Chapter 1

1. Individuals vs. Population Study –Not the same as the variable of the study. The **individuals** are the participants of a "random sample" and the **population** is the larger group for which can infer the nature of, based on our "random sample".
2. The Variable of a study
   - What quality is being **measured and recorded**
   - Qualitative vs. Quantitative – If something is a "quality" or a "quantity".
   - Emphasize the difference and point out it goes beyond "numbers" vs. words...
3. Parameter vs. Statistic
   - Parameters are numerical descriptions of a characteristic of **a population**, while a statistic is one of a **random sample.**
4. Levels of Measurement
   - Nominal. A characteristic which has no order that conveys "more of" or "less than". Good examples include names of colors, jersey numbers of a football team and names of cities.
   - Ordinal. A characteristic which has a "natural" ordering that conveys "more of" or "less than. Good examples include letter grades and finishing places of a competition.
   - Interval. An ordinal characteristic for which differences are significant. Good examples include temperatures (in C or F), dates of events and times of the day.
   - Ratio. An interval characteristic for which ratios are significant and the value of 0 corresponds to the absence of a quality. Good examples are temperature (in K), height, weight, profit and counts.
5. Descriptive vs. Inferential Statistics
   - Descriptive statistics are computed and used to **describe** the nature or properties of a sample or population.
   - Inferential statistics are computes and then used to **infer** what the corresponding measurement of the population would then be.
   - A good example is polling results after an election. The descriptive statistic we are interested in the the percentage of voters who voted in favor of a particular candidate. We use the percentage of voters in a random sample (this is a **descriptive statistic** of the sample) to then infer what percentage of all persons who voted in this district had voted in favor of. The confidence interval (the 53% $\pm$ 2% reported in a news program) is the **inferential statistic**.
6. Sampling Techniques
   - Simple Random – Each individual is equally likely to be selected in the sample
   - Cluster – A population is divided into groups and the randomly selected groups are included in their entirety for the random sample.
   - Statified – A population is divided into groups and then random samples from every group is included

- Systematic – Choosing names from a list in a systematic fashion, e.g., every 3^{rd} (or 12^{th}, or 815^{th}) person on a list.

7. Experimental Design

   - Placebo – A treatment which does not alter a persons physiology in any significant fashion. Should be implemented whenever a subjective repsonse (e.g. pain level) is used to measure the effectiveness of a method.
   - Treatment vs. control – Division of test subjects into those who are altered in an experiment (treatment group) and those who are left in a more natural state (control).
   - Double blind – A scenario in which both the observers of an experiment and the participants of an experiment do not know which group is the treatment group and which is the control.