**AP Statistics**

**Chapter 5 Problem Solving Response Piece**

You are required to give clear and thorough explanation on the open ended section of the AP Stat exam. For this assignment, you need to communicate your thinking clearly.

There are 3 questions. *2 will be evaluated*.

After responding to all of 3 problems, you will be given time in class (on final day) to discuss and compare your responses with a partner (the teacher will pair) You will have an opportunity to then fine tune where you think fine tuning will be needed.- rewriting the response if necessary. Together, you will decide which 2 you would like evaluated. And indicate those three with a star or highlighter. You will then turn in both your papers stapled together.

***This will be counted as a 20 point Project grade***. You and your partner should be receiving the same grade (unless it is clear that I need to look at both or one partner did not hold their weight in the assignment)

You must respond to the questions on a separate sheet of paper. It must be neat and readable without your teacher needed to get a higher prescription of her glasses. Typing is an option but not required for this.

Clear communication, means you need to employ proper grammar and sentence structure. Remember beginning a sentence with “Yes, because….” Or “No, because” …..might make your English teacher cringe. Keep them in mind.

**Here are the 3k Questions**:

1. *Is tarter control Crest toothpaste more effective at preventing tarter buildup on teeth than regular Crest toothpaste?* Researchers recruit 210 volunteers (120 men and 90 woman) who first get a free dental cleaning. Then the researchers randomly assign 105 to the tarter control group and 105 to the regular toothpaste group. All 210 people are given unmarked tubes of the appropriate toothpaste and are instructed on how often to brush their teeth every day. They are not told which group they are in. And the two kinds of toothpaste look the same. After 6 months they are rated on tarter buildup by dentists who don’t know who was in each group.

(A) Did the researches use any type of blinding in this experiment? *Justify your answer*.

(B) Why did the researchers give all the volunteers a free dental cleaning?

(C) The researchers used a completely randomized design in this experiment. Describe a design that uses BLOCKING to improve on the original design of the experiment. Give at least one reason why the blocking design might be more desirable.

2. An opinion poll calls 2000 randomly chosen residential telephone numbers, then asks to speak to an adult member of the household. The interviewer asks “How many movies have you watched in the movie theater in the past 12 months? In all, 1131 people responded.

(A) Identify a potential source of bias related to the question being asked. Suggest a change that would help fix this problem.

(B) Identify a potential source of bias in this survey that is not related to question wording. Suggest a change that would help fix the problem.

3. It appears that people who drink alcohol in moderation have lower death rates than either people who drink heavily or people who do not drink at all. The protection offered by moderate drinking is concentrated among people over 50 and on deaths from heart disease. The Nurses’ Health Study played an essential role in establishing these facts for woman. This part of the study followed 85,709 female nurses for 12 years, during which time 2658 of the subjects died. The nurses completed the questionnaire that described their diet, including their use of alcohol. They were reexamined every 2 years. Conclusion: “As compared to non-drinkers and heavy drinkers, light to moderate drinkers had a significantly lower risk of death.

(A) Was this study and experiment or an observational study? Justify your answer.

(B) What does “significantly lower risk of death” mean in sampling language?

(C) Identify a lurking variable that might be confounded with how much a person drinks. Explain how the variable you chose could lead to confounding?

(D) How might you make this study better?

4. Here is an opening to a press release form June 2004: “Starbucks Corp. on Monday said it would roll out a line of blended coffee drinks intended to tap into the growing populatity of reduced-calorie and reduced-fat menu choices for Americans.” You wonder if Starbucks costomers really like the new “Mocha Frappuccino Light” as well as the regular version of this coffee.

(A) Described a match pair design using 40 regular Starbucks customers that would help answer this question. Be sure to discuss blinding.

(B) Explain how you would use the partial table of random digits below to do the randomization that your design requires. Then use your method to assign treatments to the first 3 subjects. Show your work clearly on your paper.

 07511 88915 41267 16853

 84569 79367 32337 03316

 81486 69487 60513 09297

 00412 71238 27649 39950

(C) Would it have been better to use a completely randomized design instead of a matched pairs design? Justify your answer.