Name: _____ Student ID: _____

Causal Question

In one sentence, write the causal question you intend to test. It should be composed of an *outcome* variable (Y) having to do with perception of bubble water and whether it is affected by a given intervention / *treatment* variable (D).

Null Hypothesis

- Write down:
  - the corresponding *null hypothesis* (H_0) that you will gather evidence against
  - the *alternative hypothesis* (which you're hoping to prove),
  - and the *significance level*, α, that you intend to use.
- Identify your *test statistic* (T).

Protocol

Record below the step-by-step protocol that you will use to collect data. *Be precise.* You should be clear enough that, if you hand this off to another group, they'll be able to conduct your experiment. (This is called *reproducibility* in science)

Data

- In the space below, sketch out an empty data frame that stores the data you will have collected per your **Protocol**. The number of rows should reflect your sample size, n, and the number of columns should represent the number of variables that you intend to collect. (There should always be one outcome, one treatment, and potentially some covariates)
  - What's your unit of observation?
  - N.B., if your table has a column for the outcome (Y) in control conditions, and a column in treatment conditions, you're completely defeating the purpose of this. You're claiming to have god-like powers to know both counterfactuals.

Exploratory Data Analysis

- Sketch a plot that you will use to use to determine how consistent your data are with your original claim. (i.e. the empirical distribution). Please label the axes and specify units of measurement.
  - Since you do not yet have data, create two sketches of what the plot *might* look like in two hypothetical scenarios.
  - Below each plot, write the ggplot2 code that will create that graphic.