Mr Murphy
AP Statistics
3.4 Block and Matched Pairs Experiments
Homework Worksheet

1. A local steel company wishes to test a new type of heat-resistant glove for workers who must handle the molten steel. The company randomly selects 100 workers to test the gloves over a four-month period. Design an optimal experiment that will test whether the new gloves are more effective in resisting heat that the current gloves. Can your experiment be blinded? Explain your reasoning.

2. Suppose that the experiment described in #3 from the HW in the last section has been redesigned in the following way. Ten 2-acre plots of land scattered throughout the county are randomly selected. Each plot is subdivided into two subplots, one of which is treated with the current fertilizer and the other of which is treated with the new fertilizer. Wheat is planted and the crop yields are measured. How is this experiment different from that in example #3? What advantages are there for this method? Which treatment is acting as the control group? What information, if any, can be gained by having a control group?

3. A researcher wants to determine whether performance in statistics classes can be influenced by the expectation of success. A statistics teacher will be teaching 15 sections of statistics over the next two years, 9 daytime classes and 6 evening classes. He wanted to tell the students in some sections that “females perform better in statistics than males”. In some other sections he wanted to say “males perform better in statistics than females”. Design an experiment that uses treatment and control groups, and blocks for the difference between day and evening classes.

4. Is the right hand of right-handed people generally stronger that the left? Paul Murky of Murky Research designs an experiment to test this question. He fastens an ordinary bathroom scale to a shelf five feet from the floor, with the end of the scale projecting out from the shelf. Subjects squeeze the scale between their thumb and their fingers on the top. A scale which reads in pounds will be used to measure hand strength.

   (a) Explain why this is an experiment, and not an observational study.

   (b) What is/are the explanatory variable(s)? What values do/does the variable(s) take?

   (c) What is the response variable?

   (d) You have recruited 10 right-handed people to serve as subjects. Carefully describe the design of a matched pairs experiment to compare the strength of the right and left hands, using these subjects.

   (e) Use the random digits below to do the randomization required by your design and report your results.

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