

Name: \_\_\_\_\_

**Lab 1: Hypothesis Testing Worksheet***Due in class at the start of next lab*

1. Record the number of pods with and without beetle exit holes for single-seeded and multiple seeded pods in the following table. Questions 2-7 refer to these data.

	<b>Pods with a single seed</b>	<b>Pods with &gt; 1 seed</b>
<b>Number without exit hole</b>		
<b>Number with exit hole</b>		

2. What is your **null hypothesis** ( $H_0$ )?
3. What is the **alternative hypothesis** ( $H_A$ )?
4. How many **degrees of freedom** do you have? In the Chi-square contingency test, the degrees of freedom are based on the number of categories by multiplying: (# rows - 1) times (# columns - 1).
5. What are the  **$\chi^2$  value** and  **$p$ -value** for your Chi-square test? Does this mean that there is or is not a significant association between beetle parasitism and seed number?
6. Based on the results above, do you accept or reject your null and alternative hypotheses?
7. In a *complete sentence*, describe the above result as you would for a formal scientific paper:

8. Record your seed size vs. seed number data in the following table. Questions 9-20 refer to these data.

<b>Pod Number</b>	<b>Weight (in mg) of seeds from pods with a single seed</b>	<b>Weight (in mg) of seeds from pods with &gt;1 seed</b>
1		
2		
3		
4		
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9. What are the **means** of your measurements?
  
10. What are the **medians** of your measurements?
  
11. What are the **modes** of your measurements?
  
12. Draw a **histogram** (bar graph) of your results from each “treatment” (that is, draw a separate histogram for the 1-seeded and multiple-seeded pods). Ideally, your histogram should have about 10 size categories of equal width (in terms of seed size). (Note: *Excel's* graphing tool does not automatically produce histograms; to use *Excel* you will need to count how many seeds fall in each size category and enter these values into a spreadsheet).

13. What **type of distribution** do your data appear to have?
14. What are the **ranges** of your measurements?
15. What are the **standard deviations** of your measurements?
16. What is your **null hypothesis** ( $H_0$ )?
17. What is the **alternative hypothesis** ( $H_A$ )?
18. How many degrees of freedom do you have?
19. What is the  **$t$**  and  **$p$ -value** for your Student's t-test? Does this mean that your two treatments are significantly different or not significantly different?
20. In a *complete sentence*, describe the above result as you would for a formal scientific paper: