Outline for Laboratory Notebook

You will be required to maintain a laboratory notebook as a record of your personal work and to help you learn to keep a good set of laboratory notes. Your notebook must include the following features:

1. **It must either be computer generated or hand-written and in a hardbound scientific laboratory notebook, NOT a spiral notebook.** (some official laboratory notebooks have each page is numbered and a carbon copy).
2. **Table of Contents.** Each listing should be consecutive in the order that you performed the lab and should contain the date, experiment number, experiment title, and page number(s) that you can find your recorded data on.
3. **Permanent ink will be used at all times.**
4. **Your name should be boldly displayed on the cover.**

Pre-Lab

- Your pre-lab includes completing the first two sections of your lab notebook (introduction, chemical data table, & procedure) **before** you do the lab.
- I will initial your lab notebook toward the beginning of each new experiment, whether or not a pre-lab has been done or completed.

I. Introduction

1. **Listed at the top of the page: Name; Experiment Title.** (include at the top of every page)
2. **Summary of Experiment with a Procedural Reference.** This should be at the top of the first page of each experiment done, and includes:
   a) ***One or two* statements describing the overall objective of the experiment.** If you take this directly from the lab manual, put your statement in quotes followed by the reference in parentheses. These statements should answer, "Why are you doing the experiment and what do you hope to learn?"
   b) **Theory (background information) with reaction equations and/or diagrams of special equipment.** For reactions, you'll need to name each chemical involved and possibly show the conditions; for diagrams, you'll need to name & clearly label the equipment depicted.

II. Chemical Data Table (10 Points)

This should be set as a table and should be titled as follows (look up this information from the MSDS sheet):

a) Chemical Name / Formula. You should have data for ALL chemicals used in the experiment.
b) Boiling Point (BP) / Melting Point (MP) (if available).
c) Density

d) Molecular Weight
e) Flammability—either indicate the NFPA code rating, or at least whether or not the substance is flammable.
f) Toxicity—if the LD_{50} is available, list it.
g) **Comments**—noteworthy properties such as color, odor, etc.
h) Lot or batch number from bottle

For EVERY value in your data table, you must include the units
List the units at the top of each column. Include the reference that shows clearly where you obtained the data.

Example

Chemical Name / Formula	MW (g/mol)	BP (°C)	MP (°C)	Density (g/mL)	Flammability	Toxicity	Comments
Benzoin	212.30	344	135	N/A	NFPA = 1	Slight	Camphor Odor
Nitric Acid / HNO_3	63.00	122	-42	1.41	NFPA = 0	Oxidizer	Corrosive
Ethanol, 95% / CH_3CH_2OH	46.00	78	-114	0.79	NFPA = 4	Slight	Wine Smell
Benzil	210.23	346	95	1.23	NFPA = 0	Irritant	Yellow Crystal

Abbreviations: MW = Molecular Weight
BP = Boiling Point
MP = Melting Point

References: http://www.jtbaker.com/msds/
http://hazard.com/msds
http://www.chemicaland21.com

References and Key Points

- Whenever you obtain reference data, you must cite the source. The citation should include the title, author, year, and page number(s) of the reference. Put the citation immediately after the referenced data.

III. Procedure & Observations

Procedure—List in a column on the **left side of each page.** *Make sure you include all changes/omissions to the written procedure.*

Observations—List on the **right side of each procedure page**, aligned with the step in the procedure that the data is pertaining to.

Ex:

Procedure	**Observations**
Determined mass of cyclohexane	3.584g
↓	
Added 3mL water	Two Layers Formed

↓
Extracted bottom layer

1. This section should be an accurate record of what you observed. Record all of your observations. **You never can have too many observations!**
2. Provide enough detail that another student could repeat your work, using the lab manual and your notes as guides.
3. These entries must be made at the time they're taken or observed, especially measurements such as masses, volumes, temperatures, yields, etc.
4. Keep track of your samples by giving them a code in your notebook.

IV. Results and Discussion

This section should address most of the following (if applicable to the experiment):

1. How do my results relate to the objective of this experiment? Was the objective accomplished?
2. Are there any conclusions I can draw from the ease or difficulty of the various steps performed?
3. What went wrong in this experiment and why did it go wrong?
4. How would my mistakes affect the results of the experiment?
5. How can I explain some of the strange results obtained in this experiment?
6. What changes would I make in the experimental procedure to improve it?
7. What advice would I give to future students performing this experiment?
8. Was the desired product obtained?
9. REPORT and DISCUSS significant readings and observations. For example, if you were asked to determine the melting point, report what you observed, report the literature value (with a reference to where you obtained that literature value), and discuss similarities or differences between the two.

e.g. My observed melting point: 77-79 ºC; literature melting point: 80-82 ºC (Aldrich Handbook of Fine Chemicals, 2000-2001, p. 536).

All measurements (masses, volumes) should be reported. You are encouraged to put this information into a data table.

Theoretical yield / percent recovery calculations should be shown in this section as well.

ALWAYS list chemicals used in the experiment that served a significant purpose, and indicate what their purpose was.

V. What to Turn In You are allowed to computer-generate your reports, but they must be taped or stapled into the lab notebook, with initials written over the tape.

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