

**Sections 3.1-3.2 Class Prep – Printer and Stapler Needed**

**3.1: Fundamentals of Statistics**

Class Prep Assignment

Due at the beginning of next class

**Watch the videos and take notes on this sheet**

1. Researchers are interested in how many people have been evicted from their housing. Draw a diagram to represent the population, sample, parameter and statistic.

2. What is a representative sample?

**Common Sampling Methods**

	<b>Description</b>	<b>Picture</b>	<b>Example</b>
<b>Simple Random Sample (SRS)</b>			
<b>Systematic Sample</b>			
<b>Stratified Sample</b>			
<b>Convenience Sampling</b>			

3. What does it mean for a sample to be biased?

## Basic Types of Statistical Studies

### Observational Studies

Example: Researchers examined health records of thousands of males to determine whether there was a relationship between family history and heart attack.

### Experiment

Example: Researchers want to investigate whether taking aspirin regularly reduces the risk of heart attack. Four hundred people who identify as men are divided randomly into two groups: one group will take aspirin, and the other group will take a sugar pill. At the end of the study, researchers count the number of men in each group who have had a heart attack.

Treatment group:

Control group:

Random Selection:

Placebo:

Placebo effect:

Single-blind:

Double-blind:

### Observational Case-Controlled

Example: A group of disabled women aged 65 and older was tracked for several years, ending in 2010. Those who had a vitamin B12 deficiency were found to be twice as likely to suffer severe depression as those who did not.

Subjects were separated into two categories:

Caution:

### Margin of Error and Confidence Intervals

Example: According to a [gallup.com](http://www.gallup.com/poll/216746/hourly-workers-unhappier-salaried-job-aspects.aspx?g_source=WWWV7HP&g_medium=topic&g_campaign=tiles) poll in 2017, 29% of hourly workers and 41% of salaried workers are completely satisfied with the amount of money they earn. The survey had a margin of error of  $\pm 5\%$ . Source: [http://www.gallup.com/poll/216746/hourly-workers-unhappier-salaried-job-aspects.aspx?g\\_source=WWWV7HP&g\\_medium=topic&g\\_campaign=tiles](http://www.gallup.com/poll/216746/hourly-workers-unhappier-salaried-job-aspects.aspx?g_source=WWWV7HP&g_medium=topic&g_campaign=tiles)

Write the confidence interval for each group:

Hourly Workers

Salaried Workers

**3.1: Types of Bias in Statistical Studies**Class Prep AssignmentDue at the beginning of next class

What is bias in general?

What is bias in a statistical study?

**Types of Bias in Statistical Studies**

(Adapted from Math in Society by David Lippman)

**Sources of bias****Sampling bias** – when the sample is not representative of the population**Voluntary response bias** – the sampling bias that often occurs when the sample is volunteers**Self-interest study** – bias that can occur when the researchers have an interest in the outcome**Response bias** – when the responder gives inaccurate responses for any reason**Perceived lack of anonymity** – when the responder fears giving an honest answer might negatively affect them**Loaded questions** – when the question wording influences the responses**Non-response bias** – when people refusing to participate in the study can influence the validity of the outcome

In each situation, identify a potential source of bias

- a. A survey asks how many sexual partners a person has had in the last year
- b. A radio station asks readers to phone in their choice in a daily poll.
- c. A substitute teacher wants to know how students in the class did on their last test. The teacher asks the 10 students sitting in the front row to state their latest test score.
- d. High school students are asked if they have consumed alcohol in the last two weeks.
- e. The Beef Council releases a study stating that consuming red meat poses little cardiovascular risk.
- f. A poll asks "Do you support a new transportation tax, or would you prefer to see our public transportation system fall apart?"

**3.2: Describing Data**Class Prep AssignmentDue at the beginning of next class**Two Types of Data****Quantitative (Numerical)****Qualitative (Categorical)**

Description:

Example:

Types of Graphs:

**Graphing Qualitative Data**

Example 1. A movie review website lists eight 5-star films, nineteen 4-star films, twelve 3-star films, seven 2-star films, and four 1-star films.

a. Make a frequency table for the data.

<b>Movie Rating</b>	<b>Frequency</b>	<b>Relative Frequency</b>	<b>Cumulative Frequency</b>
5-star	8		
4-star	19		
3-star	12		
2-star	7		
1-star	4		
<b>Total</b>			

b. Create the table in a spreadsheet, and then make a frequency bar graph and relative frequency bar graph. Label the axes and give the graph a meaningful title.

c. Make a frequency and relative frequency pie chart using a spreadsheet. Label the axes and give the graph a meaningful title.

*Please print your graphs and staple them to this Assignment to turn in. ☺*

**Graphing One-Variable Quantitative Data**

Example 2. Here is a set of 15 exam scores for a fictional MTH 105 class at PCC.

31, 62, 65, 70, 76, 81, 82, 82, 87, 88, 89, 94, 95, 98, 100

a. Make a Histogram using a bin-width of 10 points. Label the axes and give the graph a meaningful title.


*Please print your graphs and staple them to this Assignment to turn in. ©*