# Accuracy in Measurement

No measurement is 100 percent accurate. All measurements have some degree of uncertainty. When taking measurements, you should always ask yourself, "How accurate is this measurement?"
For a measurement to be of any worth, it must have something that indicates its reliability. A measurement's **accuracy** is expressed as its potential amount of error. For instance, the smallest unit of measurement on a metric ruler is usually a millimeter. The most accurate measurement you could possibly make with that ruler is to the nearest millimeter; thus, the measurement's accuracy is $\pm$ 0.5 mm. This is important because not all measurements have the same accuracy.
The total accuracy of your work is only as reliable as your *least* accurate measurement.
Following is an example:
Ricardo added the following three liquids to a beaker:

• 7.9 mL of liquid *A*
• 2.1 mL of liquid *B*
• 250 mL of liquid *C*

Ricardo measured liquids *A* and *B* with a narrow graduated cylinder that had markings for every 0.1 mL. He measured liquid *C* in a beaker that had markings only for every 10 mL. Thus, the volume of liquid *C* was only accurate to within about 5 mL. As a result, Ricardo correctly stated that the total volume of the mixture in the beaker was (7.9 + 2.1 +250) mL =260 mL $\pm$ 5 mL.

**Matchmaker**

Match the measurement devices below with their level of accuracy.

**1.** _____ metric ruler with markings as small as millimeters

**2.** _____ graduated cylinder with markings as small as 2 mL

**3.** _____ scale with markings as small as 0.01 g

**4.** _____ thermometer with markings as small as 1°C

**a.** about 0.5 g

**b.** about 1 mL

**c.** about 0.5°C

**d.** about 1 mm

**e.** about 0.5 mm

**f.** about 0.005 g