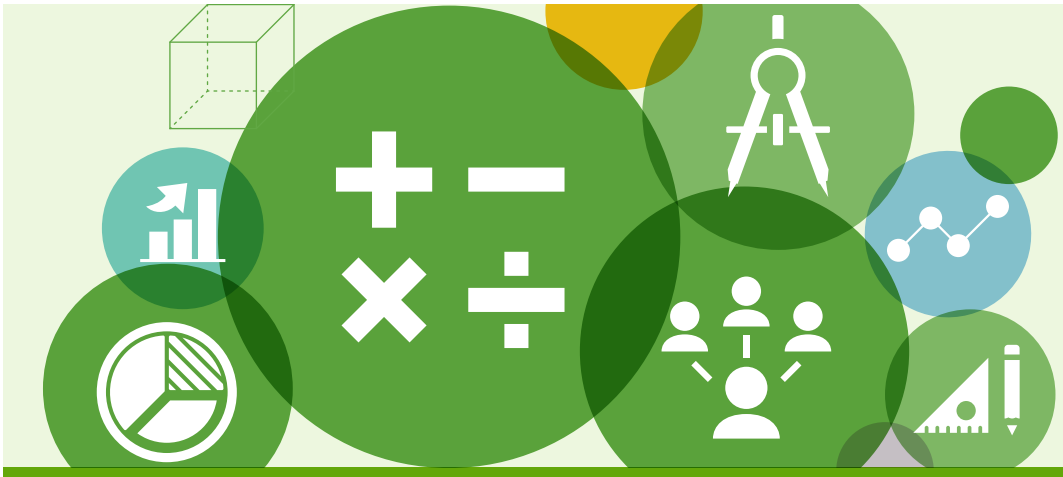


STUDENT VERSION

DOES THE PERCENTAGE OF PEOPLE WHO WALK TO WORK IN CITIES VARY WITH POPULATION SIZE?

Activity Item

The following item is part of this activity and appears at the end of this student version.

- Table 1: 15 Walk-to-Work Cities in the United States, 2019

Student Learning Objectives:

- I will be able to create box plots using census data.
- I will be able to compare my box plots to investigate differences in center and variability.

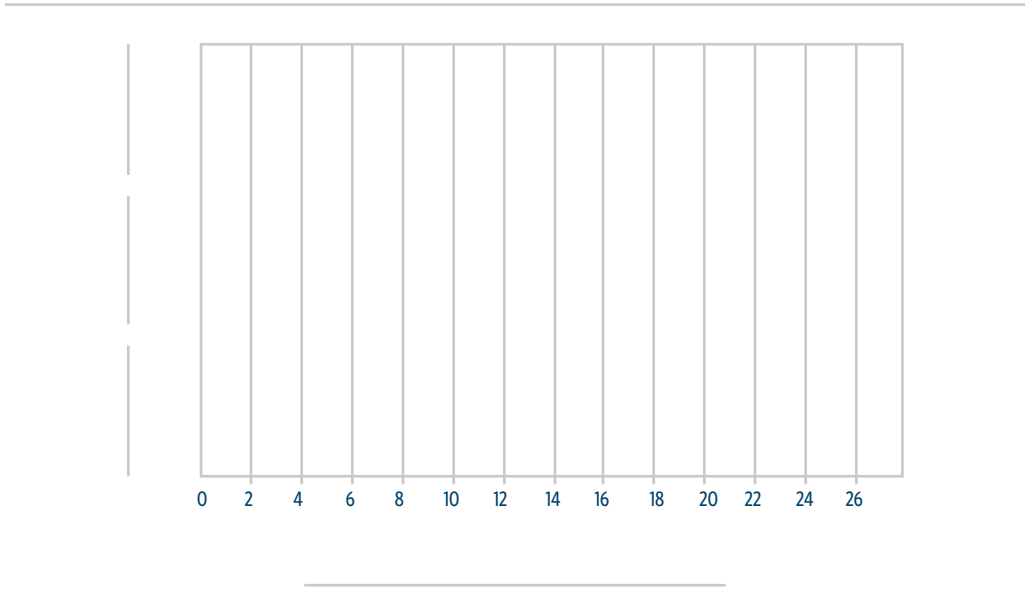
NAME:_____ DATE:_____

In this activity, you will examine the percentages of people who walk to work in cities of different worker sizes — small, medium, or large — to learn about variability.

Part 1 – Create Box Plots

Using the data in **Table 1: Walk-to-Work Cities in the United States, 2019**, create three box plots, one for each size category, on the graph template below. Stack your box plots one above the other (it doesn't matter which is on top). Make sure that you:

- Round your data points to one decimal place, and write them in the spaces provided below the number line.
- Use a ruler to make each box plot neat.



- Title each box plot in the spaces provided next to the vertical axis, add an overall title for your graph, and label your horizontal axis.

Small Cities: minimum = _____ Q_1 = _____ median = _____ Q_3 = _____ maximum = _____

Medium Cities: minimum = _____ Q_1 = _____ median = _____ Q_3 = _____ maximum = _____

Large Cities: minimum = _____ Q_1 = _____ median = _____ Q_3 = _____ maximum = _____

Part 2 – Examine and Compare Your Box Plots

1. What is being measured for the variables in all three box plots?

2. How do the medians of your three box plots compare?

3. How do you think the means for each box plot would compare with the medians for that same box plot? How about across box plots?

4. Calculate the interquartile range for each box plot:

   - Small Cities: _____ percentage points
   - Medium Cities: _____ percentage points
   - Large Cities: _____ percentage points

   a. What do these numbers tell you, in terms of variability?

5. Do you think there are any outliers in the data for small cities? If so, list the data values and explain why you think they are outliers.

6. When looking at the data in **Table 1**, do you notice any interesting features that are not captured in the box plots? If so, what are they?

7. Write three statements that compare and contrast your box plots:

   1.

   2.

   3.

8. How many of the small-city data points are greater than the maximum of the medium-city data points? Write your answer as a proportion.

9. What does it mean that the first quartiles for medium and large cities are similar?

Part 3 – Write a Report About What You Learned

Write a three-paragraph report, with a title, about what you learned in this activity. In the first paragraph, summarize what you discovered about the percentages of people who walk to work in the different cities and how that information helps (or doesn't help) you answer this question: "Does the percentage of people who walk to work in cities vary with population size?" In the second paragraph, give specific examples to support your points, being sure to use good mathematical language. In the third paragraph, discuss how these data are important — specifically how city governments could use them.

Table 1: 15 Walk-to-Work Cities in the United States, 2019

Rank	Large Cities (≥200,000 workers)	Percent of residents 16 and older who walk to work	Medium Cities (>100,000 and <200,000 workers)	Percent of residents 16 and older who walk to work	Small Cities (>20,000 and ≤100,000 workers)	Percent of residents 16 and older who walk to work
1	Boston, MA	16.8	Pittsburgh, PA	11.2	Columbia, SC	24.7
2	Washington, DC	13.4	Madison, WI	10.1	Cambridge, MA	23.5
3	San Francisco, CA	12.9	Honolulu, HI	8.4	Jacksonville, NC	15.6
4	Seattle, WA	10.7	Norfolk, VA	8.3	Iowa City, IA	13.2
5	New York, NY	10.3	Jersey City, NJ	7.0	Ann Arbor, MI	13.2
6	Philadelphia, PA	8.5	New Orleans, LA	6.2	Berkeley, CA	12.3
7	Minneapolis, MN	7.7	Cincinnati, OH	6.1	Bloomington, IN	12.1
8	Chicago, IL	6.6	Buffalo, NY	6.0	Flagstaff, AZ	12.0
9	Baltimore, MD	6.6	Cleveland, OH	5.4	Miami Beach, FL	11.8
10	Portland, OR	6.3	San Juan, PR	5.2	Somerville, MA	11.3
11	Atlanta, GA	5.6	Newark, NJ	4.6	Union City, NJ	11.1
12	Denver, CO	5.5	St. Louis, MO	4.5	Evanston, IL	10.9
13	Miami, FL	4.8	Richmond, VA	4.4	New Haven, CT	10.1
14	Milwaukee, WI	4.4	Salt Lake City, UT	4.3	Albany, NY	9.8
15	Detroit, MI	3.5	St. Paul, MN	3.5	Syracuse, NY	7.8

Source: *COMMUTING CHARACTERISTICS BY SEX 2019: ACS 1-year Estimates*

Large Cities

Medium Cities

Small Cities