**Last Name: First Name:**

**Lab 4: Ch 3 Sources of data: Producing data**

Write your name, class section, lab title and date. Print out commands and outputs. Make sure to answer all parts of each question.

1. Vitamin D is needed for the body to use calcium. An experiment is designed to study the effects of calcium and vitamin D supplements on the bones of first-year college students. The outcome measure is the total body bone mineral content (TBBMC), a measure of bone health. Two doses of calcium will be used: 0 and 200 milligrams per day (mg/day). The doses of vitamin D will be 0 and100 international units (IU) per day. The calcium and vitamin D will be given in a single tablet. Subjects for the study will be 24 first-year college students.

(a) What are the factors and the treatments for this experiment? List all possible treatments.

(b) Draw a picture explaining how you would do a randomized experiment with the 24 college students and possible treatments.

(c) Use Rstudio to carry out the randomization. (Follow the examples above).

(d) Is there a placebo in this experiment? Explain your answer.

2. Consider country debt data from previous lab. Import data set into Rstudio. Don’t forget to attach.

The data you imported is a spreadsheet giving the government debt for 33 countries that have data for the years 2005 to 2010. The amount of debt owed by a country is a measure of its economic health. The Organization for Economic Cooperation and Development collects data on the central government debt for many countries. Since countries that have large economies tend to have large debts, we have chosen a table that expresses the debt as a percent of the gross domestic product (GDP).

a) Suppose these 33 countries constitute your population of interest. Randomly pick 10 countries.

b) Now randomly pick 15 values from debt in 2010 and find their average.

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