



Your laboratory notebook

by Howard Judelson



Every person in the lab must keep a clear and detailed laboratory notebook. The notebook provides an accurate record of what you have done and is the basis for reports and publications. Just like a seminar, your notebook is an important vehicle to document and communicate your results.

Why is a good notebook essential?

There are dozens of reasons for keeping a good notebook, including:

- It helps you do your work. Do not underestimate how rapidly you forget experimental details!
- After you leave the lab, details in your notebook may be required for publications. An easy-to-read and well-documented notebook will make it possible for me to finish up a publication after you are gone. Otherwise no publication!
- If you have a bright idea or exciting finding, it might get patented. Your lab notebook will be needed to document the date and nature of the discovery. You might get rich but only if you have a good notebook.

Who owns the notebook, and how should it be kept safely?

- The lab notebook belongs to the lab. When you leave, you may take a copy of the notebook, but the original notebook and associated data must stay in the lab.
- Permanent ink should be used, which is light stable and not liable to smear.
- Use good-quality paper: your results should last a lifetime.
- Your name should be on the notebook. What happens if it gets misplaced?
- Notebooks should never leave the lab. If it gets stolen at the supermarket, what happens to your results?

How should I fill out the notebook?

- The lab notebook should be detailed enough to be understood by someone else.
- Start every entry with a title ("Constructing transformation plasmid for silencing gene X", "Making RNA to study expression of gene X during starvation," etc.).
- Date every entry. Numbering pages is also good.
- Experiments are best recorded in chronological order, rather than by experiment.
- Describe experiments clearly. Avoid using special abbreviations that are known only to you. Record all significant observations.
- Always include the raw data, not data after it has been manipulated.
- Do not trust to memory small details of your experiments: write them in the notebook.

- Writing summaries of results is highly encouraged. This will help any reader put together the big picture. Even a few words, like "plasmid 44 is the proper clone" are helpful.
- A *Table of Contents* is essential and should be completed, at the latest, when each volume is filled.
- If you make a mistake, put *one* line through the mistake. The mistake should still be legible.
- Later data should be back referenced to the original ("using the plasmid from Jan 4, 2003, . . .").
- Write on both sides of the page (saves storage space).

What materials should be in the notebook?

- All protocols and results should be kept in a notebook -- not in folders or piles on your desk.
- Photographs, phosphorimager printouts, excel spreadsheets of data, etc. must be placed in the notebook.
- When a gel image, phosphorimager image, blot, etc. is placed in the notebook, these must be properly labelled (what was the probe? what are the lanes? what is the membrane #?, etc.). An unlabelled blot, for example, is uninterpretable and unpublishable.
- Lab notes must NEVER be taken on scraps of paper. But if you ever do write something down on a scrap, staple it into your notebook.
- It is OK to use a separate notebook (like a spiral bound notebook or steno pad) to record calculations, to help plan experiments, record initial observations, etc. But the details of all experiments must be transferred to your formal lab book. If you use something like a spiral bound notebook, this must be kept and stored just like your regular notebook.

Finally:

- The data in your notebook must have high integrity. It must not be adulterated or "massaged" in any way. In other words: Don't write down what you think I want to see—or what you want to see. Put down what you did and what you got.
- If an experiment is not documented in your lab notebook, then for practical purposes it never took place.

Science does not take place on the pages of textbooks or learned journals, but it is simply recorded there. Your notebook is the foundation of science.