KHANACADEMY

CollegeBoard SAT®

Official SAT Practice

Lesson Plans

for Teachers by Teachers

LESSON 10 (5 OF 5 FOR PROBLEM SOLVING AND DATA ANALYSIS)

More Data and Statistics, Part 2

(see More Data and Statistics, Part 1)

Subscore: Problem Solving and Data Analysis

Focus: Analyzing data presented in a table, bar graph, histogram, line graph, or other display

Objectives:

Students will

- investigate some characteristic of a population (such as time students spend on the internet; the life of a battery; and the percentage of registered voters who plan to vote for a candidate).
- investigate relationships between variables and draw conclusions about cause and effect.

Before the Lesson:

- ☐ Review the Teacher Notes.
- ☐ Make sure students have access to Official SAT® Practice during class.
- ☐ Make sure you have a way to share example problems with students.

Partner | 40 minutes

Have students complete the Basic and Harder Examples for "Data inferences" and "Data collection and conclusions" in Official SAT Practice on Khan Academy®.

- Remind students to pause the video as soon as they can see the problem. Once students have worked through the problem, have them watch the video to check their work.

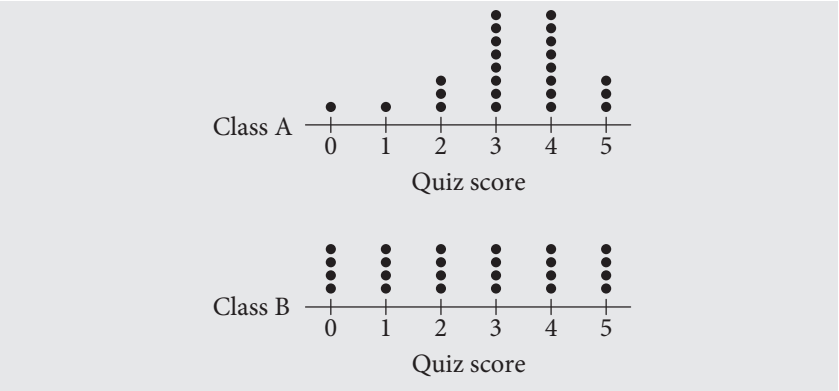
Teacher Notes

- The videos from these four sections add up to about 20 minutes. Encourage students to discuss their solutions and questions for each problem prior to watching the video.

Alternative Activity: Classwork and Discussion (as time allows):

- Have students complete the Example Problems below and then discuss them as a class.
- Review terms and definitions, as needed (see Teacher Notes below).

1.



The dot plots above show the distributions of scores on a current events quiz for two classes of 24 students. Which of the following correctly compares the standard deviation of the scores in each of the classes?

A. The standard deviation of quiz scores in Class A is smaller.
B. The standard deviation of quiz scores in Class B is smaller.
C. The standard deviation of quiz scores in Class A and Class B is the same.
D. The relationship cannot be determined from the information given.

2. A quality control researcher at an electronics company is testing the life of the company's batteries in a certain camera. The researcher selects 100 batteries at random from the daily output of the batteries and finds that the life of the batteries has a mean of 342 pictures with an associated margin of error of 18 pictures. Which of the following is the most appropriate conclusion based on these data?

   A. All the batteries produced by the company that day have a life between 324 and 360 pictures.
   B. All the batteries ever produced by the company have a life between 324 and 360 pictures.
   C. It is plausible that mean life of batteries produced by the company that day is between 324 and 360 pictures.
   D. It is plausible that the mean life of all the batteries ever produced by the company is between 324 and 360 pictures.

3. A community center offers a Spanish course. This year, all students in the course were offered additional audio lessons they could take at home. The students who took these additional audio lessons did better in the course than students who didn't take the additional audio lessons. Based on these results, which of the following is an appropriate conclusion?

   A. Taking additional audio lessons will cause an improvement for any student who takes any foreign language course.
   B. Taking additional audio lessons will cause an improvement for any student who takes a Spanish course.
   C. Taking additional audio lessons was the cause of the improvement for the students at the community center who took the Spanish course.
   D. No conclusion about cause and effect can be made regarding students at the community center who took the additional audio lessons at home and their performance in the Spanish course.

Teacher Notes

- See Examples 13, 14, and 15 on pages 222–226 in Chapter 17 of the *SAT Study Guide for Students* for answers and explanations.
- Students will not be asked to calculate the exact *standard deviation* of a set of data on the SAT Math Test, but they will be expected to demonstrate an understanding of what standard deviation measures.
- When asked to compare the standard deviations of two data sets, students should first approximate the mean of each data set. Then, they should ask themselves which data set has values that are more closely clustered around the mean. That data set will have the smaller standard deviation.
- Students will not need to calculate **margins of error** or **confidence intervals** on the SAT Math Test, but they should understand what these concepts mean and be able to interpret them in context.
- When a confidence interval is provided, students should determine the value of which the interval applies. Confidence intervals concern the average value of a population and do not apply to values of individual objects in the population.

- In order for the results of a study to be generalized to the entire population, and for a cause-and-effect relationship to be established, both random sampling and random assignment of individuals to treatments is needed.
  - Caution students to be wary of conclusions that claim a cause-and-effect relationship or that generalize a conclusion to a broader population. Before accepting a conclusion, students should assess whether or not the subjects were selected at random from the broader population and whether or not subjects were randomly assigned treatments.

Wrap-Up: For your term book | 5 minutes

- Standard deviation
- Population parameter
- Margins of error
- Confidence intervals
- Random sampling
- Treatment

Homework | 20 minutes

- Complete practice problems in Official SAT Practice on Khan Academy in these skill areas:
  - Data inferences
  - Data collection and conclusions
- Encourage students to move on to the higher skill level once they successfully complete the problems in their current skill level and can "level up."