

SECTION 2

OBJECTIVES

- Describe the relationship between electrons in sublevels and the length of each period of the periodic table.
- Locate and name the four blocks of the periodic table. Explain the reasons for these names.
- Discuss the relationship between group configurations and group numbers.
- Describe the locations in the periodic table and the general properties of the alkali metals, the alkaline-earth metals, the halogens, and the noble gases.

Electron Configuration and the Periodic Table

The Group 18 elements of the periodic table (the noble gases) undergo few chemical reactions. This stability results from the gases' special electron configurations. Helium's highest occupied level, the 1s orbital, is completely filled with electrons. And the highest occupied levels of the other noble gases contain stable octets. Generally the electron configuration of an atom's highest occupied energy level governs the atom's chemical properties.

Periods and Blocks of the Periodic Table

While the elements are arranged vertically in the periodic table in groups that share similar chemical properties, they are also organized horizontally in rows, or *periods*. (As shown in **Figure 6**, there are a total of seven periods of elements in the modern periodic table.) As can be seen in **Table 1**, the length of each period is determined by the number of electrons that can occupy the sublevels being filled in that period.

TABLE 1 Relationship Between Period Length and Sublevels Being Filled in the Periodic Table

| Period number | Number of elements in period | Sublevels in order of filling |
|---------------|------------------------------|-------------------------------|
| 1 | 2 | 1s |
| 2 | 8 | 2s 2p |
| 3 | 8 | 3s 3p |
| 4 | 18 | 4s 3d 4p |
| 5 | 18 | 5s 4d 5p |
| 6 | 32 | 6s 4f 5d 6p |
| 7 | 32 | 7s 5f 6d, etc. |