



**FIGURE 1.1**  
Heating devices.

**Open flames.** Open-flame ignition of organic vapors or liquids is easily prevented: **Never bring a lighted Bunsen burner or a match near a low-boiling-point flammable liquid.** Furthermore, because vapors from organic liquids can travel over long distances at bench or floor level (they are heavier than air), an open flame within 10 ft of diethyl ether, pentane, or other low-boiling organic solvents is an unsafe practice. In fact, the use of a Bunsen burner or any other flame in an organic laboratory should be a rare occurrence and done only with the permission of your instructor.

**Hot surfaces.** A hot surface, such as a hot plate or heating mantle, presents a trickier problem (Figure 1.1). An organic solvent spilled or heated recklessly on a hot plate surface may burst into flames. The thermostat on most hot plates is not sealed and can spark when it cycles on and off. The spark can ignite flammable vapors from an open container such as a beaker. Remove any hot heating mantle or hot plate from the vicinity before pouring a volatile organic liquid because the vapors from the solvent can be ignited by the hot surface of a hot plate or a heating mantle.

**Faulty electrical equipment.** Do not use appliances with frayed or damaged electrical cords as their use could lead to an electrical fire.

**Chemical fires.** Chemical reactions sometimes produce enough heat to cause a fire and explosion. For example, in the reaction of metallic sodium with water, the hydrogen gas that forms in the reaction can explode and ignite a volatile solvent that happens to be nearby.

### Cuts and Injuries



**FIGURE 1.2**  
Breaking a glass rod properly.

Cuts and mechanical injuries are hazards anywhere, including the laboratory.

**Breaking glass rods or tubing.** When you purposely break a glass rod or a glass tube, do it correctly. Score (scratch) a small line on one side of the tube with a file. Wet the scored line with a drop of water. Then, holding the tube on both sides with a paper towel and with the scored part away from you, quickly snap it by pulling the ends toward you (Figure 1.2).