

SAMPLE MEANS – EXPLORING SAMPLING VARIABILITY

Activity Items

There are no separate items for this activity.

Student Learning Objectives

- I will be able to help create dot plots to represent a collection of sample means.
- I will be able to select a random sample from a population.
- I will be able to understand that sample means for different random samples of the same population will differ due to random selection.
- I will be able to understand that there is less sampling variability in the sample mean when the sample size is large than when the sample size is small.

NAME: _____ DATE: _____

Part 1 - Analyze a Dot Plot

Can a sample of 10 help you learn about a population of 51? In this activity, you will investigate sampling variability in the sample mean.

Example of Sampling Variability

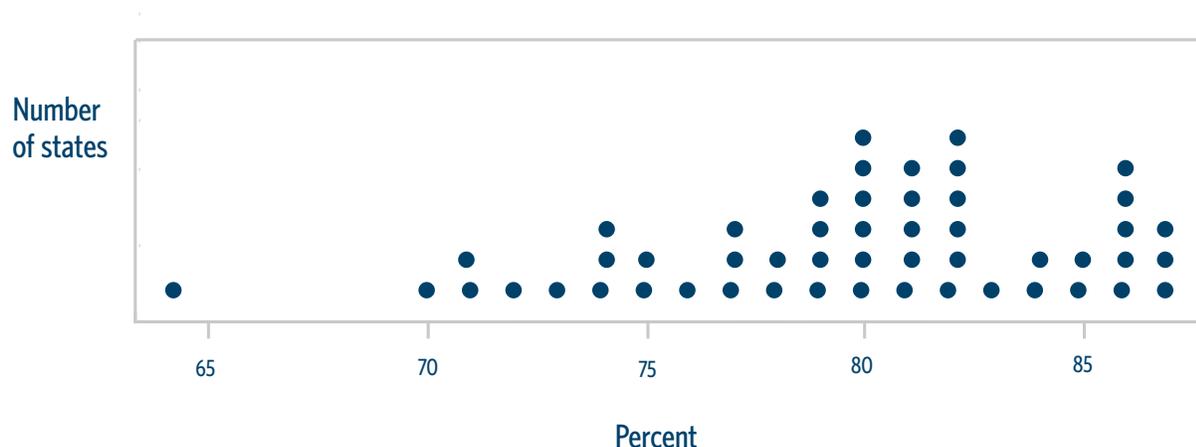
If you average all the numbers from 1 to 99, you get 50. In the table below are eight samples, each with 10 randomly chosen numbers from 1 to 99.

Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7	Sample 8
59	84	68	88	68	97	9	52
62	77	26	17	12	21	84	19
24	61	25	57	84	88	20	12
36	74	41	62	7	76	52	93
91	26	89	70	26	48	7	64
9	89	49	2	64	17	32	18
14	1	79	70	8	80	70	17
63	35	1	26	42	20	27	9
90	5	87	40	82	50	86	88
36	52	76	22	18	9	16	41
48.4	50.4	54.1	45.4	41.1	50.6	40.3	41.3
Sample means							

Although the values in each sample differ, their means are all clustered close to the actual mean of 50 — though none is exactly 50. This is because of sampling variability.

In 2014, the average percentage of homes with Internet access in all 50 states and the District of Columbia was 79.6 percent. With this information in mind, review the dot plot below and work with your group to answer the following questions:

Percentage of Homes With Internet Access in Each State and the District of Columbia: 2014



1. If the mean is a measure of center, why isn't it at the center of this dot plot?

2. What is the range of the data? Show your work.

3. How are the data distributed?

4. Is the data distribution symmetrical: If you folded the dot plot in half from side to side, would the data points on each side match up approximately?

Part 2 - Create Your First Dot Plot

Working as a class, follow your teacher's guidance to create a dot plot showing the percentage of homes with Internet access in all 50 states and the District of Columbia (where the sample size is $n = 3$, and the number of samples is 10). Use this dot plot to answer the following questions with your group:

1. What value represents the center of this dot plot?
2. How does this sample center compare with the actual center of 79.6 percent?
3. What is the range of these 10 sample means, and how does it compare with the range you found in part 1?

4. How are the sample means distributed, and how does this distribution compare with that of the dot plot from part 1?

5. Is the distribution more symmetrical or less symmetrical than that from part 1?

Part 3 - Create Your Second Dot Plot

Again working as a class, follow your teacher's guidance to create another dot plot showing the percentage of homes with Internet access in all 50 states and the District of Columbia (where the sample size $n = 10$). Use this dot plot to answer the following questions with your group:

1. What value represents the center of this dot plot?
2. How does this sample center compare with the actual center of 79.6 percent?
3. What is the range of the values, and how does it compare with those found in parts 1 and 2?

