What is your « *Lab Book* »?

- **Story of your life** ..... In the lab!
  - ☞ Of your daily life at the bench
  - ☞ Of your scientific thoughts
  - ☞ Of your daily work
  - ☞ Work progress (e.g. time line, ….)
  - ☞ Of your PI/Supervisor's remarks/Suggestion/Comments
  - ☞ Maybe also some things you have read, ideas you had
- Its your lab "*autoLABOgraphy*"

What should your Lab Book really tell?

- ➢ Your lab *autolabography* is about your "*lab life story*":"
  - ☞ You are the author so you think it should look "good" ????
- ➢ But it is not a novel .... Not meant to be a best seller …
  - ☞ IT IS A LOG BOOK ➔ It must tell
    - ↳ The GOOD
    - ↳ The BAD
    - ↳ The UGLY

The Bottom Line?

Its the *Bad* & the *Ugly*

That are going to make you do the

Good science

So what is your Lab Book's purpose?

- Follow up of experiments => Experimental Flow => Research Finality
- Traceability of Experiment and Sample
- Results & Interpretations
- Scientific Integrity
- Proof of experiments and results and dates
- Contribute to the labs group research advancement - Discussions
- Write up your articles
- Write up your thesis

WHYYYYYYY ????

BECAUSEEEEEEEEEEEEE !!!!!

Do you really think
that you will remember tomorrow
what you did today?

What should be in your Lab Book?

Planning
- Purpose/Goal/Question Asked of the Experiment(s)
- What you plan to do
- How you will do it
- What you will do

Action
- What you actually did

Outcome
- What were the outcomes – RESULTS
- What it means to you – the interpretation
- What to do next

What you actually do????!!!

- This is where The Bad & the Ugly ..... and also the Good are consigned
- Here is where you describe what you do

everything you do - everything that happens

- The changes made (to protocols or during the experimental procedures)
- The temperatures (what is a "*room temperature*"??)
- The timing – incubation times (what is an "*overnight incubation*"??)
- OBSERVATIONS MADE e.g.: un unexpected change in color or transparency, a precipitation, a drop lost, a drop to much, no sure of exact volume, mistake in timing, temperature, sample,...

WHYYYYYYYY ??????

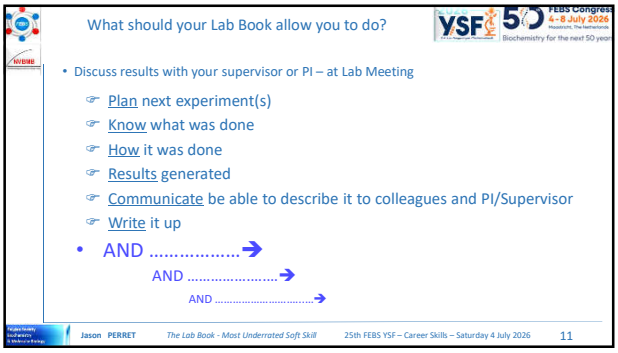
BECAUSEEEEEEEEEEEE!!!!!

Murphy's Law is especially true in the lab

"If anything can go wrong it will !!!"

Luckily " Richard Zeckhauser" said:

" Sometimes things that should not work, work nevertheless "


What should your Lab Book allow you to do?
• Discuss results with your supervisor or PI – at Lab Meeting
Plan next experiment(s)
Know what was done
How it was done
Results generated
Communicate be able to describe it to colleagues and PI/Supervisor
Write it up
• AND .....
AND .....
AND .....
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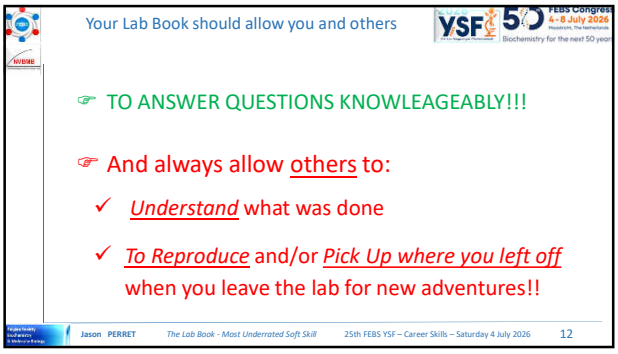
Your Lab Book should allow you and others
TO ANSWER QUESTIONS KNOWLEAGEABLY!!!
And always allow others to:
✓ Understand what was done
✓ To Reproduce and/or Pick Up where you left off when you leave the lab for new adventures!!
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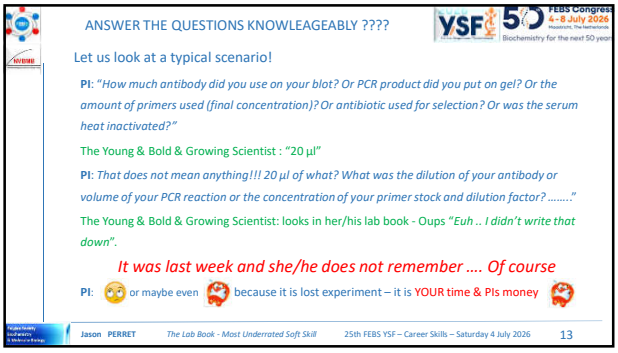
ANSWER THE QUESTIONS KNOWLEAGEABLY ????
Let us look at a typical scenario!
PI: "How much antibody did you use on your blot? Or PCR product did you put on gel? Or the amount of primers used (final concentration)? Or antibiotic used for selection? Or was the serum heat inactivated?"
The Young & Bold & Growing Scientist : "20 µl"
PI: That does not mean anything!!! 20 µl of what? What was the dilution of your antibody or volume of your PCR reaction or the concentration of your primer stock and dilution factor? ....."
The Young & Bold & Growing Scientist: looks in her/his lab book - Oups "Euh .. I didn't write that down".
It was last week and she/he does not remember .... Of course
PI: or maybe even because it is lost experiment – it is YOUR time & PIs money
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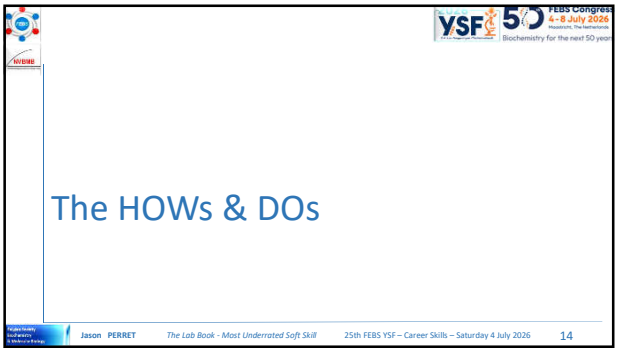
The HOWs & DOs
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1) Experiment Information - Planning
To start .... THE DATE
Indicate what is the Question you are addressing (project or sub-project)
Mention what is the Purpose of the planned experiment(s)
Describe the Experimental Design
List what you are Going to do
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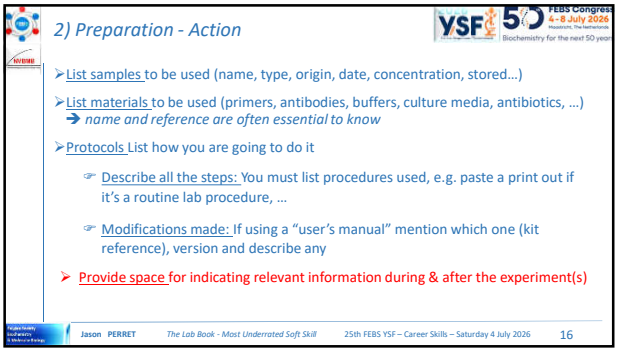
2) Preparation - Action
List samples to be used (name, type, origin, date, concentration, stored...)
List materials to be used (primers, antibodies, buffers, culture media, antibiotics, ...)
name and reference are often essential to know
Protocols List how you are going to do it
Describe all the steps: You must list procedures used, e.g. paste a print out if it's a routine lab procedure, ...
Modifications made: If using a "user's manual" mention which one (kit reference), version and describe any
Provide space for indicating relevant information during & after the experiment(s)
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3) Experiment Outcome

- Readouts - Results – Comments & INTERPRETATION(s)
  - Copy of
    - ✓ Tables
    - ✓ Picture/Images - if it is a digital file indicate file names(s) and location(s)
    - ✓ Instrument printouts
  - Remarks, Comments, Conclusions for the given experiment(s)
  - ANNOTATE PROPERLY ALL IMAGES/INSTRUMENT PRINTOUTS
  - If problems and/or inconsistencies arise point out & indicate possible reasons
  - **Interpretation(s)**
    - ✓ Indicate the follow-up, i.e. what next?
    - ✓ Next steps or controls to do or experiments for problem solving .....

BOTTOM LINE – TAKE HOME MESSAGE

WHAT DOES YOUR LAB BOOK LOOK LIKE??

DOES YOURS ALLOW YOU TO:

- Understand what the question(s) is/are addressed.
- Redo the experiment = Understand what was done, how it was done, and exactly what materials/reagents were used.
- Interpret the results and answer the question(s).
- Next step(s)

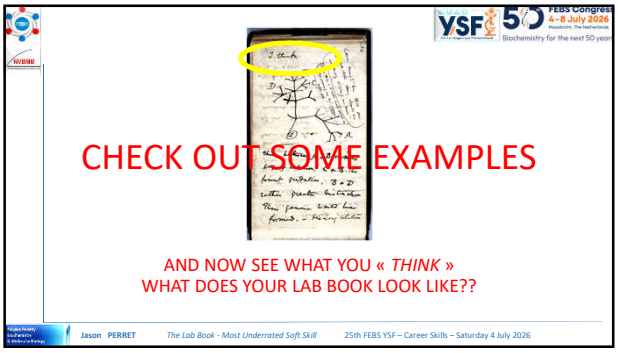
Thanks for your Attention

Darwin's "Tree of Life" sketch, from his Lab notebook. The Text starts with:

"I think ...."

Do you???

From: https://betterscienceteaching.com/2013/04/18/famous-science-notebooks/


CHECK OUT SOME EXAMPLES
AND NOW SEE WHAT YOU « THINK »
WHAT DOES YOUR LAB BOOK LOOK LIKE??
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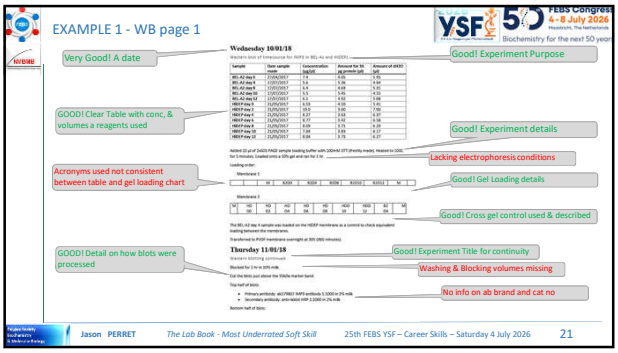
EXAMPLE 1 - WB page 1
Very Good! A date
Good! Experiment Purpose
GOOD! Clear Table with conc, & volumes a reagents used
Good! Experiment details
Lacking electrophoresis conditions
Acronyms used not consistent between table and gel loading chart
Good! Gel Loading details
Good! Cross gel control used & described
GOOD! Detail on how blots were processed
Good! Experiment Title for continuity
Washing & Blocking volumes missing
No info on ab brand and cat no
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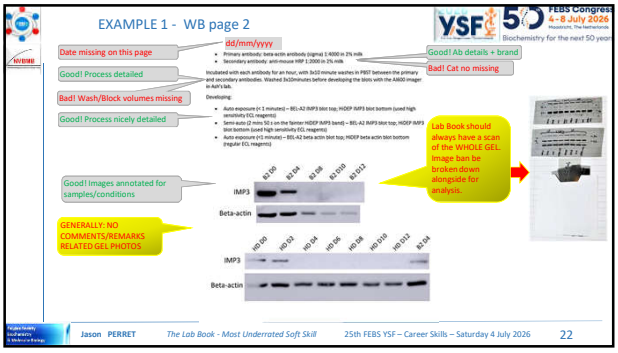
EXAMPLE 1 - WB page 2
Date missing on this page
dd/mm/yyyy
Good! Ab details + brand
Bad! Cat no missing
Good! Process detailed
Bad! Wash/Block volumes missing
Good! Process nicely detailed
Lab Book should always have a scan of the WHOLE GEL. Image ban be broken down alongside for analysis.
Good! Images annotated for samples/conditions
IMP3
Beta-actin
GENERALLY- NO COMMENTS/REMARKS RELATED GEL PHOTOS
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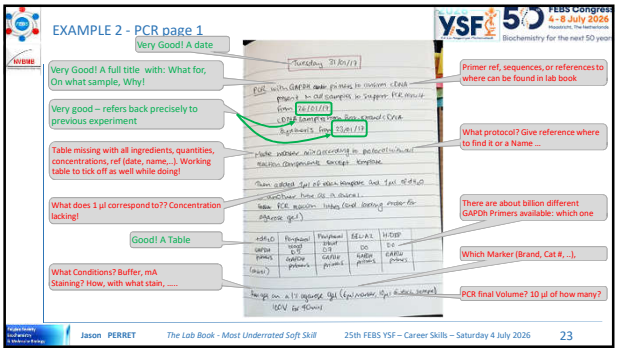
EXAMPLE 2 - PCR page 1
Very Good! A date
Very Good! A full title with: What for, On what sample, Why!
Very good – refers back precisely to previous experiment
Table missing with all ingredients, quantities, concentrations, ref (date, name,..). Working table to tick off as well while doing!
What does 1 µl correspond to?? Concentration lacking!
Good! A Table
What Conditions? Buffer, mA Staining? How, with what stain, ...
Primer ref, sequences, or references to where can be found in lab book
What protocol? Give reference where to find it or a Name ...
There are about billion different GAPDh Primers available: which one
Which Marker (Brand, Cat #, ..),
PCR final Volume? 10 µl of how many?
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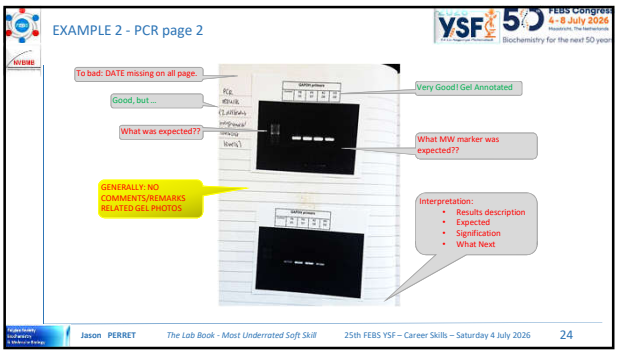
EXAMPLE 2 - PCR page 2
To bad: DATE missing on all page.
Good, but ...
What was expected??
GENERALLY: NO COMMENTS/REMARKS RELATED GEL PHOTOS
Very Good! Gel Annotated
What MW marker was expected??
Interpretation:
Results description
Expected
Signification
What Next
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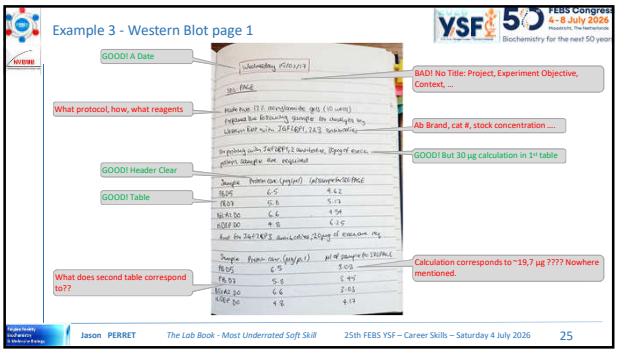
Example 3 - Western Blot page 1
GOOD! A Date
What protocol, how, what reagents
GOOD! Header Clear
GOOD! Table
What does second table correspond to??
BAD! No Title: Project, Experiment Objective, Context, ...
Ab Brand, cat #, stock concentration ....
GOOD! But 30 µg calculation in 1st table
Calculation corresponds to ~19,7 µg ???? Nowhere mentioned.
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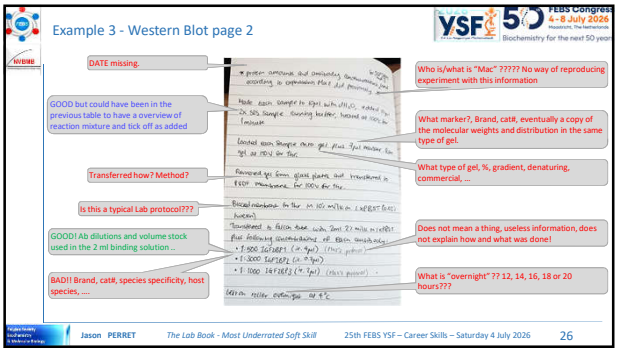
Example 3 - Western Blot page 2
DATE missing.
GOOD but could have been in the previous table to have a overview of reaction mixture and tick off as added
Transferred how? Method?
Is this a typical Lab protocol???
GOOD! Ab dilutions and volume stock used in the 2 ml binding solution ..
BAD!! Brand, cat#, species specificity, host species, ...
Who is/what is "Mac" ???? No way of reproducing experiment with this information
What marker?, Brand, cat#, eventually a copy of the molecular weights and distribution in the same type of gel.
What type of gel, %, gradient, denaturing, commercial, ...
Does not mean a thing, useless information, does not explain how and what was done!
What is "overnight" ?? 12, 14, 16, 18 or 20 hours???
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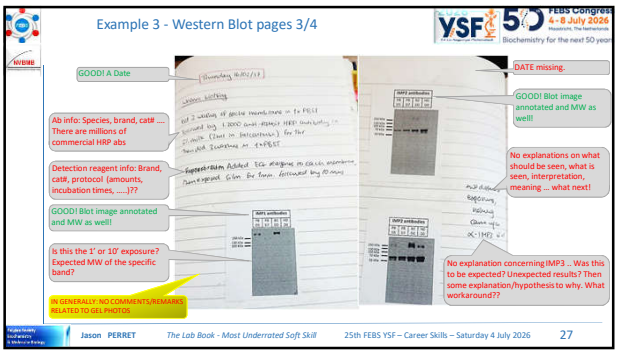
Example 3 - Western Blot pages 3/4
GOOD! A Date
Ab info: Species, brand, cat# .... There are millions of commercial HRP abs
Detection reagent info: Brand, cat#, protocol (amounts, incubation times, ...)??
GOOD! Blot image annotated and MW as well!
Is this the 1' or 10' exposure? Expected MW of the specific band?
IN GENERALLY NO COMMENTS/REMARKS RELATED TO GEL PHOTOS
DATE missing.
GOOD! Blot image annotated and MW as well!
No explanations on what should be seen, what is seen, interpretation, meaning ... what next!
No explanation concerning IMP3 .. Was this to be expected? Unexpected results? Then some explanation/hypothesis to why. What workaround??
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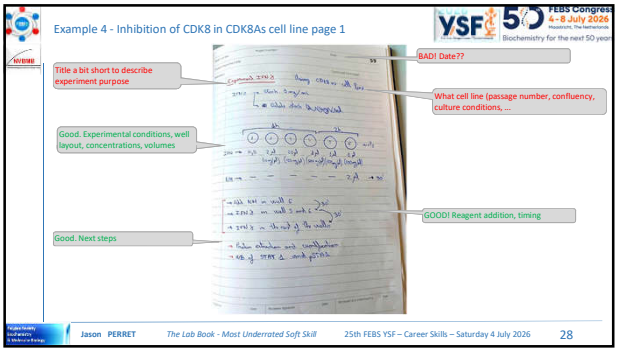
Example 4 - Inhibition of CDK8 in CDK8As cell line page 1
Title a bit short to describe experiment purpose
Good. Experimental conditions, well layout, concentrations, volumes
Good. Next steps
BAD! Date??
What cell line (passage number, confluency, culture conditions, ...
GOOD! Reagent addition, timing
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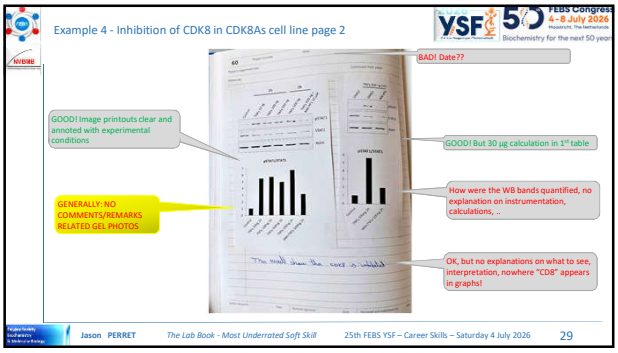
Example 4 - Inhibition of CDK8 in CDK8As cell line page 2
BAD! Date??
GOOD! Image printouts clear and annoted with experimental conditions
GOOD! But 30 µg calculation in 1st table
GENERALLY: NO COMMENTS/REMARKS RELATED GEL PHOTOS
How were the WB bands quantified, no explanation on instrumentation, calculations, ..
OK, but no explanations on what to see, interpretation, nowhere "CD8" appears in graphs!
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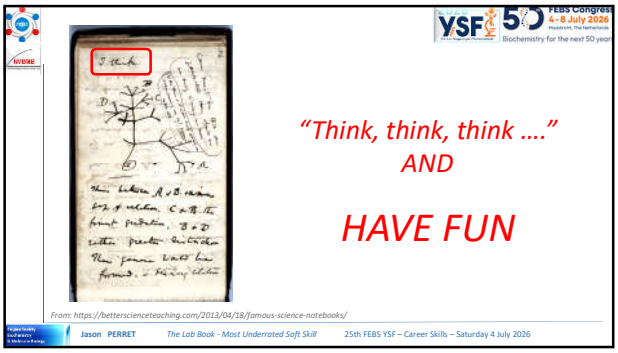
"Think, think, think …."
AND
HAVE FUN
From: https://betterscienceteaching.com/2013/04/18/famous-science-notebooks/
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