

Lab Notes

How to keep a lab notebook

Instructions to students prepared by Prof. Reinhard Jahn

Important

Your lab notes must be both legible and intelligible to someone else. They are important work records and belong to the laboratory you are working in, i.e. they are **not your private property** and will remain in the laboratory when you leave it. They must be written in such a way that everyone with some lab experience can repeat the experiment. Despite an often casual - sometimes even “playful” - attitude, scientific research is a serious professional activity that costs a lot of public money. Detailed and professional record keeping is mandatory. All records must be stored by the laboratory for 10 years.

Most institutional rules require that you use a book and not loose sheets of paper! Some institutions are moving towards electronic record keeping, and in this case special regulations apply.

Rules

- Your notebook is the primary record of all experiments. It should contain consecutively numbered pages. Every entry must be dated. Use permanent ink (no pencils). Do not remove pages. Be sure your name and location is written in the book.
- Every lab notebook should contain a table of contents at the beginning indicating date, page number and title of your experiments.
- Every record (gels, printouts, autoradiograms, photos etc.) must be taped into your book. If kept in a separate file, every single item (even repetitive exposures of the same gel) must be dated, must contain reference to notebook page (and vice versa), and must be properly labeled. The same applies if the records are kept in an electronic format (see below). Label, label, label everything! For instance, gels where you do not know anymore what is on which lane are worthless and a waste of time and money. Also, notes put on scrap paper during an experiment should be transferred into the notebook. While you are still a beginner, also record the details for making reagents.
- Every single experiment should have a short header section stating the aim of the experiment in a few sentences and, at the end a conclusion (did or did not work, what to change next time, what result you got, and how to evaluate it).
- The methods must be crystal clear and reproducible. You can refer to previous pages, but even small changes in the proceedings must be recorded. Whenever you use a method for the first time, your notebook must contain a full description of all details. If the method is obtained from a method file, from somebody else's notebook or from a company leaflet, xerox it and tape it into your book.
- Every experiment must be recorded. This also applies to experiments that did not work.
- Don't use personally defined abbreviations or acronyms unless they are clearly defined in the book on the front or back cover.
- If experiments are utilized for a paper, make sure you note in your notebook which experiments are used for which publication. It is essential that all published data can eventually be traced back to your lab notes!

Storage of electronic data

An increasing percentage of original scientific data is generated electronically. Usually, a printout of the data should be filed with your lab notes, with the original data file being archived. In some instances, the amount of the original data is very large, making it impractical to generate hardcopies, and data reduction and processing is an integral part of the experiment. All electronic data files must be stored with the same care that applies to your written notes. While there are still differences between laboratories and institutions, some general rules apply:

- While you work with the data, you must ensure that regular backups are being made, either by regularly creating backups on peripheral storage media (CDs, DVDs etc.), or by storing them on a fileserver that is professionally managed (e.g. by the GWDG).
- When you leave the lab, all data must be archived, either on CDs/DVDs, or (preferably) on an archive server such as that offered by the GWDG. As with paper notebooks, electronic data need to be archived for 10 years. Keep in mind that CDs and DVDs are generally not considered being safe for such long-term storage. Archiving should be carried out in cooperation with your lab/supervisor, and access to the data must be ensured.
- Make sure that your data are accessible and retrievable by providing appropriate indexing and dating, and by ensuring that others (e.g. supervisor) have access. As discussed above, your lab records are the “master file”, and each electronic data set needs to be referred to in the lab records with the appropriate filename and date.
- As with every other scientific method, data processing and the software used for processing needs to be documented. All original, unprocessed data files must be kept.

Remember:

An experiment that is not properly recorded is worthless!

Your lab notes are the essence of your work: be as careful in keeping your records as you are in performing your experiments. They are also legal documents that are subject to scrutiny and investigation if questions arise concerning any aspects of your work.