The Laboratory Notebook

The laboratory notebook is an important part of science. Although we will not be keeping a research style notebook, your notebook will serve a similar role. It is where you will plan your experiments and record your observations and results. Everything should be recorded in detail so that a clear record of your experiment exists for future reference. Your notebook should have pages that are permanently bound to the notebook, like a composition notebook. Spiral bond notebooks are not appropriate, and you should always write in pen. Corrections are made by sticking out an incorrect entry with a single line. Obliterating and error by scribbling it out is inappropriate.

Our notebooks will start with a table of contents, so leave the first three pages blank. In order for a table of contents to be useful, the pages of your notebook need to be numbered. If you purchase a notebook with numbered pages fine; however, if you purchase a "composition" notebook, which is recommended) you will have to number the pages. Each experiment will be entered into the table of contents and each notebook entry for an experiment will have five sections: Reaction, Materials, Plan, Observations, and Calculations. I have included sample pages from a notebook to help describe each section. These samples are not presented as a model for a perfect notebook; in fact, it could be a better notebook. The first three sections must be completed before coming to lab (Reaction, Materials, Plan), observations will be recorded while doing the experiment, and calculations will be recorded as necessary.

Reaction Section

The first entry in your notebook is the reaction. If you are performing a purification or isolation instead of a reaction, simply write what you will be doing (See fig. 1). Of course, if you are performing a reaction, write the reaction. Use structures in your balanced equations (See Fig. 2).

Fig 1. A Sample Reaction for a Lab without a Reaction

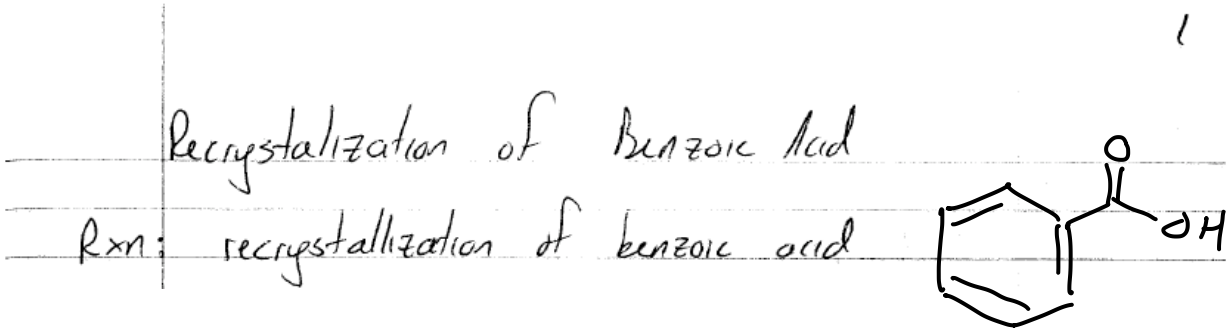
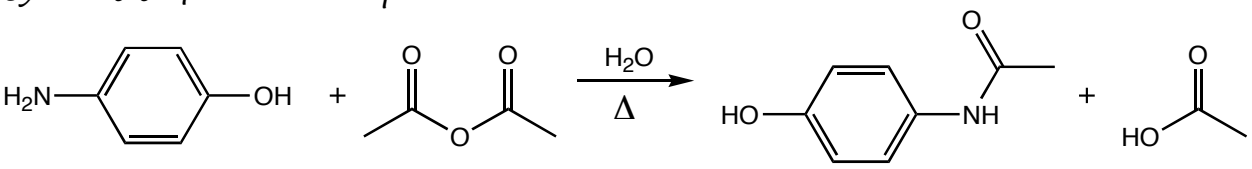


Fig 2. A Sample Balanced Equation for the Synthesis of Acetaminophen

Synthesis of acetaminophen



Materials Section

Fig 3. The Chemicals Table for a Benzoic Acid Recrystallization lab

Materials:	benzoic acid	121-123	249	no d irritan
	water	0° C	100°C	1.0

The second section of your notebook is the materials section. All chemicals and equipment are listed in the materials section. In the chemicals table, the name of the chemical, the molar mass of the chemical (if it is a reagent or product), the melting point, the boiling point, the density, and any notable hazards must be listed. Boiling points of solids are not necessary. Melting points of ionic solids can also be omitted.
In the equipment list, list everything else that you will need. Don't forget to list the sizes of the items that you need. For example, the equipment list in Fig 4. doesn't specify the size of the Erlenmeyer flasks.

Fig 4. The Equipment List

equipment: ~~two~~ three erlenmyer flasks 1 for soln,
1 for hot water 1 for cold water
vacuum flask
Hirsch filter
filter paper
spatula
rubber police man
pasteur pipets (disposable)

Plan Section

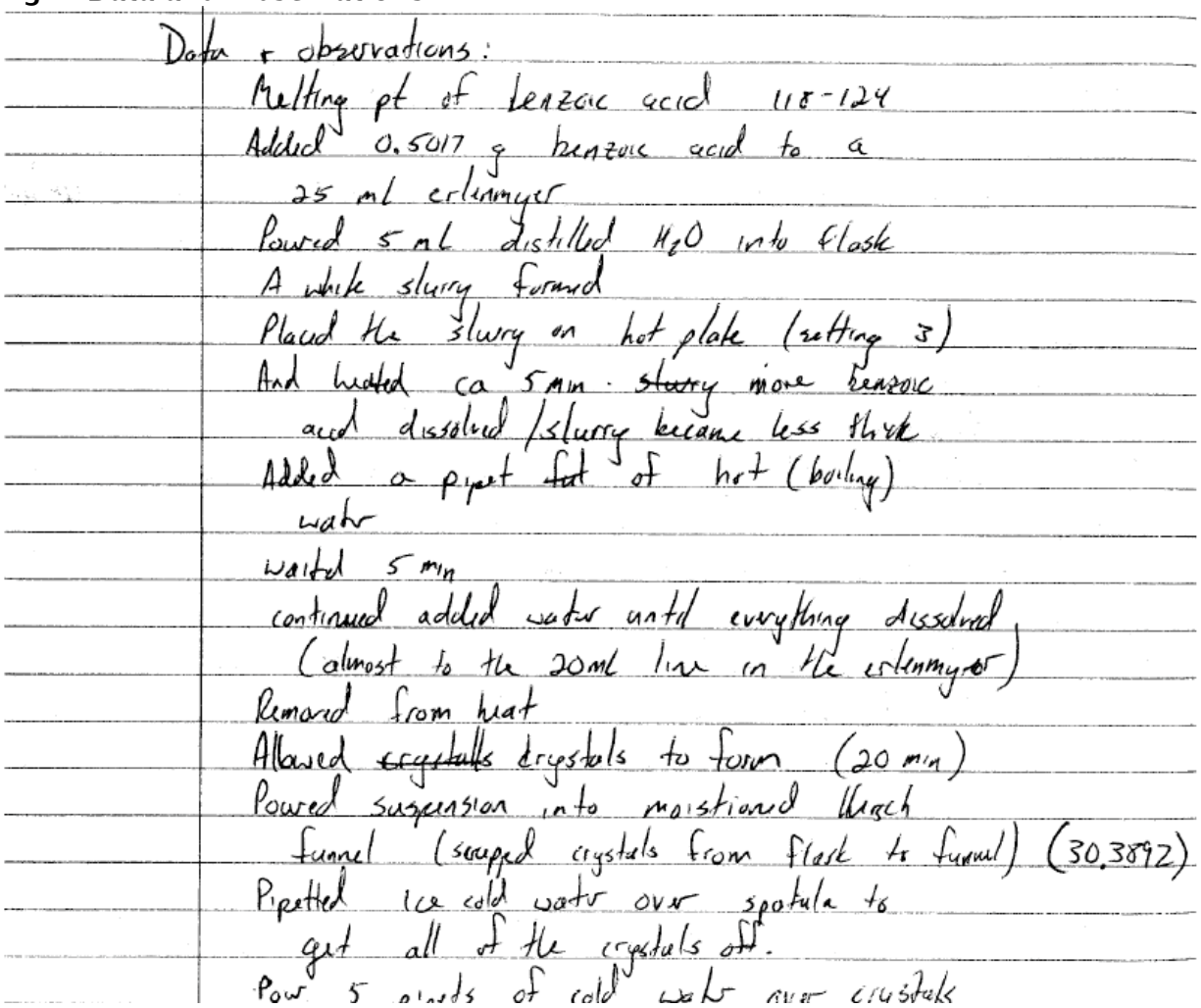
In the third section, you will explain what each step of the procedure is supposed to accomplish. For example, during the benzoic acid lab you are asked to cover your solution with a beaker and allow it to cool slowly. The explanation of this step isn't "we cover it so the flask will cool. The explanation is, "We cover it to slow down the cooling so the solubility of the benzoic acid decreases slowly. Since the solubility decreases, the benzoic acid will

come out of solution. Since the crystals have more time to grow they should be bigger and more pure."

Data and Observations

While in the lab, you will make observations and record data. The observation that you make should include enough information so that they are unambiguous. Simply writing "It was white" is not a particularly good observation. What was white? A portion of an observation section is included in Fig 6.

Fig 6. Data and Observations


Data + observations:
Melting pt of benzoic acid 118-124
Added 0.5017 g benzoic acid to a 25 mL erlenmyer
Poured 5 mL distilled H_2O into flask
A white slurry formed
Placed the slurry on hot plate (setting 3)
And heated ca 5 min. ~~slurry~~ more benzoic acid dissolved / slurry became less thick
Added a pipet ~~fut~~ of hot (boiling) water
waited 5 min
continued added water until everything dissolved (almost to the 20mL line in the erlenmyer)
Removed from heat
Allowed ~~crystals~~ crystals to form (20 min)
Poured suspension into moistioned Hirsch funnel (scraped crystals from flask to funnel) (30.3892)
Pipetted ice cold water over spatula to get all of the crystals off.
Pour 5 mLs of cold water over crystals

Calculation Section

The calculation section is where you will calculate yields and recovery percentages. You will also record any calculations that you made if you needed to adjust any amounts during the experiment. For example, if you added a little too much of one reagent, you would have to calculate the new amount of the other reagents. Those calculations would go in your calculation section.