

Variation Challenges

Below I provide a few different challenges to help deepen your understanding of **statistical variation**. Test things out by using the [Descriptives Scratchpad](#).

Using the Playground

The activities for this playground are organized around the **POE principal**. First **predict**, then **observe**, and finally, **explain**.

The purpose of the predict step is that you write down your predictions before entering data for a particular exercise. This step is extremely important: I do not want to encourage people to mindlessly input numbers until a correct solution is reached. Instead, I want to encourage you to actively think about the questions and make your best educated guess before starting to enter data. Observing the results of data entered based on your well thought out prediction builds a better stage for understanding where and when you have misconceptions.

More importantly, students should view using the Statistical Scratchpads as an iterative process. This means that you will enter some data, receive feedback, and then you can revise your data as often as necessary to meet the conditions stated in a particular problem. If your observation is very different from what you predicted, then you will have an important basis for re-evaluating and re-conceptualizing where and why your prediction was off base. The final step is to explain either the similarities between your prediction and subsequent observation OR to explain the dissimilarities.

The Activities

For all the activities you are going to enter emotional stability scores (1–100 scale) for six students. When you have made your predictions, then go ahead and observe the results using the [Descriptives Scratchpad](#).

Use a blank piece of paper to write down a set of scores that you think might work based on your prediction. When you are happy with a draft set of scores, then enter them into the web-based scratchpad.

Challenge 1

Create a set of scores where **the standard deviation between scores is < 1** .

1. **Predict:** Write a set of numbers that you think will generate this result.
2. **Observe:** Now put your numbers into the scratchpad. What do you observe when you put in this data?
3. **Explain:** Compare your predictions and observations. Explain the results you observe.

Challenge 2

Create a set of scores where **the standard deviation between scores is > 4** .

1. **Predict:** Write a set of numbers that you think will generate this result.
2. **Observe:** Now put your numbers into the scratchpad. What do you observe when you put in this data?
3. **Explain:** Compare your predictions and observations. Explain the results you observe.

Challenge 3

Create a set of scores where **the mean is greater than 5 and the standard deviation is greater than 3**.

1. **Predict:** Write a set of numbers that you think will generate this result.
2. **Observe:** Now put your numbers into the scratchpad. What do you observe when you put in this data?
3. **Explain:** Compare your predictions and observations. Explain the results you observe. .

Challenge 4

Create a set of scores where **the mean is greater than 70 and the standard deviation is less than 2**.

1. **Predict:** Write a set of numbers that you think will generate this result.
2. **Observe:** Now put your numbers into the scratchpad. What do you observe when you put in this data?
3. **Explain:** Compare your predictions and observations. Explain the results you observe.

Challenge 5

Create a set of scores where **the mean is less than 20 and the standard deviation is more than 20**.

1. **Predict:** Write a set of numbers that you think will generate this result.
2. **Observe:** Now put your numbers into the scratchpad. What do you observe when you put in this data?
3. **Explain:** Compare your predictions and observations. Explain the results you observe.