**Total Time needed 45 minutes**

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| **Handouts:**   * Gettysburg Address Task | **Materials:**   * TI-Navigator * TI-Nspires * ***Gettysburg Address.tns*** * Nspire QuickPoll documents ready to go. |

**Objective**

Students will use sampling distributions to provide mathematical backing for conclusions they make regarding how precise different groups’ sampling methods were for providing an estimate for the average word length of the Gettysburg Address.

**Initial Estimate Portion (15 minutes)**

Pair students up and give each pair of students **5 minutes** to give an estimate of the average word length for the Gettysburg Address.

*View the Gettysburg Address below and give a quick* ***estimate*** *of the average word length for this document.*

*Fourscore and seven years ago our fathers brought forth on this continent a new nation, conceived in liberty and dedicated to the proposition that all men are created equal. Now we are engaged in a great civil war, testing whether that nation or any nation so conceived and so dedicated can long endure. We are met on a great battlefield of that war. We have come to dedicate a portion of that field as a final resting-place for those who here gave their lives that that nation might live. It is altogether fitting and proper that we should do this. But in a larger sense, we cannot dedicate, we cannot consecrate, we cannot hallow this ground. The brave men, living and dead who struggled here have consecrated it far above our poor power to add or detract. The world will little note nor long remember what we say here, but it can never forget what they did here. It is for us the living rather to be dedicated here to the unfinished work which they who fought here have thus far so nobly advanced. It is rather for us to be here dedicated to the great task remaining before us--that from these honored dead we take increased devotion to that cause for which they gave the last full measure of devotion--that we here highly resolve that these dead shall not have died in vain, that this nation under God shall have a new birth of freedom, and that government of the people, by the people, for the people shall not perish from the earth.*

*1. Provide your estimate here.*

*2. Describe the method you used to find your estimate.*

After students have found an estimate, give a list **Quickpoll** to have one person from each pair report their estimate. View the Quickpoll results. Have 3 groups share their method for finding their estimate. Once we receive the data, we can view the results as a dotplot.

Choose 2 or 3 of the groups’ estimates and write them on the board along with a summary of the method used. (**10 minutes**).

**Random Sample Portion (15 minutes)**

Now, send the associated Nspire document to students and as a group have everyone take a true random sample from the wordlength variable list and find the mean. Send a list **Quickpoll** to have each person share their estimates. Once we receive the data, we can view the results as a dotplot. Have students reflect on how correct their initial estimate was in light of these results. Use the random name caller to have students share their reflections (**15 minutes**)

*3. Using the TI Nspire file for this task, take a random sample of words from the Gettysburg Address and find the mean word length. How does it compare to your estimate?*

**Sampling Distribution Portion and Assessment (15 minutes)**

Have each student use the sampling distribution program in the associated Nspire document to evaluate the accuracy of the estimates we placed on the board. Ask students to come to a conclusion about the estimates and provide mathematical backing for their conclusions. Use the random name caller to have students share.

*4. As a class, choose one person's estimate and sample size from 1 and 2 above, use the Nspire to take 200 samples of that size, find the mean of each of those samples, and consider the distribution of those means.*

*5. What can you conclude about the estimate and method used by the person we chose? Provide a mathematical justification for your conclusion.*