Level 1 Statistics Final Project 2009
Guidelines and Expectations

Mrs. Walczewski

Due date: Friday, May 22, 2009 : All students should email an electronic copy attachment of your Power Point Project to me at swalczewski@sch.ci.lexington.ma.us. Please verify that this attachment can be opened on a school computer before emailing it to me. There is a 10 Point a day penalty on project grade for each day it is late.

As a final project for the Statistics level 1course, students will design their own statistical project involving testing hypotheses about proportions in a Power Point presentation. Students will present their projects in class on the following dates: May 22 through May 29. The Project will be 20% of the final grade. All students are required to attend all 3 presentation days and are responsible for completing peer evaluations on projects presented each day. A penalty of 15 points per day off the student's final project will be applied if evaluations are not completed on the appropriate day.

A statistical project is the process of answering a research question using statistical technique and presenting the work in a final report that allows observers to clearly follow the presentation.

Guidelines for developing a statistical project.

- The research question may arise from any field of scientific endeavor such as athletics, advertising, aerodynamics, nutrition, politics, etc.

- The project should demonstrate the scientific method of solving a problem by using the following process:

    1. Pose a focused question. State the null hypothesis and the alternative hypothesis. The null hypothesis MUST come from recent research or a recent survey, etc. You cannot just "make it up."

    2. Collect appropriate data *and check the conditions* that are required for "meaningful" data. You must include documentation of data collection process in your project and also demonstrate that the conditions stated in the CLT are met

        - Non-biased data collection design and/or survey technique?

        - Randomization? How implemented? Describe process?

        - Success/failure condition? Large enough sample size?

    ➢ Are you able to collect data to answer the proposed question? If yes, time should be spent deciding how to collect it, record it, and use it. *Great care should be exercised at every stage of data collection. Careless measurement or recording of data cannot be remedied in the analysis phase of the project.*

- Has someone else already collected the data that could be used in the project? If published data are used, explain how the published data were obtained and record the source. (include a hardcopy)

3. Analyze the data intelligently

   - Intelligent analysis of the data may take many forms and should be guided by the question of how the data were collected. Usually it is best to begin by *graphing the data*. Appropriate statistical methods of analysis should be used such as summary statistics and description of the distribution, etc.

   - State the parameters and draw a detailed sketch of the sampling distribution model using the Central Limit Theorem, that is - a normal distribution. Mark off your sample proportion and shade appropriate area under the normal curve.

     Calculate the standard deviation and the sample proportion.

     Compute the test statistic and find the p-value. State an acceptable alpha level as your level of significance. Compare your p-value to the alpha level and make an appropriate conclusion.

4. Draw correct conclusions

   - Once the analysis is complete **the null hypothesis question should be answered** correctly. The data may not be able to provide a conclusive answer. **Be careful not to get 'caught up' in the analysis phase and obtain many answers, none of which addresses the research question.**

   - **State your conclusion in the context of the hypothesis**; that is your conclusion should link the P-value to a decision about the null hypothesis.

   - Confidence intervals help us think about the results and help to summarize the population parameter. **Include a confidence interval for the parameter of interest.**

   - Consider the strengths and weaknesses of the project. What went well? What went wrong? What would you change if you could do this project was done again?

<u>What to turn in on Friday, May 22, 2009:</u>

1. An electronic copy of your power point presentation. It must be burned onto a CD (that can be opened on a school computer) or sent via email to Mrs. Walczewski at email address listed on top of paper.

2. **A TYPED, DOUBLE SPACED** print out **of your script for the presentation**. Please - do not give me a print out of the power point, but a script in words of what you (and your partner, if applicable) will be saying during the presentation. Also include all scripted work that was completed that was not entered into the Power Point Presentation.

Project Grading Rubric
(100 total points)

The following guidelines will be used to assess each project:

1. **Selection of Project & submit Project in a timely manner. Possible Penalties.**

   You will lose 5 points per day on your final project if your Final Project Proposal – Rough Draft Contract is not turned in on Friday May 08, 2009.

   You will lose 10 points per day on your final project for emailing an electronic copy of the project to me after the due date, **Friday, 5/22/09.** (If the emailed project cannot be opened on a school computer, the penalty will be imposed until the student rectifies the problem. It is the student's responsibility to check and make sure that the project can be opened on a school computer.)

   There is a loss of 15 points per day on your final project if a student is absent on any of the three days of Project Presentations. If a student has an excused absence for a presentation day, it is the responsibility of the student to contact the teacher and make immediate arrangements to meet after school and view all the projects for that day on the computer and submit evaluations on all presentations in order to avoid the 15 point penalty for that day.

2. **Question of interest** (10 points)

   Is the question of interest focused, clearly stated, and relevant? Is correct symbolism used? Does the question match the question on the contract submitted?

3. **Research Design and Data Collection** (20 points)

   Can the data, as collected, answer the question? Was the data organized in a format where the observer can understand and read the data? Were the data collected in an appropriate manner using proper randomization techniques? Were data collected directly by the students- describe your design process. The raw data must be included in your project as a separate hard-copy hand-in.

4. **Analysis of data** (25 points)

   Is the analysis appropriate for the design? Are all required tools of analysis used? Is the analysis done correctly? Include sample proportion, population proportion, alpha level, confidence level, test statistic, p-value, and a decision relating p-value and alpha level. (reject or fail to reject)

5. **Conclusion** (20 points)

   Is conclusion consistent with the null hypothesis? Has the focused question been answered? Include a paragraph summary in the context of the problem. Include a Confidence Interval and summarize the interpretation of the confidence interval.

6. **Reflection on the Process** (5 points)

   What went right? What went wrong? What could be done differently? Are there any suggestions for further study?

7. **Final Presentation** (15 points)

   Is the Power Point Presentation well organized and clearly presented? Does the project display creativity and/or originality? Are supporting graphs and charts carefully prepared? Is your delivery of the presentation rehearsed, planned, and well executed? (see Oral Presentation Rubric)

8. **Degree of Difficulty** (5 points) How difficult was it to complete this project? What Problems did you have to overcome? What things did you learn from the process?