Measuring Liquids

Apparatus

graduated cylinder	pipette
buret clamp	ring stand
buret	beakers, 50 mL, 250 mL

Materials
water

Procedures

l. For approximate measurements of liquids, a graduated cylinder such as the one shown in Figure 1-6 is generally used. These cylinders are usually graduated in milliliters (mL). Such a graduated cylinder may read from 0 to 10 mL, 0 to 25 mL, or more, from bottom to top. It may also have a second row of graduations reading from top to bottom. Examine your cylinder for these markings.

Figure 1-6

*Observation:*_____

_____

2. A pipette or a buret is used for more accurate measurements. Pipettes are made in many sizes and are used to deliver measured volumes of liquids. A pipette is fitted with a suction bulb which is used to withdraw air from the pipette while drawing up the liquid to be measured. See Figure 1-7. Always use the suction bulb-NEVER pipette by mouth.

3. Burets, fitted with either a stopcock, a pinch clamp, or a glass bead, are used for delivering any desired quantity of liquid up to the capacity of the buret. Many burets are graduated in tenths of milliliters. See Figures 1-8 and 1-9. When using a buret, follow these steps:
a. Clamp the buret in position on a ring stand. See Figure 1-10.
b. Place a beaker, 250-mL, at the bottom of the buret. The beaker serves to catch any liquid that will be drawn off.

c. Pour into a 50-mL beaker a quantity of the liquid you want to measure from the liquid's reagent bottle. (NOTE: In this first trial you will be using water.) Remember to carefully check the label of the reagent bottle before removing any liquid.
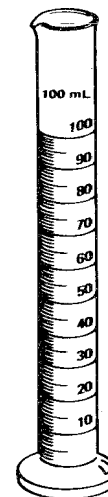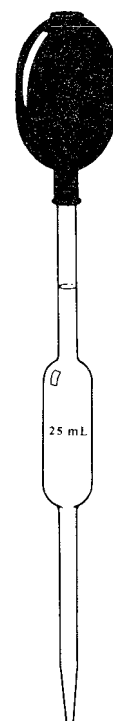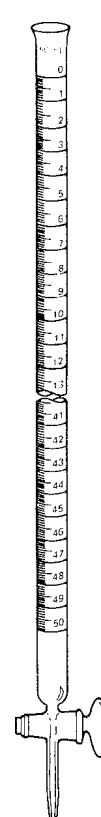

Figure 1-7   **Figure 1-8**   **Figure 1-9**

Laboratory Procedures
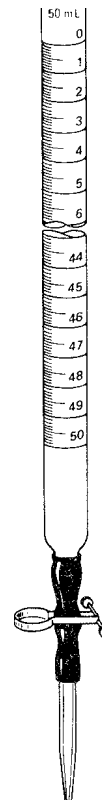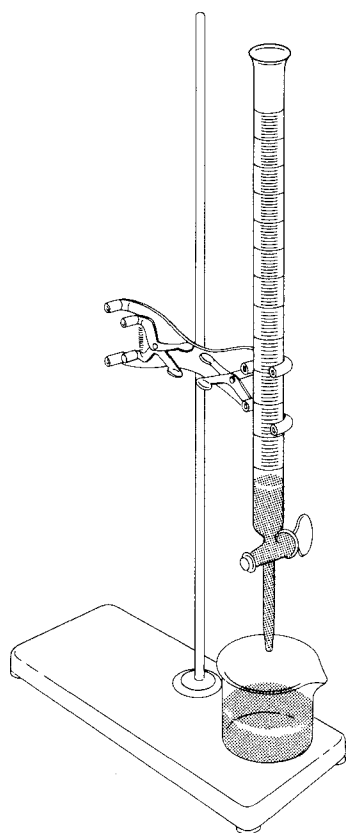
CAUTION Safety goggles, gloves, and apron should be worn whenever you measure chemicals. Never pour a liquid directly from its reagent bottle into the beret. You should first pour the liquid into a small beaker (50-mL) that is easy to handle. Then pour the liquid from the small beaker into the beret. This simple method will prevent unnecessary spillage. Never pour any unused liquid back into the reagent bottle.

d. Fill the beret with the liquid and then draw off enough liquid to fill the tip below the stopcock and bring the level of the liquid down to scale. The height at which the liquid stands is then read accurately. Practice this procedure several times by pouring water into the beret and emptying it through the stopcock.

4. Observe that the surface of a liquid in the beret is slightly curved. It is concave if it wets the glass, and convex if it does not wet the glass. Such a curved surface is called a meniscus. If the liquid wets the glass, you read to the bottom of the meniscus, as shown in Figure 1-11. You must read the mark at the bottom of the meniscus. This is the line AB. If you read the markings at the top of the meniscus, CD, you will get an incorrect reading. Locate the bottom of the meniscus when reading the water level in the beret.
*Observation:*_____

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5. After you have taken your first beret reading, as directed, open the stopcock and draw off as many milliliters of the liquid as you wish. The exact amount drawn off is equal to the difference between your first and final beret readings. Practice measuring liquids by measuring 10 mL of water, first using a graduated cylinder, then a pipette, and finally a beret.

6. At the end of this part of the experiment, the equipment you store in the lab locker or drawer should be clean, dry, and arranged in an orderly fashion for the next lab experiment.
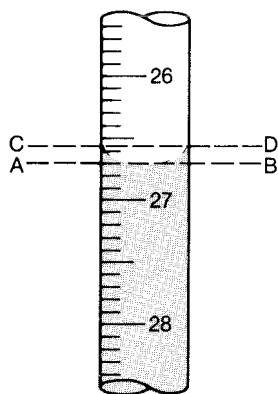
CAUTION In many experiments you will have to dispose of a liquid chemical at the end of a lab. Always ask your teacher for the correct method of disposal. In many instances liquid chemicals can be washed down the sink's drain by diluting them with plenty of tapwater. Very toxic chemicals should be handled only by your teacher. All apparatus should be washed, rinsed, and dried.

7. Remember to wash your hands thoroughly at the end of this part of the experiment.

Figure 1-10

Figure 1-11