

## Project: Compare Variation

Name: \_\_\_\_\_

v. 1.2

Pick a topic of your choice. You can make an experiment, do a study, or use experimental or observational data published on the Internet. If you make your own experiment or do your own study, you can work with another student. You must choose a variable that can take many values (not yes/no and not just 1, 2, 3, 4).

You will compare the **variable in two different situations** in terms of the central value and variation (spread) such as median and inter-quartile range, respectively. You will interpret differences. You must have 20 or more data points, preferably 30, for each situation. You can have one subject repeat 20 times and compare to another subject who also repeats 20 times. Or you can have 20 students do something and 20 other students do the same thing.

Examples:

- (1) The distance hit by two different golf players, hitting 20 balls each.
- (2) The amount of time it takes to do a simple Algebra 1 quiz for students who are currently in different math classes, 20 in each. Alternatively, compare two students doing 20 problems, timing each problem.
- (3) A person playing a game at 8am versus playing the game at 4pm: comparing scores of 20 trials at each time of day.

**Your topic** (must be approved before proceeding): \_\_\_\_\_

### Rubric

1) Proposal of topic.	10
a. Why did you choose the topic?	
b. What did you want to learn?	
c. How will you study central value? How will you study variation?	
d. Write a specific <i>Question of Interest</i> .	
e. You must get your topic approved.	
2) Data gathering	30
a. Use one variable in two situations	
b. Has 20 data points in each	
c. All data listed in a table	
d. All data listed in fathom, in one table with at least two columns with headings variable name (such as $x$ ) and the situation name (player A and player B).	
3) Calculations	10
a. Calculate, for each: Min/Max, Q1/Q3, Median, range, IQR, outliers, mean	
b. Find the difference in medians, difference in IQRs, and difference in means	
4) Graphs	10
a. Graph side-by-side stacked dot plots	
b. Graph side-by-side stacked box plots	
c. Label the graphs in detail: title, caption, axis labels, source of the data	
5) Explain each graph and what we learn from it.	10
a. Are the graphs skewed? Explain.	
b. Write about the differences in central value and variation.	
6) Report that contains all of the above elements and the below conclusion, etc.	10
a. Correctly uses the results to draw an appropriate conclusion about the question of interest	
b. Shows evidence of critical reflection (discusses possible errors, shortcomings, limitations, alternate explanations, etc.).	
c. Report is well organized, neat and easy to read.	
d. Ideas are well communicated, including appropriate transitions between sections.	
7) Overall process	10
a. Quality of work and attention to detail	
b. Consistent progress to meet the deadline.	
c. Independence.	
d. Originality.	
8) Effort	10
<b>Total</b>	<b>100</b>