1. **ABSTRACT**: Many hurried scientists will only read the abstract of a report, so this first section should cover all aspects of the experiment. The abstract should state the initial question and include pieces of the methods, results, and conclusion.

   Particulars to the abstract:
   - No citations
   - No figures
   - No longer than 150-200 words

2. **INTRODUCTION**: Like all introductions, the introduction to a formal lab report familiarizes the reader with the information about to be presented. The two main purposes of a scientific introduction are to:

   1. Provide any background information on the topic. Citations of previous papers, textbooks, etc. are almost always necessary to write this section properly.
   2. State the objectives of the work. If there’s no sentence that states a purpose or question to be answered, worry. The hypothesis should naturally flow from the previous portion on existing knowledge.

3. **METHODS and MATERIALS**: As the title suggests, this section describes how the experiment was carried out. Another individual (with the same level of experience) should be able to carry out the experiment by reading this section.

   Important notes:
   - DON’T copy the procedure from a given lab protocol. This is a BIG NO-NO.
   - The section should NOT be listed in 1,2,3,… steps. Only paragraph form is acceptable.
   - Selectivity is key—only include the materials and procedures that are necessary to recreate the experiment. This section should not dominate the entire report!
   - Briefly explain why you chose a certain organism, reagent, piece of equipment, etc.
   - If you’re following a lab manual, do cite it!

4. **RESULTS**: The results section includes any data, figures, calculations, tables, etc. for the experiment.

   Important notes:
   - This section does NOT include any conclusions made from the data
   - Any figures, etc. should be explicitly explained in the text. It is not acceptable to merely say “see figure a”. Contrary to what most students think, figures do not explain themselves.
5. DISCUSSION: The main purpose of the discussion is to demonstrate one’s understanding of the results obtained. Anyone can complete an experiment, but the best students understand the experiment in terms of a larger picture.

Questions to answer:
- Were the results obtained the expected results?
- If not, why are the results unexpected? What are the reasons for any errors? Were the errors avoidable? (Blaming scientific error for any discrepancies suggests that you didn’t think hard enough. Avoid the excuse if possible.)
- What do the results suggest?
- Do any ambiguities still exist?
- Was the design of my experiment appropriate given the initial question? What changes to the protocol could be made to lead to a more effective experiment?
- What further experiments could be done? (This topic can be included in a separate section titled “Further Experiments”.)

Most importantly, explicitly state the significance of the results, relate the results back to the hypothesis, and connect your findings to any background information!

GRAMMAR, FORMAT, and CITATIONS:

- The abstract is always single-spaced; the rest of the report can either be single or double-spaced.
- Most professors don’t have a preference for citation format. Options include MLA, APA, CBE (Council of Biology Editors) and CSE (Council of Science Editors)
- Any figures, etc. should be clearly labeled as Figure, Table, or Calculation #: Title Description
- If a report includes a lot of calculations, it is customary to include a sample calculation within the report and include any further calculations in the appendix. Each calculation should have a separate appendix.
- Passive voice is perfectly acceptable in scientific papers. Scientists prefer to say “the gel was run at 40 volts” instead of “I ran the gel at 40 volts” – the “I” is implied.
- Only use third person!
- Scientists hate flowery language and couldn’t care less about complex sentences. They worship brevity.
- Past tense = methods, new findings; present tense = basic scientific knowledge, description of figures