Chapter 1.2

Physical Science Lab

MEASUREMENT

OBJECTIVE: to take measurements and make calculations using the metric system.

WEAR YOUR SAFETY GLASSES

Procedure A – TEMPERATURE *beakers, thermometers, stands, ice, hotplate*

Measure and record the temperature of the water in each of the three beakers.

A _____ B _____ C _____

Procedure B – LENGTH (HEIGHT) *measuring stick*

Measure your heights using both sides of the measuring stick. Record the measurements in a table.

Procedure C – MASS (WEIGHT) *triple beam balance, student supplied items*

Measure and record the mass of five small items such as pens and coins.

Procedure D – VOLUME - Method #1 *graduated cylinder, milk carton with water*

The carton holds more water than the graduated cylinder does. Therefore, this measurement will take several steps:

1. Fill the milk carton with water up to the line where the side of the carton starts to slant toward the top.
2. Pour water from the carton into the graduated cylinder until it reaches the 100 line. Empty the graduated cylinder into the sink.
3. Again, pour water from the carton into the graduated cylinder until it reaches the 100 line. Empty the graduated cylinder into the sink.
4. Empty the last of the water in the carton into the graduated cylinder and take a measurement of the volume. Record all three measurements.
5. Find the total volume of water used by adding the three measurements together.

NOTE - The results for procedures D and E should be the same.

Procedure E -- VOLUME - Method #2 *ruler, empty milk carton*

Using the metric side of the ruler, measure the length, width, and height of the milk carton. Length and width are found by measuring the bottom of the carton. Measure the height from the bottom to the point where the side of the carton starts to slant toward the top. Next, calculate the volume of the carton using the formula; Volume = Length x Width x Height.

Procedure F -- VOLUME - Method #3 *graduated cylinder, hose*

First, add water to a graduated cylinder until it reaches the 50 line.
Next, tilt the graduated cylinder slightly and carefully slide the hose into it.
Then, measure the new volume (called the *end volume*).
Calculate the volume using the formula; Volume of hose = End Volume - 50
Last, empty the graduated cylinder.

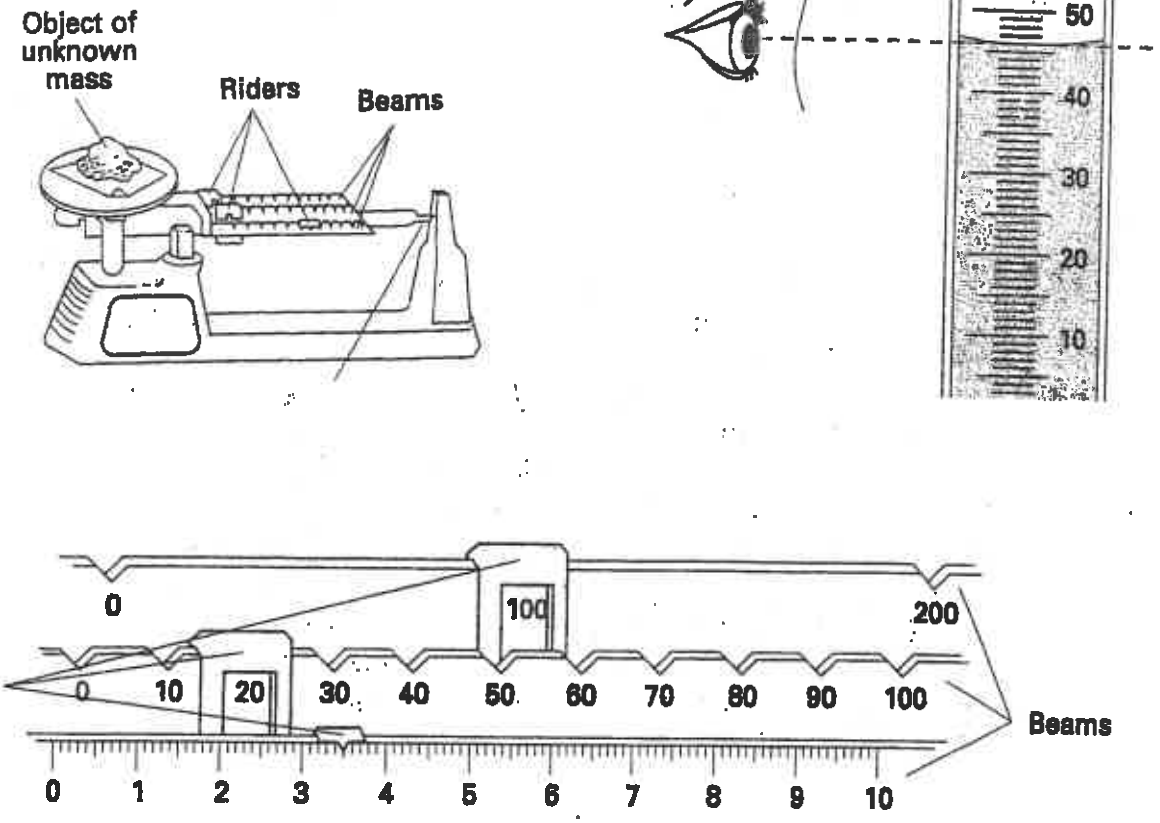


Figure 3

Science Activity - Measuring length

A. Obtain a ruler, meter stick, science textbook, and a dime.

B. Look at the metric side of the ruler. The units that are numbered are centimeters. There are 10 spaces between each numbered centimeter line. Each of these spaces is equal to one millimeter. See figure 1.

C. Look at figure 2. It shows a ruler that is 10 centimeters long. The space between each number is equal to one centimeter. A measurement at the lines in between can be read as a decimal. For example; the reading at A is 2.6 centimeters. What is the reading at B, C, and D? Write your answer below.

B _____ C _____ D _____

D. Using the ruler, measure the width of each of the fingernails on one of your hands. Which fingernail is closest to one centimeter? _____
Measure the thickness of the dime. What is the thickness of a dime? _____

E. Using the meter stick, find a length along your body that is about one meter long. For example, the distance from the floor to your waist or from your nose to the fingertip of your outstretched arm.

figure 1

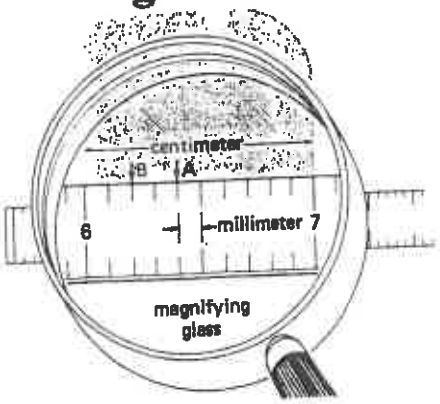
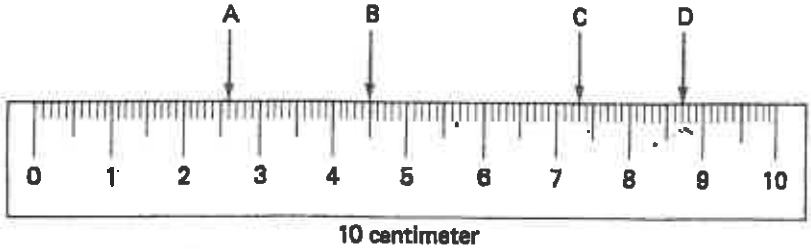


figure 2



10 centimeter metric ruler

F. **CALCULATING AREA** Using the ruler, measure the length and width of your textbook. The width is usually the shorter than the length.
What is the length of the textbook in centimeters _____? in millimeters _____?
What is the width of the textbook in centimeters _____? in millimeters _____?
Calculate the area of the textbook in square centimeters using the formula for area;
Length x Width = Area _____ cm x _____ cm = _____ cm^2

G. **CALCULATING VOLUME** Using the ruler, measure the thickness of your textbook. The thickness is usually the shorter than the length or width. Calculate the textbook's volume in cubic centimeters using the formula for volume;

Length x Width x Thickness = Volume

_____ cm x _____ cm x _____ cm = _____ cm^3