Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Block: \_\_\_\_\_\_\_\_\_\_\_

Statistical Analysis:

* 1.1.1 State that error bars are a graphical representation of the variability of data.
* 1.1.2 calculate the mean and standard deviation of a set of values.
* 1.1.3 State that the term standard deviation is used to summarize the spread of values around the mean, and that 68% of the values fall within one standard deviation of the mean.
* 1.1.4 explain how the standard deviation is useful for comparing the means and the spread of data between two or more samples.
* 1.1.5 deduce the significance of the difference between two sets of data using calculated values for t and the appropriate tables.
* 1.1.6 explain that the existence of a correlation does not establish that there is a causal relationship between two variables.

Guided Notes:

**Scientific Questions**

For questions to be answered scientifically what two items must be present?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ & \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Defining Variables**

What are three categories of variables?

1)

2)

3)

**Collecting and presenting data:**

What kind of table is used when observations and results are recorded?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

We process our data by calculating what?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_& \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Processed data is always presented how?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Interpreting results:**

What is this purpose of interpreting results in a scientific investigation? Please give an explanation on what happens if your graph supports OR contradicts your hypothesis.

**Mean and Standard Deviation**

Mean is the statistical term for? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What does the standard deviation measure? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What happens to the data points when the standard deviation is small OR large?

Explain what typically happens in a large normally distributed data set? Explain the standard deviation.

**Error Bars:**

What are the purpose of error bars? What do error bars represent?

**The t-test**

What is a t-test? When should a t-test be used?

Please write down the t-test formula and what each variable represents:

In biology we use what **confidence interval?** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

D**egrees of freedom** (DF) determined how? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Where would you find a **critical value** (CV)? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

In step three of a t-test what is determined?

If a t-test test does not indicate a significant difference between two sample means what could this indicate? What could you do?

**Questions:**

1)

2)

3)