

Sampling and Statistics

Family Letter

Dear Family,

In this module, *Sampling and Statistics*, students will use their prior knowledge of measures of center and measures of variation to develop understanding of sampling and statistics. Making generalizations, responding to surveys, comparing measures of center and variation of data are all skills that carry through life when making decisions and judging the validity of statements.

What Did Students Learn Previously?

In a previous grade, students found measures of center and measures of variation of a set of data.

For example, the table shows the weights of various vehicles. The mean can be found by adding the weights and dividing by the number of data values. The sum of the weights in the table is 22,611 pounds. The mean is $22,611 \div 6$, or 3,768.5 pounds.

Weights of Vehicles (lb)	
3,497	3,845
3,942	3,799
3,840	3,688

What Will Students Learn in This Module?

Sampling and Populations

- **Statistics** can be used to gain information about a population. One way to do this is to **survey a sample**, or part, of the population.
- One type of sampling method is a **valid sampling method**. With this method, the sample must be representative of the population, random, and large enough to provide accurate data. These samples are also called **unbiased samples**.
- **Biased samples** come from **convenience samples** (members of the population that are easily accessible, such as your neighbors) and **voluntary response samples** (only those members of the population that choose to participate).
- **Inferences**, or predictions, can be made from both biased and unbiased samples. Only those from unbiased samples can be considered **valid inferences**. For example, only surveying the people in a library about whether they enjoy reading would be considered a convenience sample and therefore the inference that the entire population enjoys reading would be an invalid inference.
- Proportional relationships can be used to make predictions about a population. For example, if 100 random adults were surveyed about their favorite mode of transportation, and 10 said motorcycles, then a student could solve a proportion to determine how many adults out of 1,500 would say motorcycles were their favorite mode of transportation.

- When the data from a sample is collected and displayed in a graph, the shape of the graph is referred to as its distribution. Distributions can be symmetric or asymmetric.

What Vocabulary Terms Will Students Use?

Term	Definition
asymmetric	A distribution in which the shape of the graph on one side of the center is very different than the other side.
distribution	The shape of a graph of data.
inferences	Predictions about a population. Valid inferences can be made when a valid sampling method has been used on an unbiased sample. An invalid inference makes a conclusion from the results of a biased sample.
population	The entire group of items or individuals from which the samples under consideration are taken.
sample	A randomly selected group chosen for the purpose of collecting data.
survey	A question or set of questions designed to collect data about a specific group of people, or population.
symmetric	A distribution in which the shape of the graph on each side of the center is similar.
visual overlap	A visual demonstration that compares the centers of two distributions with their variation, or spread.

How You Can Provide Support

1. Support your child's understanding of sampling and statistics by asking them to explain how they can make predictions about populations and by asking them to explain the validity of surveys.
 - *Supplies:* Find the number of juice boxes needed for 150 students if 12% of the students surveyed said they prefer juice boxes after practice.
 - *Surveys:* Determine if a store used a valid sampling method by surveying only those that chose to respond to a social media post.
 - *Shopping:* Compare the mean cost of smart TVs at one store to the mean cost of smart TVs at a different store. Compare the distribution of each.
2. Encourage your child to have a positive, growth-oriented attitude towards mathematics and their learning.
 - Encourage them to ask questions – both at home and in class. Sometimes, an answer to a question will generate more questions. That's how you know they are learning!
 - Encourage your child to embrace challenges and remind them that every challenge is an opportunity to learn something new.
 - Celebrate successes – both small and large.

3. Contact me to arrange a time to discuss the specifics of your child's performance and how we can work together to help them succeed in this module.

Sincerely,

(Teacher's Name)

(Email/Phone)