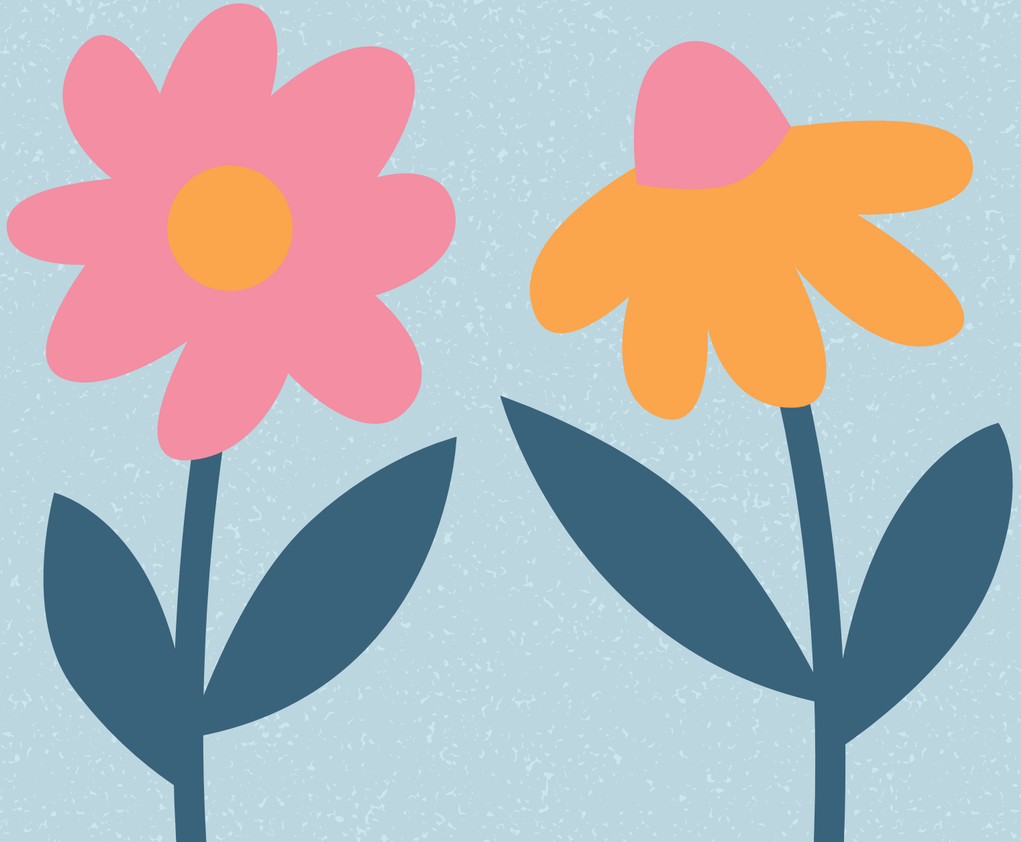
LESSON 11

FINDING MAD



FIRST 5

WELCOME

REMINDERS

- **Permission slips for field trip due 6/5**
- Earning period for LWOS (going after DTA and UL)
- **Math Gradebook CLOSES on 6/14**

WHAT TO DO

1. **GO directly to your assigned seat**
2. **Pass out Workbooks (paper copies)**
3. **Materials: Pencil and Calculator**
4. **Any work to submit?**

WARM UP

1) Calculate the mean number of baskets each player made, and compare the means. What do you notice?
2) What do the means tell us in this context?

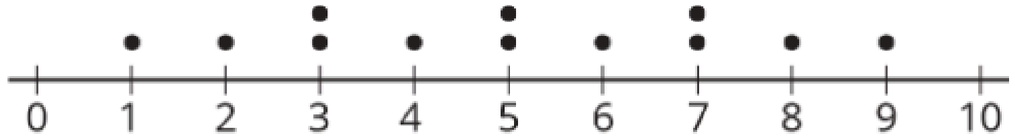


DIRECTIONS

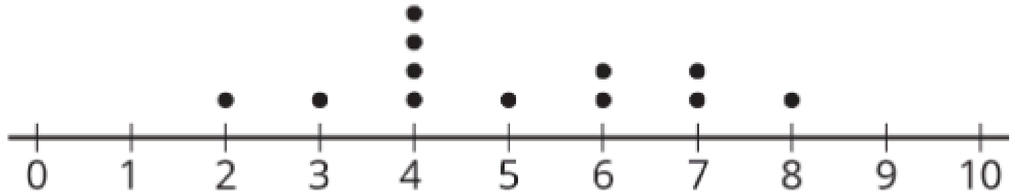
Mean: Add up all of the values and divide by the number of values in the data

Here are the dot plots showing the number of baskets Elena, Jada, and Lin each made over 12 school days.

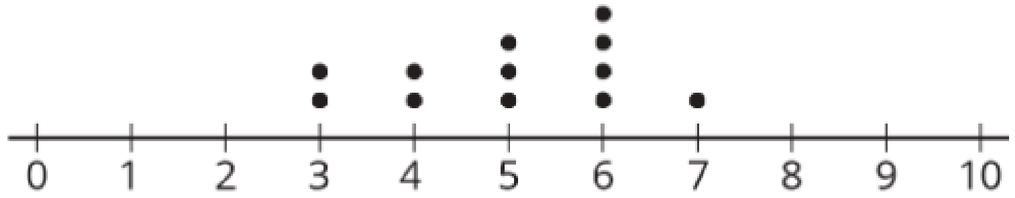
1. On each dot plot, mark the location of the mean with a triangle (Δ). Then, contrast the dot plot distributions. Write 2–3 sentences to describe the shape and spread of each distribution.



number of baskets Elena made



number of baskets Jada made



number of baskets Lin made

a. Would you say that all three students play equally well?

b. Would you say that all three students play equally consistently?

c. If you could choose one player to be on your basketball team based on their records, who would you choose?

The tables show Elena, Jada, and Lin's basketball data from an earlier activity. Recall that the mean of Elena's data, as well as that of Jada and Lin's data, was 5.

Elena	4	5	1	6	9	7	2	8	3	3	5	7
distance from 5	1			1								

Now find *the average of the distances* in the table. Show your reasoning and round your answer to the nearest tenth.

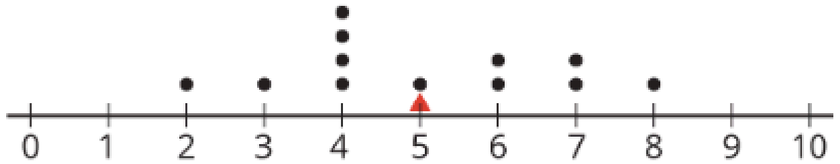
This value is the **mean absolute deviation (MAD)** of Elena's data.

Elena's MAD: _____

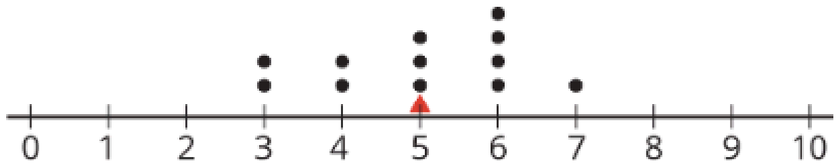
4. Compare the MADs and dot plots of the three students' data. Do you see a relationship between each student's MAD and the distribution on her dot plot? Explain your reasoning.



number of baskets Elena made



number of baskets Jada made



number of baskets Lin made

morrison after lunch

1. **Go Directly to Assigned Seat**
2. **Take off ANY outerwear** *(its too hot)*
3. **Complete Heading on CR and Cool Down**
4. **WAIT for next instruction. Do not start cool down without hearing directions.**

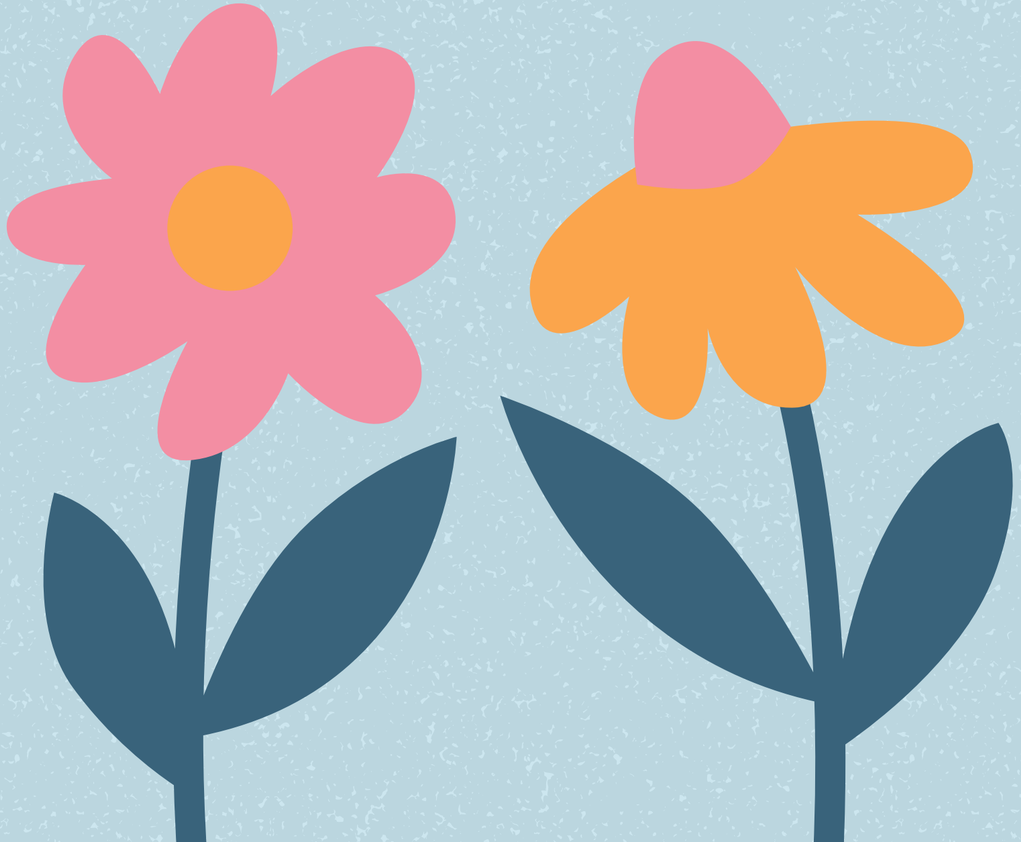
COOL DOWN

These three data sets show the number of text messages sent by Jada, Diego, and Lin over 6 days as well as the mean number of text messages sent by each student per day.

Jada: mean 5	4	4	4	6	6	6
Diego: mean 6	4	5	5	6	8	8
Lin: mean 4	1	1	2	2	9	9

LESSON 12

USING MEAN/MAD TO COMPARE



FIRST 5

WELCOME

REMINDERS

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WHAT TO DO

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WARM UP

$42 \div 12$

$2.4 \div 12$

$44.4 \div 12$

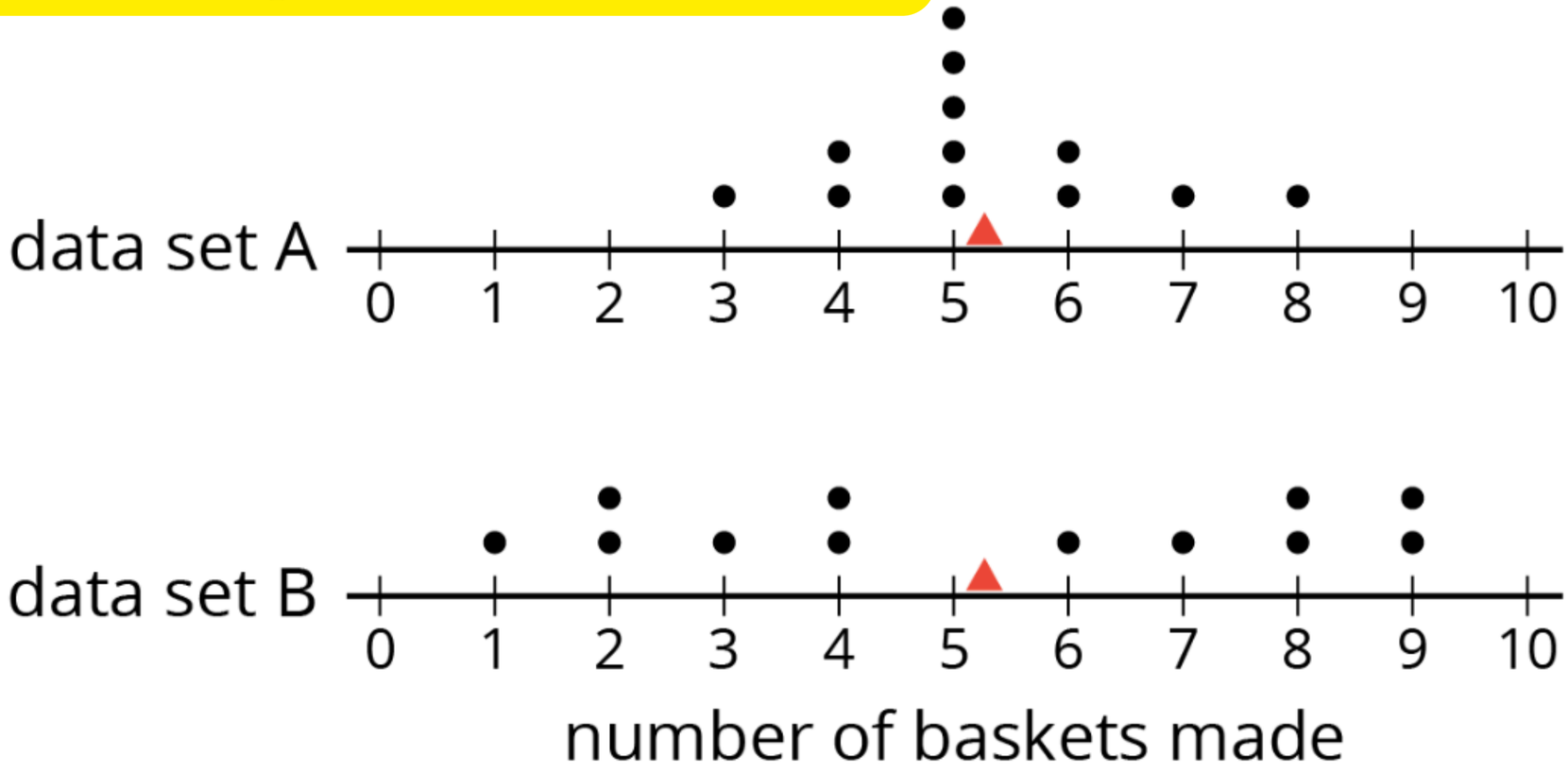
$46.8 \div 12$

90 seconds (quick math)
Solve the 4 problems in your warm up.

What do you notice about dividends and divisors?

60 seconds: JOT, one thing you notice and one thing you wonder

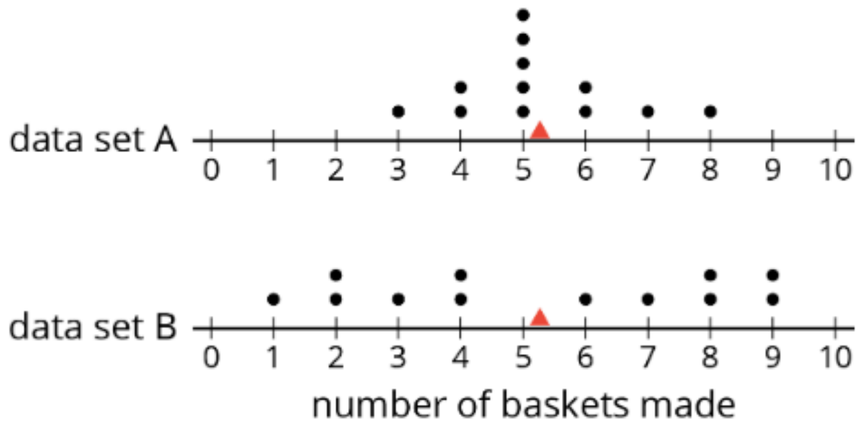
?



1. Andre and Noah joined Elena, Jada, and Lin in recording their basketball scores. They all recorded their scores in the same way: the number of baskets made out of 10 attempts. Each collected 12 data points.

- Andre's mean number of baskets was 5.25, and his MAD was 2.6.
- Noah's mean number of baskets was also 5.25, but his MAD was 1.

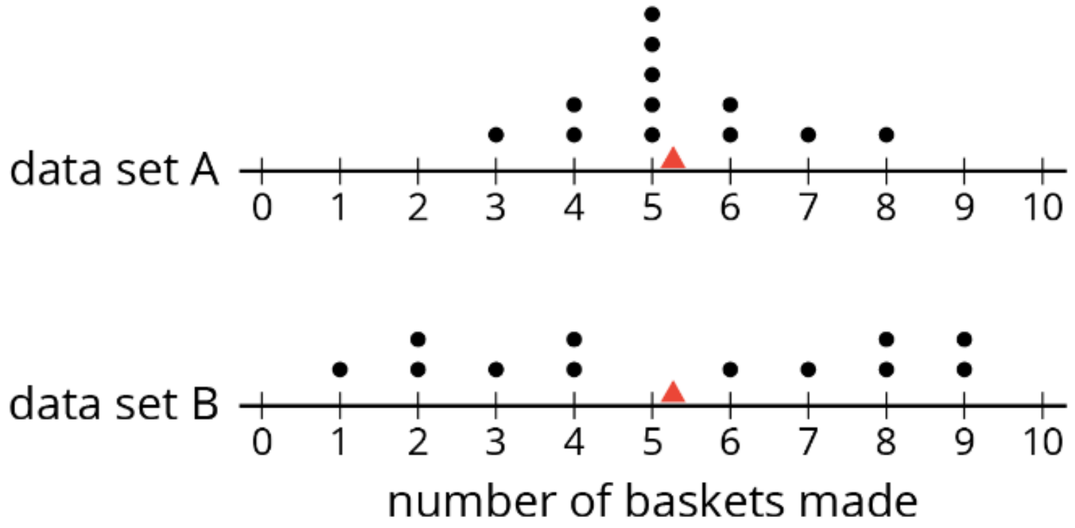
Here are two dot plots that represent the two data sets. The triangle indicates the location of the mean.



- Andre's mean number of baskets was 5.25, and his MAD was 2.6.
- Noah's mean number of baskets was also 5.25, but his MAD was 1.

a. Without calculating, decide which dot plot represents Andre's data and which represents Noah's. Explain how you know.

b. If you were the captain of a basketball team and could use one more player on your team, would you choose Andre or Noah? Explain your reasoning.

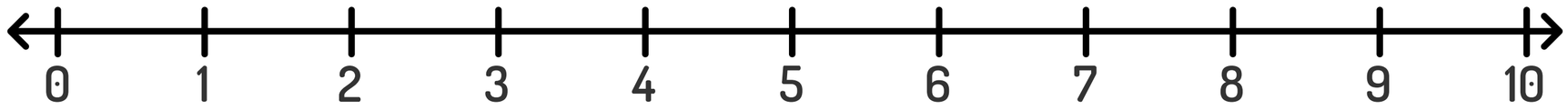


2. An eighth-grade student decided to join Andre and Noah and kept track of his scores. His data set is shown here. The mean number of baskets he made is 6.

a. Calculate the MAD. Show your reasoning.

b. Draw a dot plot to represent his data and mark the location of the mean with a triangle (Δ).

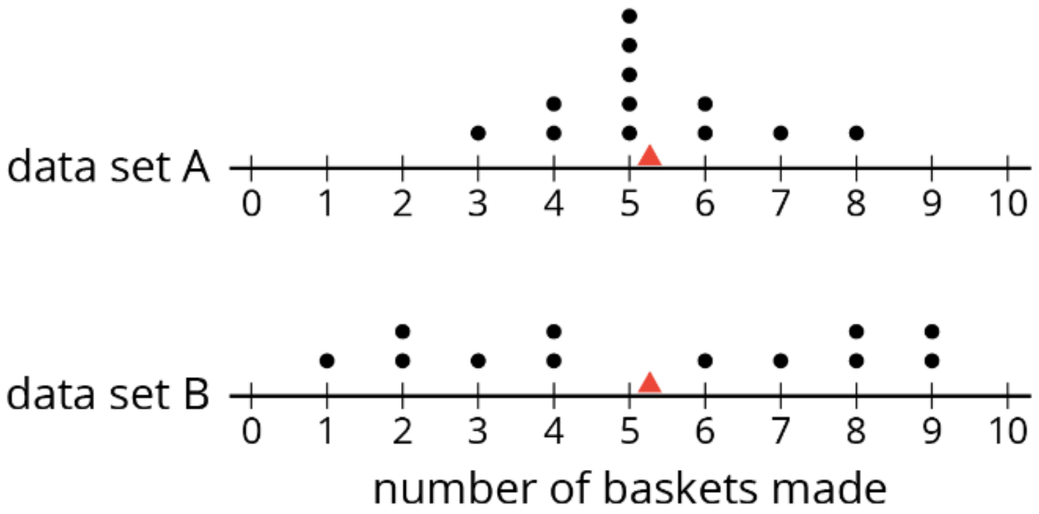
eighth-grade student	6	5	4	7	6	5	7	8	5	6	5	8
distance from 6												



c. Compare the eighth-grade student's mean and MAD to Noah's mean and MAD. What do you notice?

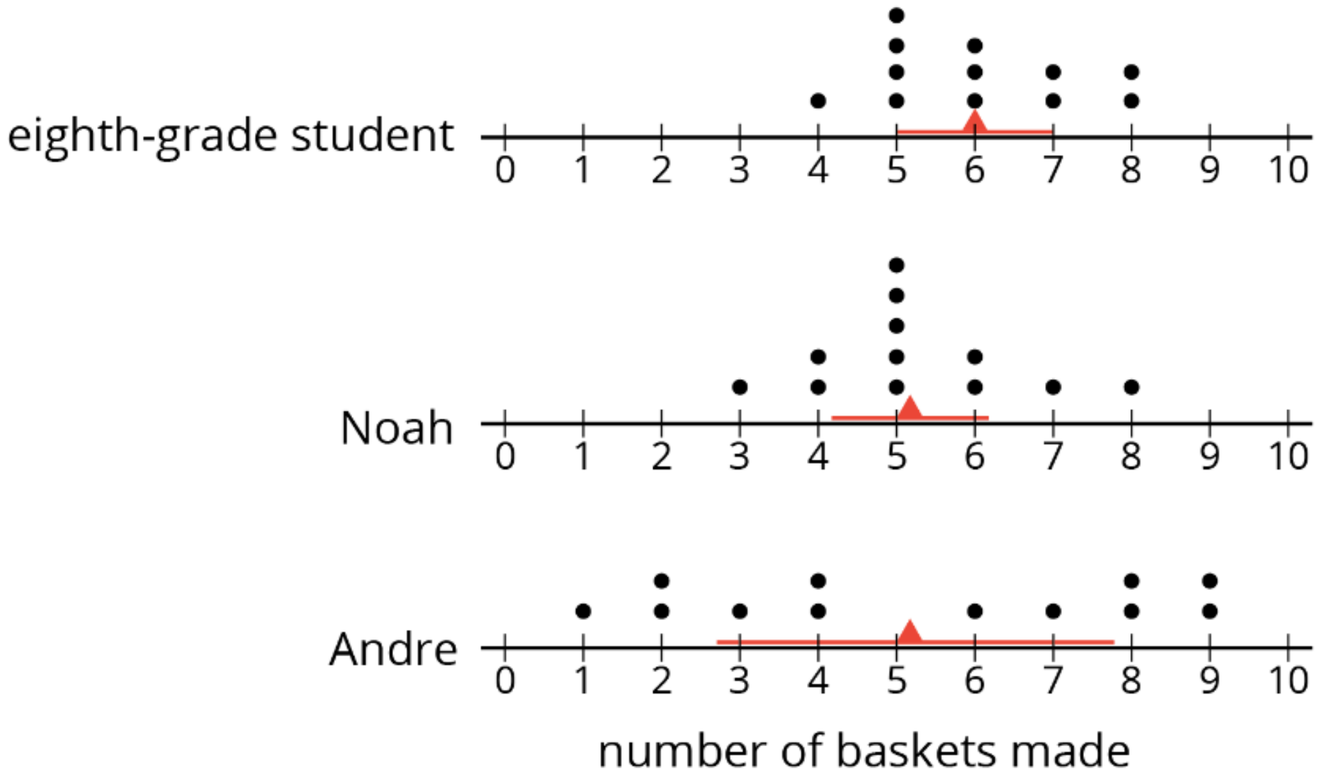
d. Compare their dot plots. What do you notice about the distributions?

e. What can you say about the two players' shooting accuracy and consistency?



Let's share who we think is the best player and why!





Lesson Synthesis

1. **MAD = mean absolute deviation**

tells me about the spread of the data, the larger the MAD is, the more spread out and VARYING the data is.

2. ***MEAN = average***

tells me about a group and what is typical of that group

COOL DOWN

1. Which group of students has the greatest variability in their travel times? Explain your reasoning.

	mean (minutes)	MAD (minutes)
United States	9	4.2
Australia	18.1	7.9
South Africa	23.5	16.2
Canada	11	8
New Zealand	12.3	5.5

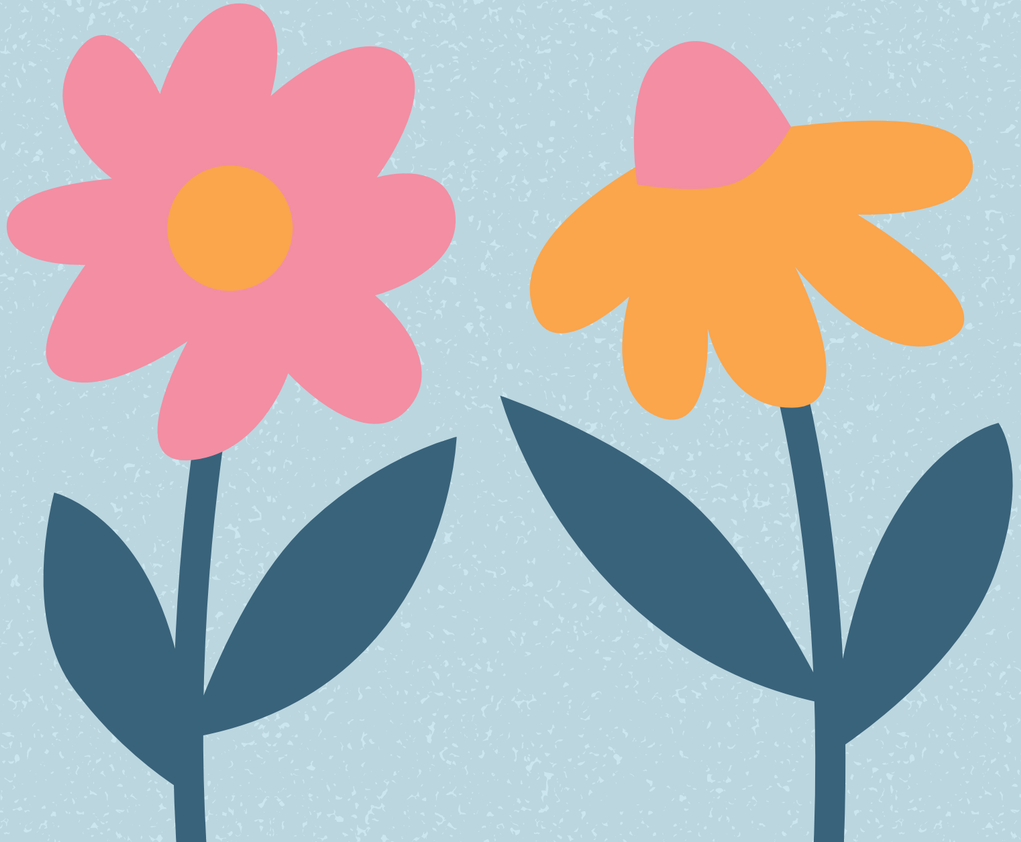
2. a. The mean of the data set for New Zealand is close to that of Canada. What does this tell us about the travel times of students in those two data sets?

b. The MAD of the data set for New Zealand is quite different than that of Canada. What does this tell us about the travel times of students in those two data sets?

3. The data sets for Australia and Canada have very different means (18.1 and 11 minutes) but very similar MADs. What can you say about the travel times of the students in those two data sets?

LESSON 15

QUARTILES AND IQR



FIRST 5

WELCOME

REMINDERS

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WHAT TO DO

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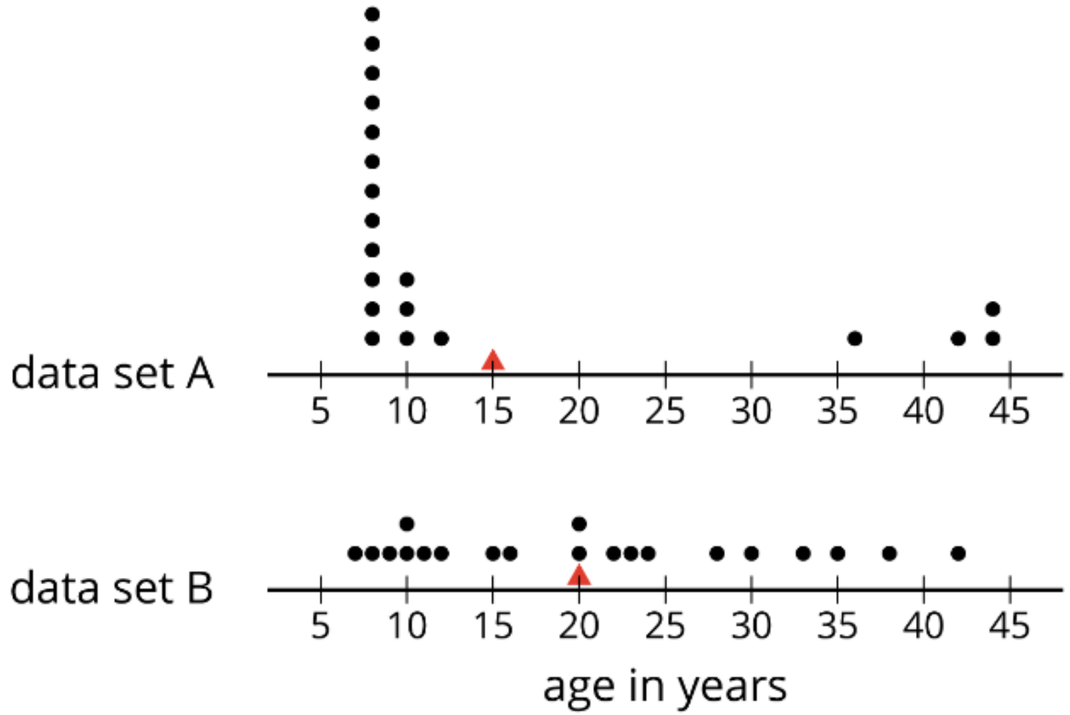
WARM UP

Here are dot plots that show the ages of people at two different parties. The mean of each distribution is marked with a triangle.



60 seconds: JOT, one thing you notice and one thing you wonder

Here are the ages of the people at one party, listed from least to greatest.

7	8	9	10	10	11	12	15	16	20	20	22	23	24	28	30	33	35	38	42

1. a. Find the median of the data set and label it “50th percentile.” This splits the data into an upper half and a lower half.

1. b. Find the middle value of the *lower* half of the data, without including the median. Label this value “25th percentile.”

c. Find the middle value of the *upper* half of the data, without including the median. Label this value “75th percentile.”

do together

answer questions 2-4 in table teams

2. You have split the data set into four pieces. Each of the three values that split the data is called a **quartile**.

- We call the 25th percentile the *first quartile*. Write “Q1” next to that number.
- The median can be called the *second quartile*. Write “Q2” next to that number.
- We call the 75th percentile the *third quartile*. Write “Q3” next to that number.

3. Label the lowest value in the set “minimum” and the greatest value “maximum.”

4. The values you have identified make up the *five-number summary* for the data set. Record them here.

Minimum: _____

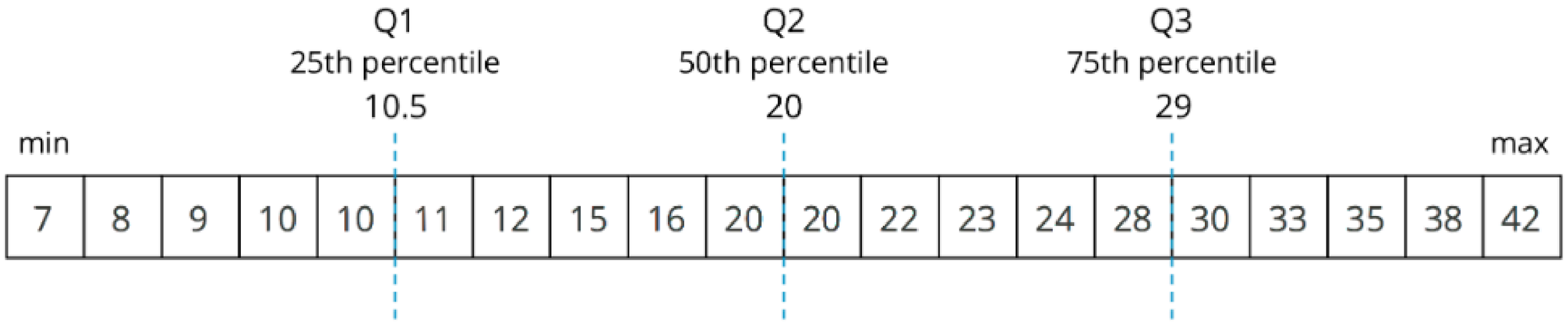
Q1: _____

Q2: _____

Q3: _____

Maximum: _____

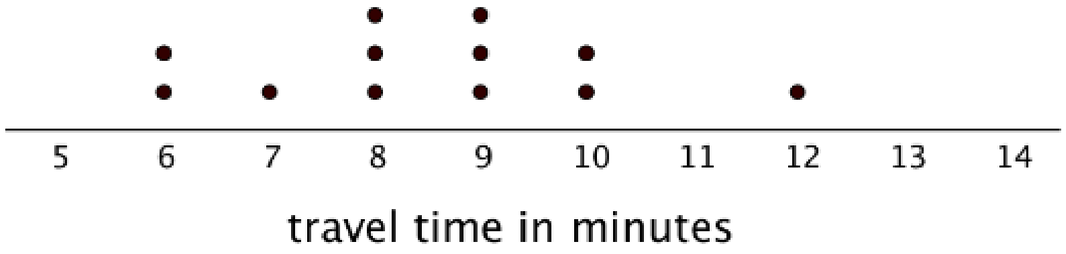
Let's discuss the five numbers we labeled on the table.



- In this context, what do the minimum and maximum values tell us?
- Why are Q1 called 25th percentile, Q2 50th percentile, and Q3 75th percentile?
- In this context, what does Q1 (10.5) tell us?
- What does Q3 (29) tell us?
- How do the five numbers help us to see the distribution of the data?

1. Here is a dot plot that shows the lengths of Elena's bus rides to school, over 12 days.

Write the five-number summary for this data set. Show your reasoning.



Minimum: _____

Q1: _____

Q2: _____

Q3: _____

Maximum: _____

it may be helpful to write down the numbers in a list rather than working on the dot plot

2. The **range** is one way to describe the *spread* of values in a data set. It is the difference between the maximum and minimum. What is the range of Elena's travel times?

3. Another way to describe the spread of values in a data set is the **interquartile range (IQR)**. It is the difference between the upper quartile and the lower quartile.

a. What is the interquartile range (IQR) of Elena's travel times?

b. What fraction of the data values are between the lower and upper quartiles?

cool down

1. Order the data in a list from least to greatest
2. Write the 5 Number Summary for the data (min, q1, median, q3, and max)
3. use this information to answer the questions.
4. Ensure you write in complete sentences and answer fully.

morrison after lunch

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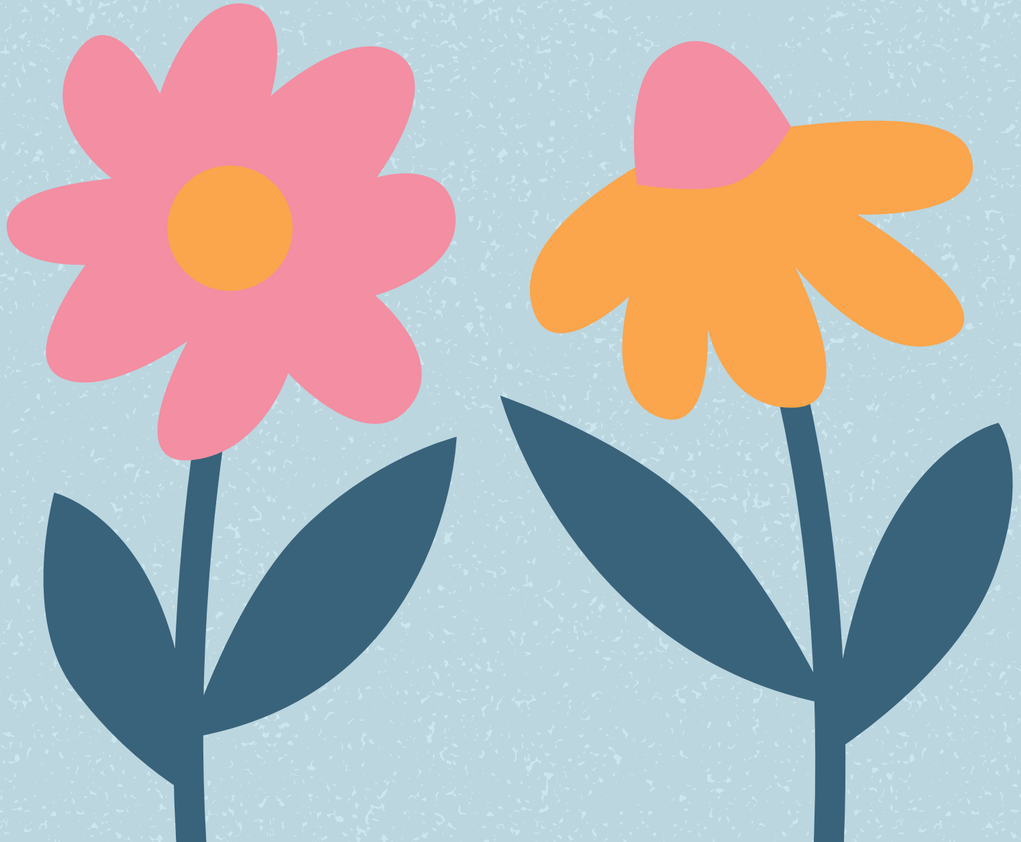
LESSON 15

QUARTILES AND IQR



FIRST 5

WELCOME

REMINDERS

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warm up

Here are the birth weights, in ounces, of all the puppies born at a kennel in the past month.

13	14	15	15	16	16	16	16	17
17	17	17	17	17	17	18	18	18
18	18	18	18	18	19			

What do you notice and wonder about the dis
weights?

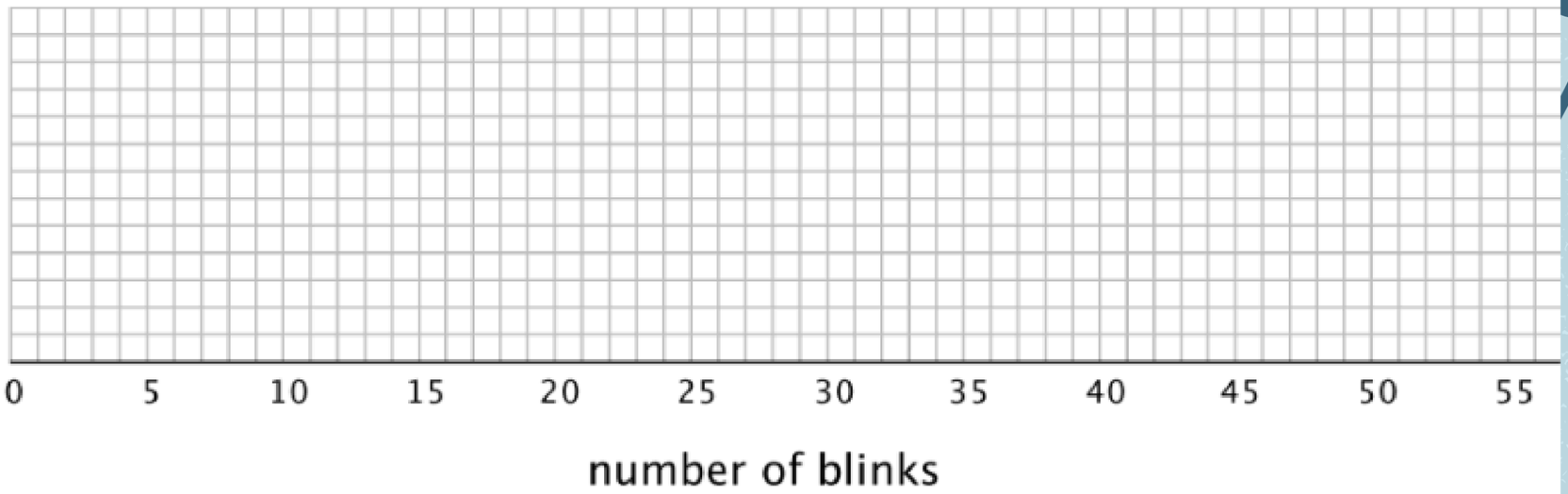
60 seconds: JOT, one thing you notice and one thing you wonder

16.3 Studying Blinks

Twenty people participated in a study about blinking. The number of times each person blinked while watching a video for one minute was recorded. The data values are shown here, in order from smallest to largest.

- 3
- 6
- 8
- 11
- 11
- 13
- 14
- 14
- 14
- 14
- 16
- 18
- 20
- 20
- 20
- 22
- 24
- 32
- 36
- 51

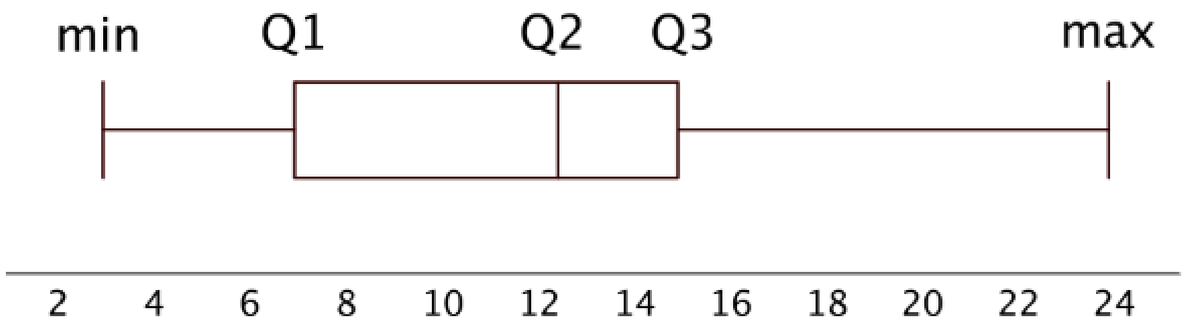
1. a. Use the grid and axis to make a dot plot of this data set.



b. Find the median (Q2) and mark its location on the dot plot.

c. Find the first quartile (Q1) and the third quartile (Q3). Mark their locations on the dot plot.

d. What are the minimum and maximum values?



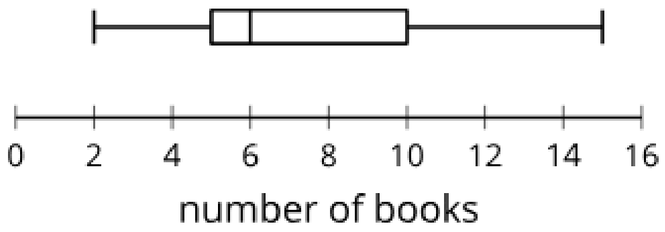
- The left and right sides of the box are drawn at the first and third quartiles (Q1 and Q3).

- A vertical line inside the box is drawn at the median (Q2).
- The two horizontal lines (or 'whiskers') extend from the first quartile to the minimum and from the third quartile to the maximum.
- The height of the box does not give additional information about the data, but should be tall enough to distinguish the box from the whiskers.

box plot

A box plot is a way to represent data on a number line. The data is divided into four sections. The sides of the box represent the first and third quartiles. A line inside the box represents the median. Lines outside the box connect to the minimum and maximum values.

For example, this box plot shows a data set with a minimum of 2 and a maximum of 15. The median is 6, the first quartile is 5, and the third quartile is 10.



Your teacher will give you the data on the lengths of names of students in your class. Write the five-number summary by finding the data set's minimum, Q1, Q2, Q3, and the maximum.