2.1 The Nature of Matter

Atoms

1. Diagram a model of a carbon atom (figure 2-1 pg 34), with an atomic number of 6. Complete the diagram by drawing in the rest of the atomic particles, including their charges. Label all particles and the nucleus.

Elements and Isotopes

2. Diagram models of the carbon isotopes using the Isotopes of Carbon Table on pg 35. Complete diagrams by drawing in all of the atomic particles, including their charges.

Use your completed diagrams to answer Questions 3–4.

3. Identify two differences between carbon-12 and carbon-14.

4. Identify two ways in which carbon-12, carbon-13, and carbon-14 are alike.

For Questions 5–7, complete each statement by writing the correct word or words.

5. A chemical element is a pure substance that consists entirely of one type of _____.

6. Atoms of the same element that differ in the number of neutrons they contain are called _.

7. An atom is made up of protons, neutrons, and _____.

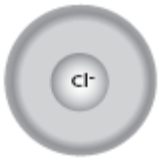
Chemical Compounds

8. What is a chemical compound?

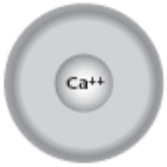
9. What do the formulas for table salt, NaCl, and water, H_2O, indicate about these compounds?

Chemical Bonds

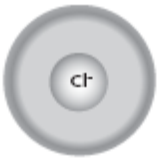
10. Sea salt contains calcium chloride ($CaCl_2$), an ionic compound similar to table salt. One atom of calcium (atomic number 20) bonds to two atoms of chlorine (atomic number 17). Fill in the number of protons and electrons in each ion.



Chloride ion
Protons ___
Electrons ____



Calcium ion
Protons ___
Electrons __



Chloride ion
Protons ___
Electrons ___

11. What is the difference between an ionic bond and a covalent bond?

12. How are chemical bonds important in metabolism?