

Purpose: Design and carry out an experiment. This may be an experiment involving your fellow students, or inanimate objects.

Design: Before doing an experiment, you must *design* it. Determine your response variable, and then focus on one possible factor that could affect this response variable. Here are some examples:

- response: % of people who prefer Coke to Pepsi; factor: order in which colas are presented
- response: number of drops of water that fit on a penny; factor: which side of coin is used (heads or tails)
- response: heart rate factor: seconds of jumping jacks (say 15 and 45)

Design your experiment to see if your factor has any effect on the response variable. Plan to obtain data from at least 10 different individuals/units for *each* level of your factor. (This means you will have to collect data from *at least 20* individuals/units.) Carefully describe the design of your experiment, being sure to:

- Specify the response variable.
- Describe the factor you have chosen to study and its levels
- Identify your pool of experimental units (where/how did you get them)?
- Carefully describe your method for assigning the treatments to the experimental units. Your method must make use of randomization. (You can use a table, the random number generator on the web page, dice, coins, etc.)
- Identify at least two *other* potential factors that might affect your response variable and describe how you designed your experiment to control for these and to eliminate biases they could introduce.
- Include operational definitions for the measurements you make.
- Write down your specific plan *before doing the experiment*.

Implementation. Once you have carefully laid your your experimental design, go ahead and perform the experiment and record the results.

Analysis. We will study formal techniques for analyzing results of experiments like this later in the semester. For now, use graphs and descriptive statistics to decide whether or not you think your experiment demonstrates a significant effect due to the factor you studied.

Report. Each group should submit one report (typed) presenting your design, implementation, data and analysis as outlined above. Include enough detail that your experiment could be *replicated* by someone else. Include an organized list of all data collected in addition to whatever summaries (graphical or numerical) you include in your report. Finally, discuss any additional observations that you may have noticed while conducting the experiment, and suggest ways you could improve the design of the experiment were you to repeat it.