Chapter 1 – Stats Starts Here

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Data is any collection of numbers, characters, images, or other items that provide information.

Statistics is a branch of mathematics dealing with the collection, analysis, interpretation, and presentation of masses of numerical data. (www.m-w.com)

This course will help recognize flaws in conclusions drawn by others using data. You will become more informed and better able to understand, question, and interpret data

Statistics is about **variation**. Disciplines use Statistics differently and by studying different data. Data will vary since we cannot measure everything and what we do measure will not be measured perfectly. Data we look at and base decisions on provides an imperfect picture of the real world.

Steps in doing Statistics right:

1. **Think** - Know where you are heading and why.
   - Context -
     - WHO was measured? (Student's or parent's incomes)
     - WHAT was measured? (Student's height or weight)
     - WHERE was the data collected? (Incomes in Murray or New York City)
     - WHEN was study performed? (Value of Stocks at end of 2007 or 2008)
     - WHY was the study performed?
     - HOW was data collected? (Student's weight - was it self reported or were each weighed and recorded. We will found out later the problems with voluntary surveys.)

2. **Show** - Calculating statistics (Numerical calculations on the data) and making displays of the data.

3. **Tell** - Explain your results, so someone else can understand.

Individual (cases) - the objects data describes. Individuals who answer a survey are called **Respondents**. Individuals involved in an experiments are called **Subjects** or **Participants**. Animals, plants and other inanimate objects are often called **Experimental Units**.

Often the cases are a **sample** selected from a larger **population**.

Variables - Characteristics recorded about each individual. There are two types.

> **Categorical (also Qualitative or Nominal)** - Variables that name categories. Can be words or numbers.
>
> **Quantitative** - Variables with numerical values for which arithmetic operations make sense. Always have units. [This pig weighs 450. Does that mean pounds, grams, kilograms, etc?]

Units - A quantity or amount adopted as a standard of measurement, such as dollars, hours, feet, or grams. (~~Please don't use percent~~)

Some variables can be either categorical or quantitative depending on what we want to learn from the variable.

Example: Final grades are numbers like 72, 75, 83, 92, 96, 99. An average can be performed on these grades and possibly used to compare with another class to see which class did better. (Categorical or Quantitative?) We use the numbers to tell how many students received A's, B's, C's, D's, or F's. (Categorical or Quantitative?)

Identifier Variables are categorical variables with exactly one individual in each category. These are used to identify the individuals. Examples: Student #, Social Security #, Account #, etc.

Ordinal Variables are variables that report order without natural units. Examples: Rate this restaurant on a scale of 1-5 with 5 = The Best and 1 = Never eat here again.

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Who - 1180 American Voters

What - Region - Categorical
Age - Quantitative - units - years
Party - Categorical
Voted in 2006 - Categorical

When - First quarter of 2007

where - United States

Why - To gather information for a public opinion poll

How - Telephone Survey.