

FORMAL RESEARCH PAPER GUIDELINES – AP BIOLOGY

College Level Writing - Scientific Results

Times New Roman, 12pt. Font, 1 in Margins, Double Spaced

Title	Title is specific and informs the reader on the investigation.
Abstract	<p>Brief section that gives a snapshot of the entire report. Abstracts appear first in a report, but should be completed last. An abstract should include the following:</p> <ul style="list-style-type: none"> • One paragraph in length • Review of the entire report, from introduction to conclusions • Should contain a short (one sentence) summary of results and discussion • Abstract followed with a “by-line” (AKA: Who wrote the paper)
Introduction	<ul style="list-style-type: none"> • One to four paragraphs in length should be enough • What question did you ask in your experiment? Why is it interesting? • Include your hypothesis/hypotheses to answer the purpose. • Any relevant literature and/or background information should be provided here so that the reader will understand why you were interested in the question you asked. • Do NOT mention any specifics about your methods or results here. End with a sentence explaining the specific question you asked in this experiment.
Materials & Methods	<p>This whole section needs to be written in paragraph form (no bullets or numbering) and include the following details:</p> <ul style="list-style-type: none"> • Approximately two to four paragraphs • Past tense (was added, was obtained, poured, etc.) • Clear and specific recall of experimental procedures: <ul style="list-style-type: none"> - What you tested. - How you tested it. - Where you tested it. - Why you tested it that way. • Concentrations of chemical reagents used (when known), scientific names of organisms are named, volumes of apparatus, etc. are provided • The last paragraph should deal with how the data was analyzed, and a brief justification for why you chose to do it that way. • <i>May (or may not) include a diagram, images, or map.</i>
Results	<p>This section is only a statement or restatement of the data, facts, and observations. Do NOT include any inferences or conclusions based on your data. When in doubt, be as specific as possible. It’s better to have too much data than not enough. Results should include the following:</p> <ul style="list-style-type: none"> • Approximately two to four paragraphs • <u>AT LEAST</u> two graphics <ul style="list-style-type: none"> - Includes, but not limited to: graphs, lists, maps, tables, charts, diagrams - All graphics have appropriate units, titles, labels, etc. <p>All elements of data section are explained with one or two descriptive sentences. <i>*Note: Make sure all of the tables and graphs do not get separated onto multiple pages.</i></p>

<p>Discussion/ Conclusion</p>	<p>The conclusion needs to be in paragraph form. The conclusion piece is <i>your</i> voice to the experiment. It lets the audience know what you did, how it turned out, and details of how to do it better if they tried it. This should be the longest part of your report because of all the details involved. Discuss the following details:</p> <ul style="list-style-type: none"> • purpose of the lab (what you did and why) • clear connection is made between the lab activity and the understandings of the course • your hypothesis details • support or reject hypothesis based on data/results (details necessary) • patterns/trends in the data • error that occurred during the lab and how those errors could have effected the outcomes (don't say human error!) • any additional research which may be necessary to answer the questions raised by your results • how your results fit into the big picture • conclusion summary paragraph at the end (sums up the purpose and your conclusion of the purpose of the lab)
<p>Acknowledgements</p>	<p>This section is optional. You may thank those who either helped with the experiments, or made other important contributions, such as:</p> <ul style="list-style-type: none"> • Discussing protocol/experimental design • Helping form the topic of research/question • Commenting on the manuscript • Buying you pizza • Etc.
<p>References (Literature Cited)</p>	<p>All sources used must be cited. There are several possible ways to organize this section. He is one commonly used method:</p> <ol style="list-style-type: none"> 1. In the text, cite the literature in the appropriate places. For example: <p style="margin-left: 40px;">Scarlet (1990) thought that the gene was present only in yeast, but it has since been identified in the platypus (Indigo ad Mauve, 1994) and wombat (Magenta, et al., 1995).</p> 2. In the references section list citations in alphabetical order. For example: <p style="margin-left: 40px;">Indigo, A.C., and Mauve, B.E. 1994. Queer place for qwerty: gene isolation from the platypus. <i>Science</i> 275, 1213-1214.</p> <p style="margin-left: 40px;">Magenta, S.T., Sepia, X., and Turquoise, U. 1995. Wombat genetics: In: <i>Widiculous Wombats</i>, Violet Q., ed. New York: Columbia University Press, 123-145.</p> <p style="margin-left: 40px;">Scarlet, S.L. 1990. Isolation of qwerty gene from <i>S. cerevisiae</i>. <i>Journal of Unusual Results</i> 36, 26-31.</p>