

How long are the words in the Gettysburg Address? Student Guide

The Gettysburg Address shown below was delivered by Abraham Lincoln on November 19, 1863 on the battlefield near Gettysburg, Pennsylvania. It is one of the most famous speeches ever given by an American President.

The Gettysburg Address

Four score 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.

In this investigation, we will address the question “How long are the words in the Gettysburg Address?”

1. a. What are the population and the variable of interest for this investigation?

1. b. Describe how would you select a sample of words to produce a sample that is similar to (representative of) the population?

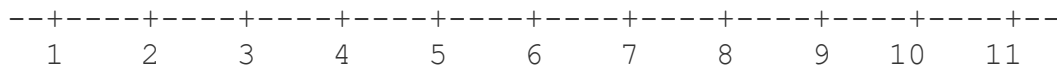
Part I – Self-Selected Sampling

The first method we will use to select a sample is called self-selection. With self-selection, use your eyes and circle 10 words you think are representative of the varying word lengths in the Gettysburg Address. Record the words and the lengths in Table 1.1.

Table 1.1. Self-Selected Sample of 10 Words (Sample 1)

| Word Number | Word Selected | Length of Word |
|-------------|---------------|----------------|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |
| | <i>Total</i> | |

2. Use the plot below to make a dotplot of your sample data. Once completed, compare your dotplot with other students’ dotplots. Are they the same or different?



Dotplot 1.1. Length of Word (Sample 1)

Based on your dotplot, comment on the shape, center and variability of your sample data distribution.

3. Did you use a strategy for selecting the words in your sample? Describe your strategy.

4. Determine the mean word-length for your sample (Add up the 10 word-lengths and divide by 10). Report your mean to the closest one-decimal place (for example, 7.1). Compare your mean with other students' means. Did you all get the same mean?

5. Using a large sheet of paper provided by your teacher, make a dotplot of the sample means for your class (Dotplot 1.2). Comment on the shape, center and variability of this distribution. Based on the dotplot, give a range of typical values for a sample mean using self-selected sampling.

Part II – Simple Random Sampling

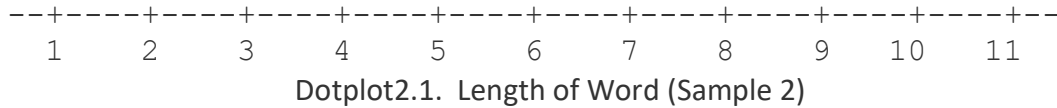
Another way to select a sample from a population is to use simple random sampling. How do we select a simple random sample of 10 words from the Gettysburg Address?

Your teacher will provide you with a list of the 268 words in the Gettysburg Address. Each word in this list has been assigned a number from 1 (001) to 268. To randomly select 10 words from the Gettysburg Address we will generate 10 distinct random integers between 1 and 268 and select the corresponding word from the Gettysburg Address. Your teacher will provide instructions on how to select 10 distinct random integers between 1 and 268. Once selected, enter your numbers in Table 2.1 below along with the corresponding words from the Gettysburg Address and the length of each word.

Table 2.1. Simple Random Sample of 10 Words (Sample 2)

| Random Integer | Word Selected | Length of Word |
|----------------|---------------|----------------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | <i>Total</i> | |

6. Use the plot below to make a dotplot your sample data. Once completed, compare your dotplot with other students' dotplots. Are they the same or different?

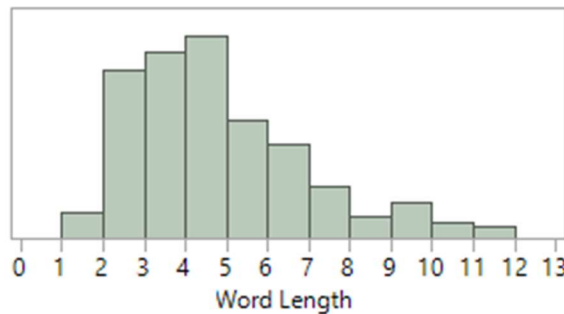


Based on your dotplot, comment on the shape, center and variability of your sample data distribution.

7. Determine the mean word-length for your sample (Add up the 10 word-lengths and divide by 10). Report your mean to the closest one-decimal place (for example, 7.1). Compare your mean with other students' means. Did you all get the same mean?
8. Using a large sheet of paper provided by your teacher, make a dotplot of the sample means for your class (Dotplot 2.2). Comment on the shape, center and variability of this distribution. Based on the dotplot, give a range of typical values for a sample mean using simple random sampling.
9. Compare Dotplots 1.2 (30 Means from Self-Selected Samples) and Dotplot 2.2 (30 Means from Simple Random Samples). Specifically, compare the centers and variability for these two distributions. Also, compare the ranges of typical values for a sample mean for each distribution.

10. Which sampling method (self-selection or simple random) do you think is more likely to produce a sample representative of the population. Explain your reasoning.

11. The histogram of word-lengths for the entire population of all 268 words in the Gettysburg Address is shown below.



Based on the histogram, comment on the shape, center and variability of the population distribution of word-lengths.

12. The actual mean word length for all 268 words is approximately 4.3 characters. Let's compare your classes' sample means from each method with 4.3. Specifically, using self-selected sampling, how many sample means are below 4.3, equal to 4.3 and above 4.3? Using simple random sampling, how many sample means are below 4.3, equal to 4.3 and above 4.3? Now that you know this, which sampling method do you think would be better to use?

Summary

When sampling words from the Gettysburg Address, self-selected samples tend over-represent longer words when compared to how often they occur in the population. Using simple random sampling tends to produce samples that are representative of the population. While the sample mean may not be the same as the population mean, we expect the sample mean to be within a range of values centered around the population mean. Larger simple random samples tend to produce sample means closer to the population mean.

Gettysburg Address Word List (page 1)

| Number | Word | Length | Number | Word | Length | Number | Word | Length |
|--------|-------------|--------|--------|-------------|--------|--------|-------------|--------|
| 001 | Four | 4 | 046 | Nation | 6 | 091 | Live. | 4 |
| 002 | Score | 5 | 047 | So | 2 | 092 | It | 2 |
| 003 | And | 3 | 048 | Conceived | 9 | 093 | Is | 2 |
| 004 | Seven | 5 | 049 | And | 3 | 094 | Altogether | 10 |
| 005 | Years | 5 | 050 | So | 2 | 095 | Fitting | 7 |
| 006 | Ago. | 3 | 051 | Dedicated, | 9 | 096 | And | 3 |
| 007 | Our | 3 | 052 | Can | 3 | 097 | Proper | 6 |
| 008 | Fathers | 7 | 053 | Long | 4 | 098 | That | 4 |
| 009 | Brought | 7 | 054 | Endure. | 5 | 099 | We | 2 |
| 010 | Forth | 5 | 055 | We | 2 | 100 | Should | 6 |
| 011 | Upon | 4 | 056 | Are | 3 | 101 | Do | 2 |
| 012 | This | 4 | 057 | Met | 3 | 102 | This. | 4 |
| 013 | Continent | 9 | 058 | On | 2 | 103 | But | 3 |
| 014 | A | 1 | 059 | A | 1 | 104 | In | 2 |
| 015 | New | 3 | 060 | Great | 5 | 105 | A | 1 |
| 016 | Nation: | 6 | 061 | Battlefield | 11 | 106 | Larger | 6 |
| 017 | Conceived | 9 | 062 | Of | 2 | 107 | Sense, | 5 |
| 018 | In | 2 | 063 | That | 4 | 108 | We | 2 |
| 019 | Liberty, | 7 | 064 | War. | 3 | 109 | Cannot | 6 |
| 020 | And | 3 | 065 | We | 2 | 110 | Dedicate, | 8 |
| 021 | Dedicated | 9 | 066 | Have | 4 | 111 | We | 2 |
| 022 | To | 2 | 067 | Come | 4 | 112 | Cannot | 6 |
| 023 | The | 3 | 068 | To | 2 | 113 | Consecrate, | 10 |
| 024 | Proposition | 11 | 069 | Dedicate | 8 | 114 | We | 2 |
| 025 | That | 4 | 070 | A | 1 | 115 | Cannot | 6 |
| 026 | All | 3 | 071 | Portion | 7 | 116 | Hallow | 6 |
| 027 | Men | 3 | 072 | Of | 2 | 117 | This | 4 |
| 028 | Are | 3 | 073 | That | 4 | 118 | Ground. | 6 |
| 029 | Created | 7 | 074 | Field | 5 | 119 | The | 3 |
| 030 | Equal. | 5 | 075 | As | 2 | 120 | Brave | 5 |
| 031 | Now | 3 | 076 | A | 1 | 121 | Men, | 3 |
| 032 | We | 2 | 077 | Final | 5 | 122 | Living | 6 |
| 033 | Are | 3 | 078 | Resting | 7 | 123 | And | 3 |
| 034 | Engaged | 7 | 079 | Place | 5 | 124 | Dead, | 4 |
| 035 | In | 2 | 080 | For | 3 | 125 | Who | 3 |
| 036 | A | 1 | 081 | Those | 5 | 126 | Struggled | 9 |
| 037 | Great | 5 | 082 | Who | 3 | 127 | Here | 4 |
| 038 | Civil | 5 | 083 | Here | 4 | 128 | Have | 4 |
| 039 | War, | 3 | 084 | Gave | 4 | 129 | Consecrated | 11 |
| 040 | Testing | 7 | 085 | Their | 5 | 130 | It, | 2 |
| 041 | Whether | 7 | 086 | Lives | 5 | 131 | Far | 3 |
| 042 | That | 4 | 087 | That | 4 | 132 | Above | 5 |
| 043 | Nation, | 6 | 088 | That | 4 | 133 | Our | 3 |
| 044 | Or | 2 | 089 | Nation | 6 | 134 | Poor | 4 |
| 045 | Any | 3 | 090 | Might | 5 | 135 | Power | 5 |

Gettysburg Address Word List (page 2)

| Number | Word | Length | Number | Word | Length | Number | Word | Length |
|--------|------------|--------|--------|-----------|--------|--------|------------|--------|
| 136 | To | 2 | 181 | Have | 4 | 226 | We | 2 |
| 137 | Add | 3 | 182 | Thus | 4 | 227 | Here | 4 |
| 138 | Or | 2 | 183 | Far | 3 | 228 | Highly | 6 |
| 139 | Detract. | 7 | 184 | So | 2 | 229 | Resolve | 7 |
| 140 | The | 3 | 185 | Nobly | 5 | 230 | That | 4 |
| 141 | World | 5 | 186 | Advanced. | 8 | 231 | These | 5 |
| 142 | Will | 4 | 187 | It | 2 | 232 | Dead | 4 |
| 143 | Little | 6 | 188 | Is | 2 | 233 | Shall | 5 |
| 144 | Note, | 4 | 189 | Rather | 6 | 234 | Not | 3 |
| 145 | Nor | 3 | 190 | For | 3 | 235 | Have | 4 |
| 146 | Long | 4 | 191 | Us | 2 | 236 | Died | 4 |
| 147 | Remember | 8 | 192 | Here | 4 | 237 | In | 2 |
| 148 | What | 4 | 193 | To | 2 | 238 | Vain, | 4 |
| 149 | We | 2 | 194 | Be | 2 | 239 | That | 4 |
| 150 | Say | 3 | 195 | Dedicated | 9 | 240 | This | 4 |
| 151 | Here, | 4 | 196 | To | 2 | 241 | Nation, | 6 |
| 152 | But | 3 | 197 | The | 3 | 242 | Under | 5 |
| 153 | It | 2 | 198 | Great | 5 | 243 | God, | 3 |
| 154 | Can | 3 | 199 | Task | 4 | 244 | Shall | 5 |
| 155 | Never | 5 | 200 | Remaining | 9 | 245 | Have | 4 |
| 156 | Forget | 6 | 201 | Before | 6 | 246 | A | 1 |
| 157 | What | 4 | 202 | Us, | 2 | 247 | New | 3 |
| 158 | They | 4 | 203 | That | 4 | 248 | Birth | 5 |
| 159 | Did | 3 | 204 | From | 4 | 249 | Of | 2 |
| 160 | Here. | 4 | 205 | These | 5 | 250 | Freedom, | 7 |
| 161 | It | 2 | 206 | Honored | 7 | 251 | And | 3 |
| 162 | Is | 2 | 207 | Dead | 4 | 252 | That | 4 |
| 163 | For | 3 | 208 | We | 2 | 253 | Government | 10 |
| 164 | Us | 2 | 209 | Take | 4 | 254 | Of | 2 |
| 165 | The | 3 | 210 | Increased | 9 | 255 | The | 3 |
| 166 | Living, | 6 | 211 | Devotion | 8 | 256 | People, | 6 |
| 167 | Rather, | 6 | 212 | To | 2 | 257 | By | 2 |
| 168 | To | 2 | 213 | That | 4 | 258 | The | 3 |
| 169 | Be | 2 | 214 | Cause | 5 | 259 | People, | 6 |
| 170 | Dedicated | 9 | 215 | To | 2 | 260 | For | 3 |
| 171 | Here | 4 | 216 | Which | 5 | 261 | The | 3 |
| 172 | To | 2 | 217 | They | 4 | 262 | People, | 6 |
| 173 | The | 3 | 218 | Gave | 4 | 263 | Shall | 5 |
| 174 | Unfinished | 10 | 219 | The | 3 | 264 | Not | 3 |
| 175 | Work | 4 | 220 | Last | 4 | 265 | Perish | 6 |
| 176 | Which | 5 | 221 | Full | 4 | 266 | From | 4 |
| 177 | They | 4 | 222 | Measure | 7 | 267 | The | 3 |
| 178 | Who | 3 | 223 | Of | 2 | 268 | Earth. | 5 |
| 179 | Fought | 6 | 224 | Devotion, | 8 | | | |
| 180 | Here | 4 | 225 | That | 4 | | | |