

# Welcome!

|  | Assignment<br>Effort Grade<br>(Circle One) | Comments<br>(What was interesting or<br>challenging?) |
|--|--|---|
| <b>Monday</b><br>Date: <u>5 - 7</u><br>Topic: <u>Hidden Figures</u>                            | 0 1 2                                      |   |
| <b>Tuesday</b><br>Date: <u>5 - 8</u><br>Topic: <u>Experimental vs. Theoretical Probability</u> | 0 1 2                                      |   |
| <b>Wednesday</b><br>Date: <u>5 - 9</u><br>Topic: <u>Tree Diagrams - Independent Events</u>     | 0 1 2                                      |   |
| <b>Thursday</b><br>Date: <u>5 - 10</u><br>Topic: <u>Tree Diagrams - Dependent Events</u>       | 0 1 2                                      |   |
| <b>Friday</b><br>Date: _____<br>Topic: _____   | 0 1 2                                      |   |

| <b>Lunch A</b> |             |            |
|----------------|-------------|------------|
| 1st Hour       | 10:05-10:38 | 33 minutes |
| 2nd Hour       | 10:43-11:16 | 33 minutes |
| 3rd Hour       | 11:21-11:54 | 33 minutes |
| Lunch A        | 11:59-12:29 | 30 minutes |
| 4th Hour       | 12:34-1:07  | 33 minutes |
| 5th Hour       | 1:12-1:45   | 33 minutes |
| 6th Hour       | 1:50-2:23   | 33 minutes |
| 7th Hour       | 2:28-3:00   | 32 minutes |

| <b>Lunch B</b> |             |            |
|----------------|-------------|------------|
| 1st Hour       | 10:05-10:38 | 33 minutes |
| 2nd Hour       | 10:43-11:16 | 33 minutes |
| 3rd Hour       | 11:21-11:54 | 33 minutes |
| 4th Hour       | 11:59-12:32 | 33 minutes |
| Lunch B        | 12:37-1:07  | 30 minutes |
| 5th Hour       | 1:12-1:45   | 33 minutes |
| 6th Hour       | 1:50-2:23   | 33 minutes |
| 7th Hour       | 2:28-3:00   | 32 minutes |

| <b>Lunch C</b> |             |            |
|----------------|-------------|------------|
| 1st Hour       | 10:05-10:38 | 33 minutes |
| 2nd Hour       | 10:43-11:16 | 33 minutes |
| 3rd Hour       | 11:21-11:54 | 33 minutes |
| 4th Hour       | 11:59-12:32 | 33 minutes |
| 5th Hour       | 12:37-1:12  | 33 minutes |
| Lunch C        | 1:17-1:45   | 30 minutes |
| 6th Hour       | 1:50-2:23   | 33 minutes |
| 7th Hour       | 2:28-3:00   | 32 minutes |

## Class Plan:

1. Warm-up

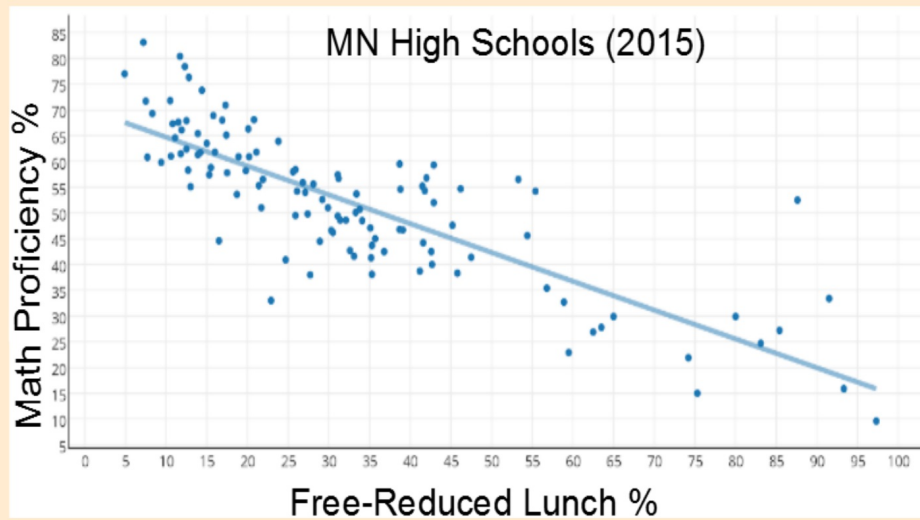
2. Data Sampling - "How can we get an accurate count?"

3. Investigation:

What does your sampling tell you...?

4. Practice, Reflection

Warm-up: What do you notice? Wonder?



What conclusions could be made?

## Question: How is the U.S. Census conducted? What changes could be made?

### Controversy [edit]

The Census Bureau estimates that in 1970 over six percent of blacks went uncounted, whereas only around two percent of whites went uncounted. Democrats often argue that modern sampling techniques should be used so that more accurate and complete data can be inferred. Republicans often argue against such sampling techniques, stating the U.S. Constitution requires an "actual enumeration" for apportionment of House seats, and that political appointees would be tempted to manipulate the sampling formulas.<sup>[10]</sup>

This 1940 Census publicity photo shows a census worker in Fairbanks, Alaska. The dog musher remains out of earshot to maintain confidentiality.

Groups like the [Prison Policy Initiative](#) assert that the census practice of counting prisoners as residents of prisons, not their pre-incarceration addresses, leads to misleading information about racial demographics and population numbers.<sup>[11]</sup>

In 2010 Jaime Grant, then director of the [National Gay and Lesbian Task Force's](#) Policy Institute, thought of the idea of a bright pink sticker for people to stick on their census envelope which had a form for them to check a box for either "lesbian, gay, bisexual, transgender or straight ally," which her group called "queering the census."<sup>[12]</sup> Although the sticker was unofficial and the results were not added to the census, she and others hope the 2020 census will include such statistics.<sup>[12]</sup> In 2015 [Laverne Cox](#) called for transgender people to be counted in the census.<sup>[13]</sup>

On March 26, 2018 the U.S. Dept of Commerce announced<sup>[14]</sup> plans to re-include a citizenship question in the 2020 census questionnaire which has not been included on the long form since 1950<sup>[15]</sup> but was part of the short form starting in 1910 until its removal in 2010<sup>[16]</sup>. The citizenship question will be the same as the one that is asked on the yearly American Community Survey (ACS).<sup>[17]</sup> Proponents of including the question claimed it is necessary to gather an accurate statistical count, while opponents claimed it might suppress responses and therefore lead to an inaccurate count.<sup>[18]</sup> The state of California is suing the Trump administration arguing that the proposed citizenship question is unconstitutional and will intimidate immigrants, resulting in inaccurate data on minority communities.<sup>[19]</sup>

Question: Who's proposed to not be counted?

## We've been ERASED!

### Original

|  |          |
|--|----------|
| Relationship                           | 1880     |
| Rent                                   | 1940     |
| Rooms                                  | 1940     |
| School Enrollment                      | 1971     |
| Sexual Orientation and Gender Identity | Proposed |

A-2 Subjects Planned for the 2020 Census and American Community Survey

### Modified March 28

|  |          |
|--|----------|
| Relationship                           | 1880     |
| Rent                                   | 1940     |
| Rooms                                  | 1940     |
| School Enrollment                      | 1971     |
| Sexual Orientation and Gender Identity | Proposed |

A-2 Subjects Planned for the 2020 Census and American Community Survey

#### Year Current Subjects Planned First Asked in Decennial Program—Con.

| Subjects Planned for 2020 Census and/or ACS                   | Year Subject First Asked in Decennial Census or ACS |
|---|---|
| Supplemental Nutrition Assistance Program (SNAP)/ Food Stamps | 2005  |

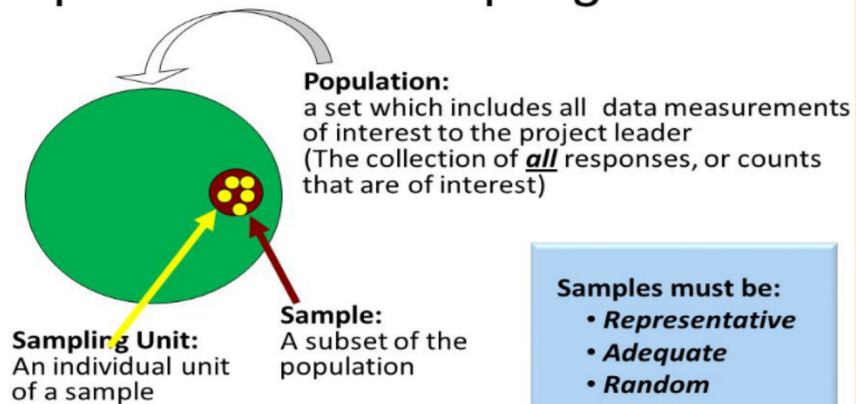
#### Year Current Subjects Planned First Asked in Decennial Program—Con.

| Subjects Planned for 2020 Census and/or ACS                   | Year Subject First Asked in Decennial Census or ACS |
|---|---|
| Supplemental Nutrition Assistance Program (SNAP)/ Food Stamps | 2005  |

National LGBTQ Task Force

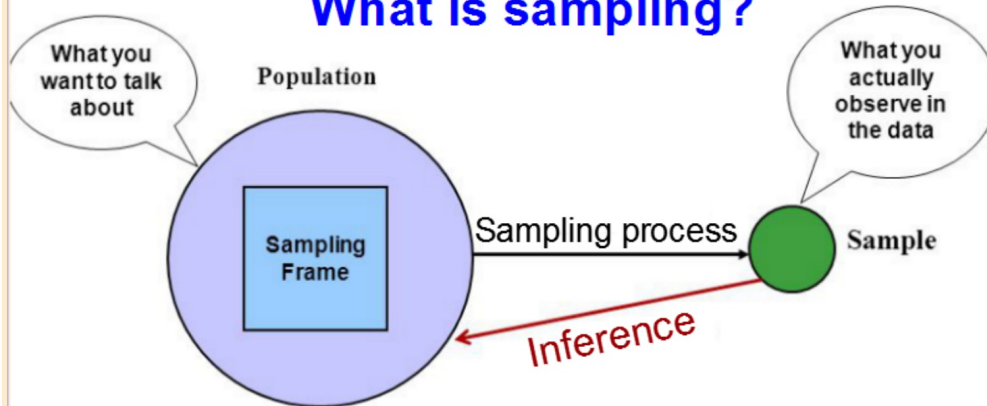
## Data Sampling:

### Principles of Data Sampling



Today: Population: MN K-12 schools.  
Sample: Demographics of students

## What is sampling?



Using data to say something (*make an **inference***) with confidence, about a whole (population) based on the study of a only a few (sample).

Today we will ***infer*** about students in MN, using evidence from sampling.



Population: Bag of 200 beads/beans. Each bag contains 5 different colors representing the racial makeup of students in MN.

Native American (White bean)  
Asian/Pacific Islander (Orange)  
Hispanic (Green)  
Black (Black)  
White (Blue)

Goal: To use a sample to predict a population.  
In other words... How many of each color?

## What is a good sample?

- 1) How do we avoid bias?
- 2) What size sample is sufficient?
- 3) How many samples do we take?

| <u>Good examples!</u> |                     |
|-----------------------|---------------------|
| <u>Sample Size</u>    | <u># of Samples</u> |
| 10-20                 | 5                   |

## Taking the Sample:

1) **How do we avoid bias?** Shake the bag, don't look in bag as you grab a sample, same size sample each time.

2) **What size sample is sufficient?**

At least 10 per sample, but no more than 20 per sample.

3) **How many samples do we take?**

As many as can be taken in 10 minutes!

Do: Take samples, count, repeat.

Quantity per sample = \_\_\_\_\_ Number of samples = \_\_\_\_\_

| Ethnicity                       | # of beads/<br>beans | # of beads/<br>beans | # of beads/<br>beans | # of beads/<br>beans | # of beads/<br>beans | # of beads/<br>beans | # of beads/<br>beans | # of beads/<br>beans | $\frac{\#}{total}(100) = \%$ |
|---------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------------------------------|
|                                 | Sample 1             | Sample 2             | Sample 3             | Sample 4             | Sample 5             | Sample 6             | Sample 7             | TOTAL                | %                            |
| Native American (WHITE - bean)  |                      |                      |                      |                      |                      |                      |                      |                      |                              |
| Asian/Pacific Islander (ORANGE) |                      |                      |                      |                      |                      |                      |                      |                      |                              |
| Hispanic (GREEN)                |                      |                      |                      |                      |                      |                      |                      |                      |                              |
| Black (BLACK)                   |                      |                      |                      |                      |                      |                      |                      |                      |                              |
| White (BLUE)                    |                      |                      |                      |                      |                      |                      |                      |                      |                              |
|                                 |                      |                      |                      |                      |                      |                      |                      | <b>TOTAL</b>         |                              |

Done?: Calculate %, Record data on the board, Discuss questions, reflect.

Done: Record your table's totals.

What do you notice? Wonder?(7th hour)

| Ethnicity & Group Totals | Native American (WHITE -bean) | Asian/Pacific Islander (ORANGE) | Hispanic (GREEN) | Black (BLACK) | White (BLUE) |
|--------------------------|-------------------------------|---------------------------------|------------------|---------------|--------------|
| Table 1                  | 2                             | 12                              | 17               | 8             | 112          |
| Table 2                  | 14                            | 5                               | 21               | 46            | 79           |
| Table 3                  | 25                            | 5                               | 27               | 107           | 163          |
| Table 4                  | 1                             | 6                               | 14               | 1             | 111          |
| Table 5                  | 3                             | 14                              | 22               | 8             | 132          |
| Table 6                  |                               |                                 |                  |               |              |
| Table 7                  |                               |                                 |                  |               |              |
| Table 8                  |                               |                                 |                  |               |              |
| Table 9                  |                               |                                 |                  |               |              |

Done: Record your table's totals.

What do you notice? Wonder?(5th hour)

| Ethnicity & Group Totals | Native American (WHITE -bean) | Asian/Pacific Islander (ORANGE) | Hispanic (GREEN) | Black (BLACK)  | White (BLUE) |
|--------------------------|-------------------------------|---------------------------------|------------------|----------------|--------------|
| Table 1                  | 0                             | 8                               | 10               | 4              | 48           |
| Table 2                  | 4                             | 7                               | 15               | 4              | 115          |
| X Table 3                | 0                             | 4                               | 6                | 2              | 58           |
| Table 4                  | 18                            | 4                               | 18               | 42             | 85           |
| Table 5                  | 13                            | 6                               | 15               | 39             | 59           |
| Table 6                  | 7                             | 3                               | 4                | 13             | 43           |
| Table 7                  | 18                            | 10                              | 18               | 36             | 76           |
| Table 8                  | 4                             | 15                              | <del>16</del> 6  | <del>8</del> 8 | 134          |
| Table 9                  | 5                             | 3                               | 12               | 20             | 58           |

Done: Record your table's totals.

What do you notice? Wonder?(4th hour)

| Ethnicity & Group Totals | Native American (WHITE -bean) | Asian/Pacific Islander (ORANGE) | Hispanic (GREEN) | Black (BLACK) | White (BLUE) |
|--------------------------|-------------------------------|---------------------------------|------------------|---------------|--------------|
| Table 1                  | 4                             | 12                              | 24               | 10            | 122          |
| Table 2                  | 3                             | 4                               | 14               | 5             | 103          |
| Table 3                  | 1                             | 12                              | 18               | 4             | 96           |
| Table 4                  | 1                             | 9                               | 14               | 4             | 82           |
| Table 5                  | 9                             | 4                               | 16               | 27            | 99           |
| Table 6                  | 10                            | 6                               | 10               | 27            | 74           |
| Table 7                  |                               |                                 |                  | --            |              |
| Table 8                  |                               |                                 |                  |               |              |
| Table 9                  |                               |                                 |                  |               |              |

Done: Record your table's totals.

What do you notice? Wonder?(2nd hour)

| Ethnicity & Group Totals | Native American (WHITE -bean) | Asian/Pacific Islander (ORANGE) | Hispanic (GREEN) | Black (BLACK) | White (BLUE)  |
|--------------------------|-------------------------------|---------------------------------|------------------|---------------|---------------|
| Table 1                  | 6                             | 5                               | 12               | 14            | 31            |
| Table 2                  | 11                            | 3                               | 17               | 31            | 88            |
| Table 3                  | 2                             | 11                              | 15               | 3             | 105           |
| Table 4                  | 4                             | 11                              | 1                | 76            | <del>98</del> |
| Table 5                  | 1                             | 1                               | 8                | 11            | 35            |
| Table 6                  | 4                             | 12                              | 26               | 13            | 132           |
| Table 7                  |                               |                                 |                  |               |               |
| Table 8                  |                               |                                 |                  |               |               |
| Table 9                  |                               |                                 |                  |               |               |



Done: Record your table's totals.

What do you notice? Wonder? (1st hour)

| Ethnicity & Group Totals | Native American (WHITE -bean) | Asian/Pacific Islander (ORANGE) | Hispanic (GREEN) | Black (BLACK) | White (BLUE) |
|--------------------------|-------------------------------|---------------------------------|------------------|---------------|--------------|
| Table 1                  | 9                             | 5                               | 18               | 19            | 79           |
| Table 2                  | 3                             | 7                               | 11               | 2             | 84           |
| Table 3                  | 1                             | 4                               | 2                | 2             | 56           |
| Table 4                  | 9                             | 4                               | 21               | 51            | 105          |
| Table 5                  | 2                             | 11                              | 9                | 4             | 115          |
| Table 6                  | 1                             | 4                               | 9                | 2             | 54           |
| Table 7                  |                               |                                 |                  | 1             |              |
| Table 8                  | 12                            | 5                               | 15               | 27            | 58           |
| Table 9                  |                               |                                 |                  |               |              |

## Before we see the actual data...

### Additional Norms: Talking about Race with real data

- 1) Acknowledge some conversations can be difficult.
- 2) Disagreement is ok, but listen and respect each other.
- 3) Accept that we may not have all the answers.

## Actual count within bags

| Ethnicity                       | MN K-12 Student Population | # of beads/beans | MN K-12 Discipline Incidents | # of beads/beans (BAG X) |
|---------------------------------|----------------------------|------------------|------------------------------|--------------------------|
| Native American (WHITE –bean)   | 2.4%                       | 5                | 7.3%                         | 14                       |
| Asian/Pacific Islander (ORANGE) | 7.2%                       | 14               | 1.9%                         | 4                        |
| Hispanic (GREEN)                | 11.5%                      | 23               | 9.4%                         | 18                       |
| Black (BLACK)                   | 8.3%                       | 17               | 42.6%                        | 86                       |
| White (BLUE)                    | 70.5%                      | 141              | 38.8%                        | 78                       |

Data from: <http://w20.education.state.mn.us/MDEAnalytics/Data.jsp>  
(MDE Data Center)

Question:

How did the experimental probability match the actual (*theory*)?



| Ethnicity                       | MN K-12 Student Population | # of beads/beans | MN K-12 Discipline Incidents | # of beads/beans (BAG X) |
|---------------------------------|----------------------------|------------------|------------------------------|--------------------------|
| Native American (WHITE -bean)   | 2.4%                       | 5                | 7.3%                         | 14                       |
| Asian/Pacific Islander (ORANGE) | 7.2%                       | 14               | 1.9%                         | 4                        |
| Hispanic (GREEN)                | 11.5%                      | 23               | 9.4%                         | 18                       |
| Black (BLACK)                   | 8.3%                       | 17               | 42.6%                        | 86                       |
| White (BLUE)                    | 70.5%                      | 141              | 38.8%                        | 78                       |

Conclusion: (**Part of your exercises**)

- 1) Do you agree or disagree with data?
- 2) What impact does this data have on ourselves? Peers? School? Society?
- 3) What next steps should be taken in regards to this data?



| Ethnicity                       | MN K-12 Student Population | # of beads/beans | MN K-12 Discipline Incidents | # of beads/beans (BAG X) |
|---------------------------------|----------------------------|------------------|------------------------------|--------------------------|
| Native American (WHITE -bean)   | 2.4%                       | 5                | 7.3%                         | 14                       |
| Asian/Pacific Islander (ORANGE) | 7.2%                       | 14               | 1.9%                         | 4                        |
| Hispanic (GREEN)                | 11.5%                      | 23               | 9.4%                         | 18                       |
| Black (BLACK)                   | 8.3%                       | 17               | 42.6%                        | 86                       |
| White (BLUE)                    | 70.5%                      | 141              | 38.8%                        | 78                       |

## Exercises

4) Suppose our team has 150 students and the same % of races identified in today's sampling.

| Ethnicity                       | MN K-12 Student Population | # of beads/beans | MN K-12 Discipline Incidents | # of beads/beans (BAG X) |
|---------------------------------|----------------------------|------------------|------------------------------|--------------------------|
| Native American (WHITE-bean)    | 2.4%                       | 5                | 7.3%                         | 14                       |
| Asian/Pacific Islander (ORANGE) | 7.2%                       | 14               | 1.9%                         | 4                        |
| Hispanic (GREEN)                | 11.5%                      | 23               | 9.4%                         | 18                       |
| Black (BLACK)                   | 8.3%                       | 17               | 42.6%                        | 86                       |
| White (BLUE)                    | 70.5%                      | 141              | 38.8%                        | 78                       |

a) How many Hispanic are on our team? Show work.

$$\frac{x}{150} = \frac{11.5}{100}$$

b) How many of our Hispanic students would be disciplined, according to the MDE data? Show work.

## Exercises

4) Suppose our team has 150 students and the same % of races identified in today's sampling.

| Ethnicity                       | MN K-12 Student Population | # of beads/beans | MN K-12 Discipline Incidents | # of beads/beans (BAG X) |
|---------------------------------|----------------------------|------------------|------------------------------|--------------------------|
| Native American (WHITE-bean)    | 2.4%                       | 5                | 7.3%                         | 14                       |
| Asian/Pacific Islander (ORANGE) | 7.2%                       | 14               | 1.9%                         | 4                        |
| Hispanic (GREEN)                | 11.5%                      | 23               | 9.4%                         | 18                       |
| Black (BLACK)                   | 8.3%                       | 17               | 42.6%                        | 86                       |
| White (BLUE)                    | 70.5%                      | 141              | 38.8%                        | 78                       |

a) How many Hispanic are on our team? Show work.

$$\frac{x}{150} = \frac{11.5}{100} \quad 100x = 1725$$
$$x \approx \underline{11.5 \text{ students}}$$

b) How many of our Hispanic students would be disciplined, according to the MDE data? Show work.

$$\frac{x}{17} = \frac{9.4}{100} \quad 100x = 159.8$$
$$x \approx \underline{1.622}$$

1 or 2 Hispanic students

## Exercises

5) High school students were surveyed and 25% of each of the four grade levels was sampled.

a) Defend whether you think this is an equitable, fair method of sampling high school students.

b) The actual percentages of the four grade levels are shown in the table. Defend whether you think the survey produced accurate results.

|                  |     |
|------------------|-----|
| 9 <sup>th</sup>  | 22% |
| 10 <sup>th</sup> | 28% |
| 11 <sup>th</sup> | 35% |
| 12 <sup>th</sup> | 15% |



## Exercises

5) High school students were surveyed and 25% of each of the four grade levels was sampled.

a) Defend whether you think this is an equitable, fair method of sampling high school students.

**25% seems equitable since there are 4 grade levels, and each one is 1/4 of the sample/survey.**

b) The actual percentages of the four grade levels are shown in the table. Defend whether you think the survey produced accurate results.

|                  |     |
|------------------|-----|
| 9 <sup>th</sup>  | 22% |
| 10 <sup>th</sup> | 28% |
| 11 <sup>th</sup> | 35% |
| 12 <sup>th</sup> | 15% |

**This could be argued as accurate OR not accurate.**

Accurate: Since each grade should be accounted, it doesn't matter how much % is in each grade for the whole school.

Not accurate: Since there are more 11th graders, 11th graders should have more of a say in the survey.