73. Group 14 of the *Elements Handbook* contains a discussion of semiconductors and the band theory of metals. How does this model explain the electrical conductivity of metals?

RESEARCH & WRITING

74. Prepare a report on the work of Linus Pauling.
   a. Discuss his work on the nature of the chemical bond.
   b. Linus Pauling was an advocate of the use of vitamin C as a preventative for colds. Evaluate Pauling's claims. Determine if there is any scientific evidence that indicates whether vitamin C helps prevent colds.

75. Covalently bonded solids, such as silicon, an element used in computer components, are harder than pure metals. Research theories that explain the hardness of covalently bonded solids and their usefulness in the computer industry. Present your findings to the class.

76. Natural rubber consists of long chains of carbon and hydrogen atoms covalently bonded together. When Goodyear accidentally dropped a mixture of sulfur and rubber on a hot stove, the energy from the stove joined these chains together to make vulcanized rubber. Vulcan was the Roman god of fire. The carbon-hydrogen chains in vulcanized rubber are held together by two sulfur atoms that form covalent bonds between the chains. These covalent bonds are commonly called disulfide bridges. Explore other molecules that have such disulfide bridges. Present your findings to the class.

77. Searching for the perfect artificial sweetener—great taste with no Calories—has been the focus of chemical research for some time. Molecules such as sucralose, aspartamine, and saccharine owe their sweetness to their size and shape. One theory holds that any sweetener must have three sites that fit into the proper taste buds on the tongue. This theory is appropriately known as the "triangle theory." Research artificial sweeteners to develop a model to show how the triangle theory operates.

ALTERNATIVE ASSESSMENT

78. Devise a set of criteria that will allow you to classify the following substances as ionic or nonionic: $CaCO_3$, Cu, H_2O, NaBr, and C (graphite). Show your criteria to your instructor.

79. **Performance Assessment** Identify 10 common substances in and around your home, and indicate whether you would expect these substances to contain ionic, covalent, or metallic bonds.

extension

Graphing Calculator
Classifying Bonding Type
Go to **go.hrw.com** for a graphing calculator exercise that asks you to classify bonding type based on electronegativities of atoms.

Keyword: HC6BNDX