

Lab Report

2-4 pages. Double spaced. 1-1.25 inch margins. (100 points total)

Introduction (10 points)

The introduction should tell why the study was undertaken, the question being addressed, and some relevant background information. You could talk about why *Drosophila* is useful in genetics, why we do crosses to understand the genetic basis of a trait, etc. You may want to give a description of the mutants and some background about them from the literature. It doesn't need to be long (1-2 paragraphs may be enough)

Materials and Methods (25 points)

Often it is easiest to start writing here because you know what you did.

Make sure the reader understands what you did. Explain what you did in sufficient detail that someone else could replicate your experiment and get the same results. Think about what are the really important things to tell the reader, and tell them those things. For instance, the reader doesn't care that you used a mouse to click a button on the screen. They DO care that the P (parent) generation consisted of a female wild type fly and a male apterous fly, and then you crossed the wild-type F1s to make F2s. For each cross that you made the reader needs to know the **sex and phenotype of each parent**. Are these parents the F1s from a previous cross? If so, which one? What software did you use? How were your statistics (chi square tests) done? Did you do them by hand or use software?

Think about whether the crosses you are describing are informative. Only include informative crosses in your paper.

Results: (35 points)

Describe your results. If you did multiple sets of crosses make sure we can figure out which results are from which cross.

Analysis

You must carry out statistics on your results (Chi-squared tests).

For each chi-squared test, you must say what your null hypothesis was, and why you chose that null hypothesis.

You must present your statistical results, including the chi-square value, degrees of freedom, and whether the p-value (level of significance) was greater or less than 0.05.

Here is an example of an appropriate format:

My null hypothesis was that the pink eyes was autosomal dominant to wild-type. This null hypothesis should produce 3 pink: 1 wild-type offspring in the F2 generation.

My results were not significantly different from this null hypothesis ($\chi^2=1.23$, $df=1$, $P>0.05$).

You may want to perform chi-square tests to compare your data to several different null hypotheses. You should decide what null hypotheses are appropriate for your data. Think about your data. Work out the Punnett squares for all the possibilities, and compare your results to the Punnett squares. Are your results showing that your traits are recessive? If so, what tells you this? Are your traits sex-linked? Lethal? Dominant?

Figures and Tables: You should use tables and/or figures to show your results, but you also need text. All tables and figures should be referenced in the text (Table 1). Always include a short description of what is being presented in the figure or table (called a legend). Figure legends go beneath the figure (graph), while table legends go above the table.

Example of Table referenced in text:

After I crossed the wild-type F₁ flies from the previous cross, I obtained four different fly phenotypes in the F₂ generation (Table 1).

Example of Table:

Table 1. F₂ results from crossing wild-type F₁ flies after starting with red-winged female and blue-bodied male parents.

<i>phenotype</i>	<i>observed</i>	<i>expected</i>
wild-type	25	20
blue body, wt wings	15	18
wt body, red wings	35	12
blue body, red wings	45	40

Discussion: (15 points)

In this section you can talk about the wider applicability of your results. What do they tell you about some bigger question? How do your results compare to what is known about the mutant trait, genes, biochemical pathways or other relevant information from the literature? For example, if a published paper says your mutation is dominant, and your data support that conclusion, please include that information. If the results were not what was expected, or contradicted published literature, discuss possible reasons. Can you suggest additional studies to learn more about your trait? Do you have suggestions on how to improve the methods or future research, such as different crosses you could do without the limitations of the computer program? Is there anything you can't explain? If so, discuss it.

Literature cited: (10 points)

You must cite at least one scientific manuscript from this website:

<http://www.esp.org/foundations/genetics/classical/browse/>

When citing information, **do not quote the source word-for-word**. Rather, **use your own words**.

Citations are most often found in the Introduction and Discussion.

In the text of your paper, citations should be in this format:

Jellyfish consist of water and fruit pectin (Jones *et al.*, 1993).

According to Jones *et al.* (1993), jellyfish consist of water and fruit pectin.

note: if there is one author, "Jones, 1993" would be used. If there are two authors, list both

In the literature cited, the format for this reference would be:

Jones, E.B., Wally B.Q., and Hershel X.P. 1993. A chemical breakdown of jellyfish. *Journal of Jellyfishology*, 13:1-5.

Grammar, spelling: (5 points) Remember to run spell check and grammar checker, and/or go to the writing center <http://www.alaska.edu/english/studentresources/writing/about-the-writing-center/>