

Comparing Data Sets

MAIN IDEA

Compare and analyze two data sets by using graphical displays.



7.S.3 Analyze graphical displays of two distributions of data in terms of their shape, measures of center and variability. Also addresses 7.S.3.1, 7.S.3.2, 7.S.3.3.

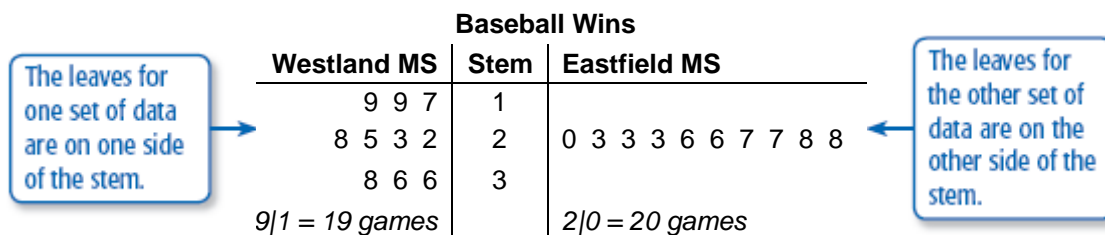
GET READY for the Lesson

BASEBALL The table shows the number of wins of two middle school baseball teams for the past ten years.

Westland MS	36	38	36	22	19	23	17	25	28	19
Eastfield MS	26	23	23	28	26	20	27	23	28	27

- Which team had a greater range of wins?
- What is the mean number of wins for each team?

When comparing two or more sets of data, it may be helpful to use graphical displays of the data. A **back-to-back stem-and-leaf plot** can be used to compare the wins of the two teams. The data in the table above is shown in the back-to-back stem and leaf plot.



EXAMPLE

Back-to-Back Stem-and-Leaf Plots

1

Analyze the data in the back-to-back stem-and-leaf plot shown above.

- a. Which middle school has a more consistent number of wins?**

Explain.

Eastfield Middle School; All of the data values appear in one stem while the data values for Westland Middle School are spread out over three stems.

- b. Find the median number of wins for each team.**

Since the values are in numerical order, find the middle value for each team. There is an even number of values, so find the mean of the fifth and sixth value.

$$\text{Westland MS} = \frac{23 + 25}{2} = 24 \qquad \text{Eastfield MS} = \frac{26 + 26}{2} = 26$$

The median number of wins for Westland Middle school is 24, and the median number of wins for Eastfield Middle School is 26.



CHECK Your Progress

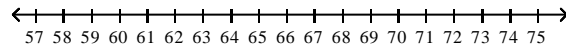
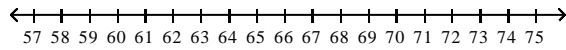
- a.** Describe and compare the shapes of the stem-and-leaf plots for each team.

EXAMPLE**Double Dot Plots****2**

The table shows the number of minutes Katie and Danielle trained for a cross-country run. Create a double dot plot of the data. Then compare the data.

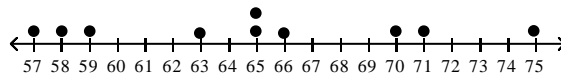
Katie		Danielle	
65	75	70	72
70	58	68	70
57	59	71	73
63	65	67	74
66	71	72	71

STEP 1 Draw and label two number lines with the same scale as shown below.

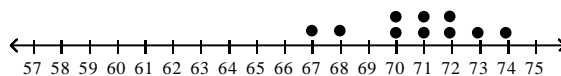


STEP 2 Let each number line represent one girl's training times. Graph each training time by placing a dot above the corresponding number on the number line. Include a title for each graph.

Katie's Training Times (min)



Danielle's Training Times (min)



STEP 3 Compare the data.

- Katie's times are spread out while Danielle's times are clustered together.
- Danielle's times have no gaps while Katie's times have three gaps: between 59 and 63, between 66 and 70, and between 71 and 75 minutes.
- Danielle's times peak between 70 and 72 minutes while Katie's times peak only at 65 minutes.

**CHECK Your Progress**

- b. Create a double dot plot of the data for the two baseball teams on the previous page. Then compare the data.

Recall that a histogram is a special kind of bar graph that represents the frequency of numerical data that has been organized into equal intervals. You can represent two different sets of data organized into the same intervals by using a **double histogram**. One type of double histogram places the bars for the same interval side by side.

EXAMPLE

3

MAGAZINES The number of magazines sold by each student in Room 102 and Room 104 is shown in the stem-and-leaf plot. Create a double histogram.

Magazines Sold		
Room 102	Stem	Room 104
9 8 7 7 5 2	0	1 2 4 8 9 9
6 6 4 4 3	1	0 0 1 1 2 5 6 6
8 4 3	2	0 5 6
5 5 3	3	
0	4	
	5	1

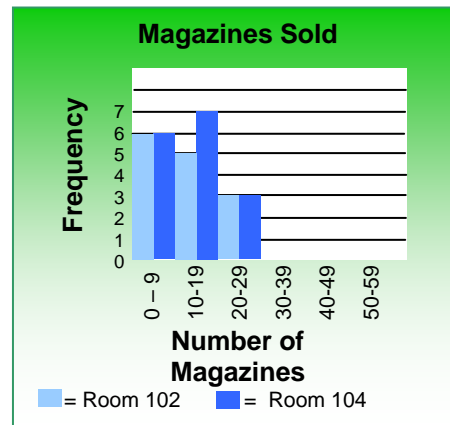
3|2 = 23 magazines

2|5 = 25 magazines

STEP 1 Draw and label the horizontal and vertical axes. Add a title.

STEP 2 There will be two different bars for each interval. Add a key to show which bar will represent each room

STEP 3 Draw a bar to represent the frequency of each interval for each set of data.



CHECK Your Progress

- In which interval(s) did Room 104 sell more magazines than Room 102? fewer magazines?
- Which graphical display, the double stem-and-leaf plot or the double histogram, is better for finding the mean, median, mode, or range? Explain.



CHECK Your Understanding

Example 1 1. **COUNTIES** The number of counties for certain western and northeastern states are shown.

- Which region has more varied numbers of counties?
- Describe and compare the shapes of the each stem-and-leaf plot for the two regions.
- Find the mean, median, mode and range for each of the regions.

Number of Counties by Region		
Western States		Northeastern States
	0	3 5 8
7 5	1	0 4 4 6
9 3	2	1 4
9 6 3	3	
4	4	
6 3	5	
	6	2

3|2 = 23 counties

2|4 = 24 counties

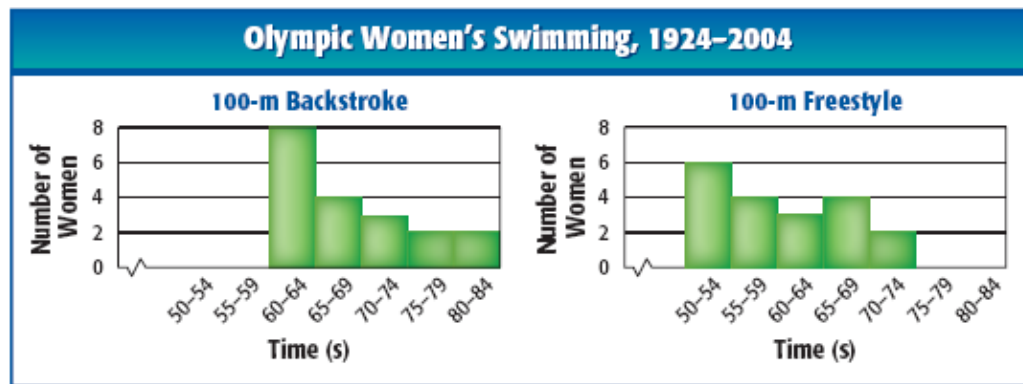
Example 2

2. **SCIENCE FAIR** Create a double dot plot of the data showing the science fair scores for two science classes. Then compare the data.

Science Scores	
Room 100	Room 110
94	82
64	79
88	85
100	91
91	97
106	109
97	103
88	100
97	82

Example 3

3. **ANALYZE GRAPHS** The double histogram below shows the winning times for two different women's swimming events from a summer Olympics.



- Which event has more winning times less than one minute?
- How many Olympic Games were held from 1924 to 2004?
- Compare the winning times of the two Olympic events.

Practice and Problem Solving

4. **SNOWFALL** The monthly snowfall accumulations for nine months in Syracuse and Buffalo, New York, are shown.

- Which city had more varied amounts of snowfall?
- Describe and compare the shapes of the stem-and-leaf plots for the two cities.
- Find the mean, median, mode and range for each of the cities.

Snowfall Accumulations		
Syracuse	Stem	Buffalo
9 4 1	0	1 1 3 9
7	1	2 2 8
7 6	2	3 7
5 4	3	
0	4	

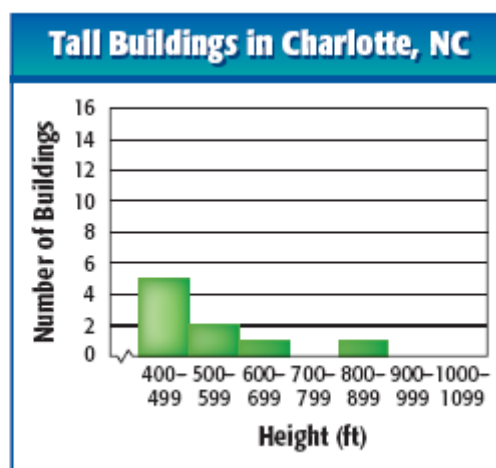
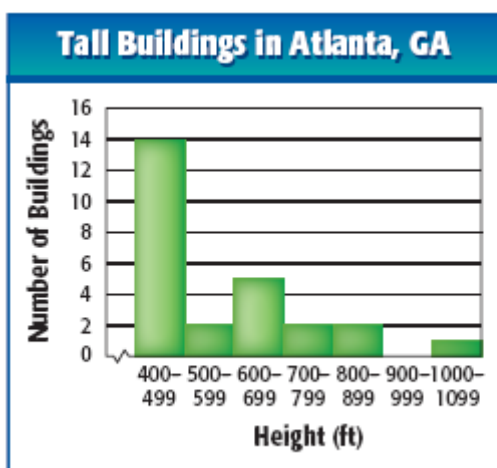
$7 \mid 1 = 17 \text{ in.}$

$1 \mid 2 = 12 \text{ in.}$

5. **TEMPERATURE** The table shows the average monthly high temperatures for two cities in North Carolina. Create a double dot plot of the data. Then compare the data.

Average Monthly High Temperatures												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Wilmington	56	58	65	74	81	86	89	89	84	75	67	59
Asheville	46	50	58	67	74	81	84	83	77	68	58	50

6. **BUILDINGS** The double histogram shows the heights of the tallest buildings in Atlanta and Charlotte.



- Which city had the tallest building?
- Which city has more building that are 800-899 feet tall?
- Compare the heights of the tall buildings in the two cities.

7. **FOOD** The back-to-back stem-and-leaf plot shows the number of Calories per serving for various fruits and vegetables.

- Construct a double dot plot to display the data.
- Use the shape of the double dot plot to describe the data.

Calories Per Serving		
Fruits	Stem	Vegetables
	3	0 5 5
	4	0 0 0 5
0 0 0 0	5	0
0 0 0	6	
	7	
0	8	

0|6 = 60 Calories 3|5 = 35 Calories

8. **EXERCISE** The table shows the results of a survey about the exercise habits of men and women.

- Construct a back-to-back stem-and-leaf plot and a double dot plot to display the data.
- Identify and interpret any gaps, peaks, or intervals in both graphs.
- Which display makes it easier to find the measures of central tendency? Explain.

Exercise Habits (days per month)			
Men		Women	
5	15	7	9
25	13	10	14
27	12	8	11
25	26	6	10
18	25	12	8

9. **BASKETBALL** The back-to-back stem-and-leaf plot shows the number of points Cami scored per basketball game in two different seasons.

- Create a double box-and-whisker plot from the data.
- Describe what the length and placement of the whiskers tells about the data.
- Describe what the length of the boxes tells about the data.

Cami's Basketball Stats		
2008	Stem	2007
	0	6 7 8 9 9
8 8 6 6 4 4 4	1	0 0 2 4 6 7 8
6 6 4 4 2 2	2	1 7
	3	
0	4	

4|2 = 24 points 2|1 = 21 points