Alternative Assessment

1. Build a hydrometer from a long test tube with some sand at the bottom and a stopper. Adjust the amount of sand as needed so that the tube floats in most liquids. Calibrate it, and place a label with markings on the tube. Measure the densities of the following liquid foods: skim milk, whole milk, vegetable oil, pancake syrup, and molasses. Summarize your findings in a chart or table.

2. The owner of a fleet of tractor-trailers has contacted you after a series of accidents involving tractor-trailers passing each other on the highway. The owner wants to know how drivers can minimize the pull exerted as one tractor-trailer passes another going in the same direction. Should the passing tractor-trailer try to pass as quickly as possible or as slowly as possible? Design experiments to determine the answer by using model motor boats in a swimming pool. Indicate exactly what you will measure and how. If your teacher approves your plan and you are able to locate the necessary equipment, perform the experiment.

3. Record any examples of pumps in the tools, machines, and appliances you encounter in one week, and briefly describe the appearance and function of each pump. Research how one of these pumps works, and evaluate the explanation of the pump's operation for strengths and weaknesses. Share your findings in a group meeting and create a presentation, model, or diagram that summarizes the group's findings.

Graphing Calculator Practice

Flow Rates

Flow rate, as you learned earlier in this chapter, is described by the following equation:

$$\text{flow rate} = Av$$

Flow rate is a measure of the volume of a fluid that passes through a tube per unit time. A is the cross-sectional area of the tube, and v is the flow speed of the fluid. If A has units of centimeters squared and v has units of centimeters per second, flow rate will have units of cubic centimeters per second.

The graphing calculator will use the following equation to determine flow rate.

$$Y_1 = \pi * V(X/2)^2$$

You will use this equation to study the flow rates (Y_1) for various hose diameters (X) and flow speeds (V). The calculator will produce a table of flow rates in cubic centimeters per second versus hose diameters in centimeters.

In this graphing calculator activity, you will learn how to read a table on the calculator and to use that table to make predictions about flow rates.

Visit go.hrw.com and enter the keyword **HF6FLUX** to find this graphing calculator activity. Refer to **Appendix B** for instructions on downloading the program for this activity.