

## Collecting Data ( Census versus Sample ) :

### **Collecting Data**

You can use a Census or a sample to collect data. When using a sample, it is important to make sure your sample is random.

### **Census Versus Sample**

When collecting data about a certain group, or population, a statistician can gather data from each member of the population. The statistician takes a census when data is gathered on every member of the population. Often taking a Census is impractical. Instead, the statistician collects data on a sample, or part, of the population and uses that data to make predictions about the characteristics of the entire population.

Example:

You want to find the average number of CDs the students in your art class have at home. What is the population? What is a sample? Is a census or a sample better to use?

The population consists of all the students in your art class. A sample consists of only some of the students in your art class. It is very easy to find the number of CDs that each student in your art class has at home. Therefore, a census is better to use.

Example :

If you want to find out the percentage of Arizona 10<sup>th</sup> graders who like to play the violin, is it better to use a census or a sample?

It is almost impossible to survey all the 10<sup>th</sup> graders in Arizona to ask them if they like to play the violin. A sample is better to use. The following are some possible samples to represent the population of all Arizona tenth graders.

The students in your 10<sup>th</sup>-grade math class

The 10<sup>th</sup>-grade students at Kofa High School

The 10<sup>th</sup>-grade students in Yuma County

### **Random versus Biased Samples :**

A random sample is unbiased: Every individual in the population has an equal chance of being selected. When the sample size is large and random, the data gathered from the sample will better represent the entire population. A biased sample is less random and favors certain outcomes. The data gathered from a biased sample are usually not very accurate.

Example :

You want to find the favorite sport of the junior-high school and the high-school students in your school district. To create a sample, you decide to ask high-school girls who play volleyball.

The sample you created is biased for three reasons. First, it does not include students from the junior-high school. Second, it does not include boys. Finally, it includes students who already play a sport such as volleyball.

So how can you make the sample less biased? Introduce a random element. Maybe you can have a person stand outside the main entrance of each school on the same day at the same time and survey every fifth student. The sample is now less biased since the participants will be randomly selected.