do not biodegrade. (7.7)



Simple chemical tests can identify common gases.

- Oxygen gas can be identified by more vigorous burning. (7.5)
- Hydrogen gas can be identified by a “pop” sound heard when hydrogen atoms combine with oxygen atoms to form water vapour. (7.5)
- Carbon dioxide can be identified by the white solid it produces when it reacts with limewater. (7.5)

WHAT DO YOU THINK NOW?

You thought about the following statements at the beginning of the chapter. You may have encountered these ideas in school, at home, or in the world around you. Consider them again and decide whether you agree or disagree with each one.



- 1** Oxygen can be both beneficial and harmful.
Agree/disagree?



- 2** When oxygen reacts with a substance, flames are always produced.
Agree/disagree?



- 3** Compounds must be heated to break down into simpler substances.
Agree/disagree?



- 4** All compounds will eventually break down over several years.
Agree/disagree?



- 5** Compounds have different properties than their elements.
Agree/disagree?



- 6** The chemical products we use affect only local ecosystems.
Agree/disagree?

How have your answers changed since then?
What new understanding do you have?

Vocabulary

molecule (p. 257)
chemical formula (p. 257)
molecular element (p. 257)
molecular compound (p. 258)
ion (p. 260)
cation (p. 260)
anion (p. 260)
ionic compound (p. 261)
covalent bond (p. 265)
catalyst (p. 273)

BIG Ideas

- ✓ Elements and compounds have specific physical and chemical properties that determine their practical uses.
- ✓ The use of elements and compounds has both positive and negative effects on society and the environment.