Graph My Center
ID: 10896

<div align="right">

Time required
30 minutes
</div>

Activity Overview
In this activity, students will be able to create a box plot or histogram. They will find measures of central tendency and identify which best describes the data set. This activity is intended to be a teacher-led discussion, but can be done using the student worksheet.

Topic: Graphing and Numerical Distributions
- *Graphing quantitative data*
- *Measures of central tendency*

Teacher Preparation and Notes
- *Teacher should know how to graph a histogram and box plot using TI-Nspire technology. This is described in the teacher notes.*
- *Students will have different opinions about the centers. Allow discussion, asking for justifications to enable students to better determine how a mean and median can be estimated from a graph. While this activity can be done independently with a basic knowledge of graphing using the Data & Statistics application, it is intended to be a teacher-led activity with class discussion. The questions on the student worksheet can be used as discussion questions.*
- ***To download the student and solution TI-Nspire documents (.tns files) and student worksheet, go to education.ti.com/exchange and enter "10896" in the quick search box.***

Associated Materials
- *StatWeek01_GraphMyCenter.tns*
- *StatWeek01_GraphMyCenter_Soln.tns*
- *StatWeek01_GraphMyCenter_worksheet_TINspire.doc*

Suggested Related Activities
- *A Data and Statistics Example — 9674*
- *Distributions of Data — 10209*

Part 1 – Graphing Histograms

Students are given a spreadsheet with data about fifty pro-football players. The spreadsheet consists of four variables for each player. Students need to create a histogram each of the four variables on pages 1.6 to 1.9.
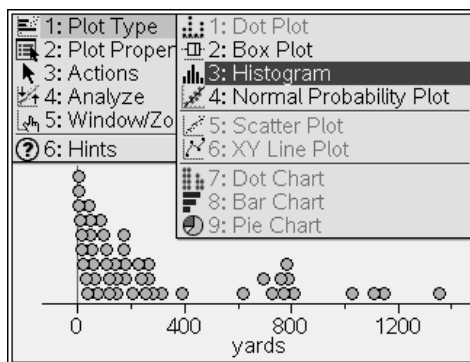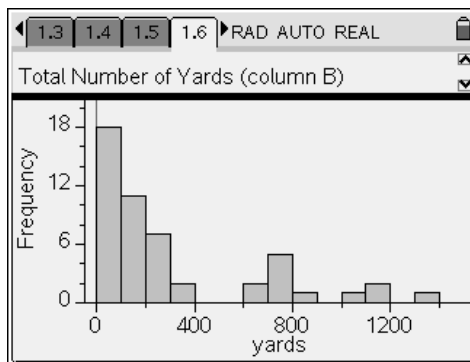
To graph a histogram:

On the *Data & Statistics* page, click on "Click to add variable" at the bottom of the screen. Choose the desired variable (the title of the column on the *Lists & Spreadsheet* page). The graph created will be a dot plot.

Press **MENU > Plot type > Histogram**. This will change the graph to a histogram.

They should describe the shape of the histogram and estimate the center (both mean and median). The answers can be written on the student worksheet or be part of a class discussion.

Students may need a review of terms to describe a distribution such as symmetric, uniform and skewed. Outliers, while not yet defined, should be discussed.

Part 2 – Graphing Box plots

Students now need to change each of the histograms to a box plot. To do this, they can press **MENU > Plot Type > Box Plot**.
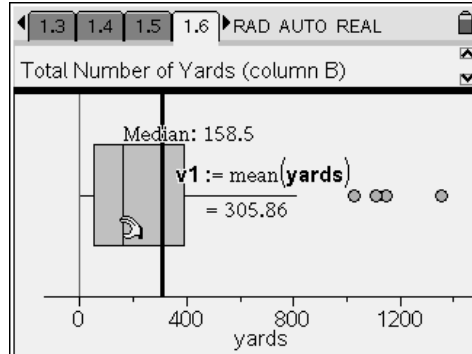
The handheld automatically shows the outliers as separate points. To extend the whiskers to include the outliers, students can press **MENU > Plot Properties > Extend Box Plot Whiskers**.
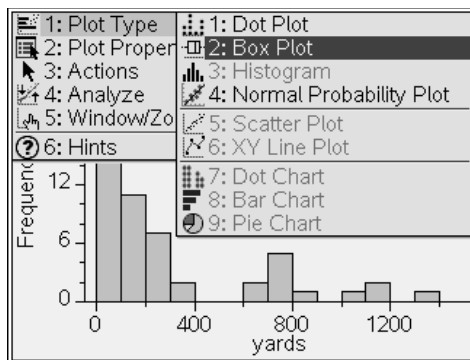
Discuss how the shape of the histogram determines the lengths of the 4 parts of the box plot. Also discuss how the shape of a symmetric or skewed histogram is seen in a box plot, how outliers denoted, where the mean and median are located.

| 1.3 | 1.4 | 1.5 | 1.6 | ▶RAD AUTO REAL |
Total Number of Yards (column B)
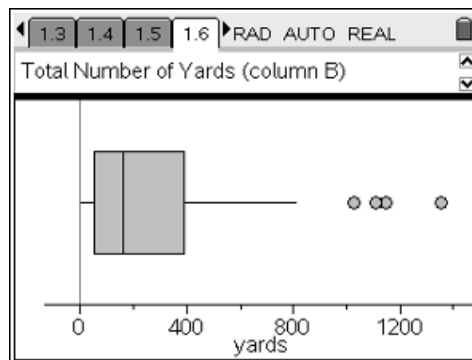
There a couple different ways for students to calculate the mean and the median for each data set. The first way uses the *Data & Statistics* page on which the box plot appears. Students need to press **MENU > Analyze > Plot Value**. In the box that appears, they are to type **mean(variable)** or **median(variable)**, replacing the word variable with the name of the data set used on the page.

| 1.3 | 1.4 | 1.5 | 1.6 | ▶RAD AUTO REAL |
Total Number of Yards (column B)
Median: 158.5
$v1 := \text{mean}(\textbf{yards})$
$= 305.86$

The second way students can calculate the mean and the median is to insert a *Calculator* page and use the command mean() and median(), inserting the name of the data set between the parentheses. To change the fraction to a decimal, press **MENU > Number > Convert to Decimal**.
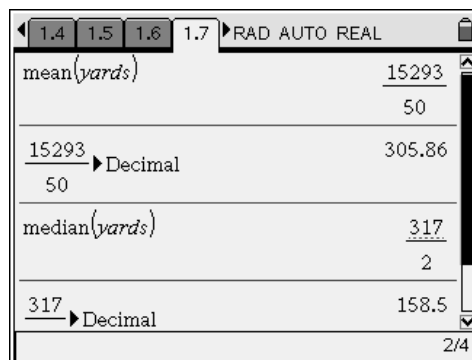
Have students compare their estimations with the actual values. Discuss the reasons for the discrepancies between the estimations and the calculations. Emphasize the relationship between the graph and the position of the mean versus the median.

| 1.4 | 1.5 | 1.6 | 1.7 | ▶RAD AUTO REAL |
$\text{mean}(yards)$ — $\dfrac{15293}{50}$
$\dfrac{15293}{50}$ ▶Decimal — 305.86
$\text{median}(yards)$ — $\dfrac{317}{2}$
$\dfrac{317}{2}$ ▶Decimal — 158.5
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Possible Extensions – Creating data sets

- Students can find or create a data set with given objectives (i.e. skewed to the right, symmetric, mean greater than the median)
- Students can compare two data sets and draw conclusions based on the graphs.
- Students can drag an outlier and investigate the effect an outlier has on the shape of the histogram and box plot.