

Biology Honors

Planaria Regeneration Experiment: Final Instructions for Report

Results: In this section you will report the results of the experiment from the entire class in table and graph form. **All tables and graphs should be labeled, titled, columns and axes labeled.** Most of this section will be the tables and graphs, however, you also need to **include a written explanation** that translates the table and graph into words and you need to tell about the statistical test (just define what you used, refer to the appendix for an explanation). Tables and graphs should be on separate pages, taking up a whole page. The written explanation should be within the text of the report under the Results heading.

You have been given a data table that reports the raw data (the actual numbers). For ease of comparison, we want to find the percentages. **On Table 1, you need to add a Total % Regenerated column, a Total % Died column, and the % that were not finished.** These are the numbers you will use when analyzing the data and to make the graph. For the Controls DT, you need to find the % of anterior ends and % posterior ends that regenerated and died. Again, these are the numbers you will use when analyzing the data.

You will **also do a simple statistical test, the 2propZtest, to see if any of the differences seen are significant.** This test will be done on your graphing calculator. This info should also be presented in a table (include what you compared and the p value).

Analysis: In this section, you will interpret and analyze the class data. You should write a separate paragraph that **discusses** each of the following points (but do not break up the analysis into these separate headings, this is a guide to help you break up paragraphs):

General Trends: an overall statement as to what happened in the experiment (did each piece show some successful regeneration, did many of them die, did many of the controls drop their tails). This will be short and serves as a lead-in to this section. No data nor numbers need to be discussed here.

% Regeneration: This is where you look at the table and **discuss** whether one piece showed a greater % regeneration than another. Report the % regeneration of each cut and compare the results. If there are differences, we need to see if these differences are significant, and that is what the statistical test will tell you. If the differences are or are not significant, you **must try to explain why.** Be sure to compare the Controls DT here, too. Also compare the anterior ends of Controls DT to cut A and posterior ends of Controls DT to cut P. Again, **try to explain** if there is a significant difference in anterior vs. posterior end regeneration.

Comparison of Mortality Rates: All worms that died were lumped together (those dying due to the stress of cuts, due to lab conditions, or due to experimental error). We usually use the % that died in the intact controls as the **Natural Mortality Rate** (what does this mean) under lab conditions. This year the death rate was high due to some mysterious water issues. The assumption is usually that the death rate in the experimental worms is higher than the controls and that is due to the trauma of being cut, however, this year that may not be the case. Anyway, you will compare any deaths in the experimentals to the death rate in the controls. **Discuss what** you think this says about our lab conditions and give some ideas as to how we could improve these conditions. **Discuss** the % that died in each group to the controls and each other. Were the differences seen significant? **Explain why.**

% Dropping tails: What % of planaria dropped their tails. Explain why they do this.

What does this say about our experimental set-up? Do you have any suggestions?

Discussion of Hypotheses: Restate your hypothesis. **Discuss** whether it was supported or refuted by the data.

Relationship to Research: **Discuss** whether this experiment supports what is known about regeneration in planaria. Also discuss how planaria regeneration experiments can be used to benefit humans.

Suggestions for future experiments: All good experiments lead to other experiments. Give suggestions as to what could be done from here. This should be about different ideas, not how to improve this one.

Conclusion: In this section you should restate the question this experiment was investigating and give a simple answer to that question. You should restate your hypothesis and tell whether it was supported or refuted by the data. Then state what you personally learned from this experiment, whether you can relate it to your life in any way.

References: Include any references used. Every reference listed should be cited in the text of your report somewhere. You need a minimum of 5 references, with 3 of those from a scientific journal or textbook not a website. If you have more than 5 references, more can be from website sources.

Appendix: There should be a page labeled "**Appendices**" and include your team's data sheets, summarized data, and the instructions for the 2propZtest (you can include what I gave to you).

As a guideline, revise the introduction and procedure by **Jan. 12**
finish the **data percentages and statistics** by **Jan 19**;
Final report is due Jan 29.

Some items that may be helpful in analysis:

The highest natural mortality rate that we have experienced in the past was around 33%, so this year whatever happened to the water was not good. Last year the natural mortality rate was 0%, not a single control worm died. The death rate of the experimental worms was around 15%. However, the percent of controls dropping their tails was much better than in the past. Last year, nearly 50% of the controls dropped their tails. This also says something about our water conditions. In the last few years, we have also encountered higher regeneration rates. Last year regeneration was about 85% in the cut worms and around 50% in the controls that dropped their tails.