

Pen, Paper and Lab Book: Understanding Research Success

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How do you do 40 years of work in 1 hour?

Spot the losers

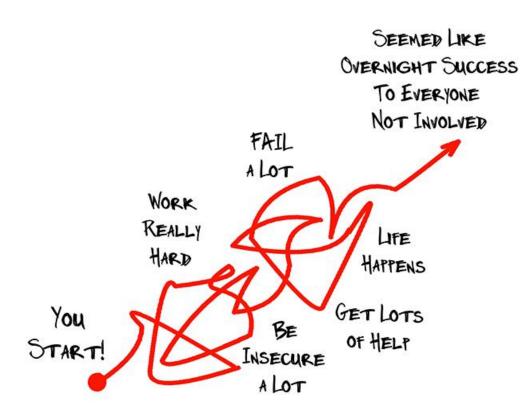


Spot the losers





WHAT PEOPLE THINK IT LOOKS LIKE ...



WHAT IT REALLY LOOKS LIKE ...

Systems vs Goals

A goal is something you achieve once.

A system is something you achieve every single day.



Goals

- Limited
- Tunnel-vision
- Stressful
- Fragile
- Everyday failure

Systems

- Open-ended
- Expansive
- Energising
- Anti-fragile
- Everyday success

Gassman and Meyers letters

Gassman and Meyers were American chemists who gave the following guidelines to their students:

- 60 hour work week
- 10 hours of reading journals

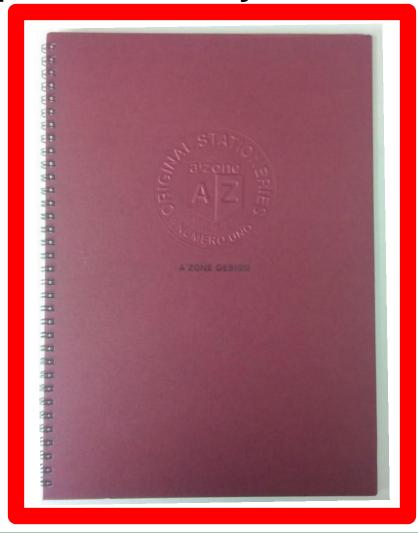
Efficient is much less important than effective

The full Gassman and Meyers letters can be found here.



The most important tool any scientist will ever

have:



Reasons to keep a lab book?

Some ideas:

- Complete record of procedures, reagents, data and thoughts to pass on to other researchers
- Explanation of why experiments were initiated, how they were performed, and the results
- Legal documents to prove patents and defend your data against accusations of fraud
- Scientific legacy in the lab

(US National Institute of Health)



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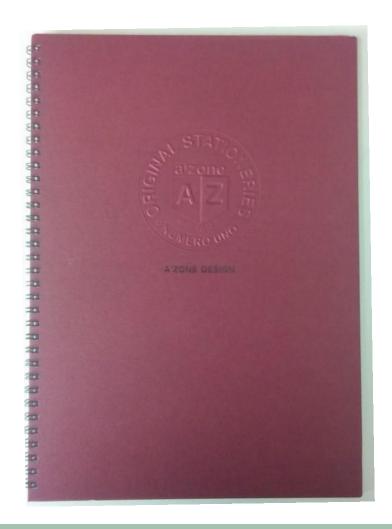
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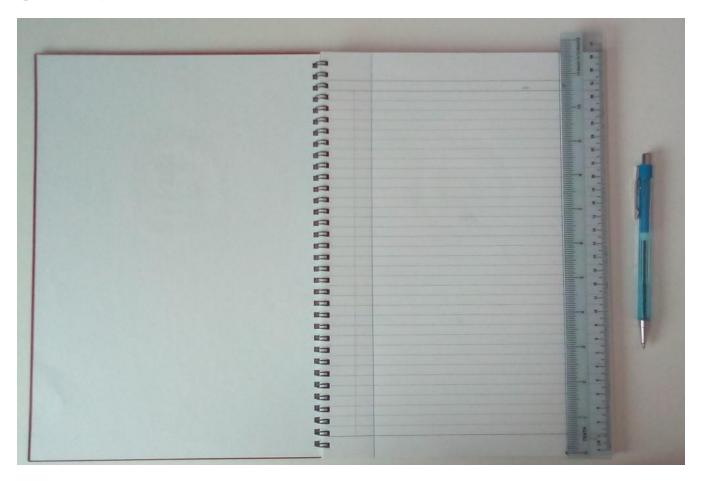


Reasons to keep a lab book?

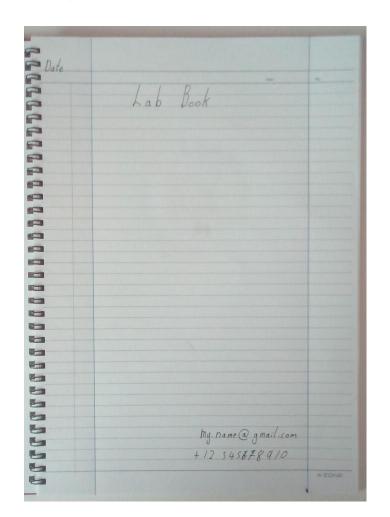
To help you,

right now

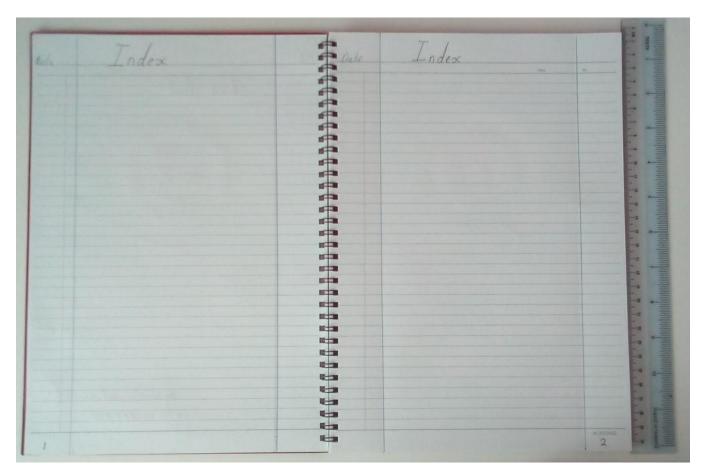




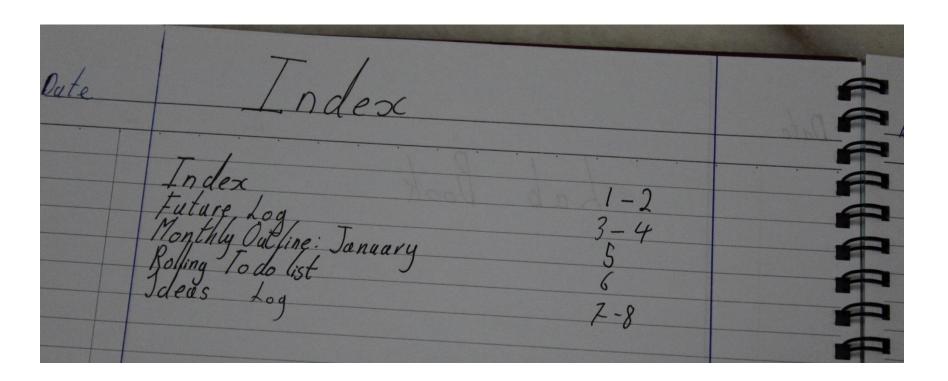
Rule margins on the left and right of the page

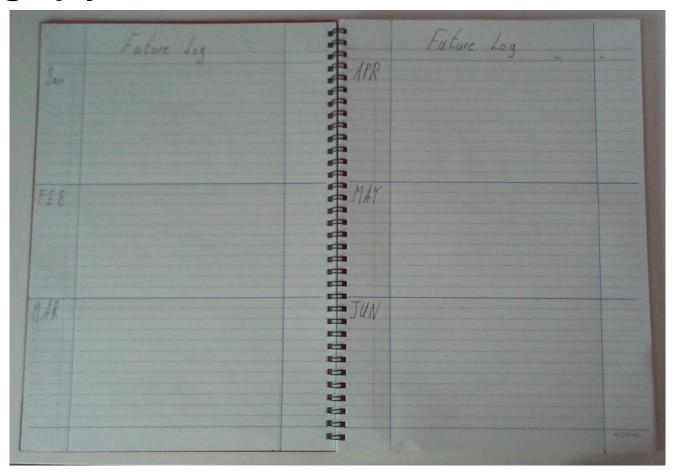


Add a title and date

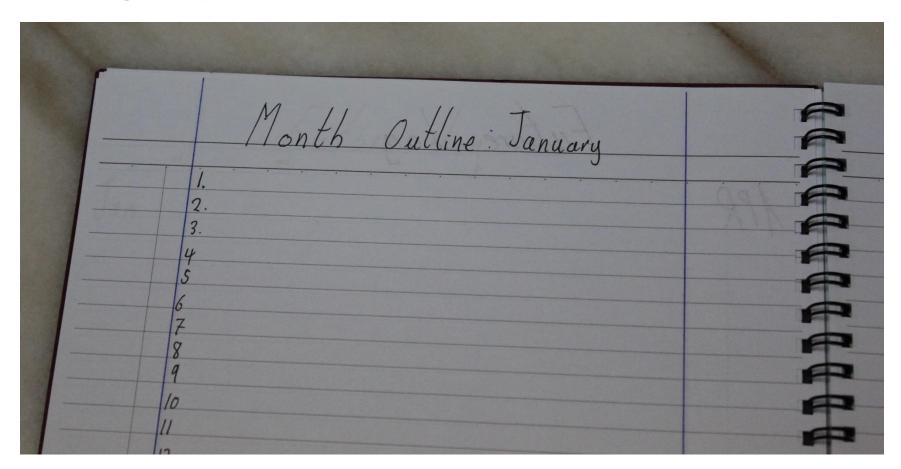


Include an index at the beginning to keep track of your work





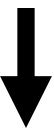
Future log: for planning ahead



Month outline: for planning your main tasks and processes each month

The rolling to-do list – the last to-do list you'll ever need

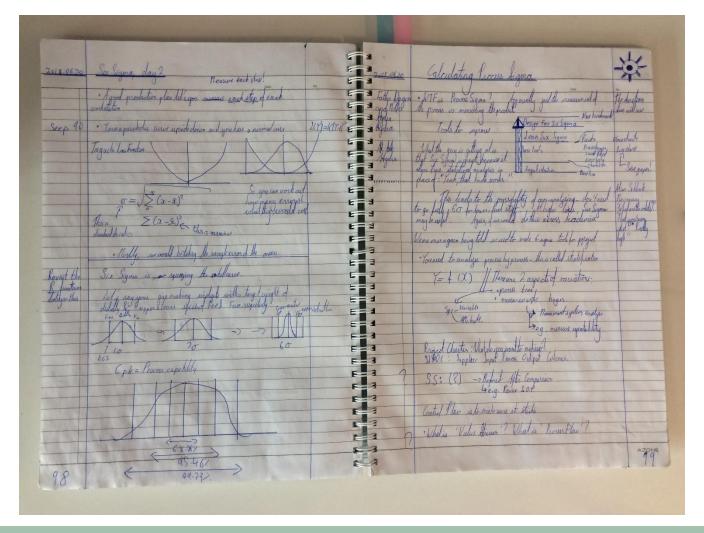
Read paper > Make notes on paper protocol > Write up protocol > Get prof. to proof read protocol



Get prof. to proof read protocol

Check off tasks as you complete them. Any unfinished tasks can go onto your next list.

Keep your literature notes in your lab book



Experimental Record example

During Observations Date experiments Title Before each Purpose and every Speculations After experiment Reagents experiments / Future Directions 5. Steps

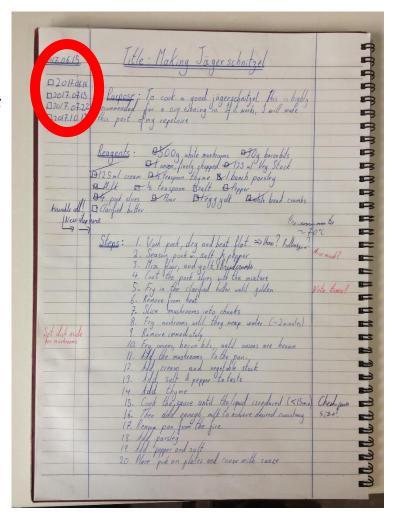
Proofread your experimental protocol

	TII MI T 117	
2017.06.15	Title: Making Jägerschnitzel	
D2017.06.16		-
D2017.07.15	Purpose; To cook a good jagerschnitzel. This is highle	
D2017.07.22	lupose: To cook a good jägerschnitzel. This is highli commended for a any waring in It works, I will make this part any repetaire	
02017.10.1S	this part of my repetoire	
	Reagents: \$500g white mustrogms \$30g bocombils	
	DIO Sml cream Distraspoon thyme By bunch parsley	
	Hilk I 2 leaspoon Balt Depper	
terentle all!	Dif port slices De Mour Dieggyalt Danie bread crumbs	
New step	wel Re-em	ren over to
	Cl (a) 1 1 1 1 1 1 1 2 2	
	Steps: 1. Vash park, dry and beat flat. > How? In Stepser	How = 12
	2. Season pork in salt & paper 3. Mix Hay, and yolk I prederants	- much !
	3. Mix flow, and gold liberations 4. Load the pork ships with the mixture	w/ / / /
	5. Fry in the clarified butter until golden 6. Remove from heat	Note time!
	7. Slice mushrooms into chunks	
84111	8. Fry mushrooms until they weap water (~2 minutes)	
Set dish aside for mushrooms	9. Kemove immediately 10. Egy pongos, bacon bils, aglil onions are brown	
	11. Add the mushrooms to the pun.	
	12. Add, cream and vegetable stock	
	14 had thome	
	15. Cook the space until the liquid is reduced (<15m.	Chedjun
	16. Then ddd grough mift to achieve desired construy	572e.
	18. Add parsley 18. Add parsley 19. Its appearant saft	
	19 Add pepper and suft	
	20 Mare gok on plates and cover with sauce	

Read through your entire experiment beforehand to ensure you have everything you need and are familiar with the process. Make notes as necessary.

Review, review!

Keep a note of your review dates



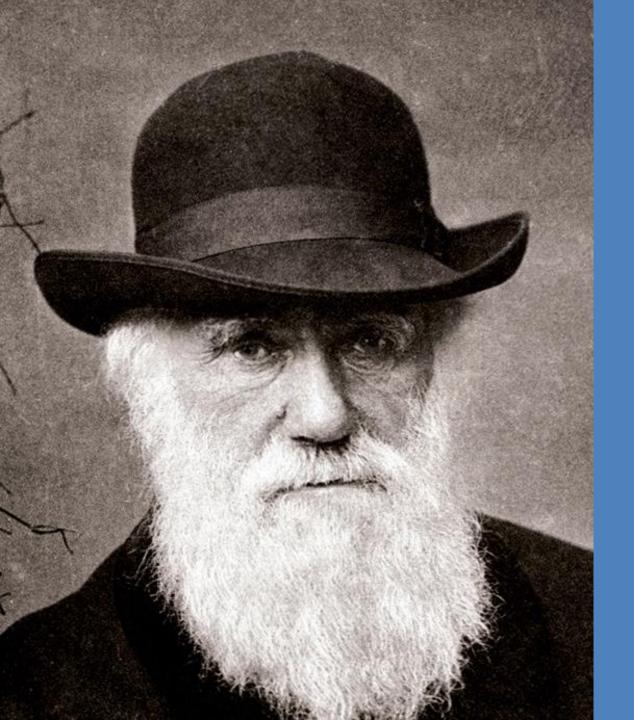
Go back over the sections you've done already. This will help you to cement what you've learned, which you can easily draw on when writing your paper.

Improved Gassman and Meyers process

- 60 hour work week
- 10 hours of reading journals
- Keep a first rate lab book



Where you can get help from... anywhere!



"If any man wants to gain a good opinion of his fellow men, he ought to do what I am doing: pester him with letters."

- Charles Darwin

Getting the most from your help

- Lead with a detailed email
- Pay attention during the meeting
 - a) Mirror
 - b) Encourage
 - c) Summarise and ask
- Summarise and follow up

How do you do 40 years of work in 1 hour?

BIOCHEMICAL SOCIETY TRANSACTIONS



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ENZYME MECHANISMS: FAST REACTION AND COMPUTATIONAL APPROACHES

An end to 40 years of mistakes in DNA-protein association kinetics?

Stephen E. Halford
Biochemical Society Transactions
Apr 01, 2009,
37
(2)
343-348;
DOI: 10.1042/BST0370343

This researcher discovered a mistake in a paper published 40 years ago.

If it takes 1 hour for you to find and prevent a mistake...

It'll take 1 month for you to correct after making it...

And 1 year if your boss finds it....

And 10+ years if the scientific community finds it.

Effective beats Efficient

Finally, from the what to the how...





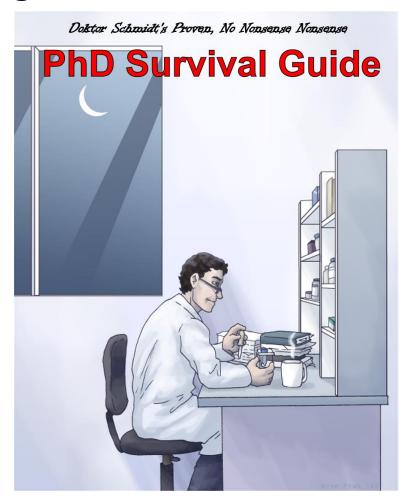
Finally, from the what to the how...

Make bets

(If you know you have trouble sticking to systems, give some money to friend to hold on to. You can only get it back if you follow your system for a certain length of time.)

- Form a workgroup
- Start small
- Get your PI to check your lab book daily

Further reading...



www.nobsphd.com



Acknowledgement:

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