**By the end of this unit you should be able to present my knowledge of the essential understanding(s)**

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| **Essential Understanding(s)** |
| * I can distinguish between a sample (statistic) and a population (parameter). * I can describe how to select a random sample from a given population. * I can explain the purposes and the differences of sample surveys, observational studies, and experiments, including how randomization applies to each. * I can distinguish between sample surveys, observational studies, and experiments. * I can determine how results of a statistical study can be generalized to make conclusions about a population based on the sample. * I can use data from a sample survey to estimate a population mean or proportion with a margin of error. * I can identify the parameter of interest in an experiment. * I can select and calculate sample statistics. * I can set up and complete a simulation re-randomizing the groups. * I can compare the actual difference to the simulated differences to determine statistical significance. * I can state a conclusion about the effectiveness or accuracy of a claim based on a sample. * I can identify bias in questions and rephrase questions to remove the bias. * I can read graphs and determine whether the graphs are misleading. * I can evaluate and make sense of a statistical article or website. |

**Vocabulary – Give examples of all**

\*Statistic

\*Population

\*Sample estimate

\*Parameter

\*Simple Random Sample (SRS)

\*Stratified Random Sample

\*Cluster Sample

\*Convenience Sample

\*Voluntary Response Sample

\*Survey

\*Experiment

\*Observational Study

\*Bias (Types: Under-coverage, Nonresponse bias, Voluntary Response, Response, Wording of ?s)

\*Margin of Error – including how to find

Helpful Websites:

[Survey Sampling Methods](http://stattrek.com/survey-research/sampling-methods.aspx?Tutorial=AP)

[Parameter v. Statistic](http://www.statisticshowto.com/how-to-tell-the-difference-between-a-statistic-and-a-parameter/)

[Margin of Error](http://www.isixsigma.com/tools-templates/sampling-data/margin-error-and-confidence-levels-made-simple/)

* [Sampling Strategies Quiz](http://webquiz.ilrn.com/ilrn/quiz-public?name=stmr01q%2Fstmr01q_WS_chp11&cookieTest=1)

This is a short news video that discusses how margin of error works

<http://www.nbcnews.com/video/believe-the-polls-how-margin-of-error-really-works-695936579940>

A TED talk on how statistics can be misleading: <https://www.youtube.com/watch?v=sxYrzzy3cq8>