Chapter 3 Project: Investigating Relationships

What is a better predictor of battery life in netbooks, weight or cost? What is a better predictor of the cost of a used car, age or number of miles? What is a better predictor of winning percentage, points scored or points allowed? What is a better predictor of success in AP Statistics, ACT score or GPA?

In this project you will investigate which of two possible explanatory variables is a better predictor of a response variable by doing a thorough analysis and comparison of the relationships between each pair of variables. You may choose your own variables, or you may choose one of the examples given above, but there may be no repeats. You must include a written report and some way of displaying your information. This could be on a poster, power point, etc.

Your report/poster/presentation should include the following components:

1. Introduction: In this section you will introduce the context of your study, define the variables you will be investigating, and discuss any preliminary hypotheses you might have about the relationships between the variables.

2. Data Collection: In this section you will describe how you obtained your data. If it is from the Internet, make sure to cite the specific page. Include the data in a table and make sure you have at least 10 observations.

3. Graphs: Display the relationships in well-labeled scatterplots. Make sure to display the response variable on the same scale in each plot. Describe the relationships in each scatterplot and compare the relationships.

4. Numerical Summaries and Interpretations: Calculate and interpret the correlation, equation of the least-squares regression line (slope and y-intercept), the standard deviation of the residuals s and r^2 for each relationship. Also, make and describe the residual plots for each relationship.

5. Conclusion and Discussion: Decide which of your explanatory variables does a better job of predicting the response variable, citing specific evidence from the graphs and numerical summaries. Discuss when it would be appropriate to make predictions using the least-squares regression line and any potential limitations of your model.

Your project is due on: _____

On the back page is the rubric I will use to grade your (or you and one partner's) project. Make sure you read through it before you turn in your project!!

Chapter 3 Project Rubric

	4	**3**	**2**	**1**
Introduction and Data Collection	-Describes the context of the research -Clearly defines the variables and any preliminary hypotheses -Specifically describes how the data were collected (including source, if appropriate) -Includes appropriate amount of data and displays in a table	-Clearly introduces the context of the research and the variables being used -Describes how the data were collected or includes the data in a table	-Introduces the context of the research, but doesn't specifically define variables. -Describes how data were collected, but doesn't include the data (or vice-versa)	-Briefly describes the context of the research or the method of data collection
Graphs	-Scatterplots are correctly drawn, clearly labeled and easy to compare -Important characteristics of the graphs are described and compared -Residual plots are correctly displayed and interpreted	-Includes all three characteristics above, but makes one of the following errors -Scatterplots are correctly drawn, but some labels are missing -Scatterplots are compared, but the descriptions are weak or some comparisons are missing -Residual plot is included, but not interpreted correctly	-Includes scatterplots with appropriate descriptions and comparisons, but no residual plots OR includes both scatterplots and residual plots with weak descriptions or no descriptions	-Only scatterplots are included with little or no descriptions or interpretations
Numerical Summaries	-Includes all of the numerical summaries (r, slope, y intercept, s, $r2$) -All numerical summaries are interpreted correctly in context	-Includes all of the numerical summaries, but the interpretations are weak and/or lack context	-Includes most or all of the numerical summaries but several interpretations are missing or incorrect or not written in context	-Some numerical summaries are included
Conclusions	-Makes a reasonable conclusion about which explanatory variable is a better predictor -Decision is based on specific evidence from the graphs and numerical summaries -Discusses when making predictions is appropriate (i.e. discusses extrapolation) -Shows evidence of critical reflection (discusses possible errors, shortcomings, limitations, etc.)	-Makes a reasonable conclusion citing evidence from graphs and numerical summaries -Discusses when to make predictions or shows some other evidence of critical reflection	-Makes a reasonable conclusion based on evidence from graphs and numerical summaries	-Makes a reasonable conclusion with little or no reference to specific evidence
Presentation	-Clear, holistic picture of the project -Project is well organized, neat and easy to read -Ideas are well communicated, including appropriate transitions between sections.	-Project is organized and easy to read, but lacks clear communication or a holistic picture of the project	-Project is not well organized or communication is poor	-Communication and organization are very poor