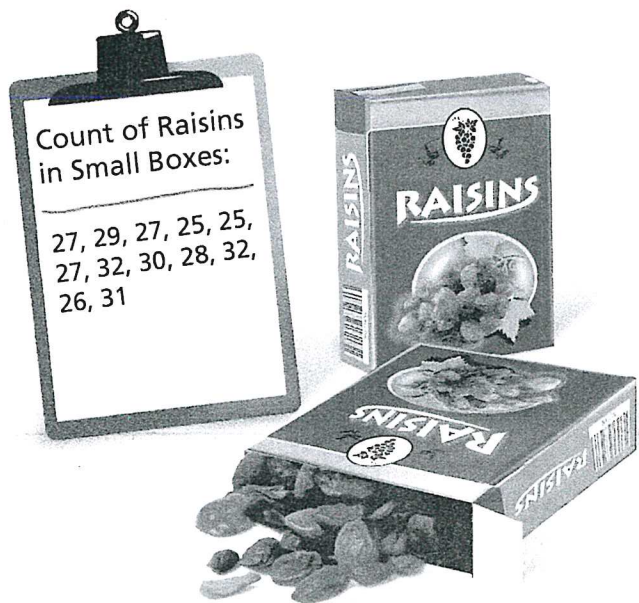


## Solve & Discuss It!



ACTIVITY

To track how many raisins are needed for packaging, a quality control inspector at a food processing plant collected data for the number of raisins in small boxes. Describe the data, including minimum value, maximum value, and median. Then describe what you notice about the values between the minimum and the median, and between the median and maximum.




## Lesson 8-3

### Display Data in Box Plots



Go Online | [PearsonRealize.com](http://PearsonRealize.com)

**I can...**  
make and interpret box plots.

-  **MAFS.6.SP.2.4** Display numerical data in plots on a number line, including... box plots.
- MAFS.K12.MP.1.1, MP.2.1, MP.3.1, MP.4.1**

**Reasoning** How can ordering the numbers of raisins in small boxes from least to greatest help you find the median?

### Focus on math practices

**Construct Arguments** The median of the first half of the data is 26.5, and the median of the second half of the data is 30.5. Why would this information be helpful and what do those medians show? Explain.

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

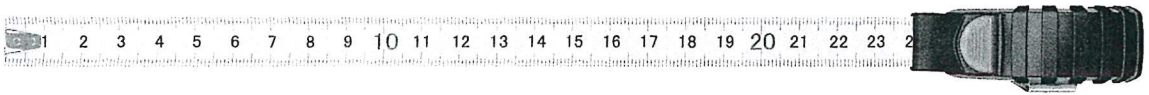
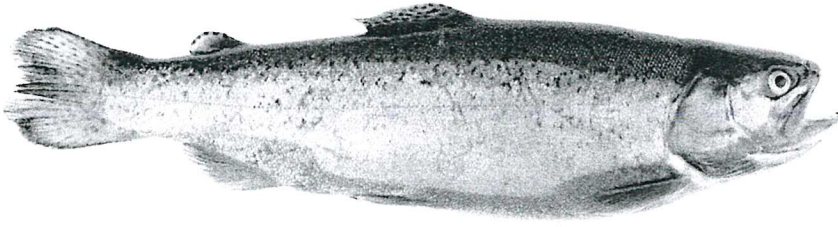
**EXAMPLE 1**  **Make a Box Plot**

Scan for Multimedia 

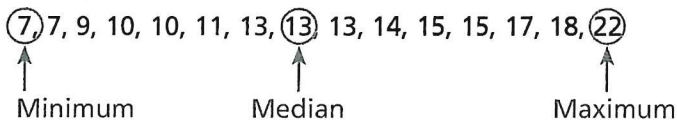
Helen wants to display the lengths of 15 fish she caught this year to compare to the lengths of fish she caught last year. How can she use the data to make a box plot?

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.

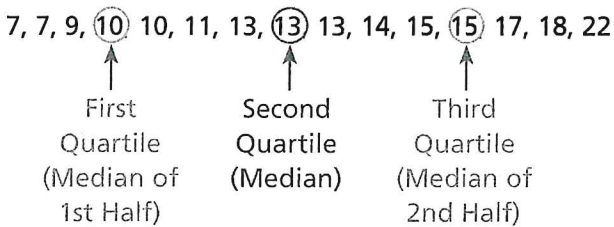
Length of Fish (in.)		
7	9	10
7	13	13
10	15	15
18	11	13
22	14	17



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



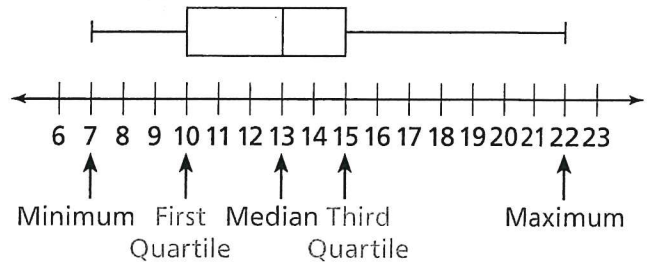
Find the median for each half.



Draw the box plot.

Show a number line with an appropriate scale, a box between the first and third quartiles, and a vertical segment that shows the median.

Draw segments that extend from the box to the minimum value and to the maximum value.



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

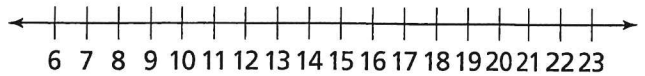
 **Try It!**

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



### Make a Box Plot When the Number of Values Is Even



ACTIVITY



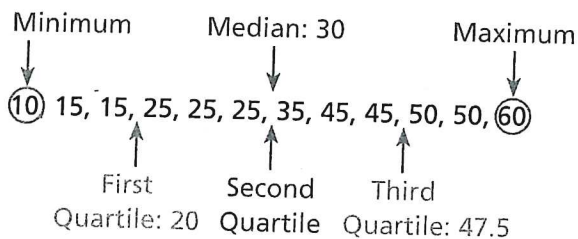
ASSESS

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.



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

## Earth Club

Sign Up Log In

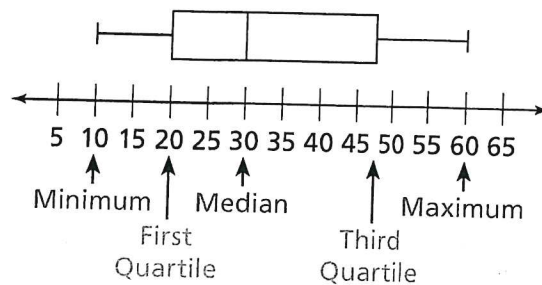


### Fund-Raiser

Donations Received		Thank you!	
\$50	Ken M.	\$25	Anon.
\$35	Ann K.	\$15	Jay T.
\$45	J. W.	\$15	Ben A.
\$50	Anon.	\$10	Anon.
\$25	Anon.	\$60	Nia M.
\$25	Hal K.	\$45	Anon.

**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



### Interpret a Box Plot

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?

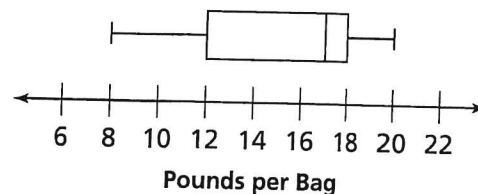
The minimum is 8, so the lightest bag weighs 8 pounds.

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.

### Bags of Donated Clothing



### 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.

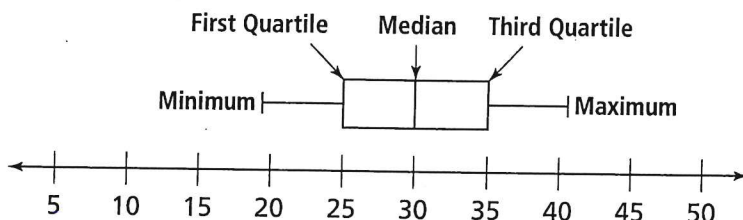




A box plot shows a distribution of data values on a number line. A box plot visually represents a data set divided into four equal parts.

Quartiles divide data into quarters, or equal groups.

The median is also the second quartile.

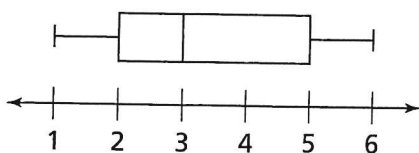


## Do You Understand?

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.



## Do You Know How?

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

4. What are the minimum and maximum test scores?

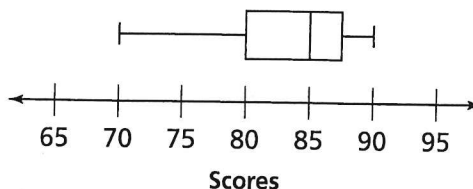
5. Find the median.

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



Name: \_\_\_\_\_



PRACTICE



TUTORIAL

# Practice & Problem Solving



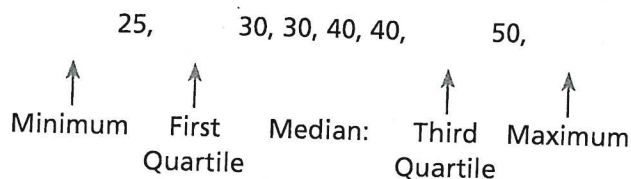
Scan for  
Multimedia



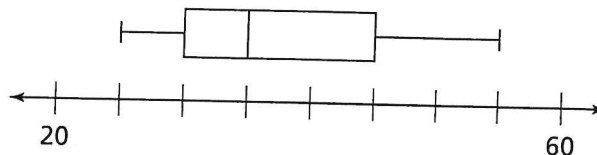
**Leveled Practice** In 9 and 10, use this data set, which shows how many minutes Enzo practiced violin each day for 10 days.

40, 25, 45, 55, 30, 25, 30, 50, 30, 40

9. Find the statistical measures that you need to make a box plot of Enzo's practice times.



10. Complete the box plot to represent Enzo's practice times.



In 11 and 12, use this data set, which shows the prices, in dollars, of tickets to 10 plays at the community theater.

14, 22, 8, 14, 16, 8, 20, 14, 10, 18

11. Find the minimum, maximum, median, and quartile ticket prices.

Minimum:

First Quartile:

Median:

Third Quartile:

Maximum:

12. Make a box plot to display the ticket prices.

In 13 and 14, draw box plots using the data provided.

13. The sprint times, in seconds, of students who tried out for the track team:

44, 40, 40, 42, 49, 43, 41, 47, 54, 48, 42, 52, 48

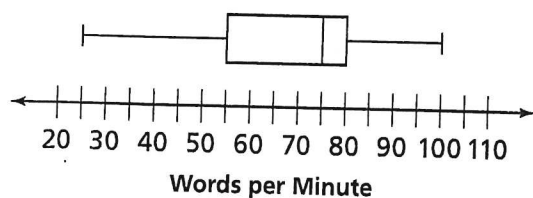
14. Scores earned on science tests:

73, 78, 66, 61, 85, 90, 99, 76, 64, 70, 72, 72, 93, 81

In 15 and 16, use the box plot to answer the question.

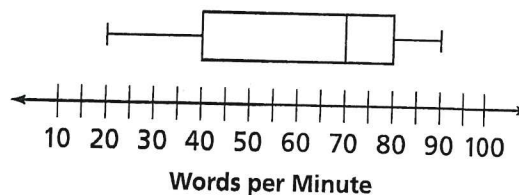
15. How many words per minute does the fastest keyboarder type?

**Keyboarding Speeds**



16. How many words per minute do the fastest 50% of keyboarders type?

**Keyboarding Speeds**



17. **Reasoning** The price per share of Electric Company's stock during 9 days, rounded to the nearest dollar, was as follows: \$16, \$17, \$16, \$16, \$18, \$18, \$21, \$22, \$19.

Use a box plot to determine how much greater the third quartile's price per share was than the first quartile's price per share.

18. **Make Sense and Persevere** The temperature forecast for Topeka, Kansas, for the next 8 days is shown. Use a box plot to determine the range for the lower half of the temperatures.

DAILY HIGH TEMPERATURES							
SUN	MON	TUE	WED	THU	FRI	SAT	SUN
29° 	31° 	24° 	26° 	29° 	35° 	27° 	32° 

19. **Model with Math** Coach Henderson clocked the speeds in miles per hour of pitches thrown during the first inning of a middle school baseball game, as shown at the right.

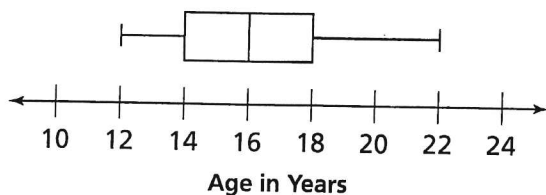
Draw a box plot to display the data and write two conclusions about the data shown in the box plot.

**Speeds of Pitches Thrown**  
(in miles per hour)

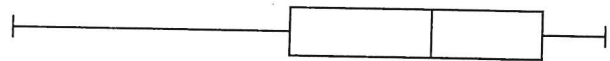
45.3 47 48.1 51.3 55.8 61.1 48.5 60.7 49

20. **Critique Reasoning** Tanya recorded the ages of 10 local babysitters: 20, 16, 18, 13, 14, 13, 12, 16, 22, 18. She says that the box plot below shows the distribution of ages. What error did she make?

**Babysitters**



21. **Higher Order Thinking** Alana made this box plot to represent classroom attendance last month. Without seeing the values, what conclusions can you make about whether attendance was mostly high or low last month? Explain.



## Assessment Practice

22. Use the data given to complete the box plot.

The ages in years of the students in Caryn's gymnastics class are shown in the table.

6.SP.2.4

**Ages of Students in Years**

12 11 9 18 10 11 7 16 14 11 6

Complete the box plot to show the distribution of the students' ages.

