

**Atoms and Bonding** ▪ *Guided Reading and Study*

## **Atoms, Bonding, and the Periodic Table**

*This section explains how the reactivity of elements is related to the number of electrons in the highest energy level. It also describes what the periodic table can tell you about atoms and the properties of elements.*

### **Use Target Reading Skills**

*After you read this section, reread the paragraphs that contain definitions of Key Terms. Use all the information you have learned to write a definition of each Key Term in your own words.*

valence electrons

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electron dot diagram

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chemical bond

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symbol

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atomic number

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period

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group

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family

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noble gas

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halogen

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alkali metal

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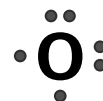
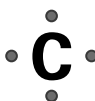
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**Atoms, Bonding, and the Periodic Table** *(continued)*

**Valence Electrons and Bonding**

1. \_\_\_\_\_ are those electrons that are held most loosely in an atom.
2. Is the following sentence true or false? The number of valence electrons in an atom of an element determines the ways in which the atom can bond. \_\_\_\_\_
3. Identify each element and the number of valence electrons it has.



- a. \_\_\_\_\_  
\_\_\_\_\_
- b. \_\_\_\_\_  
\_\_\_\_\_
- c. \_\_\_\_\_  
\_\_\_\_\_

4. Circle the letter of each sentence that is true about valence electrons and chemical bonding.
  - a. Most atoms are less stable when they have eight valence electrons.
  - b. Atoms with eight valence electrons easily form compounds.
  - c. Having eight valence electrons makes atoms very reactive.
  - d. Atoms with eight valence electrons are less likely to form chemical bonds than atoms with fewer valence electrons.
5. Is the following sentence true or false? When atoms bond, new substances are formed. \_\_\_\_\_

**The Periodic Table**

6. How are elements represented in the periodic table?  
\_\_\_\_\_  
\_\_\_\_\_
7. The \_\_\_\_\_ of an element is the number of protons in the nucleus of an atom.
8. What is a row of elements across the periodic table called?  
\_\_\_\_\_
9. Describe how atomic number changes across a period of elements.  
\_\_\_\_\_  
\_\_\_\_\_
10. What are elements in the same column of the periodic table called?  
\_\_\_\_\_
11. Elements within a group always have the same number of \_\_\_\_\_.

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12. Complete the table about groups of elements in the periodic table.

Group Number	Group Name	Number of Valence Electrons	Reactivity (High/Low)
1	a.	1	b.
17	c.	7	d.
18	e.	8	f.

13. How many valence electrons do all nonmetals have?

\_\_\_\_\_

14. Describe two ways that nonmetals can combine with other elements.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

15. How do metalloids differ from metals?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

16. Is the following sentence true or false? Hydrogen is considered to be a metal. \_\_\_\_\_