**Statistical Analysis**

AP Biology 11

In order to determine if your data supported your hypothesis, you must determine whether the differences between you experimental and control are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_or are they the results of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**You Must Know**: What is meant by degrees of freedom, critical value, the null hypothesis, and how to do a Chi-square analysis of data.

**Chi-Square Test**

This test is a type of ‘goodness of fit’ test.

Your experimental results are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_to match the predicted results exactly but are the differences due to \_\_\_\_\_\_\_\_\_\_\_\_\_\_alone or something else?

The Chi-Square tests how well the data fits the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

The null hypothesis states that there is \_\_\_\_ statistically significant \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_between the experimental and expected results.

The null hypothesis is a hypothesis which the researcher tries to disprove, reject or \_\_\_\_\_\_\_.

**Example** **of the Null Hypothesis:**

A researcher may postulate a hypothesis:

*H*1*: Tomato plants exhibit a higher rate of growth when planted in compost rather than in soil.*

And a null hypothesis:

*H*0*: Tomato plants do not exhibit a higher rate of growth when planted in compost rather than soil.*

When there is little difference between the observed results and the expected results, you obtain a very low Chi-square values; your hypothesis is\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_!

 

o =

e =

  

**Degrees of Freedom:** this number is \_\_\_\_\_\_\_\_\_\_\_\_\_\_than the total number choices in your experiment

df =

**Probability value (p):** Deviations having a chance probability greater than 0.05 (5%) \_\_\_\_\_\_\_\_\_\_support the null hypothesis.  Therefore, you should consult the table for the p value in the 0.05 row



**How to do an Analysis:**

1. Set up a \_\_\_\_\_\_\_\_\_\_(p. 328 Holtzclaw)

2. Determine the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Find the probability (p) value for the number of degrees of freedom in the \_\_\_\_\_\_\_\_row.

 This is the\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

4. Accept or Reject the \_\_\_\_\_\_\_\_\_\_\_ hypothesis.

**If the Chi-square value is greater than the critical value, the null hypothesis is rejected!**

**Example**

HA :  If pill buys are given a choice between moist and dry environments, they will have a preference for the moist because they need a moist environment for respiration

Ho: If pill bugs are given a choice between moist and dry environments, they will have no preference

Observed Data: 7 bugs on moist and 3 bugs on dry

Expected Data: 5 bugs on moist and 5 on dry