Lab Template

Text: CORD or any other Algebra 1 Statistics Chapter
Volume: _____   Chapter: _____
Unit number: _19____   Title of unit: _Working with Statistics___
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Attach the Following Documents:
1. **Lab Instructions**
2. **Student Handout(s)**
3. **Rubric and/or Assessment Tool**

Short Description (Be sure to include where in your unit this lab takes place):

> Students look at linear transformations of a data set and predict changes to the center and variation of the data.

Linear Transformations of Data

LAB PLAN

TEACHER: *(Teacher Prep/Lab Plan)*

- ✠ **Lab Objective**

    Students should be able to predict the change of the mean and standard deviation when an each value of data has a linear transformation applied.

- ✠ **Statement of prerequisite skills needed** *(Vocabulary, Measurement Techniques, Formulas, etc.)*

    Students need an understanding of measures of center and measures of variability. They should know how to create simple plots of data.

- ✠ **Vocabulary**

    Mean, Median, Quartiles, Standard Deviation, Range, Variability, linear transformation.

- ✠ **State Standards addressed:** *(Highlight "Green" Standards, you may use your District's Power Standards if applicable)*
  - ✠ **Math:** A1.6.C Describe how linear transformations affect the center and spread of univariate data.
  - ✠ **Reading:** Students need to be capable of reading technical information to follow lab directions
  - ✠ **Writing:** 3.1 Students write clearly and effectively
  - ✠ **Leadership:** Students will work together to interpret data about the group and brainstorm predictions about changes to the data.

- ⚔ **SCAN Skills/Workplace Skills:** Writing B. Records information completely and accurately. Arithmetic D. Uses tables, graphs diagrams and charts to obtain or convey quantities of information.

- ⚔ **Teacher Preparation:** *(What materials and set-up are required for this lesson?)*
  - ⚔ Materials: a camera to document work is useful, prepared questions
  - ⚔ Set-Up Required: The room should have enough space for the class to line up across the room. It can also be useful to set up a scale for students.

- ⚔ **Lab Organizational Strategies:**
  - ⚔ Grouping/Leadership/Presentation Opportunities: Students will work in small groups to fill out data form, and then answer exercises together.
  - ⚔ Cooperative Learning: The class will work together to explore the effect of linear transformations.
  - ⚔ Expectations: Students need to be actively engaged in the lab for the effects to work for the whole class. Lack of participation is detrimental.
  - ⚔ Time-line: This lab should take about 40 minutes. Extensions can expand the time.

- ⚔ **Post Lab Follow-Up/Conclusions** *(to be covered after student completes lab)*
  - ⚔ Discuss real world application of learning from lab: Often data sets are transformed to reorganize the data (such as a unit conversion, or accounting for a constant change) rather than adjusting each piece of data (which we may not have) linear transformations allow us to predict changes to the center and spread of the data.
  - ⚔ Career Applications: Manufacturing, data analysis, predictions
  - ⚔ Optional or Extension Activities: Computer Lab work with excel, TI84, java, Algebraic Proofs

Living Dot Plot Lab   **Name:**

Objective: Understand how linear transformations (adding or multiplying) affect the center and spread of a set of data.

Quick Review—Brainstorm in your group and write a brief definition by consensus for each of the following terms. Use student language

Data Set

Mean

Median

Range

Standard Deviation

Data Collection—Write down the following information about yourself

Height (in) =

Shoe Size =

Weekly Allowance (lie if you like) =

How old you think Mr Seidel is =

Minutes that you spent on homework last night =

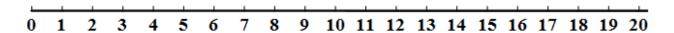**STOP** **Lets get together and talk as a class** **STOP**

Break it down…

Your exit task is on the back page. Do it on your own, compare with your group

Rubric for your Lab

Criteria	Point Possible	Points Earned
You are a contributing member of your group, following your assigned roll	5 pts	
You participate in classroom discussion, volunteer your ideas, and listen to others	5 pts	
You completed your work on time. It is organized and shows effort	5 pts	
You can state the lesson objectives in student friendly language and can assess if you met the state standard	5 pts	

1. Choose 5 numbers between 0 and 10 inclusive. Write them down here and then find the summary statistics; the mean, median, min, max and quartiles. Then calculate the range and interquartile range

2. Create a box plot of your data. Use the number line below to help scale the data.

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

3. If we added 10 to every value that you choose in task 1, what do you think would happen to the summary statistics? Make a prediction, then rewrite your list and recalculate your summary statistics.

4. Draw a new box plot next to the one you drew in task two.

5. Think back to your original set of numbers. If I double every value, what do you think would happen to the summary statistics? Make a prediction, then rewrite your list and recalculate your summary statistics.

6. Draw a new box plot next to the two others you drew in tasks two and 4.

7. Compare your work to others in your group come up with a rule for what happens to the summary statistics when adding or multiplying a list of numbers by a constant value.