**Measuring Mass**

***Purpose:***

Practice the various techniques of measuring masses using the lab balance.  Gain experience in the techniques of handling laboratory materials and equipment.

***Procedure:***

*Part I Measuring Mass Directly*

1. Check your balance to make sure that it is properly “zeroed”.  In an adjustment is necessary, consult your teacher.
2. Place a penny on the balance pan.  Record the mass of the penny
3. Repeat step 2 for the objects listed below.  Record the mass of each object
   1. A nickel
   2. A weigh boat
   3. A 150-ml beaker
   4. A 100-ml graduated cylinder

*Part II Measuring Out a Substance*

1. Place a dry 50-ml beaker on the balance pan.  Record this reading
2. Zero the balance.
3. In a 100-ml graduated cylinder, obtain exactly 30.0ml of cold tap water.  Slowly and carefully pour the water from the graduated cylinder into the beaker on the balance pan until the balance reads 20.0g.  Avoid splashing water onto the pan.  Note and record the volume of water remaining in the graduated cylinder.  Discard the water and dry the beaker.

*Part III Determining Mass by Difference*

1. Measure and record the mass of a weigh boat
2. Using the procedure described by your teacher, obtain 20-25 crystals of calcium chloride (CaCl­2) on a piece of paper.  Carefully transfer the crystals to the weigh boat.
3. Measure and record the combined mass of the weigh boat and calcium chloride.  Note and record the time of this measurement.
4. Using your scupula spread the crystals out on the weigh boat.  Study the crystals and record your observations.  Set the weigh boat and crystals aside to be reexamined later.
5. Inflate a balloon and tie off the open end so that no gas can escape.  Measure and record the mass of the inflated balloon.
6. Puncture the balloon and allow all the gas to escape.  Measure and record the mass of the deflated balloon.  Discard the balloon.
7. Reexamine the calcium chloride crystals on the weigh boat that you set aside earlier.  Record your observations.
8. Measure and record the combined mass of the weigh boat and its contents.  Note and record the time of this measurement.  Discard the calcium chloride and clean dry the weigh boat.

***Calculations:***

1 – Calculate the volume of water added to the beaker in step 6.

2 – Calculate the mass of 1ml of water

3 – Using the mass by difference calculate the mass of:

* 1. CaCl2 crystals added to the weigh boat

             b- 30ml of tap water

* 1. moisture absorbed by CaCl2 crystals
  2. Calculate the difference in mass between the inflated balloon and the deflated balloon
  3. Difference in mass between inflated/deflated balloon
  4. Calculate how much time, in minutes, elapsed between the two measurements of the CaCl2.

***Questions:***

1. The difference between the mass of the balloon when inflated and its mass after being punctured is not an accurate determination of the mass of the gas in the inflated balloon.  Why is this?
2. Suppose you were asked to measure out 5 grams of calcium chloride, describe how you would make this measurement.
3. Suppose that you wanted to know the mass of a quantity of orange juice that was poured into a drinking glass.  Describe how you would determine this mass.
4. A beaker contains a quantity of a liquid.  You want to know the combined mass of the beaker and the liquid.  Describe how you would go about making this determination.

***Conclusions:***