

GUIDELINES FOR RESEARCH IN BIOLOGY

Research in Biology is intended to provide an opportunity to experience the scientific process. Students work in the laboratory and/or field under the direct supervision of a faculty mentor. The following guidelines must be followed:

1. The student is expected to carry out his/her own research project. Although we expect the student to contribute to the overall goals of the laboratory and to learn specific scientific techniques, we also expect the student to experience the scientific process.
2. To make the experience worthwhile for both the student and the research advisor, we expect the student to commit a sizable amount of time to Research in Biology. On average, the student should expect to spend between 4 and 5 hours a week per credit in the lab.
3. A written research paper is required at the end of the semester. See below for instructions. A minimum of 10 pages is required. The graded paper is due in your Sakai dropbox by the first day of exams of that semester, therefore you must give it to your research supervisor at least one week before that day. The research supervisor must email advisor@biology.rutgers.edu with the final grade.

How to Write a Research Paper *01:119:307, 308, 406 and 407*

For many students, Research in Biology is the first time they will write a scientific paper. The format of a scientific paper is much different than for an essay or term paper. This outline has been designed to address the basics of scientific writing. It is expected that throughout the semester the student will work closely with their advisor on the paper, who will provide guidelines most appropriate for their field of research.

Construct a conservative timeline: Writing should begin early in the semester. Rough drafts of the Introduction and Materials & Methods sections are easy ones to write while you are doing the literature search on your project and beginning to learn the research techniques. The Results section can also be written early as a prediction. A first draft of the entire paper should be submitted to the research advisor at least two weeks before the final deadline for submission. The paper should include the sections described below.

Title: The title should be short, descriptive, and refer specifically to your project.

Abstract: The Abstract is a summary of the project and emphasizes the results and conclusions. It should be very succinct- approximately 200 words in length- and briefly present the objective, experimental design, summary of results, and significance of the study.

Introduction: This section provides the purpose of the experiments performed in the project and an appropriate literature background. The hypothesis and objectives of the study should be included in the Introduction. Importantly, you should include a range of expected results from the experiment; make predictions based on the possible results of the experiment.

Material and Methods: This section should provide sufficient information to permit repetition of the study by others, but avoid unnecessary detail. All methods used in the study must be documented, however, do not copy word-for-word any of the written sources you used. Instead, you should summarize in your own words what you did.

Results: This section should contain a concise account of the new information. Once data has been analyzed, a summation should be presented. Tables, figures, graphs, pictures, etc. should be used as appropriate and include figure legends.

Discussion: The Discussion is a critical section of the paper and cannot be well-written until the rest of the paper is in good shape. It should address whether your hypothesis was supported or rejected, how the data compare to work done by others, the biological principles which explain what happened in your study, and what experiments should be done next.

Literature Cited: Citations are arranged alphabetically. All references cited in the text must appear in the literature cited section, and all items in this section must be cited in the text. The formatting of the references varies among journals so select a style which is appropriate for the top journal in your field. Regardless of the format you choose, it is important to stay consistent within your paper.

General formatting: The paper must be at least 10 pages in length with the student's and research advisor's names on the front. Times New Roman, 11 point font, 1.5 line spacing and 1" margins are the recommended specifications, though a research supervisor is free to alter these requirements as per the standards of their lab or field. The paper must be stapled and plastic covers should not be included.

If you are having difficulties with the project, speak to your research advisor immediately!