

A Focus on Scientific Record Keeping

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Proper	r Record Keeping Yields
Authenticity:	research records that are original, accurate and trustworthy
Accountability:	fulfills an explicit or implicit obligation to keep appropriate records for sponsored research
Practical Applications:	records allow you and others to reproduce and build on results

Proper Record Keeping

A properly kept data book is a teaching tool that may be used to demonstrate the process of analysis of results, hypothesis construction, and trouble shooting experiments to solve problems or corrects errors

Scientific records are critical to assigning credit, establishing priority, and, acquiring and defending intellectual property protection (e.g., patent protection) **Record Keeping and Scientific Misconduct**

Some have argued that proper record keeping reduces the risk of scientific misconduct.

Investigation and prosecution of scientific misconduct allegations puts a burden on the resources of the scientific infrastructure. This burden is increased by incomplete or shoddy records.

Defending against research misconduct allegations is more difficult without good research records.

Keeping Useful Scientific Records

Useful databooks explain:

Why you did it

How you did it

Where materials are

What happened (and what didn't happen)

Your interpretation

What's next

Good databooks:

Are legible

Are well organized

Allow repetition of your experiments

Are the ultimate record of your scientific contributions

What do scientists recognize as data?

Quantitative data: graphs, recorded numbers, instrument output of any type, including photographic materials from which measurements can be made

Qualitative data: notes of any type (in any form), some types of instrument output, including photographic media

Original samples in unanalyzed form; e.g., biological specimens

Research tools: protocols in any form; computer software



Preferred choice: bound notebook with consecutively numbered pages; sewn binding, with high quality, acid-free paper.

Write with a black ink; standard grade ball point pen is acceptable; do not use pencil or any pen with water soluble ink

Data may be recorded using a computer, but printouts of such material should be affixed to databook pages.





Corroboration: Know when to have your data entries witnessed and dated by an impartial party who understands the work. For applied research, records must demonstrate that the work was diligently pursued from conception to practice; there must be no evidence of abandonment in the research record Handling of data books: Keep books in safe place to prevent damage and destruction Keep books secure to prevent their theft

Writing the Laboratory Notebook

Write legibly and in the first person with an eye towards sharing your notebook with your mentor and your colleagues.

Be organized: reserve opening pages for a Table of Contents; cross reference experiments wherever needed

Writing the Laboratory Notebook

Plan the use of your data book in the experiment

-its placement and access is critical to your successful data recording

-plan the time you will need for recording data and writing interpretations

-write everything directly in the databook

-never record data on the "first available piece of paper" and then transcript to the data book

Writing the Laboratory Notebook

Every experiment should have a

-title, and all entry records should be dated
-list of other investigators who are involved besides yourself
-statement of purpose, a hypothesis, or a goal(s)
-careful compilation of materials and equipment used including specific information about these resources (lot numbers, suppliers, equipment model/serial numbers

Record everything in detail: conception, process, data, interpretation, plans

Writing the Laboratory Notebook

Explain abbreviations and special terms

Record relevant discussions with mentor and lab colleagues (e.g., lab meetings)

Entries in the data book should be "stand alone" in terms of style: use headers, legends and annotations wherever needed

Never obliterate any entry in the data book. Cross out so that the information is still readable, annotate your reason, then date and initial the transaction.

Never remove a page from the data book

Writing the Laboratory Notebook

Mark through unused portions of pages with an X

Attached primary data in the data book (printouts, negatives, photos, etc.)

Data that cannot be practically affixed in the data book should be keyed, stored in a permanent, safe, and secure location in the lab suite; it should referenced accordingly in the data book

If appropriate maintain a methodology notebook; typically done at the lab group level than on an individual basis.

Laboratories should have a notebook tracking system

Ownership of Data and Data Books

Universities own data and data books based on interpretation of federal agency policy (e.g., NIH) and prevailing practice in higher education

Copies of data books may be made for practical reasons like back-up, using data to prepare reports and papers off-site, but only with the permission of the principal investigator or lab chief.

When you leave the lab for your next position, the lab books stay

Federal agencies typically require research records be kept for three years from the date of the filing of the final expenditure report. State law usually prevails of federal law, so if the state requirement for retention is more than 3 years that time would have to be honored (e.g., 5 years in Virginia).



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Will Tanana, a predoctoral trainee in biology spends about a third of his research time in the field collecting data. While doing his field work, he uses a digital camera to make images, a digital voice recorder to rapidly record observations, as well as a spiral-bound field notebook to make general notes on his data collection. Upon return from the field he organizes the data from all three of these sources into a bound notebook, which he considers his definitive research data book. He prints relevant images and attaches them to the data book pages. He also makes verbatim transcriptions and detailed notes into the bound note book using this digital voice files and the notes made in his field notebook. Will tells you that he knows his bound data book is the property of his institution, and it must stay with his dissertation mentor when he leaves. He plans to ask his mentor's permission to make a photocopy of it for his use after he graduates. However, he plans to maintain custody of all of his digital images, recordings, and field notebooks when he leaves. He says this will provide an additional backup of the data, and because of their personalized nature, they are meaningful only to him anyway. He asks you to comment on his plans. What do you tell him?

