

This vocabulary will give us a good foundation for the whole semester.

Definition: Statistics: the science of collecting, organizing, summarizing, and analyzing information to draw conclusions or answer questions. In addition, statistics is about providing a measure of the confidence in our conclusions.

Definitions: The entire group to be studied is the **population**. This could be a group of people but it could also be all the cars on a highway or the crayons in a box. An **individual** is a person or object that is a member of the population. Since it's often cumbersome to ask our question of every individual (called a **census**), we will sample to get answers. A **sample** is a subset of the population that is actually studied. We then infer about the entire population based on what we learned from the sample.

Definitions: Descriptive Statistics versus Inferential Statistics:

A **statistic** is a numerical summary of a *sample*. **Descriptive statistics** consist of organizing and summarizing data. It uses numerical summaries, tables, and graphs.

Inferential statistics uses methods that take the result from a sample and extend it to the population. It also provides a measure of the reliability of the result. A **parameter** is a numerical summary of the *population*. It is this information that statistics can help us estimate by looking at the sample.

expl 1: Think about a question that you want answered about your fellow classmates. Let's use it to investigate this vocabulary.

a.) What is the question you want answered?

b.) What is the **population**?

c.) Ask every person in the population and record the answers here.

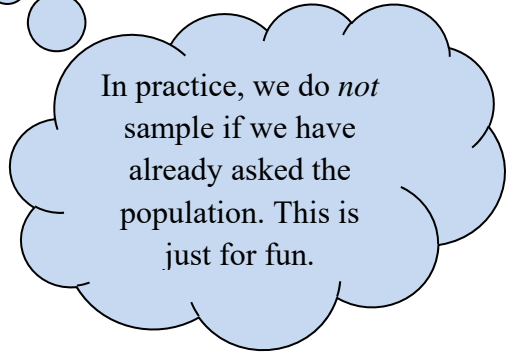
d.) The numerical summary of the answers in part c is the **parameter**. Which summary measure will you use?

expl 2: Continuing with the question from example 1, let's now sample to estimate the answer.

a.) Ask a small subset of the class the same question and record their answers here. This is the **sample**.

b.) The numerical summary of the answers in part *a* is the **statistic**. Use the same summary measure you found in question 1d.

c.) How close was the statistic (taken from the sample) to the parameter (of the whole population)? Why would they differ?



Qualitative versus Quantitative Variables:

Definition: Variable: A **variable** is a characteristic of the individuals within the population. Examples include hair color, sex, income, IQ, amount of disposable income, number of televisions, etc. Variables are called that because they vary from individual to individual. That variation is a big deal in statistics.

Definition: Qualitative, or categorical, variables allow for some classification of individuals based on some attribute or characteristic.

Definition: Quantitative variables provide numerical measures of individuals. The values of a quantitative variable can be added or subtracted and provide meaningful results.

expl 3: Consider the following variables. Which are qualitative and which are quantitative?

a.) Temperature

d.) Zip code

b.) Favorite music group

e.) Length of movie

c.) Number of cell phones owned by a family

f.) Number of hours per night a college student sleeps

Definitions: Discrete versus Continuous Variables:

Both are types of quantitative variables. The difference here is what kinds of values can be obtained from the question we ask.

Definition: Discrete variables have either a finite number of possible values or a countable number of possible values. The term “countable” means you got the number from counting something, such as 0, 1, 2, 3, etc. A discrete variable *cannot* take on every possible value between any two possible values.

Definition: Continuous variables have an infinite number of possible values that are *not* countable. A continuous variable may take on every possible value between any two values.

expl 4: For the quantitative variables from the last example, determine if each is discrete or continuous. (We do not do this with the qualitative variables so they are crossed off.)

a.) Temperature

~~d.) Zip code~~

~~b.) Favorite music group~~

e.) Length of movie

c.) Number of cell phones owned by a family

f.) Number of hours per night a college student sleeps