CONCEPT 3

The modern periodic table organizes elements in groups and periods.

Activity

Observing the Elements

Turn the page and take a look at the pictorial periodic table shown in **Figure 2.11**. What patterns do you see among elements of the same group (vertical column) and in the same period (horizontal row)?

Today's periodic table, shown in **Figure 2.9** on the left, is strikingly similar to Mendeleev's. The principle behind the order of the elements, though, is different. For the most part, Mendeleev ordered the elements in his table based on increasing atomic mass. But this principle did not work perfectly: he had to place a few elements out of order so that they would appear in the group they seemed to belong to, based on their properties. Later, a scientist called Henry Moseley developed a way to determine the number of positive charges in an atom, which told him the number of protons in the atom. This number is now known as an element's *atomic number*. When arranged according to increasing atomic number, the elements all fit perfectly in the table, with no reordering needed.

Connect to Investigation 2D on page 120

Meet the Modern Periodic Table

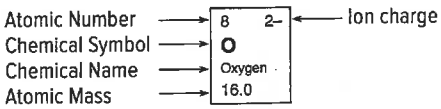

Figure 2.10 A typical box from the periodic table tells you the element's name, symbol, atomic number, and atomic mass. The symbol's font tells you the element's state.

The modern periodic table consists of boxes arranged in vertical columns and horizontal rows by increasing atomic number. The box for oxygen is shown in **Figure 2.10**. Mendeleev called the vertical columns of the periodic table families. Today they are often called **groups** and are numbered 1 through 18. The horizontal rows of the table are called **periods**. Beginning with hydrogen in the first period, there are a total of 7 periods.

group a vertical column of elements in the periodic table; also called a *family*

period a horizontal row of elements in the periodic table

Before you leave this page . . .

1. What was Moseley's contribution to the periodic table and what problem did it resolve?
2. Give the symbol and atomic number of each of the following elements:
   a) manganese
   b) magnesium
   c) arsenic
   d) astatine

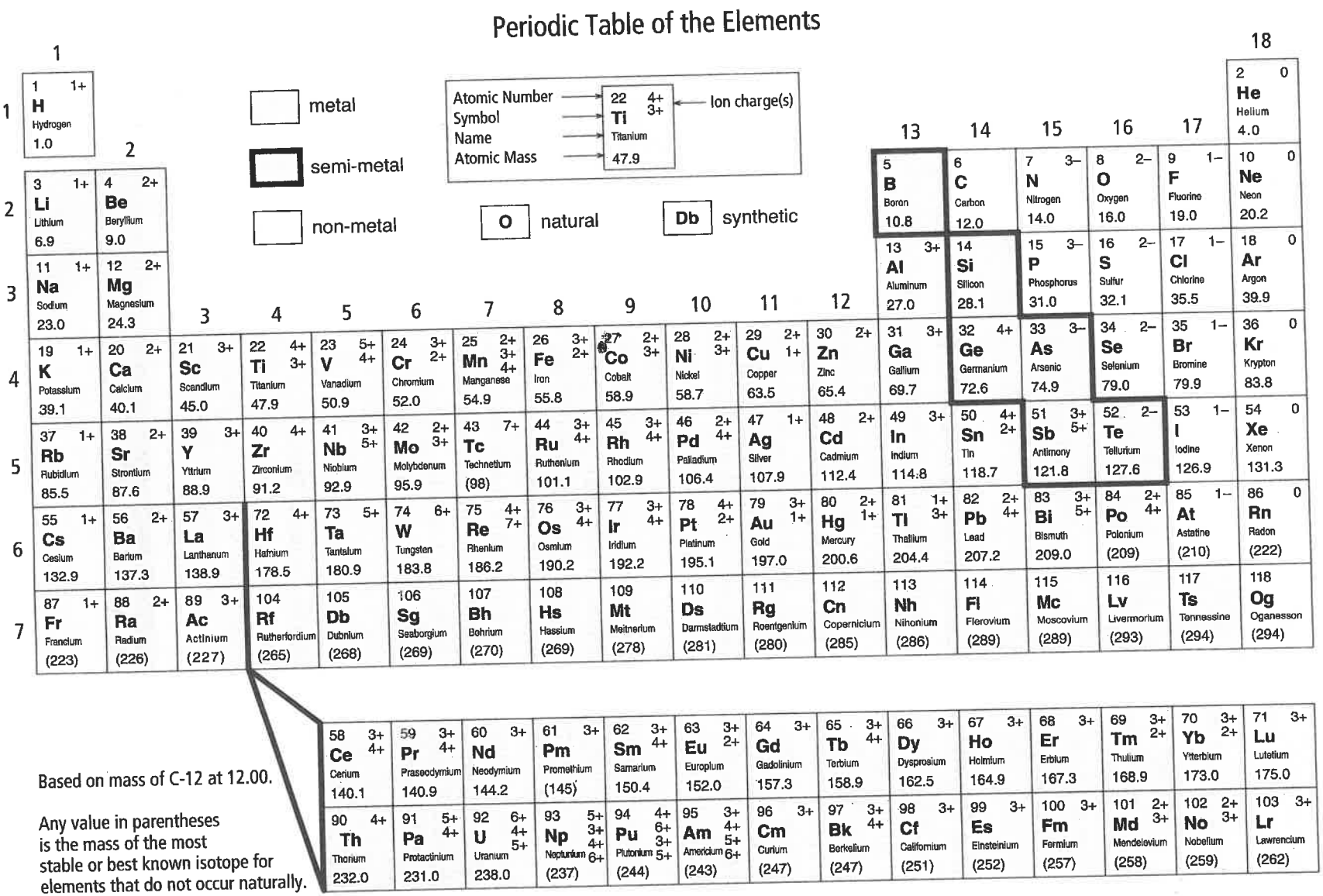

Figure 2.9 The modern periodic table enables the presentation of a wealth of information about each element on a single page.