SECTION 2-3

Using Scientific Measurements

Objectives

- Distinguish between accuracy and precision.
- Determine the number of significant figures in measurements.
- Perform mathematical operations involving significant figures.
- Convert measurements into scientific notation.
- Distinguish between inversely and directly proportional relationships.

If you have ever measured something several times, you know that the results can vary. In science, for a reported measurement to be useful, there must be some indication of its reliability or uncertainty.

Accuracy and Precision

The terms *accuracy* and *precision* mean the same thing to most people. However, in science their meanings are quite distinct. **Accuracy** *refers to the closeness of measurements to the correct or accepted value of the quantity measured.* **Precision** *refers to the closeness of a set of measurements of the same quantity made in the same way.* Thus, measured values that are accurate are close to the accepted value. Measured values that are precise are close to one another but not necessarily close to the accepted value.

Figure 2-8 should help you visualize the difference between precision and accuracy. A set of darts thrown separately at a dartboard may land in various positions, relative to the bull's-eye and to one another. The

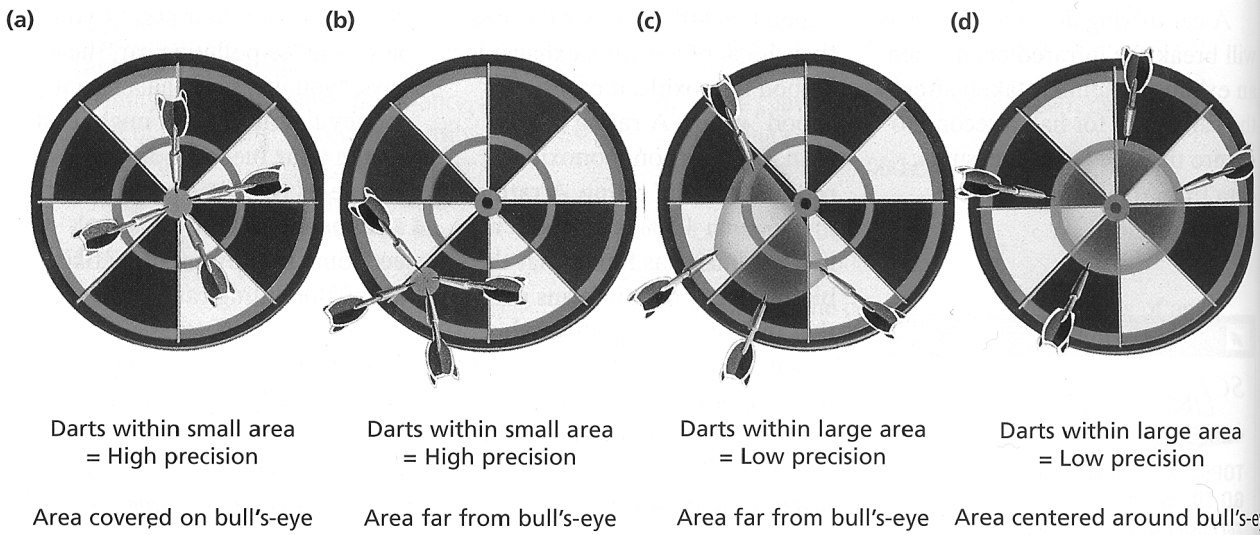

FIGURE 2-8 The sizes and locations of the areas covered by thrown darts illustrate the difference between precision and accuracy.