In-class Worksheet 1

1. You are conducting a study of students doing work-study jobs on your campus. Among the questions on the survey instrument are:

   - How many hours are you schedule to work each week? (Answer to the nearest hour.)
   - How applicable is this work experience to your future employment goals? (Respond using the following scale: 1 = not at all, 2 = somewhat, 3 = very)

   (a) Suppose you take random samples from the following groups: freshmen, sophomores, juniors, seniors, and others. What kind of sample technique are you using? Explain.

   (b) Describe the individuals of this study.

   (c) What is the variable for the first question on the survey? Classify the variable as quantitative or qualitative. What is the level of the measurement? Explain.

   (d) What is the variable for the second question on the survey? Classify the variable as quantitative or qualitative. What is the level of the measurement? Explain.

   (e) Is the proportion of responses "3 = very" to the second question a statistic or a parameter? Explain.

   (f) Would it be appropriate to generalize the results of your study to all work-study students in the nation? Explain.

2. Categorize these measurements associated with a robotics company according to level: nominal, ordinal, interval or ratio.

   (a) Salesperson's performance: below average, average, above average

   (b) Price of company stock

   (c) Names of new products

   (d) Temperature (in Fahrenheit) in the CEO's private office

   (e) Profit for each of the past 5 years

   (f) Color of product packaging

3. Suppose that you are conducting a study to compare firefly populations exposed to normal daylight/darkness conditions with firefly populations exposed to continuous light (24 hours of day). You set up two firefly colonies in a laboratory environment. The two colonies are identical except that Colony 1 is exposed to normal daylight/darkness conditions and Colony 2 is exposed to continuous light. Each colony is populated with the same number of mature fireflies. After 72 hours, you count the number of living fireflies in each colony.

   (a) Is this an experiment or an observational study? Explain.

   (b) Is there a control group? Is there a treatment group? If so, which colony is which?

   (c) What is the variable in this study?

   (d) What is the level of measurement of this variable?

4. Categorize the type of sampling (simple random, stratified, systematic, cluster, or convenience) used in each of the following situation.

   (a) To conduct a pre-election opinion poll on a proposed amendment to the state constitution, a random sample of 10 telephone prefixes (first three digits of the phone number) was selected, and all households from the phone prefixes were called.

   (b) To conduct a study on depression among the elderly, a sample of 30 patients in one nursing home was used.

   (c) To maintain quality control in a brewery, every 20^{th} bottle of beer coming off the production line was opened and tested.

   (d) Subscribers to a new smart phone app that streams songs were assigned numbers. Then a sample of 30 subscribers was selected by using a random-number table. The subscribers in the sample were invited to rate the process for selecting the songs in the playlist.

   (e) To judge the appeal of a proposed television sitcom, a random sample of 10 people from each of three different age categories was selected and those chosen were asked to rate a pilot show.

5. A tooth-whitening gel is being tested for effectiveness. A group of 85 adults have volunteered to participate. Of these 43 are randomly chosen to receive the gel with the tooth-whitening chemicals. The other 42 are given a similar looking gel with none of the chemicals.

   (a) Describe the control group and the treatment group.

   (b) Is a placebo being used?

   (c) A standard method will be used to evaluate the whiteness of teeth for all participants. Why might a double-blind design be used in this case?