How to write a lab report

Sanderson

In Biology class each of you will individually record evidence of your biological investigations in one of three ways:

a) use a pre-formatted handout
b) use your own paper and generate an informal lab report (using the format below)
c) use a word processor to generate a typed formal lab report (using the format below). Documents will be: typed, dbl-spaced, Times New Roman font, size 12, 1" margins.

Name: Yours + your lab partner(s)
Lab Table
Microscope # (if applicable)

Title

(Use the one given in the source unless you make up the lab yourself.)

I. Introduction
   A. Background (what observations led to this investigation? What information does the reader need to know when s/he reads the report?)
   B. Purpose (Why are you doing the lab? What research question(s) are you answering?)
   C. Hypothesis (Testable statement that sets up the whole lab. Note: observational labs won't have this)

II. Procedure
   A. Materials (Everything you used. Include safety precautions)
   B. Procedure (A detailed list of steps, sufficient to allow another scientist to reproduce your investigation)
   C. If the source is a handout or in a book, you may replace A & B above with, "as per instructions in [source]"

III. Results
   A. Tables (organized reporting of your raw data. Report any uncertainty*.)
   B. Graphs (your data transformed to make it easier to understand and interpret)
   C. Sketches (if applicable, such as during work with microscopes)

IV. Analysis
   A. Conclusion (Reflect on the hypothesis and answer the initial questions. Was the hypothesis supported or refuted? Note: observational labs won't have this.)
   B. Error Analysis (How reliable are your results? Identify and discuss the effect of anything in your work that relates to the *uncertainty** of your results.)
   C. Further Investigation (What new questions arise because of your results?)
   D. Discussion Questions (Include any answers to questions posed by the lab sheet or teacher during the investigation. Include the question in your answer)

*Uncertainty in Laboratory investigations:

When a student records a quantity, the last digit is always an estimate and therefore introduces uncertainty. If they are using a burette with milliliter graduations, then they could make a reading of, say, 23.5 ml. The 3 is the last measured digit and the .5 is the estimate. The minimum uncertainty is half the place value of the last measured digit (the ones column) or 0.5 ml. (i.e. 23.5mL +/- 0.5mL)

If you use calipers to measure length, the student might record 23.4 mm and should write (+/- 0.5 mm) in the data table.

The standard ruler is a special case as it introduces an error at both ends, so mm rulers should have an uncertainty of 1 mm. So a careful student might record a value of 23.7 mm using a standard mm ruler, but should ultimately write 23 mm (+/- 1 mm).

Sheldon Science Sketch Criteria®

1. Use **pencil** for any sketched data (ink may be used for labeling)
2. Draw within a **large** field of view (FOV) (approx. 5-8cm is a good diameter for the FOV)
3. Do high **quality** work; sketch your area of interest perfectly. Make it look exactly as it appears under the microscope. The remainder of the FOV must be sketched to provide context, but the quality of the sketch may be quite rough.
4. **Label** your observations with as much of the following information as possible:
   a. Title of the object of interest
   b. Include total magnification of the FOV
   c. Include size (in μm*) of your object of interest.
   d. Use a ruler to draw label lines
   e. Label on the right-hand side of the drawing, if possible. Note any structures that you can identify. Are there structures that you don't know yet? See anything interesting or surprising?

*see table below for compound scope scales (note: 1mm = 1000μm)

Objective	FOV total mag	FOV size (mm)
Scan	40x	5.0
Low	100x	2.0
High	400x	0.5