Activity: Selected Assignments from the May Optional Work Packet

Grade 6

Class Math

Teachers: Ms. Carter, Mr. Dedrick, Ms. Hartley, Ms. K. Ross, Mr. Reed

Week: June 8 – June 12

Key Content/Modeling:
Pearson Topic 8: Display Describe and Summarize Data

- Recognize Statistical Questions
- Mean, Median, and Mode
- Display Data in Box Plots
- Display Data in Frequency Tables and Histograms

You Try:

- Try-It
- Do You Understand?
- Do You Know How?
- Practice

Show me what you know (Proof of learning):

Complete your work and e-mail pictures (or solutions) to your teachers.

Self-Assessment:

Did I complete all of the tasks?
Did I try my best?

Priority Standard(s):
6.SP.A.3 Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.

6.SP.B.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

What am I learning?
I can identify, summarize, and display statistical data.

How do I know I learned?
Learning Evidence in 1-3 Descriptors

I fully completed all tasks and checked my answers to make sure they made sense to answer the questions.

Extra Learning Opportunities: Find some math in your community! Did you use ratio reasoning for cooking? Did you have to add or subtract decimals when you were shopping? Did you find any ratios in your video games? Tell us about what you’ve found on e-mail; we’d love to hear all about it!
Good Morning Students
Monday June 8, 2020

Today Focus:

- In the May 2020 Family Resource Packet
- Resource Packet Link:

Learning Target:

- Make Sense of Problems and Persevere in Solving Them
- Construct Viable Arguments
- Model with Mathematics

Special Note:

- Read each example and do your best in completing all work. If you have any questions, are stuck on a problem, or want me to check your work, please email me and I will be sure to get back with you.
- Take a picture of your work and send it via email for all feedback 📸
- If you are having trouble accessing the resource packet, please let me know so I can work on ways of getting it to you.
- Paper copies of the resource packet are available to pick up at First Creek on Tuesdays and Thursdays at lunch time.

Tips & Hints:

- Read the entire problem before beginning to work on an answer.
- What do you know about each problem?
- What’s unknown about each problem (what are you trying to discover)?
- Can you draw a diagram (or picture) to help understand the problem?
  - https://youtu.be/xi95mYf19MY (Moomoo Math - Statistical Question - Math)
  - https://youtu.be/81HezNTGeZ4 (Math Antics - Mean, Median and Mode)
  - https://youtu.be/40x0NjdmhTg (2 Minute Classroom – An Average Video)
  - https://youtu.be/UZv9YeQ-aQ (MashUp Math - Box and Whisker Plots Ex!)
  - https://youtu.be/mukk82eeftg (Wrath of Math - How to Make a Frequency Table)
  - https://youtu.be/bihuOVCQ8NU4 (Shmoop - All You Need to Know About Histograms)
8-1 Recognize Statistical Questions

KEY CONCEPT

To recognize and write statistical questions, determine whether the question has only one answer or several different answers. Statistical questions have a variety of different answers.

- How many nickels are in a dollar? Not statistical
- Which former U.S. president appears on a nickel? Not statistical
- How many nickels are in your backpack? Statistical

Statistical questions are questions that tend to have many different answers. Each person asked a statistical question may have a different answer. Collected, those answers are often referred to as data.

Data →

There are many ways to display data. These methods include the use of tables, graphs, histograms, box plots, dot plots, stem and leaf plots. You will get to learn more about these different methods in later sections.
8–1 Example 1

**Example 1**

Mr. Borden asked his students a question and recorded the data in a table. What question did Mr. Borden ask?

- What is the area of an $8\frac{1}{2}$" × 11" sheet of notebook paper?
- How many sheets of paper did you use last week?
- Did Bill use notebook paper to write his book report?

**Make Sense and Persevere** How does thinking about possible answers to the questions help you determine which questions are statistical?

<table>
<thead>
<tr>
<th>Number of Sheets</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>I</td>
</tr>
<tr>
<td>10</td>
<td>I</td>
</tr>
<tr>
<td>15</td>
<td>II</td>
</tr>
<tr>
<td>20</td>
<td>III</td>
</tr>
<tr>
<td>25</td>
<td>III</td>
</tr>
<tr>
<td>30</td>
<td>III</td>
</tr>
</tbody>
</table>

A **statistical question** always has variability in the responses. This is, it has a range of responses.

The question *How many sheets of paper did you use last week?* can have a range of answers so it is a statistical question.

The questions *What is the area of an $8\frac{1}{2}$" × 11" sheet of notebook paper?* and *Did Bill use notebook paper to write his book report?* have only one answer, so they are not statistical questions.

Mr. Borden asked, *How many sheets of paper did you use last week?*

You can display the answers to Mr. Borden’s question in a bar graph.

Mr. Borden’s question is a statistical question.

**Try It!**

Is the question *What was the high temperature on March 8 of last year?* a statistical question? Explain.

**Convince Me!** How could you change the question above to make it a statistical question?
**Example 2**

Lucia surveyed the students in her class and made a dot plot of the results. What question could Lucia have asked?

Look at the title and labels on the dot plot.

**Model with Math** A dot plot can be used to display the answers to a statistical question.

The dot plot shows the number of days different students exercise each week. The statistical question Lucia could have asked is _How many days do you exercise each week?_

**Try It!**

What is another statistical question Lucia might ask about the exercise the students in her class do each week?

**Example 3**

Dante surveyed students to see how they feel about a proposal to choose a new school mascot. The frequency table shows the results. What question did Dante likely ask?

Dante likely asked a question such as _Do you want a new mascot?_ There are only two answers, Yes or No. Because there is more than one possible answer, this is a statistical question.

**Try It!**

How could Dante change his statistical question so that there would be more than two possible answers?
Do You Understand?

1. **Essential Question** How are statistical questions different from other questions?

2. **Generalize** How does examining the answers to a question help you determine if the question is a statistical question?

3. Write a question about movies that your classmates saw last month. Is the question you wrote a statistical question? Justify your response.

4. Choose which is a statistical question: What are the ages of the students in this class? or How many pennies equal 1 dollar? Explain.

Do You Know How?

5. Determine which of the questions below are statistical questions.
   a. In which months are the birthdays of everyone in your class?
   b. Does Sue wear glasses?
   c. Who is the current president of the United States?
   d. How tall are the students in Grade 6?
   e. What is the least populated state?
   f. How many fish are in the pond?


7. Mr. Borden also asked his students, *How do you get to school each day?* Is this question statistical? Explain.

**Lesson 8-1 Recognize Statistical Questions**

**Quick Review**

A **statistical question** anticipates that there will be a variety of answers.

**Example**

Ramon surveyed his classmates to determine the answer to the statistical question “How many hours do my classmates spend online each week?” The question yielded a variety of numerical answers. Ramon made this dot plot to display the data.

**Time Spent Online Each Week**

<table>
<thead>
<tr>
<th>Time (hr)</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Practice**

In 1–4, tell whether each question is statistical.

1. How many stations are there in a subway system?

2. How would passengers of a subway system rate the quality of service on a scale of 1 to 10?

3. How many passengers travel on each of the Green, Blue, Red, and Orange Lines of the subway system each day?

4. How much does it cost for a ticket to ride the subway from Station A to Station B?
There are a lot of ways to represent a full data set using fewer numbers. Four methods of doing that are:

- **Mean**
  - Often referred to as “average”
  - Find the sum of all the terms in your data set, then divide that sum by the number of terms you added together
  - Ex. Find the mean of the data set 4, 13, 5, 7, 12, 21, 4, 12.
    
    $$\frac{4 + 13 + 5 + 7 + 12 + 21 + 4 + 12}{8} = 9.75$$
  
  The mean of the given data set is 9.75. Why did I divide by 8?

- **Median**
  - Think middle
  - Put the numbers in your data set in order (either ascending or descending), then find the number in the middle.
  - If there are two “middle” numbers, use the mean of those two numbers.
  - Ex. Find the median of the data set 4, 13, 5, 7, 12, 21, 4.
    
    4, 4, 5, 7, 12, 13, 21
  
  The median of the data set is 7.
• **Mode**
  o The number that occurs *Most Often* in your data set.
  o A data set may not contain a mode (all the numbers appear the same number of times).
  o A set may have multiple modes if more than one number appears more often than the other numbers and the same amount of times as each other.
  o Ex. Find the mode of the data set 4, 13, 5, 7, 12, 21, 4.

  The number 4 appears twice in the data set, all the other numbers only appear once.

  The mode is 4.

• **Range**
  o The range of a data set describes the distance between the greatest and least number in that set.
  o Identify the greatest number and the least number in your data set.
  o Subtract those two numbers.
  o Ex. Find the range of the data set 4, 13, 5, 7, 12, 21, 4, 12

  4 is the least number

  21 is the greatest number

  \[21 - 4 = 17\]

  The range for this data set is 17.
Carla is in a bowling league. The league is ranking the teams by average score. What is the mean, or average, final score of the five bowlers on Carla's team?

The **mean**, or average, is the sum of all the values in a data set divided by the total number of data values in the set.

**Generalize** You can summarize a data set by using a mean.

To find the mean, equally share the final scores among the five bowlers.

<table>
<thead>
<tr>
<th>Bowler</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desmond</td>
<td>95</td>
</tr>
<tr>
<td>Ramon</td>
<td>87</td>
</tr>
<tr>
<td>Kaitlin</td>
<td>84</td>
</tr>
<tr>
<td>Maria</td>
<td>81</td>
</tr>
<tr>
<td>Carla</td>
<td>83</td>
</tr>
</tbody>
</table>

The mean is 86.

A mean is a measure of center. A measure of center summarizes a data set with a single value.

To calculate the mean, add the scores in the data set. Then divide the sum by the number of values in the data set.

<table>
<thead>
<tr>
<th>Score</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>95</td>
<td>1</td>
</tr>
<tr>
<td>86</td>
<td>1</td>
</tr>
<tr>
<td>84</td>
<td>1</td>
</tr>
<tr>
<td>81</td>
<td>1</td>
</tr>
<tr>
<td>83</td>
<td>1</td>
</tr>
</tbody>
</table>

The mean, or average, final score is 86.

**Try It!**

The next week, Maria bowls a 151-point game. The other bowlers match their scores. What is the new mean final score for the team? Explain.

**Convince Me!** How did the mean final score change from the Example to the Try It!?
**8-2 Example 2**

**Use the Median to Describe a Data Set**

Trey and Sarah each download songs to their music libraries. Their players list each type of music and the total playing time in minutes for each type. How can Trey and Sarah each summarize their data sets using the median?

The **median** is a measure of center. It is the middle data value. To find the median, order the values from least to greatest, then find the middle value.

**Trey’s Music Library**

<table>
<thead>
<tr>
<th>Music Type</th>
<th>Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blues</td>
<td>62</td>
</tr>
<tr>
<td>Classical</td>
<td>72</td>
</tr>
<tr>
<td>Country</td>
<td>61</td>
</tr>
<tr>
<td>Gospel</td>
<td>67</td>
</tr>
<tr>
<td>Jazz</td>
<td>67</td>
</tr>
<tr>
<td>Movie Soundtrack</td>
<td>63</td>
</tr>
<tr>
<td>Popular</td>
<td>59</td>
</tr>
</tbody>
</table>

**Sarah’s Music Library**

<table>
<thead>
<tr>
<th>Music Type</th>
<th>Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rock</td>
<td>37</td>
</tr>
<tr>
<td>Rap</td>
<td>42</td>
</tr>
<tr>
<td>Hip Hop</td>
<td>30</td>
</tr>
<tr>
<td>Bluegrass</td>
<td>46</td>
</tr>
<tr>
<td>New Age</td>
<td>51</td>
</tr>
<tr>
<td>Opera</td>
<td>35</td>
</tr>
</tbody>
</table>

Find the median for Trey’s data set.

59, 61, 62, 63, 67, 67, 72

Trey’s median playing time is 63 minutes.

Find the median for Sarah’s data set.

35, 37, 38, 42, 46, 51, 51

Sarah’s median playing time is 40 minutes.

**8-2 Example 3**

**Use the Mode to Describe a Data Set**

Look at Trey’s and Sarah’s music libraries. How can Trey and Sarah each summarize their data sets using the mode?

The **mode** is a measure of center. It is the value that occurs most often. A data set can have one mode, no mode, or more than one mode.

Find the mode for Trey’s data set.

59, 61, 62, 63, 67, 67, 72

The value 67 appears twice. Every other value only appears once.

Trey’s mode playing time is 67 minutes.

Find the mode for Sarah’s data set.

35, 37, 38, 42, 46, 51

There is no mode playing time in Sarah’s data set.

**Try It!**

Nadia’s grades on four quizzes were 95, 75, 85, and 95. Find the mean, median, and mode for Nadia’s grades.
EXAMPLE 4

Use the Range to Describe a Data Set

Look at Trey’s and Sarah’s music libraries. What is the range of the playing times in each of their data sets?

The range is a measure of variability. A measure of variability describes how the values in a data set vary with a single number. The range is the difference of the greatest value and the least value.

### Trey’s Music Library

<table>
<thead>
<tr>
<th>Music Type</th>
<th>Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blues</td>
<td>62</td>
</tr>
<tr>
<td>Classical</td>
<td>72</td>
</tr>
<tr>
<td>Country</td>
<td>61</td>
</tr>
<tr>
<td>Gospel</td>
<td>67</td>
</tr>
<tr>
<td>Jazz</td>
<td>67</td>
</tr>
<tr>
<td>Movie Soundtrack</td>
<td>63</td>
</tr>
<tr>
<td>Popular</td>
<td>59</td>
</tr>
</tbody>
</table>

Find the range for Trey’s data set.

least value: 61, 62, 63, 67, 67, 67


greatest value: 72

72 - 61 = 11

The range of playing times is 13 minutes.

### Sarah’s Music Library

<table>
<thead>
<tr>
<th>Music Type</th>
<th>Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rock</td>
<td>37</td>
</tr>
<tr>
<td>Rap</td>
<td>42</td>
</tr>
<tr>
<td>Hip Hop</td>
<td>38</td>
</tr>
<tr>
<td>Bluegrass</td>
<td>46</td>
</tr>
<tr>
<td>New Age</td>
<td>51</td>
</tr>
<tr>
<td>Opera</td>
<td>35</td>
</tr>
</tbody>
</table>

Find the range for Sarah’s data set.

least value: 37, 38, 42, 46, 51

greatest value: 51

51 - 35 = 16

The range of playing times is 16 minutes.

EXAMPLE 5

Use the Mean, Median, Mode, and Range to Describe a Data Set

Seven people waited in line for the “Whirl and Twist” carnival ride. Find the mean, median, mode, and range of the wait times for the carnival ride. What do the mean, median, and mode tell you about the wait times? What does the range, as a measure of variability, tell you about the wait times?

Mean: 13
Median: 13
Modes: 12 and 15
Range: 5

The mean, median, and mode each give a measure of the typical wait time for the ride. The mean and median wait times were 13 minutes. Two pairs each waited 12 or 15 minutes. The range uses a single number to describe how the wait times vary. The wait times vary by 5 minutes.

### Carnival Ride Wait Times

<table>
<thead>
<tr>
<th>Person</th>
<th>Wait Time (min.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>12</td>
</tr>
<tr>
<td>B</td>
<td>12</td>
</tr>
<tr>
<td>C</td>
<td>15</td>
</tr>
<tr>
<td>D</td>
<td>10</td>
</tr>
<tr>
<td>E</td>
<td>14</td>
</tr>
<tr>
<td>F</td>
<td>15</td>
</tr>
<tr>
<td>G</td>
<td>13</td>
</tr>
</tbody>
</table>

Try It!

Find the mean, median, mode, and range for the following set of data.

4, 6, 8, 3, 2, 1, 0, 12, 9
Do You Understand?

1. **Essential Question** How can you use a single measure to describe a data set?

2. Maddie scored 3 goals, 2 goals, and 4 goals during her last three soccer games. How can you find the mean, or average, number of goals Maddie scored?

3. **Use Structure** Why is it important to order the data when finding the median? ⊗ MP?

Do You Know How?

The table shows data about the students in three classes.

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ms. Green</td>
<td>15</td>
<td>14</td>
</tr>
<tr>
<td>Mr. Nesbit</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Ms. Jackson</td>
<td>12</td>
<td>16</td>
</tr>
</tbody>
</table>

4. What is the mean number of boys in the three classes? What is the mean number of girls in the three classes?

5. What is the mode of the number of girls in the three classes?

6. What is the median number of students in the three classes?

**LESSON 8-2 Summarize Data Using Mean, Median, Mode, and Range**

**Quick Review**

The **mean** is the sum of all the values in a data set divided by the total number of values in the set. The **median** is the middle data value in a set arranged in numerical order. The **mode** is the value that occurs most often in a set. The **range** is the difference between the highest and lowest values in a set.

**Example**

Find the mean, median, mode, and range of the following set of data.

<table>
<thead>
<tr>
<th>Total Game Points</th>
<th>129</th>
<th>124</th>
<th>128</th>
<th>120</th>
<th>124</th>
</tr>
</thead>
</table>

- Mean: 125
- Median: 124
- Mode: 124
- Range: 9

**Practice**

In 1–6, find the mean, median, mode, and range of each data set.

1. 2, 5, 5
2. 11, 13, 13, 11, 13
3. 27, 26, 25, 20
4. 100, 200, 500, 300, 500
5. 1, 4, 1, 3, 1, 1, 1, 4, 1, 9, 1, 8, 1, 7, 1, 4
6. 450, 0, 500, 750, 0
Box plots are a method of showing much information about a data set in relation to a number line. There are five major pieces of information to be found in a box plot.

- **Minimum:** The least number in the data set.
- **1st Quartile:** The point halfway between the minimum and the median. (Imagine finding a new median between the minimum and the median)
- **Median:** The median (the middle number)
- **3rd Quartile:** The point halfway between the maximum and the median. (Imagine finding a new median between the maximum and the median)
- **Maximum:** The greatest number in the data set.
**Example 1**

Helen wants to display the lengths of 15 fish she caught this year to compare to the lengths of fish she caught last year. How can she use the data to make a box plot?

A box plot is a diagram that shows the distribution of data values using the median, quartiles, minimum value, and maximum value on a number line.

Find the minimum, median, and maximum values of the data.

<table>
<thead>
<tr>
<th>Length of Fish (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
</tr>
<tr>
<td>9</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>11</td>
</tr>
<tr>
<td>13</td>
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<td>20</td>
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<tr>
<td>21</td>
</tr>
<tr>
<td>22</td>
</tr>
</tbody>
</table>

**Minimum** 7 **Median** 13 **Maximum** 22

Find the median for each half.

- **First Quartile** (Median of 1st Half): 7, 7, 9, 10, 10, 11, 13, 13, 14, 15, 15, 17, 18, 22
- **Second Quartile** (Median): 7, 7, 9, 10, 11, 13, 13, 14, 15, 15, 17, 18, 22
- **Third Quartile** (Median of 2nd Half): 7, 7, 9, 10, 11, 13, 13, 14, 15, 15, 17, 18, 22

**Quartiles** are values that divide a data set into four equal parts.

**Draw the box plot.**

1. Show a number line with an appropriate scale.
2. Draw a box between the first and third quartiles, and a vertical segment that shows the median.
3. Draw segments that extend from the box to the minimum value and to the maximum value.

Try It!

The lengths in inches of 11 fish that Helen caught last year are listed below.

7, 8, 12, 12, 12, 13, 14, 15, 16, 17, 22

Circle the first quartile, median, and third quartile.

**Convince Me!** How is the distribution of Helen's data this year different from Helen's data last year? Draw a box plot of last year's data and use it to support your answer.
**Example 2**

The Earth Club collected enough donations online to build compost bins. How can the club record the donation information in a box plot?

**Model with Math** A box plot is helpful when analyzing a data set because it visually represents the data set by dividing it into four equal parts. A data table does not visually show the division of data.

**Step 1** Find the minimum, median, and maximum values as well as the first and third quartiles.

There are 12 values. So, the median is the average of the two middle numbers.

- Minimum: 10
- Median: 30
- Maximum: 50

There are 6 values in each half. The quartiles are the averages of the two middle numbers in each half.

**Step 2** Draw a box plot.

The donation values range from $10 to $60, in $5 increments. So, a good scale for the number line is $5 to $65, numbered by $5s.

**Example 3**

The box plot shows the distribution of the weights, in pounds, of bags of donated clothing. What information do you know from the box plot?

- The minimum is 8, so the lightest bag weighs 8 pounds.
- The maximum is 20, so the heaviest bag weighs 20 pounds.
- The median weight for the bags is about 17 pounds.
- The first quartile weight is 12 pounds, and the third quartile weight is 18 pounds.

**Try It!**

The ages of 12 volunteers participating in a beach clean-up are shown:

15, 27, 9, 15, 21, 9, 21, 9, 15, 21, 21, 24

Record the ages in a box plot.
Do You Understand?

1. **Essential Question** Why is a box plot useful for representing certain types of data?

2. What values are included inside the box of a box plot?

3. **Critique Reasoning** A box plot shows the distribution of the costs of used books. The box of the box plot starts at $2 and ends at $5. Alex says this means that about one-quarter of the books cost between $2 and $5. Is Alex correct? Explain. MP.1

Do You Know How?

Sarah’s scores on tests were 79, 75, 82, 90, 73, 82, 70, 85, and 78. In 4-8, use the data.

4. What are the minimum and maximum test scores?

5. Find the median.

6. Find the first and the third quartiles.

7. Draw a box plot that shows the distribution of Sarah’s test scores.

8. Eric is in Sarah’s class. This box plot shows his scores on the same nine tests. How do Eric’s scores compare to Sarah’s?

**Eric’s Tests**

![Box plot of Eric's test scores]

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**LESSON 8–3 Display Data in Box Plots**

**Quick Review**

Quartiles divide a data set into four equal groups. A box plot uses the minimum, first quartile, median, third quartile, and maximum values in a data set to show how the data are distributed.

**Example**

Make a box plot of the distances, in feet, that seven paper airplanes flew: 60, 75, 45, 55, 70, 40, 65.

First Quartile  Median  Third Quartile

**Paper Airplane Distances**

| 40 | 45 | 55 | 60 | 65 | 70 | 75 |

**Distance (ft)**

**Practice**

In 1 and 2, use the data to create a box plot.

1. 27, 31, 30, 33, 29, 25, 28

2. 3, 1, 3, 7, 5, 2, 3, 6, 3
**8-4 Display Data in Frequency Tables and Histograms**

**KEY CONCEPT**

Data displays can be used to help make sense of data.

**Bags of Popcorn Sold Each Day**

<table>
<thead>
<tr>
<th>Bags</th>
<th>Tally</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-49</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50-59</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60-69</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

You can organize data in a frequency table.

**8-4 Example 1**

**EXAMPLE 1  Make a Frequency Table and a Histogram**

Mr. Maxwell timed the cross-country team in a 2-mile run and recorded the times in the table shown. He wants to analyze the runners’ times. What is one way that Mr. Maxwell can organize the data?

**Team Times**

<table>
<thead>
<tr>
<th>Time</th>
<th>16:45</th>
<th>14:25</th>
<th>18:40</th>
<th>16:03</th>
<th>15:12</th>
<th>19:15</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>17:14</td>
<td>14:02</td>
<td>16:52</td>
<td>15:18</td>
<td>17:49</td>
<td>17:55</td>
</tr>
</tbody>
</table>

A frequency table shows the number of times a value occurs in each category or interval.

Mr. Maxwell can set up time intervals for the data, and then count the number, or frequency, of times for each interval.

Then he can use the frequency table to make a histogram.

Display the data by drawing a bar for each interval.

**Look for Relationships** How is a histogram similar to and different from a bar graph?

**Try It!**

This histogram shows a different way to represent Mr. Maxwell’s data. Fill in the boxes with appropriate times and shade the bars for the last three intervals. How have the intervals changed?

**Convince Me!** How is the analysis of the information displayed different between the two histograms?
8-4 Example 2

Use a Frequency Table to Solve Problems

Zack surveys a group of middle school students and asks them how many texts they sent yesterday. The table shows the results.

a. Is the greatest number of texts sent between 60 and 79?

The greatest frequency is 11, which corresponds to students who sent 60-79 texts. However, the greatest number of texts sent is between 80 and 99.

b. Is the lowest number of texts sent between 20 and 39?

The lowest frequency is 4, which corresponds to students who sent 20-39 texts. However, the lowest number of texts sent is between 0 and 19.

Try It!

How many students sent between 20 and 59 texts?

8-4 Example 3

Use a Histogram to Solve Problems

The histogram shows the number of points that Kendra scored during each basketball game she played last season.

a. How many games did Kendra play last season?

The total number of games can be found by adding the number of games shown by each bar.

\[3 + 0 + 6 + 2 + 1 = 12\]

Kendra played 12 games.

b. In how many games did Kendra score from 5 to 9 points?

There is no bar on the histogram for 5-9 points. Kendra did not score 5-9 points in any games last season.

Try It!

Does the histogram show the mode of the number of points Kendra scored in the games? Explain.
Do You Understand?

1. **Essential Question** How can a frequency table or histogram help you organize and analyze data?

2. How is a histogram different from a bar graph?

3. What types of numerical data sets are easier to display using a histogram instead of a dot plot? Explain.

4. **Reasoning** How are frequency tables and histograms alike and how are they different? MP2

Do You Know How?

5. A data set contains ages ranging from 6 to 27: 6, 11, 9, 13, 18, 15, 21, 15, 17, 24, 27, 12 Complete the frequency table and histogram.

<table>
<thead>
<tr>
<th>Ages</th>
<th>Tally</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>6–10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11–15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16–20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21–25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26–30</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ages in Data Set

<table>
<thead>
<tr>
<th>Number of People</th>
<th>Ages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**LESSON 8-4** Display Data in Frequency Tables and Histograms

**Quick Review**

A frequency table shows the number of times a data value or a range of data values occurs in a data set. A histogram is a graph that uses bars to show the frequency of equal ranges or groups of data.

**Example**

Organize the ages of the campers listed below in a frequency table.
12, 14, 12, 14, 10, 11, 15, 13, 13, 11, 12, 12, 7, 14, 12

Divide the data into equal intervals and mark the frequency of the data using tally marks.

Then write the frequency.

<table>
<thead>
<tr>
<th>Ages of Campers</th>
<th>6–8</th>
<th>9–11</th>
<th>12–14</th>
<th>15–17</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tally</td>
<td>I</td>
<td>III</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>Frequency</td>
<td>1</td>
<td>3</td>
<td>10</td>
<td>1</td>
</tr>
</tbody>
</table>

**Practice**

1. Represent the data in the frequency table on the left in a histogram.