



(b)

(c)

FIGURE 1-9 (a) Barium chromate can be separated from the solution in the beaker using filtration. (b) A centrifuge can be used to separate certain solid components. The centrifuge spins rapidly, which causes the solids to settle to the bottom of the test tube. (c) The components of an ink can be separated using paper chromatography.

of which retains its own identity and properties. The parts, or components, of a mixture are simply mixed together physically and can usually be separated. As a result, the properties of a mixture are a combination of the properties of its components. Because mixtures can contain various amounts of different substances, a mixture's composition must be specified. This is often done in terms of percentage by mass or by volume. For example, a mixture might be 5% sodium chloride and 95% water by mass.

Some mixtures are *uniform in composition*; that is, they are said to be **homogeneous**. They have the same proportion of components throughout. *Homogeneous mixtures are also called solutions*. A salt-water solution is an example of such a mixture. Other mixtures are *not uniform throughout*; that is, they are **heterogeneous**. For example, in a mixture of clay and water, heavier clay particles concentrate near the bottom of the container.

Some mixtures can be separated by filtration or vaporized to separate the different components. Filtration can be used to separate a mixture of solid barium chromate from the other substances, as shown in the beaker in Figure 1-9(a). The yellow barium compound is trapped by the filter paper, but the solution passes through. If the solid in a liquid-solid mixture settles to the bottom of the container, the liquid can be carefully poured off (decanted). A centrifuge (Figure 1-9(b)) can be used to separate some solid-liquid mixtures, such as those in blood. Another technique, called paper chromatography, can be used to separate mixtures of dyes or pigments because the different substances will move at different rates on the paper (Figure 1-9(c)).