

8.6

Communicate about Data

YOU WILL NEED

- a calculator

GOAL

Explain why one measure represents a set of data better than another.

LEARN ABOUT the Math

Ashley's science teacher challenged the students to build little cars powered by elastic bands. Ashley recorded the distance each student's car travelled, in metres:

7.0, 6.4, 8.3, 10.0, 5.5, 4.6, 8.2, 6.7,
7.0, 9.1, 7.5, 9.4, 25.0, 8.6, 30.7, 6.0

Ashley explained which measure of average represented the data best.



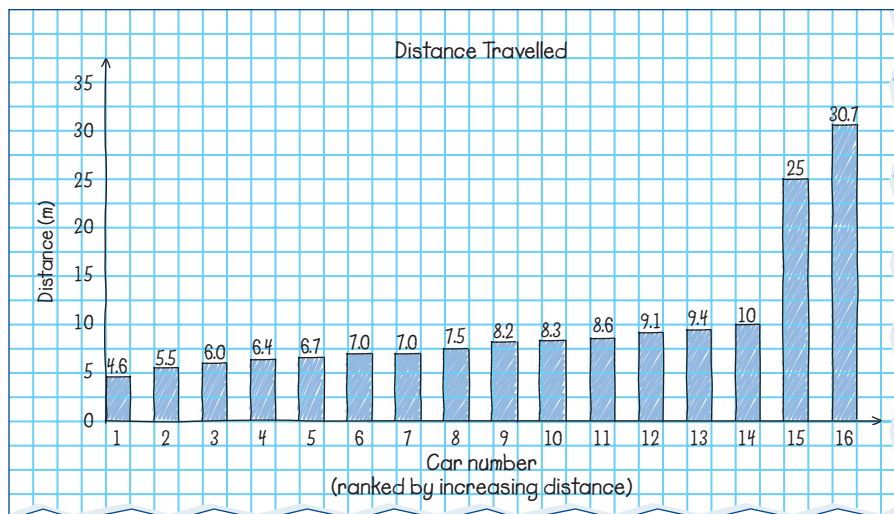
How can Ashley improve her explanation?

Ashley's Explanation

1. I plotted the distances in a bar graph because a bar graph makes it easier to see how the values are arranged.

Gail's Questions

How does this help you?



2. I calculated the mean to one decimal place. ←

$$160.0 \div 16 = 10.0 \text{ m}$$

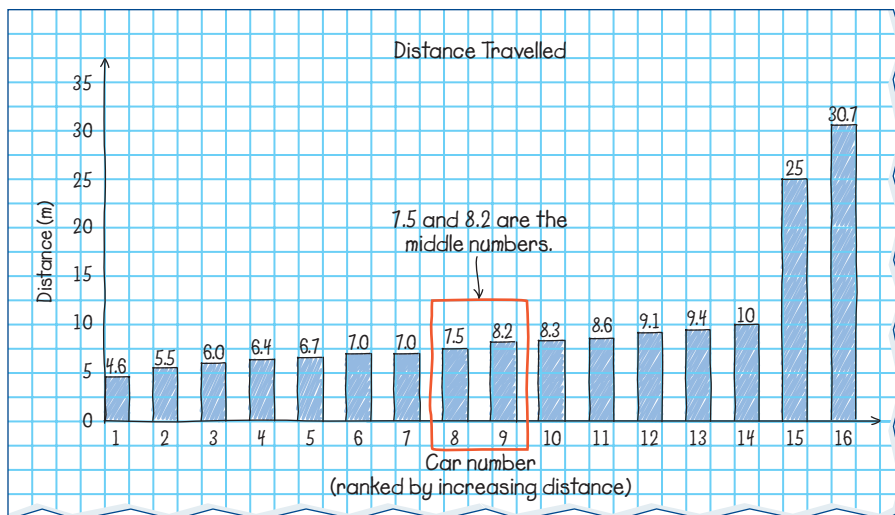
How did you calculate the mean?

3. I calculated the mean without the two greatest numbers. ←

$$104.3 \div 14 = 7.5 \text{ m}$$

Why did you do this? Is it fair to do this?

4. I used the bar graph to locate the median.



The median is 7.9.

5. The mode is 7.0 m.

6. The best measure of average is the median, 7.9 m. ←

Why did you choose the median as the best measure of average?

Communication Checklist

- ✓ Are the graphs appropriate for the data?
- ✓ Did you include all the important details?
- ✓ Did you make reasonable conclusions?
- ✓ Did you justify your conclusions?
- ✓ Were you convincing?

Reflecting

- A. What other questions would you ask about Ashley's explanation?
- B. Rewrite Ashley's explanation. Include the answers to Gail's questions and answers to your questions.
- C. Which part of the Communication Checklist did Ashley cover well? Explain your answer.

WORK WITH the Math

Example

Choosing the best average

Janine is practising the shot put. Here are the results of her last 10 attempts:

Attempt	1	2	3	4	5	6	7	8	9	10
Distance (m)	8.5	8.2	8.5	8.4	8.5	5.5	8.6	8.5	8.3	8.6

Do you think that Janine will put the shot 8.5 m on track and field day?

Solution

The mean is 8.2. The median is 8.5. The mode is 8.5.

Janine had one very short distance, 5.5 m. This distance lowered the mean below the value that you would expect. Most of Janine's attempts are close to the 8.5 m distance. Even the shorter attempts were close to 8.5 m. The median and the mode show this better than the mean does so they are the best measures to use for predicting. Based on these two measures, Janine will probably throw about 8.5 m on track and field day.

A Checking

- How much milk should the school order each day? Improve Judy's solution using the Communication Checklist.

Judy's Solution

I gathered data and calculated the mean, median, and mode.

Day	White milk (cartons)	Chocolate milk (cartons)
Monday	45	70
Tuesday	61	50
Wednesday	54	45
Thursday	65	52
Friday	68	62

	White milk (cartons)	Chocolate milk (cartons)
mode	no mode	no mode
median	61	52
mean	59	56

The cafeteria should buy 61 cartons of chocolate milk and 56 cartons of white milk each day.

B Practising

2. Roger asked 15 students how many hours of TV they watched each week. Here are his results:
14, 16, 12, 14, 14, 11, 20, 12, 10, 16, 15, 17, 5, 15, 10
 - a) Determine the mean, median, and mode of these values.
 - b) Roger said, “If I watched 2 h of TV each day, I’d be an average TV watcher.” Is he correct? Explain your reasoning.
3. Asha, Peter, and Winnie are the captains of the school math teams. They wrote their contest results in this table.

	Contest								
Captain	#1	#2	#3	#4	#5	#6	#7	#8	#9
Asha	82	82	88	100	77	81	87	83	83
Peter	84	84	90	71	78	87	89	88	86
Winnie	85	85	85	81	81	85	82	85	83

- a) Whose math team is best, based on the mean? Explain.
 - b) Whose team is best, based on the median? Explain.
 - c) Whose team is best, based on the mode? Explain.
 - d) Which measure would you choose to determine whose team is the best? Why might someone else disagree with you?
4. Melanie found this information about forest fires started by lightning.

Western and Northern Canada	Number of fires	Eastern Canada	Number of fires
Manitoba	105	Newfoundland and Labrador	14
Saskatchewan	180	Prince Edward Island	0
Alberta	425	Nova Scotia	27
British Columbia	842	New Brunswick	20
Yukon Territory	14	Québec	74
Northwest Territories	253	Ontario	168

- a) Represent the data in a graph.
 - b) Are more fires started by lightning in Western and Northern Canada or in Eastern Canada? Explain.