# Density Lab

## Lab Safety:
1) Goggles and aprons must be worn when working with the liquids
2) All liquids should be poured into waste beakers in the hood!
3) Metals should be returned to the drying area after use, DO NOT PUT METAL DOWN THE DRAIN OR IN THE TRASH!!

## Procedure:

For liquid:
1) Mass the 10mL graduated cylinder
2) Add about 2mL of liquid, record actual volume (don't forget about uncertainty and sig figs)
3) Remass the graduated cylinder to find out the mass of liquid
4) Repeat for a 4mL, 6mL, and 8mL sample

For solid:
1) Gather a sample of the unknown metal.
2) Measure out about a 2g sample, record actual mass.
3) Determine the volume by water displacement in a 10mL graduated cylinder (don't forget about uncertainty and sig figs)
4) Repeat steps for a 4g, 6g, and 8g sample of the unknown metal.

## **Graphing**:
1) On graph paper, make two graphs, one for the solid and one for the liquid.
2) Graphs should be mass vs. volume.
3) On both graphs, draw the best fit line through your three points.

## Questions to answer in conclusion:
1) Using the following table of densities, determine the identity **<u>all</u>** unknown metals.

| | | | | | |
|---|---|---|---|---|---|
| Magnesium | = 1.74 g/mL | Zinc | = 7.13 g/mL | Silver | =10.50 g/mL |
| Aluminum | = 2.70 g/mL | Iron | = 7.87 g/mL | Lead | =11.35 g/mL |
| Titanium | = 4.54 g/mL | Nickel | = 8.90 g/mL | Gold | =19.30 g/mL |
| Tin | = 5.75 g/mL | Copper | = 8.96 g/mL | Platinum | =21.45 g/mL |

2) Using the following table, determine the identity **<u>all</u>** unknown liquids.

| | | | |
|---|---|---|---|
| Hexane= 0.660 g/mL | Benzene | =0.877 g/mL | Glycerine | = 1.27 g/mL |
| Ethanol= 0.782 g/mL | Water | = 0.997 g/mL | Methylene chloride | = 1.59 g/mL |

3) What volume would a 1.05kg sample of iron have?
4) What mass would a $3.88cm^3$ sample of titanium have?
5) Why is density called a physical property of a substance?
6) When doing water displacement, should you determine the mass of the sample before or after you measure the volume?  Why?
7) How would you find the volume of an irregularly shaped object that has a density of 0.80g/mL?
8) If we placed the following items together in a graduated cylinder, where would they come to rest from top to bottom?
   a)   Water     b) Copper     c) Hexane     d) cork (d = 0.24 g/mL)     e) ice (d=0.92 g/mL)
9) Why is it experimentally wrong to record a density of 1.42857g/mL if the objects mass was 10.0g and the volume was 7.0mL?