Analyzing Country Data
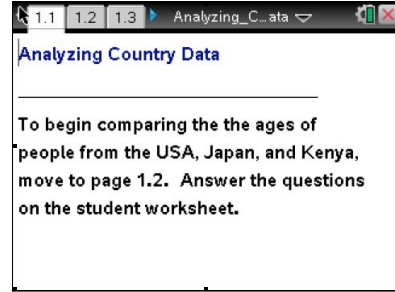## Student Activity

Name _____

Class _____

Open the TI-Nspire document *Analyzing_Country_Data.tns.*

This investigation will compare and contrast the population distributions of the United States, Kenya, and Japan. Issues related to commerce, health, transportation, and education are related to the information in this investigation.

According to the 2010 US Census, nearly 15% of the population is 45 to 54 years old. A summary of the USA population from birth to over 100 years old indicates that more people are 45 to 54 years old than any other 10-year age group. What challenges does this pose for the United States? Does this affect teenagers or people who are younger? In what way could these data explain some of our challenges in education, health care, transportation?

Other countries have challenges and opportunities based on different distributions of their population. How might other countries benefit by studying Japan or Costa Rico's special demographics? (See Bluezones.com)

Move to page 1.2.

Press `ctrl` ▶ and `ctrl` ◀ to navigate through the lesson.

1. The spreadsheet shows a sample of the ages of 200 people from each of the United States, Kenya, and Japan. The numbers have been rounded to the nearest integer not larger than the number, so a "2" in a cell indicates someone who is two years old but not yet three.

    a. Identify the age of the youngest person and the age of the oldest person in each of the three samples.

Country	Youngest	Oldest
USA		
Kenya		
Japan		

    b. Based on the list of ages from each sample, how do you think a summary of the population of the USA differs from the population of Kenya? In a similar way, how would a summary of the USA population differ from a summary of the population of Japan? Explain your answers.

Move to page 1.3.

This page displays a relative frequency histogram of the sample population of the USA compared to a relative frequency histogram of the sample population of Kenya based on the two samples.

2. Describe at least two differences between the histogram of the USA sample and the histogram of the Kenya sample.

3. Move the cursor over the bins in the histogram.

    a. Stop the cursor at the first bin for the USA. What ages are represented by this bin? How many people from the sample does this bar represent?

    b. What is the approximate percent of the Kenya sample representing 0, 1, 2, 3, and 4-year olds? How many people does that percent represent?

    c. What percent of the sample population in each of the two countries is under 30 years old? Explain how you found your answer.

    d. What percent of the sample population in each of the two countries is 65 and older?

    e. Based on the differences in the percents derived from the samples, would you change your previous descriptions of the population distributions of these two countries? Why or why not?

    f. How is using histograms to compare the population samples from the two countries different from using spreadsheets?

4. a. What ages are summarized by [10,15)?

    b.   What percent of the sample is in that age interval?

    c.   Without using the spreadsheet of the actual data, develop an estimate of the percent of people in this interval who are 13 or 14 years old. Explain how you derived your estimate.

    d.   Based on your estimate in c, what percent of the USA sample are teenagers (13 to 19 years old)?

    e.   In a similar way, estimate the percent of the Kenya sample who are teenagers.

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5. a.   What is the approximate percent of the sample population of Japan in the age bracket [0,5) years old?

    b.   What percent of the Japanese sample population is under 30 years old?

    c.   What percent of the Japanese sample population is 65 and older?

    d.   Using the numbers in the USA and Japan who are in [0,5) age range and those 65 and over, compare the ages of people in the USA and in Japan. Explain your thinking.

6. Estimate the percent of teenagers in Japan in a way similar to the one you used to estimate the percent of teenagers for the USA and Kenya.

Move to page 1.5.

7.   Which country do you think is represented by the boxplot for *country_x*? Which country do you
     think is represented by the boxplot for *country_y*? Explain your reasoning.

8.   Move the cursor over the boxplots on Page 1.5, and fill out the tables for each country.
     a.   USA sample:

Minimum age	Q1	Median Age	Q3	Maximum age

     b.   country_*x:*

Minimum age	Q1	Median Age	Q3	Maximum age

     c.   country_*y:*

Minimum age	Q1	Median Age	Q3	Maximum age

9.   What additional information do the boxplots provide that were not provided in the histograms?

10. The population of the United States according to the US Census Bureau in 2000 was approximately
     285 million people.
     a.   If the USA sample provided in this investigation were representative of the United States, what
          is an estimate of the number of people 0 to 9 years old?

b. If another sample of 200 people were obtained from the USA population, do you think you would get the same percent of people 0 to 9 years old? Why or why not?

c. Statistical techniques suggest that the variation in estimates from sample to sample for a sample size of 200 is about + or -7%. For the percent of the 0 to 9-year olds from the sample, what interval of percents might be seen in multiple samples of size 200?

d. Given that there are about 285 million people in the USA, use your answer in part c to determine a reasonable range of estimates for the number of people in the USA who are 0 to 9 years old.

11. The estimated population of Kenya in 2000 was 31 million people, and the estimated population of Japan in 2000 was 127 million people. Use the information about the samples of 200 people in each country in the .tns files and the +/- 7% rule to estimate the number of people within the age categories specified in the table.

	United States	Kenya	Japan
Ages 0-9			
Sample percent			
Interval			
Estimated number of people			
Older than 65			
Sample percent			
Interval			
Estimated number of people			
Teenagers (13-19)			
Sample percent			
Interval			
Estimated number of people			

Extension:

Create your own country that has the following characteristics:

- The total population of your country is approximately 140 million people who are 0 to 100 years old.

- The percent of people 0 to 9 years old is 15%.

- The percent of people 65 to 100 years old is 25%.

- The median age is approximately 37 years old.

1. Create a sample of 200 people for your country in the spreadsheet. Be sure to label the country at the top of the column.

2. Insert new pages (ctrl I), and graph a histogram and boxplot of your sample.

3. Compare your country's histogram and boxplot to the United States. (Don't forget to name your country!)

   - Refer to the Statistics Nspired Activities *Creating Multiple BoxPlots* and *Creating Histograms* if you need help making these plots.