Information on Lab Notebooks, Lab Reports and Graphs

Lab Notebook:

Each student is required to purchase a Meade composition style notebook for recording data during lab. These notebooks may be purchased at stores like Walmart or Big Lots for about a dollar. Notebooks which have non-removable pages might acceptable as a substitute; talk to the instructor for details on eligibility.

Once you have a lab notebook, sequentially number the pages in the upper corner. Make sure you use pen for numbering the pages as well as for the lab notes. Leave the first several pages blank for a table of contents as you go along.

Each lab should begin on a new page in your lab notebook. Start the page with the title of the lab, the names of your lab partner(s), and the date. Be sure to include anything necessary for completing the lab report for this lab. This will include, but is not limited to, all unknown numbers, relevant data points, measurements (with units), temperatures, etc. Make sure you include a description of what the measurement is for (i.e. *Mass of metal = 50.00 g*). Use tables when appropriate, and be sure to include key calculations.

If an error is made, use a single line to cross out the incorrect statement.

Lab Notebooks will be collected at the end of the term for grading. Omission of the above information will result in lost points.

Lab Reports:

Each student must turn in his or her own lab report. Lab reports must be typed and complete for credit. Each lab report should include:

- your **name**
- your **lab partner(s) name(s)**
- the **title** of the lab
- the **date** that the lab was performed
- a **purpose** section - this is a section with no more than two sentences answering *why* you did this lab.
- a **data** or **results** section - this section should include any relevant data points and calculations obtained within the lab. Make sure you include the **unknown number or letter** if appropriate.
- a **conclusion** section - this section answers the question asked by the purpose
- any **postlab questions**, if any
- In addition, be sure to include any **graphs** or **relevant observations**. If relevant, be sure to include any **averaged values, percent error, parts per thousand (ppt),** etc. All labs must use the correct number of **significant figures** and **units**.

Lab reports are due at the *beginning* of recitation one week following completion in class. Late lab reports will suffer a point penalty depending on how late they are; in other words, *turn your lab reports in on time!* If a lab is incomplete in terms of calculations, effort, etc., the lab will be returned to the student for completion.

Make-up labs must be completed within one week of the original lab with your instructor's approval. **Late lab reports** must be turned in within one week of the scheduled due date, and all late labs will receive a point penalty. If you are going to be absent, you must call and leave a message on the scheduled day or your report will be considered late.

Lab reports must be printed to receive credit for the assignment. If a laboratory report is **emailed** to the instructor, a three point printing cost will be assessed to convert your lab report into a printed version.

Students turning in all the scheduled labs and who have a satisfactory lab notebook will be eligible for the **lab completion bonus.** Failure to turn in even one lab report or keep a lab notebook will result in forfeiture of the lab completion bonus. Ask the instructor if unsure.

A sample lab report example follows:

The Separation and Identification of Metal Ions

Michael A. Russell
Lab partner: Joyce Sherpa
CH 221 Lab Manual page 17
September 29, 2009

Purpose:

Paper chromatography will be utilized to separate metal ions in an unknown solution. Using a mobile phase of HCl in butanol / ethanol, we will apply a variety of known metal ions to our paper chromatography system to establish their retention factors (R_f). We can use these R_f values to analyze the unknown solutions to determine their identity.

Data / Observations:

< Create a data page with relevant calculations and observations here. >

Conclusion:

We successfully utilized paper chromatography to determine the R_f values for silver, cobalt, copper, iron and mercury ions. Using the calculated retention factors, we were able to determine the identity of the components within the unknown solutions.

Post-Lab Questions:

1) Pencils are used to mark the chromatographic paper rather than ink because I only had a pencil on me.
2) The mass of silver ions in a 1 cm spot can be determined by utilizing dimensional analysis.

Graphs:

Whenever you create a graph for a chemistry lab, keep the following points in mind:

- If creating a graph by hand, use a large portion of the graph paper to create your graph; small graphs can easily misrepresent data and/or trendlines. If using a computer program like Microsoft Excel, use large graph sizes when creating lab reports (up to the size of one complete page.)
- Plan ahead! Make sure all the data points will fit on the graph but will not be too crowded together horizontally or vertically. Again, use as much of the graph paper as possible when constructing your graph.
- On the vertical axis, label the quantity that is being plotted (i.e. "Time") and put its units in parentheses (i.e. "(seconds)". Do the same on the horizontal axis.
- If you are drawing a **best-fit line** through the data points, do ***not*** connect the dots! Instead, draw a line which has some data points on each side of the line you are drawing... think of your line as an "average" of the data points.
- Never force a graph to go through the origin (i.e. at x=0 and y=0) unless expressly told to do so.
- Examine your graph: are there one or two points which are farther away from the line than the other points? If so, make sure you plotted them correctly.
- Use regression techniques to find the equation for the best fit for your data. **ALWAYS** include the regression equation with the graph itself.
- Linear regression equations should always be accompanied by the **correlation coefficient**, **r**, and not just R^2. To find r from R^2, take the square root of R^2. If the slope is negative, your r value will be negative as well.

An example graph follows: