Writing a Good Lab Report - Organic Chemistry Labs

Lab report is an integral part of a chemistry lab. There are three components of writing a lab report.

1) Lab Summary

This should be typed and ready to submit when you come into the lab. It will be returned to you with your lab report after both are graded.

a) Your Name; Partner's Name
b) Title
c) Date
d) Purpose
e) Theory and Abstract (maximum 200 words)
f) Table of Quantity
g) Reaction (if there is a reaction in the experiment)

2) Flow Chart and Observations

This is to be written in the carbon copy lab notebook. You should have the following in this notebook:

a) The title, date and your name at the top of every page in this notebook.
b) The flow chart. This should be on the left half column of your lab notebook. You may write the experiment as a flow chart or brief key points of the lab. You should NOT copy the entire procedure for your flow chart.
c) Any relevant diagrams that you need for the lab.
d) As the lab proceeds you should write the quantities and changes in the procedure. This has to be done while you are doing the lab. You should write all your observations during the lab here. All this should be written on the right half column of the lab notebook.
e) All your data taken during the lab. This should be done in the appropriate places in the flow chart.
f) Take care that the writing does not bleed through the carbon to the next page.
g) You cannot skip any pages in the lab book. All pages that you have written on during the lab have to be submitted.
h) All lab reports in this notebook MUST be written in pen only (no pencil). The color of the ink should be ONLY blue or black.

You will submit the carbon copy pages of this lab report after you have finished the experiment in the lab, and ***before you leave the lab***. These flow charts will not be returned after grading. These are the property of the chemistry department.

Remember: These flow charts are what you use as your guideline for writing your reports - not the lab text book.

3) Lab Report

This will be the typed report that you submit for grading. It should have the following components in the exact order listed below:

a) Pre-lab Write Up - you would have submitted this to me prior to starting the lab, so you don't have to submit this again; i.e. don't print those pages again.
b) Procedure - you will have to type this from the procedure and data you wrote during the lab. See in the table on page 3 for writing the procedure.

c) Calculations - show the calculations for the actual yield (subtractions of glassware), theoretical and percent yield where the final product has been weighed.
d) Conclusions - this should reflect your purpose of the lab, explain your yield, data and analysis (mpt, IR etc.). There should be no procedure in conclusions unless it is relevant.
e) Attach any spectrum or analysis graph at the end of the report.

Document Typing Guidelines

1) All reports must be written in Times Roman font of size 12.
2) The entire report should be at least in 1.5 or double spacing.
3) The margin all around should be 1 inch.
4) In the header write "Your name" and "Title of the Experiment" in that order. The footer should have the "number of the page".
5) The printing should be in black ink on white paper only. All the pages should be of the same quality and color.
6) I don't need a title page. Your write up can begin from page 1.
7) General formatting - begin a new heading on a new page. But specifically: the entire "table of quantities" and "calculations" should be on one page. You can move the reaction and the table back and forth to save space if you want to.
8) Staple the report only once in the top left corner.
9) Do not submit any blank pages or duplicate pages.

Writing the Product Label and Submitting Product

Any time a lab is done in which a product is isolated, it must be submitted for grading. The product can be submitted in a small vial. Alternatively, it can be submitted in a test tube or flask, if it is a large amount. The product container should be labeled. The label should be have the information given below. Place this label horizontally and just under the top edge of the container, unless it is a test tube.

Tips:

1) Write on the label with majority of the information before you place it on the vial.
2) Place the label closer to the top of the vial rather than middle or low.
3) Weigh the vial with the label and without the lid.

Sapna + partner	Benzoic Acid
Date: 09/29/2010	Mpt. ^{o}C: 120-123
Wt. of Vial: 13.78 g	
Wt. of Sample + Vial: 15.22 g	
Wt. of Sample: 1.44 g	

Your product will be graded on the following:

1) dryness of the product
2) color of the product
3) cleanliness of the product
4) how clean the sample container is
5) data on the product label (weight, melting/boiling point etc.)
6) how you place the label on the vial.

	Description	Points
Lab Summary - Typed and to be Submitted Prior to Starting the Lab (15 pts)		**15**
Title	Title of the experiment (this can be the technique you are doing or the title from the lab book)	1
Date	Date that the lab is done. If lab is done over two weeks then give both dates.	1
Purpose	What is the purpose of the lab? Write this in 1 sentence. This is should be more specific than the Title.	1
Theory and Abstract (should be about 200 words)	Theory: You should also include a few sentences on the theory behind the experiment you are performing. This is very generic for any experiment that is similar to what you are doing. Abstract: This should include specific procedure you are planning to do, which chemicals you are using, how you propose to do it and how you will analyze your product. Details such as quantity and apparatus are not necessary. Points will be taken off if you write detailed procedure.	5
Table of Quantity	Make an actual table of all the chemicals you will be using in lab except water. You should have ALL the substances, including product, used in the lab, their physical property data. The data should be written in the following order. • name of compound • structure and molecular formula of the compound. All ionic compounds and small molecular compounds should be written as is e.g. NaCl, HCl, CH_3OH, CH_2Cl_2, Na_2SO_4; you need to draw the structures of larger organic compounds. • for solutions: you must give the concentration in molarity or % solution. For solutions you don't need to write any other physical information below (mol wt, moles etc.) • molecular weight • amount used in grams or mL • moles (in case of synthesis) • melting point (for solids) and boiling point (for liquid) • density (for liquids) • solubility in water (yes/no) • if a commercial product is used then the brand name should be given. Make sure you have all the units! Check MSDS online to get safety information on chemicals you will use in lab. This website has a number of links you can use. http://www.ilpi.com/msds/	5
Reaction	Write the reaction if you are doing a synthetic procedure. You don't need this part if no synthesis or chemical change is being done. You should draw your reaction using a chemistry software. The best one (and free) that I know of is Chemsketch from ACD labs. You can download it on your computer and save the files. The structures can be imported into Word files. I will show you how to use in the lab. http://www.acdlabs.com/resources/freeware/chemsketch/ You can use any other software if you wish to. Under no circumstances should you cut and paste, scan or photocopy reactions from any source to submit in your lab report. You cannot use hand drawn reactions. All reactions should be drawn by you and not your partner.	2

Lab Report to be Submitted the Week After the Lab (25 pts)		**25 pts**
Procedure	This portion is the bulk of your lab report. Write in detail as to what happened during the lab in your flow chart, all the weights, data, and observations (change in color, precipitations etc), so you can write your lab report well. There is a general tendency to forget what you did in the lab when you go home! You will be graded on the following: • Write in past tense third person, e.g. "2.50 g of benzoic acid was weighed" NOT "I weighed 2.50 g of benzoic acid" or "Weigh 2.50 g of benzoic acid". • Draw a setup if helpful to procedure - don't draw beakers or simple set ups like a hot water bath. • Include all the data in the procedure - not in a separate table. In some cases you will have to make a table. All your measurements/data should have the correct significant figures and units. • Explain "why" for techniques you have performed and observations you have made. • Write and explain any observations - write the colors, energy exchanges (exo or endothermic reactions) etc. • You should include time durations where appropriate/needed. • Write ALL your data (weights, mpts etc) in the procedure. • Check all your general English spellings and technical spellings. • There should be a general order, flow and readability of the report. • You should use the correct vocabulary for your reports. One word of warning: Do not copy the procedure from the lab text book. We make changes in the experiments sometimes. All those changes should be made in your flow chart while you are doing the lab. That is the appropriate way of noting alterations. Points will also be deducted for the improper formatting of the report. Read the "**Document Typing Guidelines**" for help.	15
Calculations	This section should have all the calculations; weight subtractions from the data in your procedure, theoretical yield, percent yields and any other calculations. Make sure you have all the necessary units and significant figures. Use the equation feature of the Word program to write equation. Proper formatting is also essential here.	4
Conclusions	Here you will explain what results you got from your experiment and compare them to what you were expecting. If you got what you were expecting, then great. If not, then explain why you did not get the expected results. In addition, cover all the details given below. Points will be taken off if you repeat the procedure. • What do you think you could have done differently to get better results? • You should explain your % yield. How can you make it better? • Analyze your data here: mpt, bpt and IR results. This is how you know that your product is the product. • Write any physical properties of your product (color, smell etc.)	6
Formatting	I will deduct points if formatting guidelines are not followed	

Flow Chart and Observations/Data (10 pts)		10 pts
Flow Chart/ Lab notebook	This is the handwritten flow chart you will write out prior to coming to lab. During the lab you will write your "actual" data and observations. This is to be written in the carbon copy lab notebook. You should have the following in this notebook: • The title, date and your name at the top of every page in this notebook. • The flow chart: This should be on the left half column of your lab notebook. You may write the experiment as a flow chart or brief key points of the lab. You should NOT copy the entire procedure for your flow chart. • Any relevant diagrams that you need for the lab. • As the lab proceeds you should write the quantities and changes in the procedure. This has to be done while you are doing the lab. You should write all your observations during the lab here. All this should be written on the right half column of the lab notebook. • All your data taken during the lab. This should be done in the appropriate places in the flow chart. • Take care that the writing does not bleed through the carbon to the next page. • You cannot skip any pages in the lab book. All pages that you have written on during the lab have to be submitted. • All lab reports in this notebook MUST be written in pen only (no pencil). The color of the ink should be ONLY blue or black. • Submit the carbon copy from the lab notebook with the flow chart, procedure and data before you leave the lab. • The flow chart will be graded on legibility, proper order of experiment and presence of the data from your experiment.	10