Algebra

SUMMER ASSIGNMENT

LEARNING TO USE SPREADSHEETS--Chapter 10: STATISTICS

In Algebra we will use graphing calculators and spreadsheets to make calculations easier. To help you become familiar with spreadsheets, you will do a project as your summer assignment. You will review what you have already learned concerning statistics and apply it to a data set having to do with hurricanes. You will make a graph of the data and record the various measures of center in a "Google Sheets" spreadsheet document. But before we start, you need to practice using this tool. **NOTE:** Your first assignment EACH DAY is to READ! You must read this information or you will not understand the assignment.

DAY #1: MAKE A MULTIPLICATION TABLE

1. Open your Google account and click on the "waffle" button in the upper right corner to find the different applications available.
2. Click on Sheets and you will be presented the chance to make a "Blank" one.
3. Click on the multicolored **+** sign and a new spreadsheet will open. It is a page full of "cells" into which data can be placed. (Where it says "Untitled Spreadsheet" type your name to name the file you are creating.)
4. Click in the "cell" located in the first row, first column on the page—i.e., in the upper left of the boxes. That cell has an "address" designated by a column letter and a row number. Type 0 in that box and notice that the entry appears in the "formula bar" marked with *f(x)* above the cells and it appears in the first box **A1.**
5. Now add a **column** to the left of that column by clicking on the down arrow which appears when you hover your mouse over the column heading **A**. The dropdown menu will allow you to "**Insert 1 Left**". Click on it and a new column will be added moving your "0" to cell **B1**.
6. Next, highlight the first row across by clicking on the 1st **row** header marked **1**. Right-click on that number to open a menu which allows you to "**Insert 1 above**". This moves your "**0**" down to row 2.
7. Starting with the zero in box **B2**, type the next number, 1, in the next column of that row, then 2 in the next box, and 3 and so on up to 12. Use TAB to move from box to box across. Then, starting with your **0**, type the same numbers from 1 to 12 going down using ENTER to move down.
8. Finish your multiplication table by typing the appropriate numbers in the boxes to multiply the row number by the number at the top of the column.
9. You have now created data sets—columns and rows of numbers—to use in the next section.

USING GOOGLE SHEETS TO CALCULATE STATISTICS: READ FIRST!

1) Spreadsheets have the capability of performing functions or operations on sets of data. To identify the data to which you want the sheet to apply the function, click on a cell and holding down the mouse key, drag the cursor down and/or to the side to box in or highlight the numbers you want to use. (To make cells wider, click on the line separating rows at the top and drag apart.)

2) Above the spreadsheet, you will see the "formula bar" which is preceded by *f(x)*. The formula used in a given cell (if any) will appear in that bar but in the cell itself will appear the value which is the result of performing that function on a given set of cells, sometimes called "arguments", i.e., independent numbers on which the value of a function depends.

3) To get the sheet to **total** the numbers, in the cell immediately below your list of numbers, type the equals sign (=). The program will suggest functions you may want to apply such as **Average** or **Sum**. It will also highlight the numbers in the column above that cell to ask if those are the numbers you want to use. (This also works for rows but we will use columns in this activity.) To find the total of all the highlighted numbers, click on **SUM**. Make sure ALL the numbers you want to use are highlighted. The program will enter the formula which will add all the data between the top number and the bottom number, inclusive, and it will enter that total in the cell. To find the average or **mean** of the numbers, use the **AVERAGE** command.

4) A spreadsheet can reorder your data so that the numbers appear from lowest to highest or vice versa. On Google Sheets, click on the column of data that you want to put in order, or SORT. Then go to the DATA tab and on the drop down menu, the first line will ask if you want to sort by that column. Click on that command and the program will organize your data from the smallest to the largest number. It will keep the data for each row together so that all of the rows are rearranged which reorganizes all of the data based on your chosen column. (To see this, look at how the years get rearranged.) If you were alphabetizing a list of names, this command would put them in order from A to Z. Once your data is an **ordered set**, you can easily count to the center of the set to locate the middle or **median** value.

5) The **mode**, too, is easily identified once the data set is ordered. It is the number that appears most frequently.

6) To find the **range** of your values, in the cell below the ordered column for which you want the range, write a formula by typing = and then clicking on the highest value (at the bottom of the column) which the program will identify by its column and row. Then type a minus sign and click on the lowest value (at the top of the column). Finally, press the ENTER key on your keyboard and the program will enter the difference between the two numbers.

Use data concerning hurricanes found at:
http://www.stormfax.com/huryear.htm

TASK #2: Read p. 651-654 and then do this activity: FIND MEASURES OF CENTER

- Read the page above on using Google Sheets.
- Open a new spreadsheet and name it (your name and Hurricanes) in the upper left corner of the page.
- Then, using data **from the website above**, copy and paste all the data for storms and hurricanes **from the year 2000** to the most recent year available into

the spreadsheet leaving one or two rows of cells empty above the data so that you can label each row according to what the data set represents according to the website you are using. (You may copy and paste the headings from the very top of the data set on that site.)

- Next, using the information given in **paragraphs 1 - 6 above**, experiment with the spreadsheet to find the following measures of center **for each row of data <u>except</u> the year**. This means you will have to order each data set <u>one at a time</u> before you can easily find these measures in it. So, find all four measures for a set and then reorder by the next column to do the next set.
- To keep your statistics from getting in the way and being reordered with the data each time, go a few columns over from your last data column and make a 4x3 (row x column) chart to put your numbers in. Label each column with the proper name of the data you are using (named storms, hurricanes, major hurricanes) and label each row of the chart according to the values you will show in it in the following order:
    - The **mean** for each row (the average of each of those three lists of numbers)
    - The **median** (the middle number once the numbers are placed in order from smallest to largest, or largest to smallest; it doesn't matter)
    - The **mode**, if any (the number which appears most frequently in a given set of data)
    - The **range** (the difference between the largest and smallest numbers)

TASK #3: <u>Read</u> p. 657 – 661 and do the following activity: MAKE A BAR GRAPH

- Using the same data from Monday's activity, highlight all of the data. Include the headings over each row.
- Then go to the INSERT tab and from the menu, choose CHART. Experiment with the kinds of charts available but your final task is to make a **BAR GRAPH** (Google Sheets calls this a "column chart" so look for that one.) You will need to format the chart by tapping on it to surround it with a blue line and clicking on the three dots that will appear in the upper right corner of the graph. Then, holding down the left mouse button, you can move the chart so that it does not cover your data.
- Explore how to make your graph show the labels you need to display to make the information clear to your reader.
- Next, going back to your data set, explore using the "fill color" key at the top to color the different columns and/or rows of data to highlight important information, e.g., the data given for the year 2005.

- Also, can you discover how to separate the data using lines and borders?
- Place your answer to the following questions in cells several rows below your hurricane data:
    1) Why was the year **2005** important in this project? What was the name of the most important hurricane that year? Ask your parents or research online.
    2) What was different about the year **2013**?

Task #4: Read p. 665-668 and do the following activity: FIND MEASURES OF SPREAD

Using the spreadsheet and data you have been working with this week on hurricanes, consider whether there is an **outlier** in those sets of data. Look at the definition of outlier on p. 666. Then, make another couple of rows for your data chart and after finding the upper and lower quartiles, enter the **5-number summary** as explained on p. 665 in the next row below your data.

Next, following example #2 on p. 666, find the **interquartile range** and enter it in your chart. See if any number falls outside that range in the data sets. **If there is an outlier**, enter it in the row below the interquartile range.

Task #5: MAKE A PREDICTION.

Write a paragraph summarizing all the work you did in analyzing the number and strength of storms for this century so far. Include answers to the following questions: What did you find interesting about this project? Which measure of center best describes this data? What did you learn about outliers and interquartile range? Make a prediction based on this project about the number of hurricanes we can expect to have this year and describe your reasoning.

Make sure you **use complete sentences** to answer the questions above. If you just say, "Yes, I did" or "No, I can't," how would the reader know what you are talking about? Assume your reader does not know my instructions concerning what should be in the paragraph.

YOUR GRADE:

- Save your work. Google does this automatically but make sure you have named it so that it is identifiable as yours. This project will earn points for next year. Up to 5 bonus points will be added to your first quiz grade for your performance on this assignment.
- During the first week of school, you will be added to the Algebra Google Classroom where you will submit it online for credit.
- **SUBMIT ALL DOCUMENTS THROUGH GOOGLE CLASSROOM, PLEASE.**