

CRITICAL THINKING

- 36. Interpreting Concepts** During the freezing of a substance, energy is being removed from that substance. Yet the temperature of the liquid-solid system remains constant. Explain this phenomenon.
- 37. Applying Models** At normal atmospheric pressure, the temperature of an ice-water system remains at 0°C as long as both ice and liquid water are present, regardless of the surrounding temperature. Explain why this occurs.
- 38. Predicting Outcomes** Given a sample of water at any point on curve AD in **Figure 16**, how could more of the liquid water in that sample be converted into a solid without changing the temperature? Explain your reasoning.
- 39. Interpreting Diagrams** Refer to the phase diagram in question 44.
- Explain what happens when solid CO_2 (“dry ice”) warms up to room temperature at normal atmospheric pressure.
 - Is there a pressure below which liquid CO_2 cannot exist? Estimate that pressure from the graph.



USING THE HANDBOOK

- 40.** The *Elements Handbook* contains a table of properties for each group that includes information on the crystal structures of the elements. Most metals crystallize in one of three lattice arrangements: body-centered cubic, face-centered cubic, or hexagonal close-packed. **Figure 10** shows a model of the face-centered cubic lattice for sodium chloride. Use this figure and the information in the *Elements Handbook* to answer the following.
- What elements in Group 2 have the same lattice structure as sodium chloride?
 - How would the model of an element in a face-centered cubic lattice differ from the compound shown in **Figure 10**?

- The body-centered cubic lattice is the least-efficient packing structure of the metals. What elements in Groups 1 and 2 show this arrangement?

RESEARCH & WRITING

- 41.** Ceramics are formed from silicates found in the soil. Artists use them to create pottery, but engineers and scientists have created ceramics with superconductive properties. Investigate the growing field of superconductive ceramics.
- 42.** Liquid crystals are substances that possess the combined properties of both liquids and crystals. Write a report on these substances and the various uses we are finding for them.

ALTERNATIVE ASSESSMENT

- 43.** Compile separate lists of crystalline and amorphous solids found in your home. Compare your lists with those of your classmates.
- 44.** Design an experiment to grow crystals of various safe, common household materials. Record the conditions under which each type of crystal is best grown.

extension

Graphing Calculator
Vapor Pressure

Go to go.hrw.com for a graphing calculator exercise that asks you to create a graph of the vapor pressure of water as a function of temperature.



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