LESSON 22

Dear Family,

This week your student is exploring random samples.

Sometimes you want to gather information from a group, or a **population**. Depending on the size of the population, it can be very difficult, or even impossible, to survey every member of the group. It is more practical to survey a smaller subset, or a **sample**, of the group. When you select a sample, you want it to be as much like the entire population as possible. That way, any conclusions you draw from the data are more likely to be true for the whole population.

In a **random sample**, every member of the population has an equal chance of being selected for the sample. A random sample is more likely to be representative of a population than other types of samples. So, you can use a random sample to draw conclusions about the entire population.

Your student will be exploring problems like the one below.

> A dance school director wants to know what type of dance the students at her school like best. Describe how the director could select a random sample of students to survey.

➤ **ONE WAY** to take a random sample is to pull names from a bowl.

- Write the names of all students on slips of paper.
- Put all the slips in a bowl and mix them up.
- Choose slips until you have reached the number of students you want to survey.

➤ **ANOTHER WAY** is to use an alphabetized list.

- List all students in alphabetical order.
- Roll a number cube to select a number 1–6.
- Start with the person on the list with that number. Then select every sixth name on the list.

Using either approach, the dance school director will get a random sample because each student has an equal chance of being chosen for the sample.

▶ Use the next page to start a conversation about samples of populations.

Activity Thinking About Sampling Around You

➤ **Do this activity together to investigate sampling in the real world.**

Have you ever read a review for a restaurant online? You cannot always trust the reviews to accurately reflect the opinions of all the people who have eaten at that restaurant.

The reviewers who comment online are not a representative sample of the population of people who have eaten at the restaurant. Because the reviewers voluntarily wrote a review, they likely have a strong positive or negative opinion about the restaurant. A negative review could be from a competitor and a positive review could be from a friend of an employee.

? How could you generate a representative sample of reviewers for a restaurant?

LESSON 23

Reason About Random Samples

Dear Family,

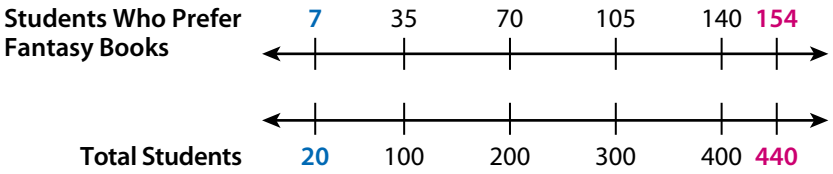
This week your student is learning about using random samples to make inferences and estimates about a population.

You can use data from a random sample to make an estimate or inference about the entire population. Using data from more than one random sample can lead to more accurate estimates.

Your student will be solving problems like the one below.

> There are 440 students at Veda's school. Veda asks a random sample of 20 students their favorite genre of book. In the random sample, 7 students prefer fantasy books. Based on this sample, how many students at the entire school should Veda expect to prefer fantasy books?

➤ **ONE WAY** to make an inference is to use a double number line.



➤ **ANOTHER WAY** is to use the percent of the sample that prefer fantasy books.

$\frac{7}{20} = 0.35$, or **35%**

35% of the students in the random sample prefer fantasy books.

So, about 35% of the **population** should prefer fantasy books.

$0.35(440) = 154$

Using either method, Veda should expect about 154 students in the school to prefer fantasy books.

Use the next page to start a conversation about random samples.

Activity Thinking About Random Samples Around You

➤ **Do this activity together to investigate random samples in the real world.**

Have you ever tried to guess the number of small objects in a jar? Your guess may have been way off. However, if you had been able to average the guesses from lots of people, your guess might have been close to the true number.

Wisdom of crowds is the idea that collecting information from many different people can result in a better decision than relying on information from one person, even an expert! When you have more sample guesses, you can make a better guess.

? What are some times when you might want to use more than one sample to make an inference?

LESSON 24

Compare Populations

Dear Family,

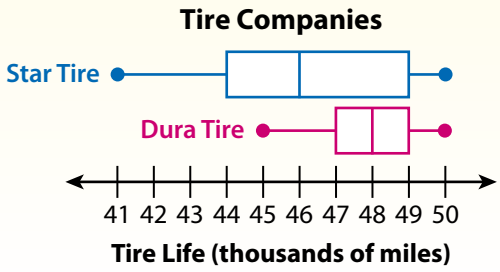
This week your student is learning about comparing random samples from two populations. Random samples resemble the populations they come from, so you can use samples from two populations to compare the populations. You can use measures of center and variability to compare samples.

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.

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

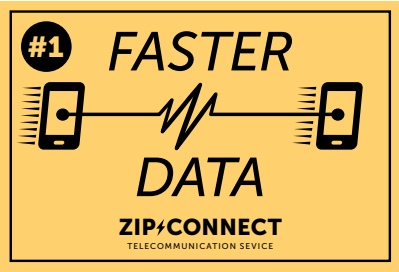
IQR for Star Tire: 49 − 44, or 5

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.

Activity Thinking About Populations



➤ **Do this activity together to investigate populations.**

Have you ever seen advertisements for two competing companies that both claim they are the best? Both companies can be right, depending on how you look at it!

For example, two companies that provide internet service might both claim to have the best data network. One company has faster data speeds, but the other company has more reliable connections.

Whether a company is the best depends on what you care about: faster speed on average, or fewer times with dropped connections.

? When else might you want to compare two claims?