

**8-2****Study Guide and Intervention****Measures of Central Tendency and Range**

The **mean** is the sum of the data divided by the number of data items. The **median** is the middle number of the ordered data, or the mean of the middle two numbers. The **mode** is the number (or numbers) that occur most often. The mean, median, and mode are each **measures of central tendency**.

**Example**

The table shows the number of hours students spent practicing for a music recital. Find the mean, median, and mode of the data.

$$\text{mean} = \frac{3 + 12 + 10 + \dots + 12}{20} = \frac{160}{20} \text{ or } 8.$$

To find the median, the data must be ordered.

0, 1, 2, 3, 3, 5, 6, 7, 8, 8, 8, 9, 10, 10, 11, 12, 12, 12, 15, 18

$$\frac{8 + 8}{2} = 8$$

To find the mode, look for the number that occurs most often. Since 8 and 12 each occur 3 times, the modes are 8 and 12.

Numbers of Hours Spent Practicing				
3	12	10	8	7
18	11	12	10	3
8	6	0	1	5
8	2	15	9	12

**Exercises**

Find the mean, median, and mode for each set of data. Round to the nearest tenth if necessary. *Find the Range.*

1. 27, 56, 34, 19, 41, 56, 27, 25, 34, 56

2. 7, 3, 12, 4, 6, 3, 4, 8, 7, 3, 20

3. 1, 23, 4, 6, 7, 20, 7, 5, 3, 4, 6, 7, 11, 6

4. 3, 3, 3, 3, 3, 3, 3

5. 2, 4, 1, 3, 5, 6, 1, 1, 3, 4, 3, 1

6. 4, 0, 12, 10, 0, 5, 7, 16, 12, 10, 12, 12

**8-2****Skills Practice*****Measures of Central Tendency and Range***

Find the mean, median, and mode for each set of data. Round to the nearest tenth if necessary. *Find the Range*

1. 5, 9, 6, 6, 11, 8, 4

2. 1, 3, 5, 2, 4, 8, 4, 7, 2

3. 1, 9, 4, 7, 5, 3, 16, 11

4. 3, 4, 4, 4, 4, 3, 6

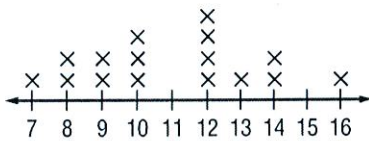
5. 3, 7, 2, 5, 5, 6, 5, 10, 11, 5

6. 19, 17, 24, 11, 19, 25, 15, 15, 19, 16, 16

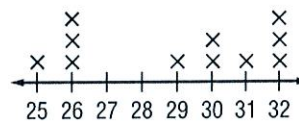
7. 5, 8, 9, 9, 12, 6, 4

8. 3, 4, 9, 7, 6, 6, 2

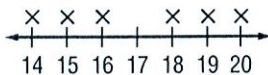
9.



10.



11.



12.

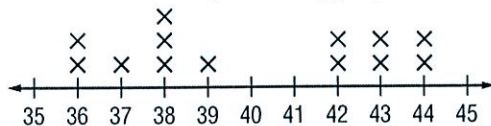


**8-2****Practice****Measures of Central Tendency and Range**

Find the mean, median, and mode for each set of data. Round to the nearest tenth if necessary. *Find the Range*

- Number of parking spaces used: 45, 39, 41, 45, 44, 64, 51
- Prices of plants: \$10, \$8, \$20, \$25, \$14, \$39, \$10, \$10, \$8, \$16
- Points scored during football season: 14, 20, 3, 9, 18, 35, 21, 24, 31, 12, 7
- Golf scores:  $-3$ ,  $-2$ ,  $+1$ ,  $+1$ ,  $-1$ ,  $-1$ ,  $+2$ ,  $-5$
- Percent increase: 3.3, 4.1, 3.9, 5.0, 3.5, 2.9, 3.9

6. **Dollars Spent Shopping**



7. **CHILDREN** The table shows the number of children living at home in a neighborhood of 24 homes. Which measure best describes the data: mean, median, or mode? Explain.

Children at Home							
2	1	3	0	4	4	1	2
0	6	2	2	5	0	2	3
3	1	1	4	2	0	1	4

8. **WORK** The table shows the hours Sam worked each week during the summer. How many hours did he work during the twelfth week to average 20 hours per week?

Hours Worked					
18	24	20	19	15	21
20	19	18	22	22	?

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

## Measures of Central Tendency (Groups of 2-3)

1. Record the number of M & M's in your package in the chart below.

	Red	Green	Yellow	Orange	Brown	Blue
Your Package						

2. Compute the range, mean, median, and mode of this data.

Round to the nearest tenth if necessary!

\*Range: \_\_\_\_\_

\*Median: \_\_\_\_\_

\*Mean: \_\_\_\_\_

\*Mode: \_\_\_\_\_

- 
3. Recopy your numbers into the chart below.

4. Record the numbers of M & M's from 2 other groups in the chart below.

	Red	Green	Yellow	Orange	Brown	Blue
Your Package						
Group #1						
Group #2						
Total Amount (Sum)						

5. Now that you have 2 other sets of data, find the sum for *each* color of M & M's.

6. With the 2 other group members, calculate the range, mean, median, and mode using the "Total Amount" data. Round to the nearest tenth if necessary!

\*Range: \_\_\_\_\_

\*Median: \_\_\_\_\_

\*Mean: \_\_\_\_\_

\*Mode: \_\_\_\_\_

Over →

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

7. With your group, answer the following question in **complete sentences**:  
"Why is it useful to know mean, median, and mode?" **4-5 COMPLETE**  
**Sentences. (Be sure to give a real life example.)**

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

8. Give this sheet to Ms. Quandt in exchange for your homework assignment.



**Don't forget  
to eat  
your M & M's!**

# 8-4

## Skills Practice

### Bar Graphs and Histograms

**ZOOS** For Exercises 1 and 2, use the table. It shows the number of species at several zoological parks.

1. Make a bar graph of the data.

**Animal Species in Zoos**


Zoo	Species
Los Angeles	350
Lincoln Park	290
Cincinnati	700
Bronx	530
Oklahoma City	600

2. Which zoological park has the most species?

**ZOOS** For Exercises 3 and 4, use the table at the right. It shows the number of species at 37 major U.S. public zoological parks.

3. Make a histogram of the data. Use intervals of 101–200, 201–300, 301–400, 401–500, 501–600, 601–700, and 701–800 for the horizontal axis.

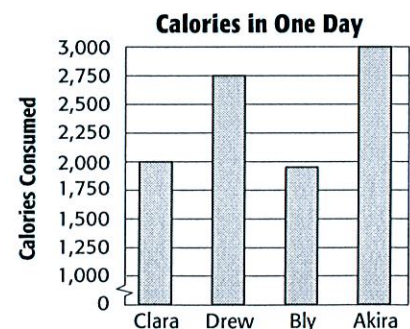
**Animal Species in Zoos**


Number of Species				
200	700	290	600	681
300	643	350	794	400
360	600	134	200	800
305	384	500	330	250
530	715	303	200	475
465	340	347	300	708
184	800	375	350	450
337	221			

4. Which interval has the largest frequency?

**HEALTH** For Exercises 5 and 6, use the graph at the right.

5. What does each bar represent?
6. Determine whether the graph is a bar graph or a histogram. Explain how you know.



**8-4****Practice*****Bar Graphs and Histograms***

Select the appropriate graph to display each set of data: bar graph or histogram. Then display the data in the appropriate graph.

1.

Ages of Children Taking Swimming Lessons	
Age	Children
0–2	8
3–5	12
6–8	18
9–11	17
12–14	12
15–17	13

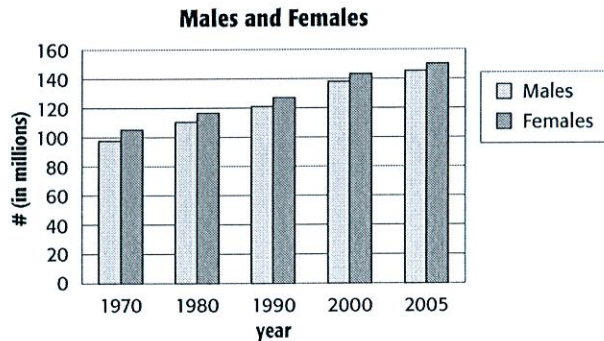
2.

Home Run Derby 2007 Round 1 Home Runs	
Player	Home Runs
Vladimir Guerrero	5
Alex Rios	5
Matt Holliday	5
Albert Pujols	4
Justin Morneau	4

Source: Baseball Almanac

**POPULATION** For Exercises 3–5, use the bar graph that shows the number of males and females in the world for the years 1970, 1980, 1990, 2000, 2005.

- By how much did the number of females increase from 1970 to 1980?
- By how much did the number of females increase from 2000 to 2005?
- Between which years did the number of females increase the most?



**8-8****Study Guide and Intervention*****Using Sampling to Predict***

In an **unbiased sample** the whole population is represented. In a **biased sample** one or more parts of the population are favored over the others.

**Example 1**

Look at the following table to determine the favorite sport of middle school students.

Favorite Sports of Middle School Students			
Basketball	Baseball	Football	Soccer
10	5	17	52

Based on the table, it would appear that soccer is the favorite sport of middle school students. However, suppose the data collected for this survey was taken at a World Cup soccer match. It can then be concluded that our sample is **biased** because students who are at a soccer match may be more likely to choose soccer as their favorite sport.

To receive an **unbiased** sample of middle school students, the sports survey could be completed at randomly selected middle schools throughout the country.

**Exercises**

Determine whether the given situations represent a *biased* or *unbiased* sample. Then tell the type of sample.

1. Writers of a popular teen magazine want to write a story about which movies their readers like. The writers decide to interview the first 50 people that walk out of a movie theater.
2. The student council wanted to raise money for their school by selling homemade cookies during lunch time. To find out the favorite kind of cookie for the majority of their school, they conducted a survey. They gave the survey to 20 randomly selected students from each grade level.
3. To determine the most frequently used gas station, a researcher randomly selected every 10th person from a drive-through fast food restaurant and asked them where they last filled up with gas.

**8-8****Skills Practice*****Using Sampling to Predict***

Each word in the box is a vocabulary word from lesson 8-8.  
Use the words to complete the sentences below. Not all of the words will be used.

unbiased biased sampling	voluntary response sample simple random sample	convenience sample valid
--------------------------------	---	-----------------------------

1. A \_\_\_\_\_ is when members of the population are selected because they are easily accessed.
2. The survey is considered \_\_\_\_\_ when the entire population is represented.
3. It is called a \_\_\_\_\_ when each person in the population has an equal chance to be selected.
4. If only some members of the population choose to participate in a survey then it should be called a \_\_\_\_\_.
5. A sample would be considered \_\_\_\_\_ if one or more parts of the population are favored.
6. A conclusion can only be considered \_\_\_\_\_ when the information comes from an unbiased sample.

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

Calculators  
are OK!!!!

# Chapter 8: Analyzing Data

## Bringing It All Together #1

### Vocabulary Check

Word Bank		
bar graph	data	mode
median	mean	histogram
range	measures of central tendency	

Choose the term from the word bank that best completes the sentence.

- 1) Statistics deal with collecting, organizing, and interpreting\_\_\_\_\_.
- 2) Numbers called \_\_\_\_\_ can be used to describe the center of data.
- 3) The \_\_\_\_\_ of a set of data is the number(s) that occur(s) the most often.
- 4) A(n) \_\_\_\_\_ uses bars to represent quantities.
- 5) A(n) \_\_\_\_\_ uses bars to represent the frequency of data that have been organized in intervals.
- 6) Define **range** in your own words\_\_\_\_\_

State whether the statement is *true* or *false*.

If *false*, replace the underlined word or number to make a true sentence.

- 7) The mode divides a set of data in half. \_\_\_\_\_
- 8) A graph that uses bars to make comparisons is a bar graph. \_\_\_\_\_
- 9) The mean is the arithmetic average of a set of data. \_\_\_\_\_
- 10) The number or item that appears the most often in a set of data is the mode. \_\_\_\_\_
- 11) The range is the middle number of the ordered data, or the mean of the middle two numbers. \_\_\_\_\_

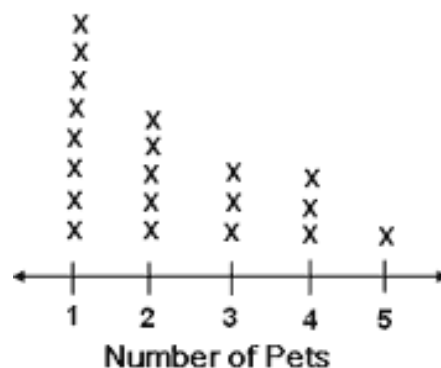
OVER→

For questions 12-16, use the list showing the number of children living at home on a neighborhood of 9 homes:

Children at home: 2, 3, 4, 3, 4, 3, 8, 7, 2
---

- \_\_\_\_\_12) What is the range of the data?
- \_\_\_\_\_13) What is the mean of the data?
- \_\_\_\_\_14) What is the median of the data?
- \_\_\_\_\_15) What is the mode of the data?
- \_\_\_\_\_16) How many homes have more than 5 children?

For questions 17-22, use the line plot. It shows the number of pets each student has in Mrs. Smith's 5<sup>th</sup> grade class.



- \_\_\_\_\_17) What is the range of the data?
- \_\_\_\_\_18) What is the mean of the data?
- \_\_\_\_\_19) What is the median of the data?
- \_\_\_\_\_20) What is the mode of the data?
- \_\_\_\_\_21) How many students have *more than* 3 pets?
- \_\_\_\_\_22) Determine which sentence is *not* true.

- a) 1 occurs the most often
- b) The range is 4.

- c) The majority of students have more than 3 pets.
- d) 20 numbers are in the data set.

For questions 23-28, use the table.

It shows prices of guitars on display at a music shop.

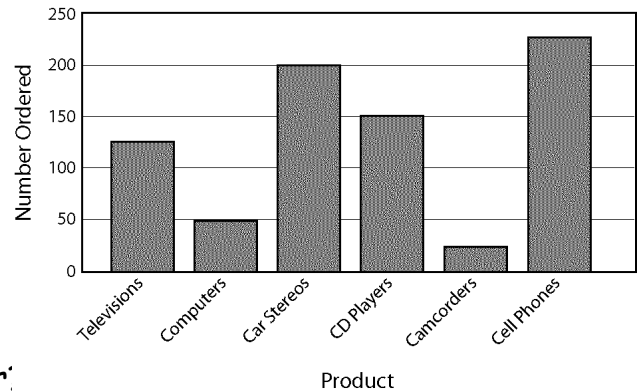
Guitar Prices (\$)				
350	425	295	1,200	500
275	2,700	300	425	400
375	395	275	355	430

- \_\_\_\_\_23) What is the range of the data?
- \_\_\_\_\_24) What is the mean of the data?
- \_\_\_\_\_25) What is the median of the data?
- \_\_\_\_\_26) What is the mode of the data?
- \_\_\_\_\_27) How many guitars are more than \$600?
- \_\_\_\_\_28) Which central measure of tendency has the greatest value?

OVER →

For questions 29-31, use the bar graph. It shows how much inventory an electronic store (Store #10435) ordered last month.

Inventory Tracking for Store #10435



\_\_\_\_\_ 29) Which product did Store #10435 order the most of last month?

\_\_\_\_\_ 30) How many CD Players did the store order?

\_\_\_\_\_ 31) How many more car stereos than computers did the store order?

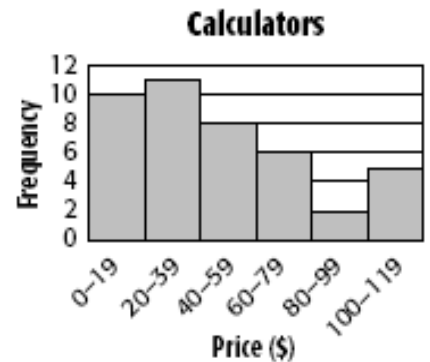
For questions 32-34, refer to the histogram.

\_\_\_\_\_ 32) What is the cost of most calculators?

\_\_\_\_\_ 33) Which price range has the least frequency?

\_\_\_\_\_ 34) Determine which sentence is *not* true.

- a) The mode of the data is 11.
- b) Eight calculators are priced from \$40-59.
- c) There are 42 calculators in the data set.
- d) Most calculators are priced from \$20-39.



For questions 35-36, determine whether the given situations are biased or unbiased samples. Then tell the type of sample (simple random sample, convenience sample and voluntary response sample)

35) Sally wants to know what household pets are people's favorite. At the dog park, Sally asks people what their favorite pet is.

36) Ms. Quandt wants to know what the most popular band is according to the 7<sup>th</sup> graders at Stilwell. At lunch she sets up a table and students can come to her, if they want to.

**OVER** →

For questions 37-38, select the appropriate graph to display each set of data: bar graph or histogram. Then display the data in the appropriate graph. Each graph is worth 4 points.

37)

Student	Number of Pets
Clara	2
Tomas	1
Tri	3
Mya	2
Larry	1
Ken	4

38)

Quarter Grade Distribution	
Grade	Frequency
92-100	6
83-91	11
74-82	9
65-73	4
Below 65	1

For question 39, use the table below. It shows the highest wind speeds in 30 U.S. cities. Make a histogram using the data. Use intervals of 40-49, 50-59, 60-69, 70-79, 80-89, 90-99 for the horizontal axis. The graph is worth 5 points.

39)

Highest Wind Speeds (mph)									
52	75	60	80	55	54	91	60	81	58
53	73	46	76	53	46	73	46	51	49
57	58	56	47	65	49	56	51	54	51

**FINALLY  
DONE**



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

## Chapter 8: Analyzing Data

### Bringing It All Together #2

For questions 1-5, use the list showing the amount of money Darcy made each week working at HyVee:

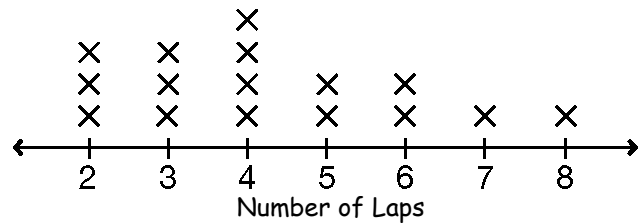
Pay Check Amount: \$84, \$40, \$54, \$33, \$88, \$95, \$25, \$87, \$64, \$40
--

- \_\_\_\_\_ 1) What is the range of the data?  
\_\_\_\_\_ 2) What is the mean of the data?  
\_\_\_\_\_ 3) What is the median of the data?  
\_\_\_\_\_ 4) What is the mode of the data?  
\_\_\_\_\_ 5) How many times did Darcy make more than \$60?

For questions 6-11, use the line plot.

It shows the number of laps each student in a class ran around the track.

- \_\_\_\_\_ 6) What is the range of the data?  
\_\_\_\_\_ 7) What is the mean of the data?  
\_\_\_\_\_ 8) What is the median of the data?  
\_\_\_\_\_ 9) What is the mode of the data?  
\_\_\_\_\_ 10) How many students ran less than 5 laps?  
\_\_\_\_\_ 11) Determine which sentence is *not* true.



- a) 4 occurs most often.                      c) The majority of students ran 5 or more laps.  
b) There are 16 students in the class.      d) The range is 6.

For questions 12-17, use the table.

It shows the average height of students in Mr. Dean's class.

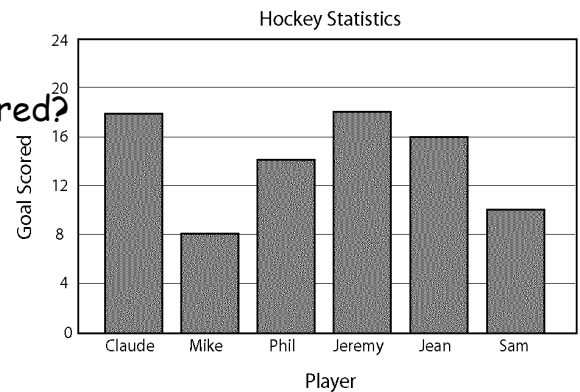
- \_\_\_\_\_ 12) What is the range of the data?  
\_\_\_\_\_ 13) What is the mean of the data?  
\_\_\_\_\_ 14) What is the median of the data?  
\_\_\_\_\_ 15) What is the mode of the data?  
\_\_\_\_\_ 16) How many students are over 56 inches?  
\_\_\_\_\_ 17) Which central measure of tendency has the least value?

Heights of Students (in.)			
49	53	60	53
54	59	60	55
53	52	54	52

OVER →

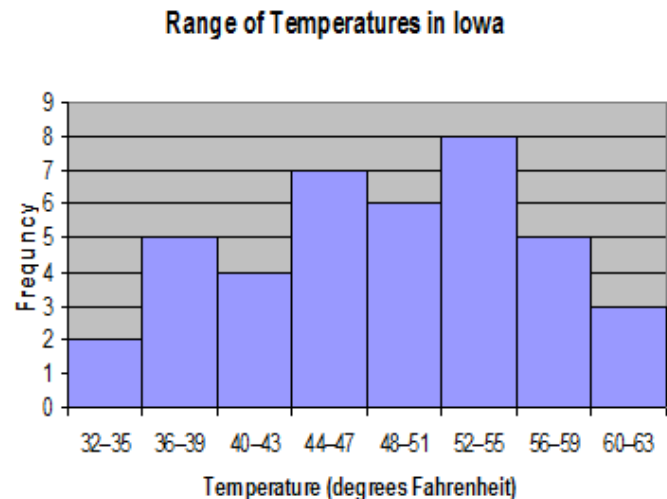
For questions 18-20, use the bar graph. It contains data on how many goals were scored this season by 6 players on a hockey team.

- \_\_\_\_\_18) Which player scored the least goals?
- \_\_\_\_\_19) What was the highest number of goals scored?
- \_\_\_\_\_20) What was the difference between the amount of goals Jean and Mike scored?



For questions 21-23, refer to the histogram.

- \_\_\_\_\_21) Which range has the least frequency?
- \_\_\_\_\_22) What is the total amount of numbers in the data set?
- \_\_\_\_\_23) Determine which sentence is
- a) Five temperatures are between 36-39 degrees.
  - b) The mode of the data is 53.
  - c) There are 40 temperatures in the data set.
  - d) Most temperatures are between 52-55 degrees.



For questions 24-25, determine whether the given situations are a biased or unbiased sample. Then tell the type of sample (simple random sample, convenience sample and voluntary response sample)

24) Mrs. Nedved wants to know which Greek mythology character is her students' favorite. During class, she asks every third person.

25) Ms. Quandt wants to know which subject is her students' favorite. During Pre-Algebra, she asks the students who are paying attention.

**OVER** →

For questions 26-27, select the appropriate graph to display each set of data: bar graph or histogram. Then display the data in the appropriate graph. Each graph is worth 4 points.

26)

Consecutive Free throws Made at Practice	
Player	Consecutive Free Throws
James	10
Theo	15
Kirk	9
Amit	18
Chris	14

27)

Quarter Grade Distribution	
Grade	Frequency
92-100	6
83-91	11
74-82	9
65-73	4
Below 65	1

For question 28, use the table below. It shows the highest wind speeds in 30 U.S. cities. Make a histogram using the data. Use intervals of 40-49, 50-59, 60-69, 70-79, 80-89, 90-99 for the horizontal axis. The graph is worth 5 points.

28)

Highest Wind Speeds (mph)									
52	75	60	80	55	54	91	60	81	58
53	73	46	76	53	46	73	46	51	49
57	58	56	47	65	49	56	51	54	51

**FINALLY  
DONE**

