

of Group 1. Although it is located above the Group 1 elements in many periodic tables, hydrogen is a unique element, with properties that do not closely resemble those of any group.

Like the Group 2 elements, helium has an  $ns^2$  group configuration. Yet it is part of Group 18. Because its highest occupied energy level is filled by two electrons, helium possesses special chemical stability, exhibiting the unreactive nature of a Group 18 element. By contrast, the Group 2 metals have no special stability; their highest occupied energy levels are not filled because each metal has an empty available  $p$  sublevel.



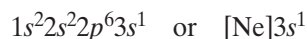
### SAMPLE PROBLEM A

For more help, go to the *Math Tutor* at the end of this chapter.

- Without looking at the periodic table, identify the group, period, and block in which the element that has the electron configuration  $[\text{Xe}]6s^2$  is located.
- Without looking at the periodic table, write the electron configuration for the Group 1 element in the third period. Is this element likely to be more reactive or less reactive than the element described in (a)?

#### SOLUTION

- The element is in Group 2, as indicated by the group configuration of  $ns^2$ . It is in the sixth period, as indicated by the highest principal quantum number in its configuration, 6. The element is in the  $s$  block.
- In a third-period element, the highest occupied energy level is the third main energy level,  $n = 3$ . The  $1s$ ,  $2s$ , and  $2p$  sublevels are completely filled (see **Table 1**). A Group 1 element has a group configuration of  $ns^1$ , which indicates a single electron in its highest  $s$  sublevel. Therefore, this element has the following configuration:



Because it is in Group 1 (the alkali metals), this element is likely to be more reactive than the element described in (a), which is in Group 2 (the alkaline-earth metals).

#### PRACTICE

Answers in Appendix E

- Without looking at the periodic table, identify the group, period, and block in which the element that has the electron configuration  $[\text{Kr}]5s^1$  is located.
- Without looking at the periodic table, write the group configuration for the Group 2 elements.
  - Without looking at the periodic table, write the complete electron configuration for the Group 2 element in the fourth period.
  - Refer to **Figure 6** to identify the element described in (b). Then, write the element's noble-gas notation.

#### extension

Go to [go.hrw.com](http://go.hrw.com) for more practice problems that ask you to relate positions of elements in the periodic table with electron configurations.



Keyword: HC6PERX