Notes on writing a short lab report.

What is a **good report**?
- simple but clear
- comprehensive (easily understood by a science student)
- organized
- English: past tense
  passive voice
- Use complete sentences. **Do not use point form.**

How can I master the skill of writing a good report?
read more
write more

For the 1st year labs, we require only **short lab reports**.

"An example of general physics lab report" is given in lab manual. Another example is in "Download Area".

Organization of our short lab report:

Objective :

Method :

Measurements :

Data analysis :

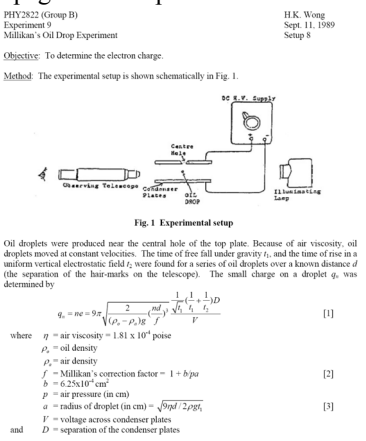
Discussion :

Conclusion :

Appendix 1: Data sheet
Appendix 2: Calculation of error

Before you come to the Lab, you need to prepare for the experiment & finish the first page of lab report.

Example of the first page of lab report (p.4 of lab manual):



PHY2822 (Group B) H.K. Wong
Experiment 9 Sept. 11, 1989
Millikan's Oil Drop Experiment Setup 8

Objective: To determine the electron charge.

Method: The experimental setup is shown schematically in Fig. 1.

Fig. 1 Experimental setup

Oil droplets were produced near the central hole of the top plate. Because of air viscosity, oil droplets moved at constant velocities. The time of free fall under gravity t_1, and the time of rise in a uniform vertical electrostatic field t_2 were found for a series of oil droplets over a known distance d (the separation of the hair-marks on the telescope). The small charge on a droplet q_e was determined by

$$q_e = ne = 9\pi \sqrt{\frac{2}{(\rho_o - \rho_a)g}\left(\frac{\eta d}{f}\right)} \frac{1}{\sqrt{p}} \left(\frac{1}{t_1} + \frac{1}{t_2}\right) \frac{D}{V} \quad [1]$$

where η = air viscosity = 1.81×10^{-4} poise
ρ_o = oil density
ρ_a = air density
f = Millikan's correction factor = $1 + b/pa$ [2]
b = 6.25×10^{-4} cm^2
p = air pressure (in cm)
a = radius of droplet (in cm) = $\sqrt{9\eta d / 2\rho g t_1}$ [3]
V = voltage across condenser plates
and D = separation of the condenser plates

In order to simplify my explanation, I use data of an experiment:
Measurement of *g* by free fall.

In the following, I give only the important points you should note for each part of the report.

The example in the "Download Area" is the report for this experiment.

First page: When you submit a lab report, make sure that you have Group number & Setup number, e.g.,

PHY2811 (Group A)	**Jason**
Experiment 1	**Sept. 15, 2006**
Measurement of *g* by free fall	**Setup 8**

Objectives:

Note:
- Do not copy the objectives from my lab manual.

Method

Note:
- Give very brief summary of theory or principle.
- **Do not use point form.**
- Define symbols.
- Draw a diagram of setup (a figure is worth a thousand words).

Measurement

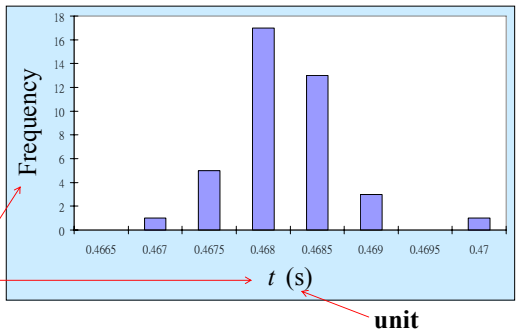
Note:
- Give very brief procedure.
- **Do not use point form.**
- Present main data with correct significant figures.
- Leave detailed data in data sheet (Appendix 1).
- Do not take too many data points.
- Cover a wide range when you scan a parameter.
- Pay attention to measurement errors.

Data analysis

Note:
- Show how you can verify an equation or theory.
- Data should have proper error.
- But do not present error calculation here.
- Pay attention to figure and table format:

Figure format:
- Put figure number and caption at bottom of figure.
- Do not show equation as it usually displays incorrect significant figures.
- Should have proper labels & units for the axes.
- Do not include gridlines.
- Use proper font size (~ 16 for numbers, 28 for labels).
- Use proper scales.

Here are two examples using the free fall experiment:
Part I: Distribution of measurement



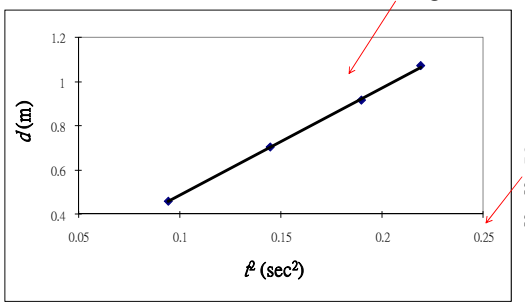
labels
unit

Fig. 2 Distribution of falling time for a fixed distance

Figure no. **Figure caption or title**

Part II: Verification of free fall equation

Do not show equation due to incorrect significant figures.



Suitable scale & font size

Fig. 3 Verification of free fall equation

Table format:

- Table number and caption at top of table.
  (See "Another sample report" in "Download Area".)

Discussion

Note:

- List sources of experimental errors: instrument error, human error, random error, or systematic error.
- If data are not good, explain why.
  Don't just blame equipment!
- Discuss how to improve the experiment?

Conclusion

Note:

- Can you achieve the objective?
  e.g., for the free fall experiment:
  The histogram has nearly a Guassian shape.
  $g = 9.8 \pm 0.1$ m/s^2
- Compare result with expected value.
- Comment on the result.

⋮

Appendix 1: data sheet
Appendix 2: error calculation

You have one week for writing the report.

The maximum length of report is 4 pages
(excluding graphs of data and appendices)
or you will have lower marks.
-10% for each additional page.

Submit your report to TA in the Lab:
We have missing report problems in the last few years.
To avoid this, submit your report to TA in the lab **at 2:30 pm**. TA will make a record.

Late reports will have lower marks:
- 10% marks for one day late.

Marking scheme is available in Download Area.

Report grading:
We have one TA for each lab session to grade your reports. The TA will come to the Lab to answer your questions at about 4:30pm after grading your reports.

Pass/Fail guideline:
A student will fail a lab course if he/she is
(a) absent in 3 lab sessions without compelling reason*, or
(b) unable to submit 4 lab reports.

* **Make-up experiments** can be arranged.