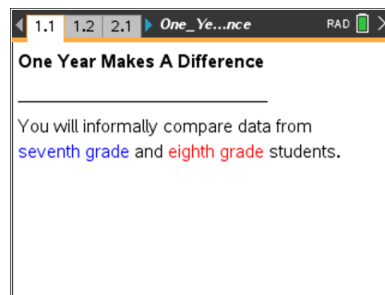




Open the TI-Nspire™ document *One\_Year\_Makes\_A\_Difference.tns*.

In this activity, you will construct and interpret box plots and histograms of data to draw informal comparative inferences about two populations. You will examine given bench press data, height data, and shuttle run data.



- The table below shows bench press strengths of 20 seventh grade male students and twenty eighth grade male students collected at the beginning of a strength-training unit in Physical Education. Does this data suggest any differences in the seventh and eighth grades? Compute and compare the minimums, medians, and maximums to support your answer.

7 <sup>th</sup> Grade Bench Press (lbs)				8 <sup>th</sup> Grade Bench Press (lbs)			
84	98	112	120	82	106	116	126
88	98	114	120	94	106	122	126
90	102	116	124	98	110	124	128
94	104	118	124	100	110	124	136
94	108	118	132	104	112	124	162

Move to page 1.2.

- The variables **grade8\_bp** and **grade7\_bp** are stored in this document, so you can select them to be plotted on the coordinate axes. To display a box plot, follow these steps:
  - Select the **add variable** text at the bottom of the page, and select the variable **grade7\_bp**.
  - Select **MENU > Plot Properties > Add X Variable** and select the variable **grade8\_bp**.
  - Select **MENU > Plot Type > Box Plot**.
  - Move the cursor over each part of the box plots to reveal the values for the five number summaries.

**Tech Tip:** Tap the *add variable* box on the x axis and then select the variable **grade7\_bp**. Select **> Plot Properties > Add X Variable** and select the variable **grade8\_bp**. Then create the box plot by selecting **> Plot Type > Box Plot**. **> Plot Properties > Extend Box Plot Whiskers** can also be selected.



3. Explore the box plots, and answer the following questions:

a. Find the five number summaries for the data sets and record them in the table below.




Grade	Minimum (lbs)	Lower Quartile (lbs)	Median (lbs)	Upper Quartile (lbs)	Maximum (lbs)
7th					
8th					

b. Describe the similarities and differences in the five number summaries and the box plots.

c. Describe any differences you find between the 7<sup>th</sup> grade and 8<sup>th</sup> grade data using the five number summaries and the box plots.

4. Suggest other plots that could be used to compare these sets of data.

5. Change the Box Plot to a Histogram by selecting **MENU > Plot Type > Histogram**.

 **Tech Tip:** Change the Box Plot to a Histogram by selecting  > **Plot Type > Histogram**. Note that in some cases, a student may need to back-out to the main Tools Menu  to see the desired menu option.

6. Describe the histograms. What are the most frequent intervals for each data set? What are the overall shapes and positions of the distributions? Explain your reasoning.

**Move to page 2.1.**

7. Do you think that young women grow much between the start of seventh grade and the start of eighth grade? The table on the next page contains the heights in inches measured at the start of each school year. Recall the interquartile range (IQR) is the difference between the upper and lower quartile while the range is the difference between the maximum value and minimum values of a data set.



Seventh Grade Height (in.)				Eighth Grade Height (in.)			
55	56	61	65	59	64	66	67
56	57	61	65	60	64	67	68
56	57	63	65	60	65	67	69
56	57	63	67	61	65	67	69
56	59	63	67	62	65	67	69

- a. Compute the five number summary, the interquartile range, and the range for each data set, and record them below.

Grade	Minimum	Lower Quartile	Median	Upper Quartile	Maximum	Interquartile Range	Range
7th							
8th							

- b. Does this data suggest that there is a difference between the heights? Support your answer using the data found in the table.
8. Create box plots for the data as before, and verify the computations for the five number summaries, the interquartile ranges, and the ranges. What does the box plot show, if anything, that the computed statistics did not? Explain.
9. Now construct and describe the histograms for these data sets. Compare the shapes of the histograms. Are there gaps or clusters? Explain your reasoning.

Move to page 3.1.

10. Do you think that young men get much faster between the start of seventh and the start of eighth grade? The table below contains the shuttle run times in seconds measured at the start of each school year.



Seventh Grade Shuttle Run (sec)				Eighth Grade Shuttle Run (sec)			
6.0	7.9	9.0	12.9	6.3	7.3	8.2	9.0
6.3	8.1	9.3	13.1	6.5	7.7	8.4	9.3
7.0	8.1	10.0	13.6	7	8.0	8.5	9.6
7.1	8.2	11.7	13.6	7.1	8.1	8.6	10.
7.5	8.8	12.3	14.2	7.3	8.1	9.0	10.5



- a. Compute the five number summary, the interquartile range, and the range for each data set, and record them below.

Grade	Minimum	Lower Quartile	Median	Upper Quartile	Maximum	Interquartile Range	Range
7th							
8th							

- b. Does this data suggest that there is a difference between the times? Support your answer using the data in the table and the relative sizes of the interquartile ranges and the ranges.
11. Create box plots for the data, and verify the computations for the five number summaries, the interquartile ranges and the ranges. What does the box plot show, if anything, that the computed statistics did not? Explain.
12. Create the histograms, and then describe them. Compare the shapes of the histograms. Are there gaps or clusters? Explain your reasoning.
13. Adjust the bin widths of the histograms by selecting **MENU > Plot Properties > Histogram Properties > Bin Settings > Equal Bin Width**. Change the bin width to 0.25. What is the impact on gaps and clusters?

 **Tech Tip:** Adjust the bin widths of the histograms by selecting  **> Plot Properties > Histogram Properties > Bin Settings > Equal Bin Width**. Then select the cell for “Width” and type in 0.25.