Honors Physics Mr. McMullen

Names _____ Date _____ Period _____

1 MEASUREMENT OF LENGTH

Equipment

meter stick
metric ruler
2 books
2 wood blocks
vernier calipers

Examine a meter stick. Notice that it is divided into one hundred equal-numbered parts. Each numbered division is one centimeter (cm) long. Thus, one centimeter is 0.01 m. Each centimeter is divided into ten equal nonnumbered parts called millimeters (mm). Therefore, one millimeter is 0.001 m. The length along the meter stick between 10.0 cm and 12.5 cm is 2.5 cm. This same length can also be expressed as 25 mm, 0.025 m, and 2.5×10^{-2} m.

When you measure your wood block, do not use the ends of the metric ruler, because the ends may be damaged or stamped improperly. For a more accurate reading, use another marking farther along the ruler (Figure 1-1). Be sure to subtract your reading of the first mark from your final reading. In measuring with the metric ruler, notice that the ruler is placed on its marked edge. This helps to eliminate errors that can arise by viewing the scale from different angles. The apparent shift in position of an object when it is viewed from different angles is called parallax. Follow this same procedure for all measurements of length.

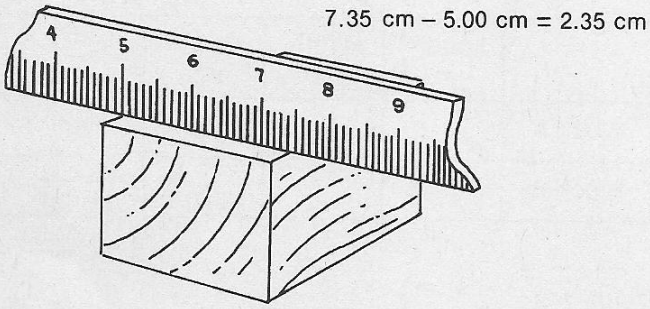

Figure 1-1. Subtract the first reading from the second to obtain an accurate length measurement.

Objectives

During this investigation you will

gain familiarity with the metric system of measurement.

practice the proper expression of measured values and results of calculations by observing the use of significant digits.

Procedure

1. Measure and record in Table 1-1 the length, width, and height in centimeters of two different wood blocks. While making each measurement, read the metric ruler to the nearest millimeter and then estimate to a tenth of a millimeter. The final estimated reading and all figures to the left of it are significant digits.
2. Calculate the volume of each block. Retain in your product only as many significant digits as you have in the value for one dimension of the block. Record the volume of each block in cubic centimeters (cm^3) in Table 1-1.
3. In Table 1-2 express the dimensions of the above blocks in meters and the volume of each of the two blocks in cubic meters (m^3).
4. Measure the thicknesses of 50, 100, and 150 sheets of a book in centimeters and determine the average thickness of a single sheet. Repeat