

## Lab Report Guidelines

During the course, you will be writing a lab report on each project/tutorial. Each report will be graded on a 10 point scale, described at the end of this document. Format your lab report with the sections shown below. Independent project will have their own guidelines.

**Title:** A descriptive title that indicates the topic of the project

**Abstract:** In no more than 100 words, briefly summarize what was done during the project, what the findings were, and why they were important.

**Introduction:** In 2-3 paragraphs, provide enough background information to understand the biology behind the project. Be sure to state *what* problem or question the work addressed, and *why* it is important. You must cite at least one scientific journal article for this section (it can, but doesn't have to be, the assigned reading). When you use outside resources, use in-text citations in the text attributing any ideas or information from materials outside of our course lecture or tutorial. In-text citations give the source for information right where it is written (1).

**Methods:** This section should contain sufficient information so that other bioinformaticians could reproduce your results. You should briefly describe your raw data (what is it, what is the name of the reference) and describe what you did with it. You should write this in 2-3 paragraphs, not in a list. When you use a bioinformatics software program, do not write out the full command you typed, but do specify which program (ie 'bwa-mem' or 'samtools tview') you used and whether you used the default options. If you did not use the defaults, you should specify the exact settings you used. The first time you mention bioinformatics software or an online tool, you should cite it. The correct citation for most software can be found by looking up its documentation online (you don't have to cite common tools like python or perl or the bash shell). If you write a custom script, that needs to be included exactly as entered when processing the data, and you should state where you ran it (in our case, a linux bash shell)

**Results:** This section should include the results of your data processing and data analysis, and may include tables with read lengths, pictures of quality distributions, or tables of gene names for examples. In the text, briefly restate how you got the results in full sentences, but in less detail than the methods, before you say what the results are (ie 'reads were mapped to the reference and scanned to identify positions that likely contained mutations. We found....'). Refer to tables and figures by number, and include a brief descriptive title after the number. Be sure to include any results specifically requested in the lab project tutorial. The results section should be as objective as possible, so please refrain from interpreting the meaning or significance here. It should be just the facts.

**Discussion:** In 2-3 paragraphs, explain what you think the results mean, and why you are interpreting them this way. If you encountered any problems, or answered questions, discuss them and suggest ways to solve them with future experiments or analyses. Also include any information specifically requested in the tutorial.

**Citations:** You can use any commonly used format you like, but be consistent. Try to avoid over-reliance on websites/Wikipedia; peer-reviewed scientific journals are always preferred. If you must cite a website, the url is sufficient (for this course, anyway). Lab reports will be checked for plagiarism, so be sure to cite other people's ideas, and put everything in your own words (paraphrasing) if you aren't using direct quotes.

1) <http://writing2.richmond.edu/training/project/biology/works.html>

**Scoring:** Each report will be scored on a 10 point scale, as follows:

Title and Abstract (1 point)

0	One or both is missing
0.5	Title is not descriptive OR abstract has large scientific mistakes
1	Title is descriptive, abstract includes what was done and why, and the major finding(s)

Introduction (2 points)

0	The section is missing
0.5	There are large scientific inaccuracies
1	Missing 2 of: mostly correct science, a citation, clearly stated significance
2	Everything is good, or missing 1 of: mostly correct science, a citation, clearly stated significance

Methods (2 points total)

0	The section is missing
0.5	There is not enough to reproduce the results AND there are mistakes in analysis
1	There is not enough to reproduce the results OR there are mistakes in analysis
2	Everything is there and correct, and style is correct

Results (2 points total)

0	The section is completely missing
0.5	Missing 3 of: all results from tutorial, text is clear and shows understanding, figures/tables are clear and labeled, sticks to the objective facts

1	Missing 2 of: all results from tutorial, text is clear and shows understanding, figures/tables are clear and labeled, sticks to the objective facts
1.5	Missing 1 of: all results from tutorial, text is clear and shows understanding, figures/tables are clear and labeled, sticks to the objective facts
2	Has all 4: all results from tutorial, text is clear and shows understanding, figures/tables are clear and labeled, sticks to the objective facts

Discussion (2 points total)

0	The section is missing
0.5	Missing interpretation and/or request items from tutorial
1	Interprets meaning of results, has requested items from tutorial, has large misunderstandings of science
1.5	Interprets meaning of results, has requested items from tutorial, may have small misunderstandings of science
2	interprets meaning of results, has requested items from tutorial, shows strong understanding of the science

Citations, spelling and grammar (1 point)

0	There are no citations
0.5	There are major spelling and grammar issues
1	There are only minor spelling or grammar mistakes