

**TABLE 2 Relationships Among Group Numbers, Blocks, and Electron Configurations**

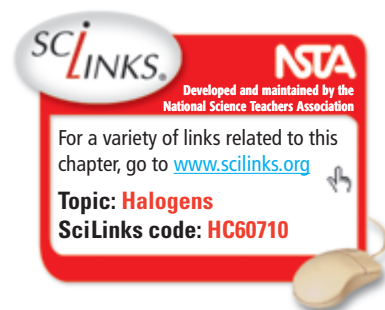
Group number	Group configuration	Block	Comments
1, 2	$ns^{1,2}$	<i>s</i>	One or two electrons in <i>ns</i> sublevel
3–12	$(n - 1)d^{1-10}ns^{0-2}$	<i>d</i>	Sum of electrons in <i>ns</i> and $(n - 1)d$ levels equals group number
13–18	$ns^2np^{1-6}$	<i>p</i>	Number of electrons in <i>np</i> sublevel equals group number minus 12

antimony, and tellurium) are also in the *p* block. At the left-hand side and bottom of the block, there are eight *p*-block metals. The locations of the nonmetals, metalloids, and metals in the *p* block are shown with distinctive colors in **Figure 6**.

The elements of Group 17 (fluorine, chlorine, bromine, iodine, and astatine) are known as the **halogens**, shown in **Figure 11**. The halogens are the most reactive nonmetals. They react vigorously with most metals to form examples of the type of compound known as salts. As you will see later, the reactivity of the halogens is based on the presence of seven electrons in their outer energy levels—one electron short of the stable noble-gas configuration. Fluorine and chlorine are gases at room temperature, bromine is a reddish liquid, and iodine is a dark purple solid. Astatine is a synthetic element prepared in only very small quantities. Most of its properties are estimated, although it is known to be a solid.

The metalloids, or semiconducting elements, are located between nonmetals and metals in the *p* block. They are mostly brittle solids with some properties of metals and some of nonmetals. The metalloid elements have electrical conductivity intermediate between that of metals, which are good conductors, and nonmetals, which are nonconductors.

The metals of the *p* block are generally harder and denser than the *s*-block alkaline-earth metals, but softer and less dense than the *d*-block metals. With the exception of bismuth, these metals are sufficiently reactive to be found in nature only in the form of compounds. Once obtained as free metals, however, they are stable in the presence of air.



**FIGURE 11** Fluorine, chlorine, bromine, and iodine are members of Group 17 of the periodic table, also known as the halogens. Locate the halogens in the *p* block of the periodic table on pages 140–141.

