LAB: Graphing Exercise – The Relationship between Mass and Volume
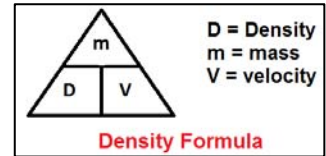
Density is the relationship of mass to volume. Specifically defined as

Density = Mass/Volume (D= m / V)

D = Density
m = mass
V = velocity
Density Formula

Materials:
100 mL graduated cylinder
Balance
Plastic tube with 4 colored samples *of the same material*. (Color may be black, dark brown, light tan, white, red translucent, green translucent, purple, gray, metallic, red opaque, yellow, or orange)

Procedure:
1. Each lab pair will be given one type of colored material. Choose the smallest of the samples and measure the mass on the balance in grams.
2. Then measure the volume of that same sample. To do this fill the graduated cylinder with 50 mL of water, then carefully put in the sample and measure the difference in the volume. The volume of the sample is the *final volume minus the initial volume of water* in the graduated cylinder. The units are mL.
3. Record the information on your data table (on back of this page).
4. Do this for all 4 samples of the same substance.
5. For each sample you have a pair of numbers: volume and mass. Make a scatterplot graph of the data with volume on the "x axis" and mass on the "y axis". DO NOT CONNECT THE DOTS!
6. When all four points have been plotted, use a pencil to draw a "best-fit line". This will be the best fitting straight line that passes through or comes as close as possible to all the points and goes through the origin (0,0).
7. Share your data with two other groups, and get their data. Add their data to your graph and create best fit lines for their data. You should now have 3 straight lines, all passing through the origin.

Calculating Slope:
Slope =Rise   OR   change in y axis   In this graph = change in mass (y axis)   = density   (slope)
       Run   change in x axis   change in volume (x axis)   of the material

Calculate the slope of each of these lines by choosing 2 points on the line, finding the rise and run and dividing.
   - Mark 2 points on the line. They should be far apart. Choose points that will make it easy to read the volume and mass measurements. Label them "A" and "B". Subtract B from A to get rise and run

LINE 1:   Point A   mass _____ g   vol _____ mL   color of material:
               Point B   mass _____ g   vol _____ mL   (this is yours)
                                Rise_____g   Run _____mL

               Slope = rise/run _____ g/mL

LINE 2:   Point A   mass _____ g   vol _____ mL   color of material:
               Point B   mass _____ g   vol _____ mL   (another group's data)
                                Rise_____g   Run _____mL

               Slope = rise/run _____ g/mL

LINE 3:   Point A   mass _____ g   vol _____ mL   color of material:
               Point B   mass _____ g   vol _____ mL   (another group's data)
                                Rise_____g   Run _____mL

               Slope = rise/run _____ g/mL

1) Color:		2) Color:		3) Color:	
Mass (g)	Volume (mL)	Mass (g)	Volume (mL)	Mass (g)	Volume (mL)

*LABEL THE SLOPE OF EACH LINE ON YOUR GRAPH BELOW