Remember to show all your work and always check your answer for correct sig figs and units.
Feel free to use your textbook or the internet to find any missing information or equations you may need.

Part A: Density of an unknown metal

1) On the next page of this worksheet you will see photos that show the measurements of the length, diameter and mass of a small metal cylinder. Use these photos to answer the following questions.
   a. What is the mass, in g, of the cylinder?

   b. What is the diameter, in cm, of the cylinder? What is the radius, in cm, of the cylinder?

   c. What is the length, in cm, of the cylinder?

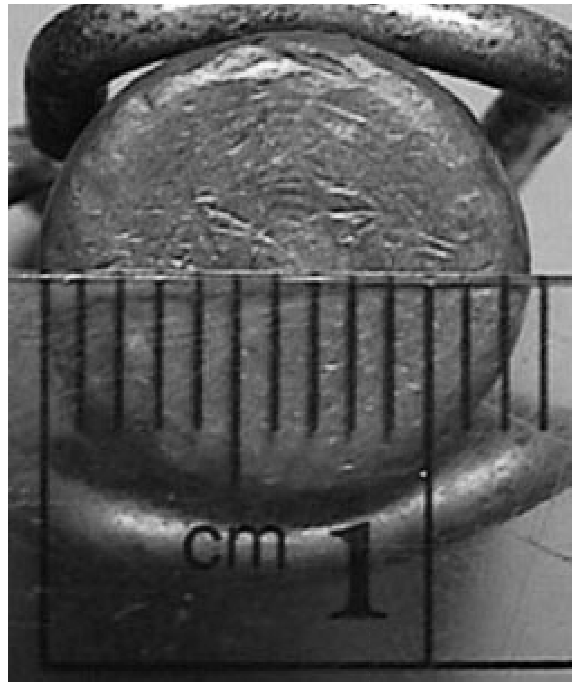
   d. Based on your measurements, what is the volume, in cm^3, of the cylinder?

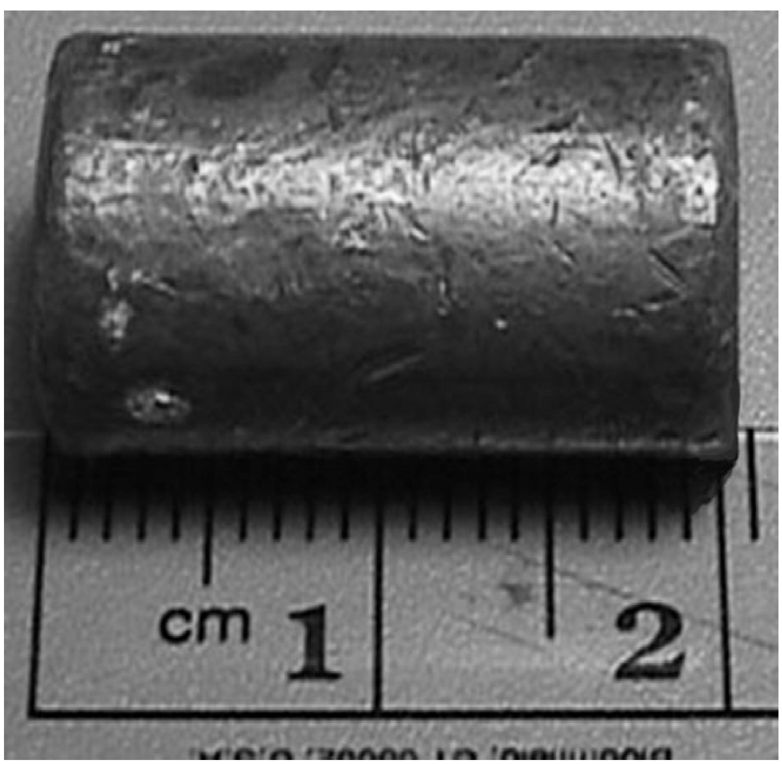
   e. What is the density, in g/cm^3, of the cylinder?

   f. Looking at the densities in Table 2.4 of your textbook, what is the most likely identity of the cylinder?

   g. A sample of the same metal is found to have a volume of 9.06×10^2 in^3. How much does the sample weigh, in pounds?

Photos for calculating density in Question 1





Part B: Some density problems from old exams

2) A copper refinery produces a copper ingot weighing 150 lb. If the copper is drawn into a wire whose diameter is 8.25 mm, how many feet of copper can be obtained from the ingot?

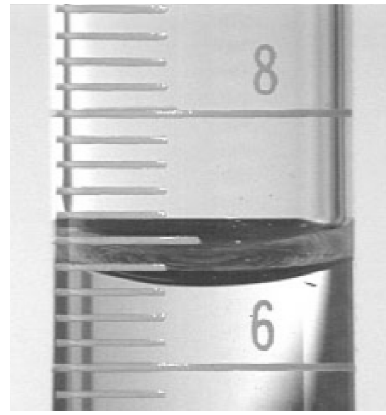
3) Aspirin has a density of 1.40 g/cm^3. What is the volume, in in^3, of an aspirin tablet having a mass of 250 mg?

4) A bag contains a mixture of copper and lead BBs. The average density of the BBs is 9.70 g/cm^3. Assuming that the copper and lead are pure, determine the relative % of each kind of BB. [Hint: What type of problem have we already done this semester that dealt with weighted averages?]

Part C: Extra practice if you have time

5) The photo to the right shows a graduated cylinder with water in it. Use the photo and the densities in Table 2.4 of your textbook to answer the following questions.
   a. What is the volume of the water? [Note: the markings on the graduated cylinder are mLs.]

   b. What is the mass, in g, of the water in the graduated cylinder?



   c. What would you expect the new volume, in mL, to be after the water was left in a freezer over night?

   d. How does the answer to the previous question explain why a can of soda might burst if left over night in a car during a snow storm?

   e. Instead of freezing the water, imagine you added liquid mercury (density – 13.5 g/cm^3) and cyclohexane (density – 0.778 g/cm^3) to the graduated cylinder. Assuming that the liquids do not mix and that they form distinct layers, where will each liquid end up?

   Bottom liquid = __________ Middle liquid = __________ Top liquid = __________

   f. If you added the same mass each of mercury and cyclohexane as the mass of water already in the graduated cylinder, what will be the total volume in the graduated cylinder?