**Maintaining a lab notebook**

**What is a lab notebook?**

A lab notebook is a written catalog of all the experimental procedures, protocols, recipes, data, results and interpretation of the data/results. Maintaining a proper lab notebook is an important skill to learn in science.

Lab notebooks…

* are a way for you to organize your thoughts/approaches and create a game plan before performing an experiment.
* have all the protocols and experimental steps that you will refer to during an experiment (your game plan).
* must be updated **as you go**. Do not expect to do an experiment one day and remember what happened the next morning or the next week so you can fill in the results.
* are used for recording variables that may influence your results such as DNA concentrations after a DNA extraction, the cell density before starting an experiment, incubation times, etc.
* are a place to record if errors happen or things deviate from your protocol (example, the centrifuge stopped short and you had to repeat your centrifuge spin).
* are a record of your work and one way for you to remember the work you did while in the lab.
* provide a how-to guide for recreating your experiments.
* include additional data readouts such as pictures of plates, gels, western blots, etc.

Lab notebooks are **NOT**…

* yours to keep. They are the property of Niagara University.
* to be taken home. They stay in the lab **at all times**.
* a journal for your personal thoughts, experiences, or a communication notebook for interactions with other lab members.

Preferred lab notebook format is a 3-ring binder with the entries written on data pad paper. Entries are written in **blue or black ink**. Do not use pencil. External data readouts are neatly taped onto the data sheets with scotch tape, without covering up any of the writing/information on the page. An additional electronic backup of any electronic data, papers, protocols etc. in the form of a flash drive.

**Parts of a lab notebook**

* Table of contents (to be completed **after** you finish your research in the lab)
* Catalog of all strains made in the lab, include correct naming and nomenclature for labelling strains.
* Catalog of all primers ordered while in the lab and a reference to what project they relate to.
* Commonly used protocols/recipes
* Experimental entries
* Supplemental materials (primer information sheets, copies of important purchase paperwork, your grant proposal, any reports, any manuscripts you have written, etc.)
* A summary statement (to be completed **after** you finish your research in the lab) detailing your research experience and findings.
* Flash drive that serves as an electronic back up of your data.

**Table of contents**- serves as a brief informational page and an overall guide to the work that you did while in the lab. Data can be grouped according to projects or chronologically. Important things to note in the table of contents are dates when important experiments are performed.

**For each experimental entry include-**

* The date (including the year!)
* A brief statement of the goal if this is a new experiment (and not a repeat). If it is a repeat experiment a statement of what will be changed compared to the last experiment, and the date of the last experiment.
* References- If you are using an already established protocol, procedure or kit, include the name/page#/where to find that information.
* If this is a new experiment/protocol, include detailed step-by-step instructions.
* Results, include any compounding variables, problems or places where you deviated from the protocol.
* Conclusions and future directions

**Final thoughts**- Why is Dr. Glazier so picky about lab notebooks? Well, I’ve seen what happens when people keep messy lab notebooks. I’ve had to go back 3 years after doing an experiment and tried to piece together what I had done using my lab notebook, which didn’t have enough detail or organization.

I once spent 4 days trying to find a strain that should have been called “Cryptococcus neoformans pkh2Δ::PKH2” made by a former lab member, her notebook was a pile of unorganized papers, half of which without dates, and the strains she made were in the -80 freezer labeled “pkh2-1062” and “PKH2-02”. Those labels could refer to either E. coli plasmid strains, or Cryptococcus neoformans strains, to knockout constructs or complementation constructs, or they could have been failed attempts at making the strains and completely useless. It sucked.