

Name: \_\_\_\_\_

Date: \_\_\_\_\_

### Lab TI-Nspire™ icebreaker height analysis

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DEG APPRX REAL

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Goal: Participants will make measurements with meter sticks and then analyze height data with the TI-Nspire™ calculator using lists and graphs. It is the intent of this activity to provide a relatively easy and quick “ice-breaker” introduction to the use of the Nspire™ calculator.

#### Step 1: Collect data

The instructor(s) will write **height** (in cm) on an appropriate surface in the classroom and each participant will write their height, in cm on the list. The participants will measure the height of their partner with two meter sticks. Since each meter stick is 100 cm, the sticks can be stacked and the centimeter number on the top stick is added to the 100 on the lower stick.

Ex:      Height (in cm)

172  
160  
135  
176  
170  
110  
120  
163  
178  
172  
188  
55

We will analyze this data on the Nspire.

## Step 2: Data analysis

Home

New Document

Add Lists and Spreadsheets

Click

Use the navpad to go to the A cell at the top left corner of the spreadsheet and type **height**. This defines our data. Use the navpad to go to the first data cell 1 below. Do not type anything into the diamond (formula) row.

In the data cells below enter the height data.

Type **each number** sequentially in each of the lower cells pressing navpad down after each entry. Continue the process until you have entered all of the numbers in the list.

Graphical analysis of data from height list:

Home

Data and Stats

Click

Use the navpad to move the arrow to the bottom of the screen and click on the box. Select **height** and Click.

This is a **dot plot** of the data from the data we entered.

We will now copy the page so that we can modify it.

Control navpad up (takes us to thumbnail sketches of screens).

Control and Menu

Copy, click

Control and Menu

Paste, click

Control navpad down (returns us to a regular view of screen).

Menu

Plot Type

Navpad right or click

Select **Box plot** and click.

Use the navpad to move the arrow to the right side of the box plot on the line (whisker). It will form a hand. Notice the number that appears. This is called an outlier; basically a number that doesn't represent the main values of all of the data.

Next, move until you reach the right edge of the box. Q3 is the 75<sup>th</sup> percentile.

Continue to move the hand until you reach the next vertical line. This represents the median or the 50<sup>th</sup> percentile, the point at which half of the data lies above and half lies below.

The left side of the box is the 25<sup>th</sup> percentile and the left whisker also represents outliers with low values.

We will now copy the page again so that we can modify it.

Control navpad up (takes us to thumbnail sketches of screens).

Control and Menu

Copy, click

Control Menu

Paste, click

Control navpad down (returns us to a regular view of screen).

Menu

Plot Type

Navpad right or click

Select **Histogram** and click.

Using the arrow to click on a bar to show its # of cases and % of total data.

We will now copy the page again so that we can modify it.

Control navpad up (takes us to thumbnail sketches of screens).

Control and Menu

Copy, click

Control Menu

Paste, click

Control navpad down (returns us to a regular view of screen).

Menu

Plot Type

Navpad right or click

Select **Normal Probability Plot** and click.

Notice the 0.0 line which represents the median. Count the number of data points above and below the line. Remember, the median is the point at which half the data is above and half the data is below.

Check out the equation: the top number represents the average of the data and the number on the bottom indicates the amount of deviation from the average seen in this sample.

In the example performed, the average is  $149.917 \pm 38.4837$ . This means that the range of heights in the sample is somewhere between  $149.917 - 38.4837 = \underline{\hspace{2cm}}$  and  $149.917 + 38.4837 = \underline{\hspace{2cm}}$ .

Since probability deals with standard deviation, the numbers here indicate the values present 68% of the time (the values within 1 standard deviation 32% above and 32% below the middle point on a bell curve). This explains why the lowest data point is not included in the range calculated above.

### **Step 3: Conclusions**

**Using ctrl and navpad left, review the previous screens and answer the following:**

**Normal Probability plot:** What is the average height of the sample according to the data provided?

**Histogram:** Which height is the most common according to the data provided?

**Box plot:** What was the median point of the sample?

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