Name:_____ Date:_____ Period:_____

Chapter 6 Investigation Guide

Before you begin the written report:

1.) Design an experiment that will result in paired data or choose a set of athletes or teams that you can compare in two contexts using paired data. For example, using all the teams in a league, investigate if there is a difference in their ability at home and on the road. Or, using one athlete or team, investigate if there is a difference in their ability at home and on the road for a minimum of 10 consecutive seasons. Or, using all the teams in a league, investigate if a rule change had a significant effect by comparing their performances in the year before and the year after the rule change.

2.) Choose a single numerical variable that you will use to measure the performances of the athletes or teams that you chose in step 1.

3.) Conduct the experiment or find the relevant data on the internet. In most cases, to find the appropriate data you will need to visit a separate webpage for each athlete or team in your study.

To complete the written report:

1.) Write an introduction which states the question of interest and briefly describes the context of the athlete or team's performances, including why you chose to use a particular variable to measure the performances. Describe how and where you obtained your data and include the null and alternative hypotheses.

2.) Include a table that shows the 2 performances for each athlete or team and the difference in performance. Make an appropriate graph to display the differences in performance. Describe the graph in detail and include appropriate summary statistics. Give a preliminary answer to the question of interest.

3.) Identify and calculate the value of the test statistic you will use to test the hypotheses.

4.) Describe how to use note cards to simulate the distribution of the test statistic. Then, using the applet, conduct at least 100 trials of the simulation to see what values of the test statistic could happen by random chance, assuming that the null hypothesis is true. Include a well-labeled dotplot to display the results of the simulation.

5.) Use the results of the simulation to estimate and interpret the p-value. Then, make an appropriate conclusion about the hypotheses based on the p-value.

6.) Discuss any limitations or possible errors you may have made in your conclusion. If there is convincing evidence of a difference in ability discuss possible causes.

Name:_____ Date:_____ Period:_____

Chapter 6 Investigation Guide: Checklist

- ☐ **Title Page**
- ☐ **Table of Contents**
- ☐ **Introduction**
  - Introduce the athlete/team (include any accomplishments)
  - What is the question of interest and why did you select this topic
  - Describe how and where you obtained your data
  - Give a preliminary answer to the question of interest
- ☐ **Table**
  - Table of the raw data for all distributions (Including the two contexts and a difference column)
- ☐ **Dotplots**
  - Dotplot for each of the distributions (2 total-raw data and simulation)
  - Compare the dotplot (Using SOCS)
  - Discuss what positive and negative values mean
  - Discuss the 5 summary statistics
- ☐ **Test Statistic (1/2 page)**
  - Identify and calculate your test statistic-discuss what you used and why you chose it
  - Discuss the process of how to achieve your test statistic
- ☐ **Simulations**
  - Discuss the note card simulation and applet simulation
  - Dotplot representing the information of the simulation
  - Brief explanation of the dotplot (estimate and interpret you p-value in the explanation)
    - Compare the dotplot (Using SOCS)
    - Discuss what positive and negative values mean
    - Discuss the 5 summary statistics
- ☐ **Conclusion**
  - Give a conclusion based on your results. (1 page minimum)
- ☐ **Errors/Causes**
  - Discuss the type of error that may have been made
  - Discuss the possible reasons for your conclusion
  - 1 page (minimum)
- ☐ **References**
  - Using appropriate citing rules and techniques, cite all the references used for the investigation