LESSON 24

Compare Populations

Math Tools

Scientific Calculator

Dear Family,

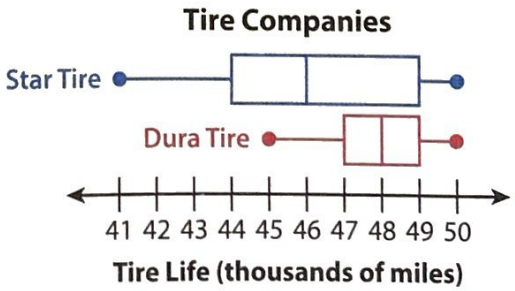
This week your student is learning about comparing random samples from two populations. Random samples resemble the populations they come from, so you can use samples from two populations to compare the populations. You can use measures of center and variability to compare samples.

Measures of center describe the middle of a set of data with a single value. The mean is the average of the data values. The median is the middle value.

Measures of variability describe the variation in the data with a single value. The range is the difference between the greatest and least values in the data set. The mean absolute deviation (MAD) is the average distance of each data value from the mean. The interquartile range (IQR) is the range of the middle 50% of the data.

Using dot plots or box plots to display two data sets can help you visually compare the data. Your student will be solving problems like the one below.

A consumer agency randomly samples tires from two different companies. The results are shown in the box plots. Which company's tires have a longer life? Which company's tires have a more consistent lifespan?



➤ **ONE WAY** to compare the tires is with a measure of center.

The median is shown by the line that divides each box into two parts.

Median for Star Tire: 46,000 Median for Dura Tire: 48,000

➤ **ANOTHER WAY** is to use a measure of variability.

parent signature

The IQR is the difference between the ends of the box.

IQR for Star Tire: 49 − 44, or 5 IQR for Dura Tire: 49 − 47, or 2

The methods show that tires from Dura Tire tend to have longer lives and more consistent lifespans.

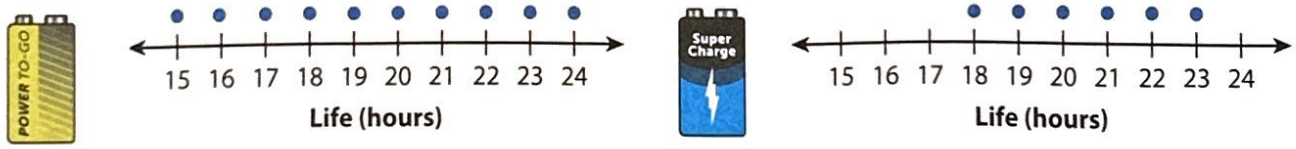
Use the next page to start a conversation about populations.

Explore Comparing Two Populations

Previously, you learned about using random samples to make inferences about a population. In this lesson, you will learn about using data to compare two populations.

➤ **Use what you know to try to solve the problem below.**

An inspector tests 30 batteries selected at random from each of two different brands. The inspector records the life of each battery using dot plots. Which sample has a more consistent battery life? How do you know?



TRY IT

Math Toolkit grid paper, number lines

The Super Charge has a smaller range, so the batteries are more similar to each other and have a more consistent battery life

Power-to Go

15 16 16 16 17 17 17 (18) 18 19 19 19 20 20 20 | 20 21 21 21 22 22

22 (23) 23 23 24 24 24 24 24

Box Plot data

DISCUSS IT

Ask: How do you know your answer is reasonable?

Share: I know my answer is reasonable because . . .

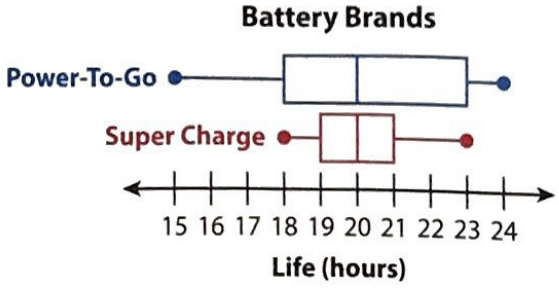
Learning Targets SMP 1, SMP 2, SMP 3, SMP 4, SMP 5, SMP 6, SMP 7, SMP 8

- Use dot plots or box plots to visually compare two data sets.
- Describe the difference in the centers of two data sets.
- Use measures of center and measures of variability to compare two populations.

CONNECT IT

1 **Look Back** Do the sample Power-To-Go or sample Super Charge batteries have a more consistent battery life? How do you know?

2 **Look Ahead** You can compare the variability of two data sets using both dot plots and box plots. The box plots at the right display the same data about the samples of Power-To-Go and Super Charge batteries as the dot plots you saw previously.



a. How can you use box plots to visually compare the variability of data sets?

You can look to see how stretched out the boxes are. the more stretched the more variability

b. How can you use dot plots to visually compare the variability of data sets?

You can look to see how the dots are clustered. The more clustered together the less variability.

c. You can use median, interquartile range (IQR), mean, and mean absolute deviation (MAD) to describe a data set. Which of those can you use to compare the variability of two data sets?

The IQR and MAD will compare variability

d. Could you find the mean and MAD of the data sets from the box plots? Could you find the mean and MAD from the dot plots? Explain.

Box plots don't allow you to find mean and MAD because you need individual data values.
Dot Plots show individual data values so you can find mean and MAD

3 **Reflect** How can displaying two data sets on the same number line help you compare them?