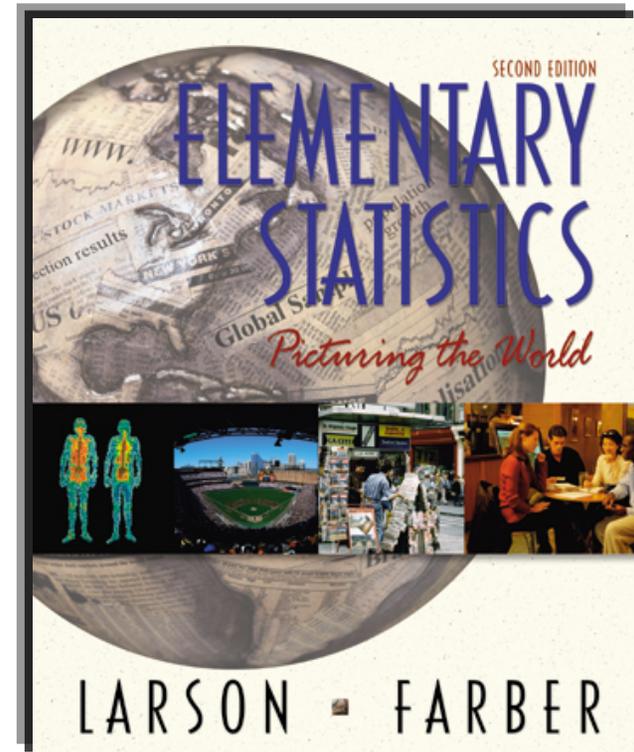


# Section 1.1

## An Overview of Statistics



After you see the slides for each section, do the Try It Yourself problems in your text for that section to see if you understood the material. Then, do the assigned problems for that section.

# Introduction to Statistics

As you view these slides be sure to have paper, pencil, a calculator and your text handy. Click to advance to the slide show.

# What Is Statistics?

Statistics is the science of collecting, organizing, analyzing, and interpreting data in order to make decisions.

# Important Terms

## Population

The collection of ***all*** responses, measurements, or counts that are of interest.

## Sample

A portion or subset of the population.

# Important Terms

## Parameter

A number that describes a population characteristic.

***Average gross income of all people in the United States in 2002.***

## Statistic

A number that describes a sample characteristic.

***2002 gross income of people from a sample of three states.***

# Two Branches of Statistics

## **Descriptive Statistics**

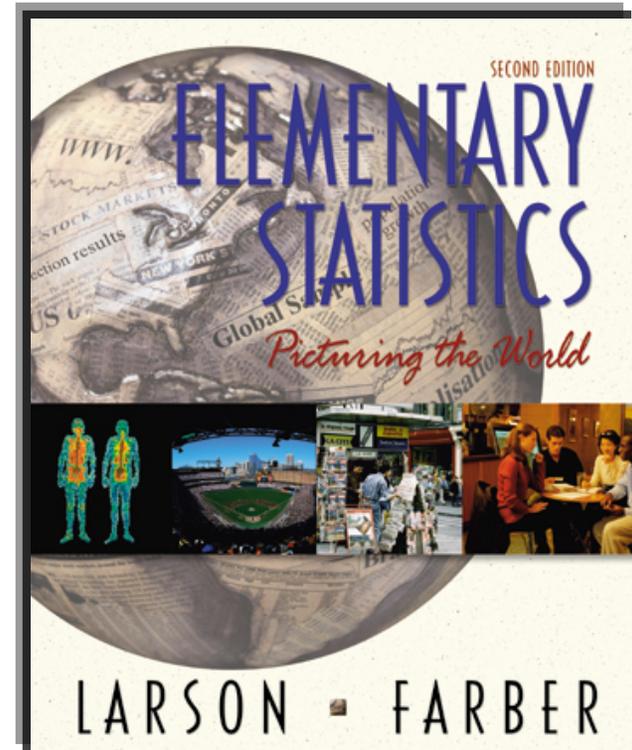
Involves organizing, summarizing, and displaying data.

## **Inferential Statistics**

Involves using sample data to draw conclusions about a population.

# Section 1.2

## Data Classification



# Levels of Measurement

A data set can be classified according to the highest level of measurement that applies. The four levels of measurement, listed from lowest to highest are:

1. Nominal
2. Ordinal
3. Interval
4. Ratio

# Levels of Measurement

**1. Nominal:** Categories, names, labels, or qualities. Cannot perform mathematical operations on this data.

Ex: type of car you drive, your major

**2. Ordinal:** Data can be arranged in order. You can say one data entry is greater than another.

Ex: TV ratings, condition of patient in hospital

# Levels of Measurement

**3. Interval:** Data can be ordered and differences between 2 entries can be calculated. There is no inherent zero (a zero that means “none”).

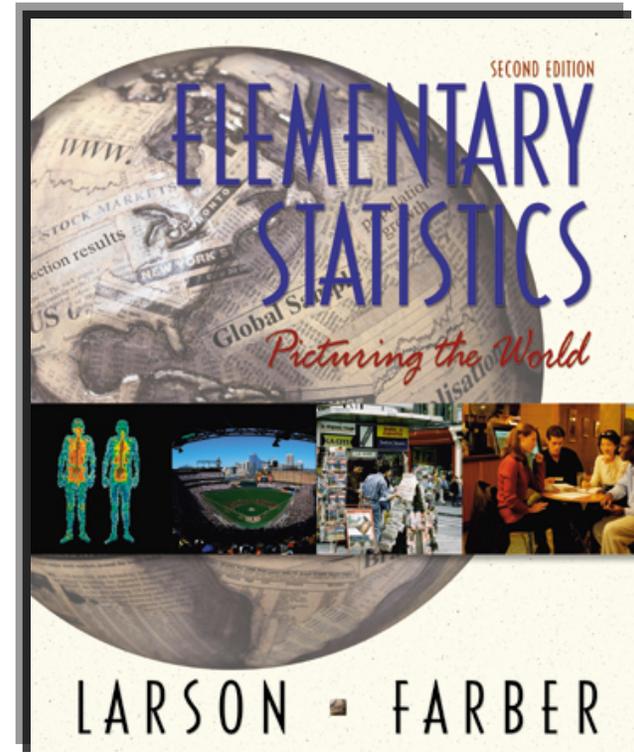
Ex: Temperature, year of birth

**4. Ratio:** There is an inherent zero. Data can be ordered, differences can be found, and a ratio can be formed so you can say one data value is a multiple of another.

Ex: Height, weight,

# Section 1.3

## Experimental Design



**Random Sample:** Each member of the population has an equal chance of being selected.

**Simple Random Sample:** All samples of the same size are equally likely.

Assign a number to each member of the population. Random numbers can be generated by a random number table, software program or a calculator. Data from members of the population that correspond to these numbers become members of the sample.

# Stratified Random Samples

Divide the population into groups (strata) and select a random sample from each group. Strata could be age groups, genders or levels of education, for example.

# Cluster Samples

Divide the population into individual units or groups and randomly select one or more units. The sample consists of all members from selected unit(s).

# Systematic Samples

Choose a starting value at random. Then choose sample members at regular intervals.

We say we choose every  $k$ th member. In this example,  $k = 5$ . Every 5<sup>th</sup> member of the population is selected.

# Other Samples

**Convenience Sample:** Choose readily available members of the population for your sample.

# Data Collection

## Experiment:

Apply a treatment to a part of the group.

## Simulation:

Use a mathematical model (often with a computer) to reproduce condition.

## Census:

A count or measure of the entire population.

## Sampling:

A count or measure of part of the population.