Data Displays
Batter Up

ACTIVITY
5.1

SUGGESTED LEARNING STRATEGIES: Activating Prior Knowledge, Marking the Text, Group Presentation, Interactive Word Wall

Henry "Hank" Aaron and Harmon Killebrew are among the all-time leaders in home runs in Major League Baseball. As a tribute to their outstanding performance during their careers, both were elected to the Hall of Fame in the 1980s. To help compare the noteworthy achievements of these two players, their home run statistics are listed below.

Total Number of Home Runs Hit by Year

Year	Aaron	Killebrew
1954	13	0
1955	27	4
1956	26	5
1957	44	2
1958	30	0
1959	39	42
1960	40	31
1961	34	46
1962	45	48
1963	44	45
1964	24	49
1965	32	25

Year	Aaron	Killebrew
1966	44	39
1967	39	44
1968	29	17
1969	44	49
1970	38	41
1971	47	28
1972	34	26
1973	40	5
1974	20	13
1975	12	14
1976	10	

1. In this table, is it easy to compare the home run data for Hank Aaron and Harmon Killebrew? Why or why not?

2. For each player's data, find the mean, median, mode and range.

Aaron	Killebrew
Mean:	Mean:
Median:	Median:
Mode:	Mode:
Range:	Range:

My Notes

CONNECT TO SPORTS

A 2007 study indicated that the average career span for a major league baseball player is 5.6 years. Statistics also indicate that the average home run production for a full time player per season is approximately 14 home runs.

ACADEMIC VOCABULARY

The mean, median, and mode are referred to collectively as **measures of center** or **measures of central tendency.**

My Notes

SUGGESTED LEARNING STRATEGIES: Question the Text, Guess and Check, Quickwrite, Self/Peer Revision, Marking the Text, Interactive Word Wall, Summarize/Paraphrase/Retell, Identify a Subtask

3. Considering this data, why do you think the home run data for Hank Aaron and Harmon Killebrew is said to be exceptional?

4. Describe any similarities or differences in the home run data of the two baseball players.

To organize data so that it can be interpreted more easily, a **stem plot** can be used.

MATH TERMS

A **stem plot**, also called a **stem-and-leaf plot**, displays each data value in a set in two parts according to place value, where the stem represents the first digit or digits and the leaf represents the last digit of the number. A key shows how to read the values in a stem plot:
Examples:
1 | 4 represents 14
21 | 0 represents 210

EXAMPLE 1

Draw a stem plot for this set of data.

{53, 84, 55, 70, 77, 63, 51, 53, 75, 82, 72}

Step 1: *Draw a vertical line. On the left side of the line write the tens digit of each number (without repeating) in the data set. This is the* ***stem****.*

5 |
6 |
7 |
8 |

Step 2: *Next to each number in the stem, write the units digit of each corresponding element of the data set in order from least to greatest. Each of these numbers is a* ***leaf****, and there will be as many leaves as there are numbers in the set.*

5 |	1 3 3 5
6 |	3
7 |	0 2 5 7
8 |	2 4

Step 3: *Make a key to show what a stem and leaf represent.*

Key: 8 | 2 = 82

TRY THESE A

Write your answers in the My Notes space. Show your work.

a. Make a stem plot for Hank Aaron's home run data.

b. Make another for Harmon Killebrew's home run data.

SUGGESTED LEARNING STRATEGIES: Create Representations, Look for a Pattern, Quickwrite, Self/Peer Revision, Group Presentation, Marking the Text, Question the Text

My Notes

5. In what ways does the stem plot make the data easier to analyze?

6. Compare the home run data for both players.

7. What advantages or disadvantages do you notice when using the stem plot to analyze each player's homeruns?

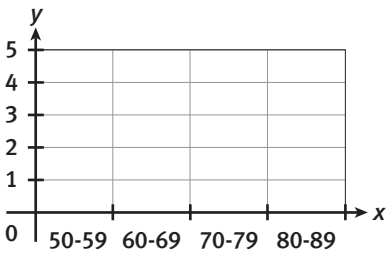
Numerical data can also be organized in a **histogram**.

EXAMPLE 2

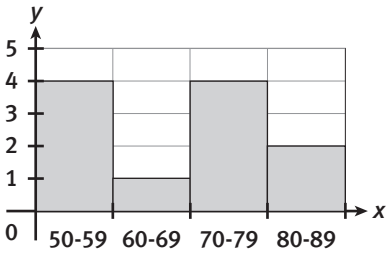
Draw a histogram for the set of data below.

{53, 84, 55, 70, 77, 63, 51, 53, 75, 82, 72}

Step 1: *Draw vertical and horizontal axes, placing equal numerical intervals on the horizontal axis and* ***frequency*** *values on the vertical axis.*



Step 2: *Count the number of elements in each numerical interval and draw a vertical bar representing that frequency.*



MATH TERMS

A **histogram** is a graph used to show the frequencies for a set of data. The horizontal axis is divided into equal intervals. The vertical axis shows the **frequency**, or the number of items, in each interval.

MATH TIP

A **histogram** is used to describe numerical data (for example, ages, heights, weights), while a **bar graph** is used to describe categorical data (for example, colors, types, qualities). The bars in a histogram always touch, but the bars in a bar graph never touch.

SUGGESTED LEARNING STRATEGIES: Marking the Text, Question the Text, Create Representations, Group Presentation

My Notes

TRY THESE **B**

Write your answers in the My Notes space. Show your work.
Use the home run data for Hank Aaron and Harmon Killebrew.

a. Make a histogram for Hank Aaron's data.

b. Make a histogram for Harmon Killebrew's data.

8. Look at the histograms you made for Try These B. Identify the information that you can gather about Aaron's and Killebrew's home run production using these displays.

MATH TERMS

A **box plot**, also called a **box-and-whisker plot**, displays data organized into four sections, each representing 25% of the data.

Another display that allows for further interpretation of data is a **box plot**. Consider the following steps.

ACADEMIC VOCABULARY

A **five-number summary** of data includes the minimum, first quartile, median, third quartile, and maximum. The information in the five-number summary is used in a box plot.

9. Construct a box plot for the following data by completing the following steps.

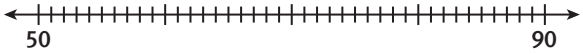
{53, 84, 55, 70, 77, 63, 51, 53, 75, 82, 72}

a. Put the numbers in order from smallest to largest and circle the maximum, minimum, and median. Leave some space between the numbers.

b. Continue using the list you made in Part a. Find the median of the data to the left of the median and put a square around this number. This number is the first quartile.

c. Find the median of the data to the right of the median and put a square around this number. This number is the third quartile.

d. Fill in the other scale marks on the number line below. Explain why 50 to 90 is chosen as an appropriate focus for this graph.



SUGGESTED LEARNING STRATEGIES: Marking the Text, Question the Text, Create Representations, Group Presentation, Quickwrite, Self/Peer Revision, Work Backward, Think/Pair/Share

My Notes

e. Continue working on the number line at the bottom of page 300. Plot the numbers from the five-number summary as dots above the number line.

f. Draw vertical lines above the first and third quartiles to serve as the ends of a horizontal rectangle. Draw the horizontal sides of the rectangle. Then draw a vertical line in the rectangular box for the median.

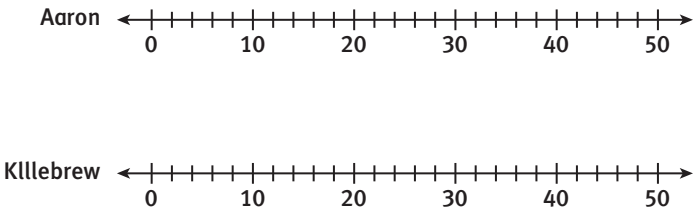
g. Draw a horizontal line to connect the dot at the maximum to the dot at the third quartile. Draw a horizontal line from the dot at the minimum to the dot at the first quartile.

10. What information does a box plot provide? What information is not provided in this display?

CONNECT TO AP

Stem plots, histograms, and box plots are among the displays used in AP Statistics.

11. Construct a box plot for Hank Aaron's home run data and another box plot for Harmon Killebrew's home run data.



12. Use the box plots in Question 12 to compare the home run data for both players. What new information can you gather using these displays?

13. Look back at the measures that you found in Question 2. Which measure do you think best describes the data for these two players? Justify your answer.

My Notes

SUGGESTED LEARNING STRATEGIES: Think/Pair/Share, Group Presentation

When you want to compare part of a data set to the whole data set, you can use a circle graph.

14. These data show the percent of homeruns scored by a high school baseball team by grade level.

Freshmen: 10% Sophomores: 25%
Juniors: 30% Seniors: 35%

Use the data and the fact that a circle has 360° to make a circle graph. Follow these steps.

a. Determine the angle measure of the sector for Freshmen by finding 10% of 360°. Use your protractor and the circle graph template provided by your teacher to draw the sector representing Freshmen homeruns.

b. Label the sector you drew.

c. Repeat the steps in parts a and b for Sophomore, Junior, and Senior homeruns.

d. Title your circle graph.

CHECK YOUR UNDERSTANDING

Write your answers on notebook paper. Show your work.

Mr. Nelson's class recently took a test. He made a list of the scores:

66, 79, 76, 95, 55, 82, 60, 85,
93, 76, 63, 96, 75, 82, 71

1. Find all three measures of central tendency for the test scores.

2. Create a stem plot from the test score data.

3. Create a histogram from the test score data using intervals of 5.

4. Complete a five-number summary of the test score data.

5. Use the five-number summary to make a box plot for the test score data.

6. After a student completed a makeup test, Mr. Nelson added his score, 85, to the data set. Make a box plot for the new data set.

7. These data show the attendance by grade level of students who attended high school baseball games last season.

Freshmen: 15% Sophomores: 20%
Juniors: 25% Seniors: 40%
Create a circle graph for the data.

8. Compare the information gathered from each of the data displays.

9. **MATHEMATICAL REFLECTION** What are the advantages and disadvantages of each type of data display addressed in this activity?