First Writing Assignment:
Goal: Reinforce Writing Skills
Reinforce Computer Skills (email, attachments, Microsoft Word)
Critical Thinking Skills (Sample, Random Sample, Population)

Problem:

How much wood can a woodchuck chuck, if a woodchuck could chuck wood? In the ancient land of Cecilville, all of the woodchucks can chop wood. Cecilia, the queen of Cecilville, wanted to know the answer to this question for her queendom, so she asked her faithful servant, the renowned statistician, Trapper John, to help her answer this question. To provide Cecilia with an answer, Trapper John placed woodchuck traps at 29 sites throughout the queendom, trapping a total of 1241 woodchucks. Each woodchuck trapped performed the task of chopping wood for as long as he or she was able, and the number of chords each woodchuck chopped was recorded. Trapper John discovered that the woodchucks selected chopped on average 1.52 chords of wood. Based on Trapper John's survey, Cecilia declared that Cecilville's woodchucks are capable of chopping approximately an average of 1-1/2 chords of wood apiece. This pleased her so much that she declared February 2 to be Woodchuck Day and made it an annual holiday. (Note: a chord of wood is defined to be a pile of wood that measures 4' x 4' x 8' and you can assume that it can be measured accurately.).

Directions: Answer questions 1 to 6 on a word processor numbering your responses accordingly. Save your word processor file in **Microsoft Word format.** Attach a printout of your responses to this sheet and email a copy of your **Microsoft Word** computer file to your instructor at jcliment@cecilcc.edu. Use "Trapper John-Your Name" as the subject of your email and label your computer file "Trapper John-You Name". Put your name and class on the top of your document. For example John Smith would label his file and email as: ***Trapper John – John Smith.***

1. In the space below, completely describe Trapper John's method of collecting data.
2. Identify the numerical descriptions (summaries) Trapper John gave to his data.
3. Completely and clearly describe the population from which Trapper John drew his sample.
4. What characteristic (describe the variable or the quantity) of the Population is being measured?
5. Completely and clearly describe the sample and tell its size.
6. In a brief paragraph argue whether or not Trapper John's sample was a random sample. Carefully check the definition of a random sample on your course handout before answering this part.

Sample Student Responses to Question 6:

Student 1: Trapper John's sample was not a random sample. "A random sample is a sample that is chosen in such a way that each observation in the population have the same chance of being selected." Trapper John can not be sure that the woodchucks he trapped would be in that site. If he was to do the same survey again in 6 months from the time the first one ended, how is anyone to know if the same woodchucks will be used, or the same sites chosen, unless the woodchucks are tagged and the sites are marked? Not every woodchuck has the same chance of being picked if a trap isn't sat at every site where there is a woodchuck.

Student 2: Although it seems they were chosen at random, technically the 1241 woodchucks are not a random sample. A lot more than 29 traps are needed to ensure that each woodchuck has an equal chance of getting trapped. It would have been impossible to strategically place 29 traps so that each wood chuck had an equal chance of being trapped because Trapper John had no way of knowing how many woodchucks were in Cecilville or where each one was located. According to the definition, the 1241 woodchucks would not be considered a random sample

Student 3: It is in my argument that I believe that the selection of the Woodchucks were not random. Random Sample is defined as chosen in such a way that each observation in the population have the same chance of being selected. It was stated in the beginning that the Woodchucks were only taken from the ancient land of Cecilville. That is only a portion of Woodchucks. That does not count for any others that might be in others land or far off places. The results of this test can only account for the portion that is in the queendom, which does not have any over view of the overall population of the Woodchucks.

Student 4: As most would agree, Trapper John's sample was not a random sample. The definition of a random sample is "a sample that is chosen in such a way that each observation in the population have the same chance of being selected". In this case, we know that there are 29 sites throughout the queendom, however we do not know their exact location. If Trapper John picked the site locations, which we will assume he did, then this is not a random sample. Because of the locations of certain sites, some woodchucks could have had a greater chance of being picked.

Student 5: Trapper John's sample was not a random sample because it was impossible for him to ensure that each woodchuck had an equal chance of being trapped. Young woodchucks' movements are restricted by their parents and they would not have had an equal opportunity of being trapped.

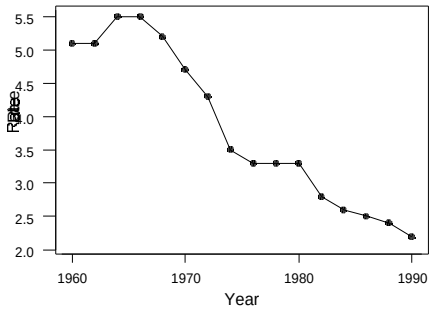
Fourth Writing Assignment:
Goal: Reinforce Writing Skills
Reinforce Computer Skills (email, attachments, Microsoft Word)
Critical Thinking Skills (Sample, Random Sample, Population)

Problem:

We often look at time series data to see the effect of a social change or new policy. Here are data on motor vehicle deaths in the United States. Because motor vehicle deaths will tend to rise as motorists drive more miles, we look instead at the rate of deaths, which is the number of deaths per 100 million miles driven. On separate paper make a **line-type** time series plot (not a bar chart type) of this death rate data and describe the overall pattern of this data (how it varies over time). Use year as the independent variable and label your axes. Make sure you maximize the use of your y-axis scale when you draw your graph. Part of the purpose of this exercise, is to see if you can draw graphs by hand, so only hand drawn graphs will be accepted.

Data and Time Series Graph

Year	Rate	Year	Rate
1960	5.1	1976	3.3
1962	5.1	1978	3.3
1964	5.4	1980	3.3
1966	5.5	1982	2.8
1968	5.2	1984	2.6
1970	4.7	1986	2.5
1972	4.3	1988	2.4
1974	3.5	1990	2.2



Directions: Answer questions 5 to 7 on a word processor numbering your responses accordingly. Save your word processor file in **Microsoft Word format.** Attach a printout of your responses to this sheet and email a copy of your **Microsoft Word** computer file to your instructor at jcliment@cecilcc.edu. Use "Traffic Deaths-Your Name" as the subject of your email and label your computer file "Trapper John-You Name". Put your name and class on the top of your document. For example John Smith would label his file and email as: ***Traffic Deaths – John Smith.***

5. Give a brief verbal description of overall pattern.
6. In 1974 the national speed limit was lowered to 55 miles per hour in an attempt to conserve gasoline after the 1973 Mid-east war. In the mid-1980s most states raised speed limits on interstate highways to 65 miles per hour. Some said that the lower speed limit saved lives. Explain if the effects of the lower speed limits between 1974 and the mid-1980s are visible in your plot.
7. Suppose that the raising of the speed limit in the mid-1980s actually caused more deaths than the lower speed limit. Furthermore, suppose that deaths due to accidents continued to drop in the decade following the higher speed limit. Give an explanation of how this could happen.

Sample Student Responses to Question 6:

Student 1: When the speed limit was lowered to 55 miles per hour in 1974, after the 1973 Mid-east war, there was no increase or decrease of traffic deaths. After 1980 when some states raised their speed limits on interstate highways to 65 miles per hour, the number of traffic deaths began to decrease. So according to the line graph I have drawn, I can not see how the lower speed limit helped save lives.

Student 2: While it may be true that lower speed limits save lives, the graph does not give strong evidence to support that the lowering of the speed limit to 55 mph between 1974 and the mid-1980s actually helped to save lives of motorists. Between 1972-74, the rate of motor vehicle deaths decreased slightly, from 4.3 to 3.5. However, the plot shows that after 1974-75, the rate of traffic deaths actually levels out at 3.3 between 1976 and 1980; the only time on the graph that it does so after 1962. Even after the speed limit was raised to 65 in the mid –1980s, the number of deaths per 100 million miles driven continued to decline at a steady rate. According to the graph, the sharpest decline in the rate of death actually takes place between 1966 and 1974, not between 1974 and the mid-1980s. If lower speed limits between 1974 and the mid-1980s in reality did save the lives of motorists, it is not obvious by looking at this graph.

Student 3: Well, the plot shows that in 1974, the rate was at 3.5 but only until 1976 did it go down 3.3. There the rate stayed at 3.3 until 1980. I believe that with that information the changing of the speed limit did minimum if not nothing to at saving lives because there was no change in the rate. What also makes the assumption that lowing the speed limit would save lives false is that even after the speed limit was increased, in some states, to 65 is that the rates then started to decrease every 2 years.

Student 4: Between the years of about 1972 through 1976, there is a fairly large drop in death rates. However, in the mid 80's, the rates still continue to drop, but slowly and consistently from 2.6 to 2.5 to 2.4 and so forth. In the beginning, it seems that the lower speed limit helped, but two years later (1976), the death rate remained 3.3 through 1980. Therefore, there is no significant change in rates because of adjusting the speed limits.

Student 5: The lowering of the national speed limit in 1974 appears to have had little effect on the death rate. In fact, it seems to have slowed the decline in death rates given the fact that from 1966 to 1974 the rate had dropped from 5.5 to 3.5 before the lowering of speed limits. 1974 to 1976 shows a drop from 3.5 to 3.3, where the rate remained until 1980. From 1980 to 1982 there was a sharp decline in deaths (3.3 to 2.8) and the rate has continued to drop (even after most states raised their speed limits).

Student	X_1 Grade on Assignment 1	X_2 Grade on Assignment 4	$X_D = X_1 - X_2$ Difference in Grades
Student 1			
Student 2			
Student 3			
Student 4			
Student 5			
Total			
Mean			

John Climent's Answers Given to Students:

Assignment 1 – Question 6: This is not a random sample. For a sample to be a random sample, each subject or unit in the population must have an equally likely chance of being selected. For example, if the population consists of 500 individuals, then each individual must have a 1/500 (0.002 or 0.2%) chance of being selected. It is nearly impossible for all of the woodchucks of Cecilville had an equally likely chance of being caught in the traps. Woodchucks that lived in the vicinity of the 75 sites were more likely to be trapped than those from other areas were. Those that never left their homes could not be trapped unless the traps were placed in their homes. There are numerous other reasons why some woodchucks had a greater likelihood of being caught than others. How many can you name?

Assignment 4 – Question 6: Is Effect of Lower Speed Limit Visible? No it is not visible. The accident rate was declining steeply prior to 1974 when speed limits were reduced to 55 mph. One would expect the effect of this reduced speed limit would be to further reduce the accident rate; however, just the opposite is seen. The accident rate levels off for most of the period during which the new speed limit was in effect. Although we were not asked to comment on the raising of speed limits in the middle 1980's, its effect is also not evident. Logic tells us that the accident rate should increase with higher speed limits, but the graph shows a decrease.

Use Newspaper Articles:

The following article appeared in the *New Your Times* on 9/17/96. According to the article, millions of Americans ignore their mother's advice concerning washing their hands after going to the bathroom. Read the article and answer the following questions.

Shame on You! Wash Your Hands! Especially You 40% at Penn Station

NEW ORLEANS, Sept. 16 (AP) — Millions of Americans routinely ignore one of their mothers' most important pieces of advice: wash your hands after you go to the bathroom.

This unsettling item of news was gathered in the only way possible — by actually watching what people do (or don't do) in public restrooms.

The researchers — if that is what they should be called — hid in stalls or pretended to comb their hair while observing 6,333 men and women do their business in five cities last month.

"Hand washing in this country has become all but a lost art," said Dr. Michael T. Osterholm, the Minnesota state epidemiologist.

Dr. Osterholm heads the public health committee of the American Society for Microbiology, which sponsored the survey with the Bayer Corporation, the aspirin maker. The figures were gathered by Wirthlin Worldwide, a survey firm, and made public today at the society's annual infectious-disease conference.

Among the results were these:

¶The country's dirtiest hands may be in New York City. Just 60 percent of those using restrooms in Penn Station washed up afterward.

¶Chicago hands, relatively speaking, are reasonably clean. The watchers saw 78 percent take the time to wash after using the bathroom at the Navy Pier.

¶Seventy-one percent washed up at a casino in New Orleans, 69 percent at Golden Gate Park in San Francisco and 64 percent at a Braves game in Atlanta.

¶Women are cleaner than men. The survey found 74 percent wash after using the toilet, compared with 61 percent of men. Only in New York and New Orleans did men use soap and water slightly more often than women.

¶The most slovenly men observed were at the Braves game. Just 4 percent of the men stopped to wash compared with 89 percent of women.

Dirty hands are an extremely common means of spreading diseases, ranging from colds to illnesses that cause diarrhea and other intestinal problems. In restaurants, one food handler with dirty hands can make dozens of patrons sick.

People probably know better. Wirthlin also did a telephone survey last month of what people had to say about their hand-washing habits. Of 1,004 adults, 94 percent said they always washed up after using public restrooms.

Actually, mothers' advice — or lack of it — may be part of the problem. "Moms often today are not telling their kids to wash their hands," said Dr. Gail Cassell of the University of Alabama. "Schools aren't telling children about it. We need to be reminded that this is important."

1. Based on this article the mayor of New York claims that 60% of all New Yorkers was their hands after going to the bathroom, which probability interpretation did the mayor use, relative frequency, subjective, or classical?
2. Explain whether the 60% claim made by the mayor of New York is a parameter or a statistic.
3. The mayor of Old York claims that he is 110% positive that the residents of Old York do a better job of washing their hands after going to the bathroom. Comment on the mayor of Old York's claim from the point of view of a statistician.
4. Which probability interpretation did the mayor of Old York use, relative frequency, subjective, or classical?
5. When the researchers observed peoples' behavior in the bathroom, they found that they washed their hands after going to the bathroom approximately sixty to seventy-five percent of the time. In a follow up telephone survey, they found that, ninety-four percent responded that they always washed up after using a public restroom. Give a plausible explanation for the discrepancy in the percentages reported by these two surveys.