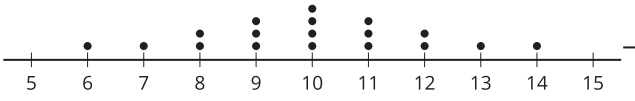
Unit 1 Lesson 12: Standard Deviation

1 Notice and Wonder: Measuring Variability (Warm up)

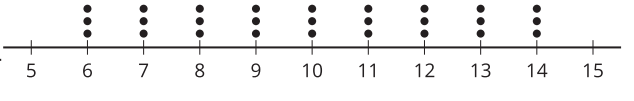
Student Task Statement

What do you notice? What do you wonder?

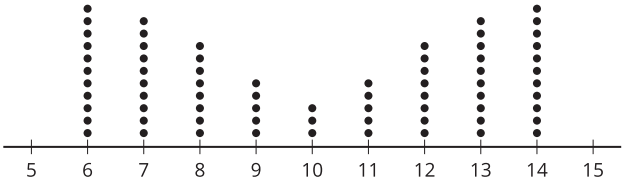
mean: 10, MAD: 1.56, standard deviation: 2



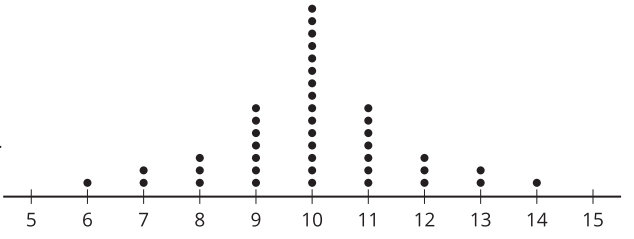
mean: 10, MAD: 2.22, standard deviation: 2.58



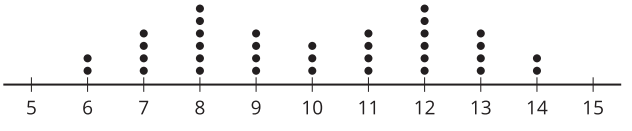
mean: 10, MAD: 2.68, standard deviation: 2.92



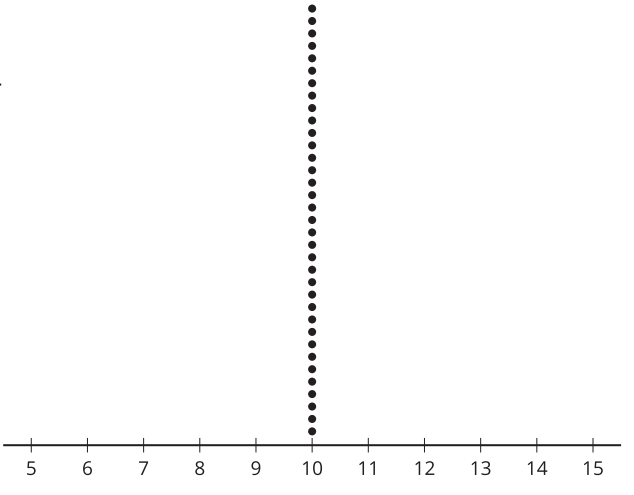
mean: 10, MAD: 1.12, standard deviation: 1.61



mean: 10, MAD: 2.06, standard deviation: 2.34



mean: 10, MAD: 0, standard deviation: 0



2 Investigating Standard Deviation

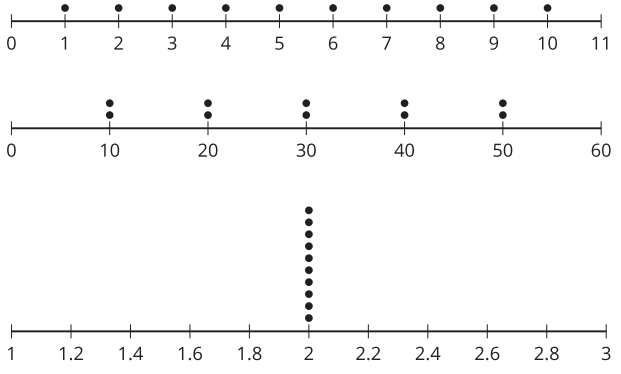
Student Task Statement

Use technology to find the mean and the standard deviation for the data in the dot plots.

1. What do you notice about the mean and standard deviation you and your partner found for the three dot plots?
2. Invent some data that fits the conditions. Be prepared to share your data set and reasoning for choice of values.

Partner 1

Dot plots:

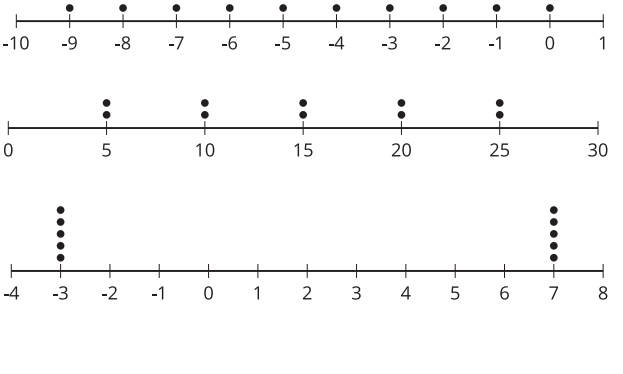


Conditions:

- 10 numbers with a standard deviation equal to the standard deviation of your first dot plot with a mean of 6.
- 10 numbers with a standard deviation three times greater than the data in the first row.
- 10 different numbers with a standard deviation as close to 2 as you can get in 1 minute.

Partner 2

Dot plots:



Conditions:

- 10 numbers with a standard deviation equal to the standard deviation of your first dot plot with a mean of 12.
- 10 numbers with a standard deviation four times greater than the data in the first row.
- 10 different numbers with a standard deviation as close to 2 as you can get in 1 minute.

3 Investigating Variability

Student Task Statement

Begin with the data:

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

1. Use technology to find the mean, standard deviation, median, and interquartile range.
2. How do the standard deviation and mean change when you remove the greatest value from the data set? How do they change if you add a value to the data set that is twice the greatest value?
3. What do you predict will happen to the standard deviation and mean when you remove the least value from the data set? Check to see if your prediction was correct.
4. What happens to the standard deviation and mean when you add a value to the data set equal to the mean? Add a second value equal to the mean. What happens?
5. Add, change, and remove values from the data set to answer the question: What appears to change more easily, the standard deviation or the interquartile range? Explain your reasoning.

Activity Synthesis