Got a Minute?

NAME:_____

You and your classmates will conduct an experiment to see how many times an action can be repeated in one minute.

Let's start with you writing your predictions for each of these three events.
How many do you think you can accomplish in one minute?
Now your teacher will time you as your class performs the activities.

TASK	PREDICTION	ACTUAL
Draw 5-pointed Stars		
Tap your foot		
Flap arms up and down		

What did you expect in performing these tasks? Did you over-, or under-, estimate your actual performance?

Were you surprised by your results? Explain.

Think up some other tasks you could repeat many times in one minute.

Gather data from your group / room about the actual counts and create a stem-and-leaf graph. Remember, only the units digit goes in the rightmost column, and be sure they are in ascending order. (If you're going to analyze more than one activity, you'll need to make another stem-and-leaf plot on a piece of paper.)

STEM   LEAF   Raw Data

Now set up a dot plot using the data

Examine the plot and discuss it with your group.
        How are the data spread out? What does it look like?

        Are there any clusters? Any gaps?

        Look at what you wrote about the shape and spread of the data. What conclusions could you draw about the class's ability to perform this repeated activity?

Let's look at a Box and Whisker Plot

First – what is a box and whisker plot?

These plots allow people to explore data and to draw informal conclusions from a set of data. It shows only certain statistics rather than all the data. Another name commonly used for this graphic is a ***Five-number summary***. The five-number summary consists of the median, the quartiles, and the smallest and greatest values in the distribution. A box-and-whisker plot displays the center, the spread, and the overall range of distribution of our data values.

Let's look at the five numbers that make up the summary in some more detail:

First, what is the range of your data – that is, what is the smallest and largest values in your data?

What is the minimum and the maximum values in your data?

Now find the ***median:*** The median is the value exactly in the middle of an ordered set of numbers. If there is an even number of values, the median is the mean (or mean) of the two middle numbers.

What is the MEDIAN of your data?

Next, we evaluate only the values to the left of the median: We now find the median of this set of numbers. Remember, the median is the value exactly in the middle of an ordered set of numbers. This number is the ***lower quartile number (also called Q_1)***.

What is the LOWER QUARTILE of your data?

Now to the values to the right of the median: We now find the median of this set of numbers. This is called the ***upper quartile number (also called Q_3).***.

What is the UPPER QUARTILE of your data?

Now we are ready to find the ***interquartile range (IQR).*** The interquartile range is the difference between the upper quartile and the lower quartile. The IQR is a very useful measurement. It is useful because it is less influenced by extreme values, it limits the range to the middle 50% of the data values. It is also used to find ***Outliers***, which are data values that skew the analysis of the quartiles and median. (Ask your teacher for more information on finding outliers)

What is the IQR of your data?

Now we'll enter the data in to the TI NSpire. Follow the direction of your teacher carefully so that we may examine the data correctly.

-Open a new document and select **3:Lists and Spreadsheets**

-Use the arrow key to move to the top of the "A" column and give it a name

-Use your stem-and-leaf table to enter the data in to your newly-named column,
   beginning on line 1.
   Be sure to enter all the data (if there are 4 36s enter 36 four times)

-When all the data are entered press **Menu** and select **4:Statistics**

   -Select 1:Stat Calculations

   -Select **1:One-Variable Statistics**
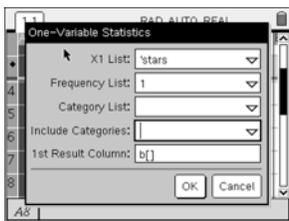
-Since we're using List A, please accept 1 for the number of lists to be used and click on "OK."

-Select the name of your list from the drop-down box

-We'll be using the list one time

-And we'll put the Results in the next column (column b)

-The results will post across columns b and c.

To investigate the data we can move around in column c.

   (The labels for the values are in column b)

   -First find the value "n" in Column band make sure it
      matches the number of data elements you collected.

   -Now find the values for the Five-Number Summary:
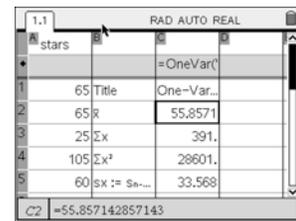
   Minimum Value: _____
   First (Lower) Quartile (Q₁): _____
   Median Value: _____
   Third (Upper) Quartile (Q₃): _____
   Maximum Value: _____

   - What other values are you provided?

Can you find the Mean?

Finally – let's look at the data. We've already input the data, so let's start with opening a new page to graph it.

    -Select the **Home** button and then **5:Data & Statistics**

        This opens a plot area and scatters the data you gave across the page.

        -Do you see all the data points?

        -Do you see anything 'wrong' with the display?
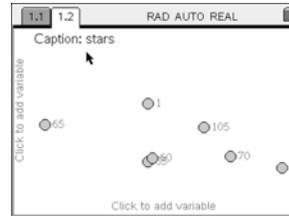
We need to give the data some order. Use your cursor to highlight the lower "**Click to add variable**" - as your cursor hovers over the area, you will be offered a list to use as the name. The NSpire uses this to properly align the data and set the scale of the plot.

    -What does this plot look like?
        (Hint: Look at page 2 of this worksheet)

    -Sketch the plot here.

    -How much does your plot (on page 2) resemble this one?

Alright! Let's look at another representation of the data - the Box and Whisker Plot (sometimes just called a Box Plot):

   In the area below, label the points on the horizontal axis with the 5 number summary:
     (Labeling the vertical axis is not necessary - we're only graphing one variable)

    -Mark the values in the quadrant by drawing short, vertical lines. Connect the five lines (through roughly the middle) and connect the top and bottom of the middle three - forming a box of those three. (⊢▯▯⊣)
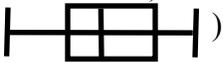
   You've created a Box-and-Whisker Plot!

Now let's see how the NSpire does this.

   -Open a new page by selecting **Home** and then **5:Data & Statistics**
     Once again, you will need to order the data by selecting your named list for the
     variable on the bottom of the screen.
   -Push the **Menu** button and select **1:Plot Type**
     -From the sub-menu select **2:Box Plot**

   -Sketch the Box Plot here:

   Label the plot. How do you know what values were used by the NSpire to set the plot up? Can you find them?