

Chapter 4 Investigation Guide

Before you begin the written report,

1. Choose an athlete, team, or league that you can compare in two different contexts. For example, are the Cowboys better at home or on the road? Or, choose two different athletes, teams, or leagues that you can compare to each other. For example, who was a better quarterback, Joe Montana or Brett Favre?
2. Choose two numerical variables that you can use to compare the *PERFORMANCES* of the athlete(s), team(s), or league(s) chosen above. For example, if you could compare the number of points scored by the Cowboys at home and on the road and the number of points allowed at home and on the road for their games in a particular season. Or, you could compare the number of passing yards for Joe Montana and Brett Favre and compare the number of touchdowns for Montana and Favre for each year of their careers.
3. Find the relevant data on the internet or another source. Many of the websites listed below allow you to copy and paste the data into a spreadsheet program such as Excel. This will allow you to sort the data and do basic calculations. *Do not use Excel to make your graphs!* To find game-by-game data for a particular team, look for a link to “Schedule and Results.” To find game-by-game data for a particular player, look for a link to “Game Logs.” Do not include playoff games and make sure that there are at least 8 observations in each context.

To complete the written report,

1. Write an introduction which states the question of interest and briefly introduces the athlete(s), team(s), or league(s) you are comparing. Also, describe which two numerical variables you are using to compare and why you chose those two variables. Describe how and where you obtained your data.
2. List the raw data in a table for all four distributions.
3. For the *first* variable, display the two distribution using *histograms*. Make sure to use the same scale so they are easy to compare! Calculate the mean and range for each distribution. Finally, write a few sentences comparing the two distributions using the characteristics of shape, center, spread, and outliers.
4. For the *second* variable, display the two distributions using *boxplots*. Make sure to use the same scale so they are easy to compare! Calculate the median and *IQR* for each distribution and check if either distribution has outliers. Finally, write a few sentences comparing the two distributions using the characteristics of shape, center, spread, and outliers.
5. Write a brief conclusion that gives an overall answer to your question of interest. Make sure to contrast the ideas of *PERFORMANCE* and *ABILITY* in your conclusion.

Web sites with data for multiple sports include:

- www.sports-reference.com
- www.espn.com
- www.usatoday.com/sports
- sports.yahoo.com
- www.si.com

Rubric for Chapter 4 Investigation	4 = Complete	3 = Substantial	2 = Developing	1 = Minimal
<p>Introduction and Data Collection</p> <ul style="list-style-type: none"> Describes the context of the research (sport, player, team, year, etc.) and includes reasons for variable choice Has a clearly stated question of interest Data is appropriate to answer question of interest Includes raw data and source of data 	<ul style="list-style-type: none"> Histograms are drawn correctly and easy to compare Summary statistics are correctly calculated 	<ul style="list-style-type: none"> Has a specific question of interest and uses appropriate data, but doesn't adequately introduce the context, describe how the data was collected, or include the raw data 	<ul style="list-style-type: none"> Has a question of interest and uses appropriate data, but has several other problems 	<ul style="list-style-type: none"> Has a question of interest
<p>Variable #1</p>	<ul style="list-style-type: none"> Histograms are drawn correctly and easy to compare Summary statistics are correctly calculated 	<ul style="list-style-type: none"> Has one minor error, such as using different scales for the histograms or making an error in the calculations 	<ul style="list-style-type: none"> Includes histograms, but has at least two minor errors or does not include summary statistics 	<ul style="list-style-type: none"> Includes histograms
<p>Variable #2</p>	<ul style="list-style-type: none"> Boxplots are drawn correctly and easy to compare Summary statistics are correctly calculated Provides evidence of check for outliers 	<ul style="list-style-type: none"> Has one minor error, such as using different scales for the boxplots, making an error in the calculations, or not showing check for outliers 	<ul style="list-style-type: none"> Includes boxplots, but has at least two minor errors or does not include summary statistics 	<ul style="list-style-type: none"> Includes boxplots
<p>Comparisons and Conclusion</p>	<ul style="list-style-type: none"> Correctly compares both sets of distributions using the characteristics of shape, center, spread and outliers. Correctly uses the results from both comparisons to give an overall answer to the question of interest 	<ul style="list-style-type: none"> Compares both distributions but doesn't use all four characteristics Provides an overall answer to the question of interest 	<ul style="list-style-type: none"> Compares one set of distributions and gives an overall answer to the question of interest or just compares both sets of distributions 	<ul style="list-style-type: none"> Compares one set of distributions or gives an overall answer to the question of interest
<p>Overall Presentation/Communication</p>	<ul style="list-style-type: none"> Clear, holistic picture of the investigation Investigation is well organized, neat and easy to read Ideas are well communicated, including appropriate transitions between sections Clearly contrasts the concepts of <i>PERFORMANCE</i> and <i>ABILITY</i> in context 	<ul style="list-style-type: none"> Investigation is organized, easy to read, and has appropriate transitions, but lacks clear communication, a holistic picture of the investigation, or does not clearly contrast the concepts of <i>PERFORMANCE</i> and <i>ABILITY</i> 	<ul style="list-style-type: none"> Investigation is somewhat organized, but has several major problems 	<ul style="list-style-type: none"> Communication and organization are poor