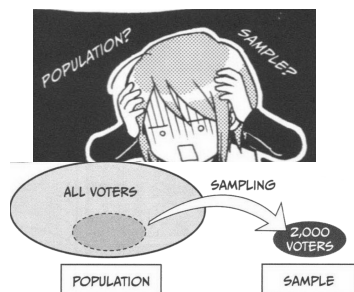


**Lesson 19:** What are the ways in which we can draw possible representative samples?

Explain  
the  
Image



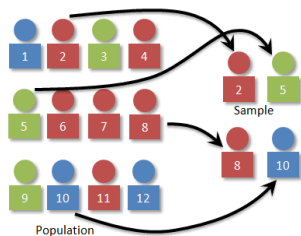
### Simple Random Sampling



Assign Numbers,  
Auto-Generate Random  
Selections

Every possible group of  $n$  individuals has an equal chance of being selected.

Sample of 4 out of a population of 12



SRS of  
size 5  
using a  
calculator?

### Stratified Sampling

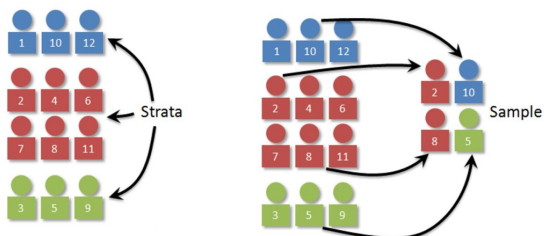
Strata





Y  
u  
m  
m  
m  
m  
m  
m

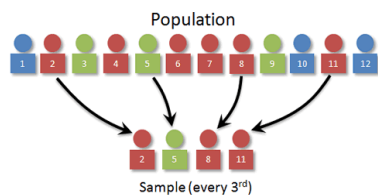
sample taste each layer



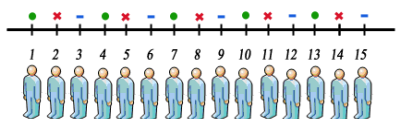
Notice: Two members from red selected.

Where was SRS employed?

## Systematic Sampling



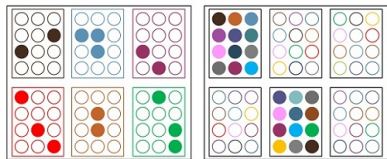
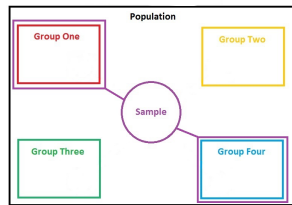
How would you do systematic sampling?



How do you select the first person?

Do the sampling in class.

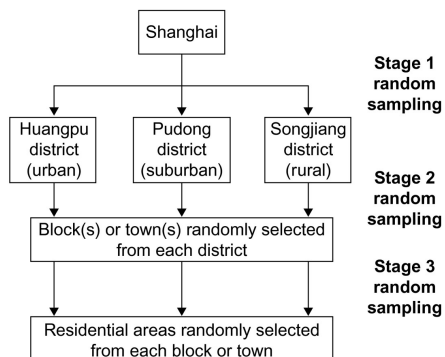
Keydifferences.com Image



## Stratified Sampling Vs Cluster Sampling

[illegible]

## Multistage Sampling Example



Definitions from two textbooks: Why look at the same definitions/ explanations from different sources?

- ▶ A Simple Random Sample (SRS) is our standard. Every possible group of  $n$  individuals has an equal chance of being our sample. That's what makes it *simple*.
- ▶ Stratified samples can reduce sampling variability by identifying homogeneous subgroups and then randomly sampling within each.
- ▶ Cluster samples randomly select among heterogeneous subgroups that each resemble the population at large, making our sampling tasks more manageable.
- ▶ Systematic samples can work in some situations and are often the least expensive method of sampling. But we still want to start them randomly.
- ▶ Multistage samples combine several random sampling methods.

**Sampling Techniques**

**Random sampling:** Use a simple random sample from the entire population.

**Stratified sampling:** Divide the entire population into distinct subgroups called strata. The strata are based on a specific characteristic such as age, income, education level, and so on. All members of a stratum share the specific characteristic. Draw random samples from each stratum.

**Systematic sampling:** Number all members of the population sequentially. Then, from a starting point selected at random, include every  $k$ th member of the population in the sample.

**Cluster sampling:** Divide the entire population into pre-existing segments or clusters. The clusters are often geographic. Make a random selection of clusters. Include every member of each selected cluster in the sample.

**Multistage sampling:** Use a variety of sampling methods to create successively smaller groups at each stage. The final sample consists of clusters.

**Convenience sampling:** Create a sample by using data from population members that are readily available.

JUST CHECKING

- We need to survey a random sample of the 300 passengers on a flight from San Francisco to Tokyo. Name each sampling method described below.
- a) Pick every 10th passenger as people board the plane.
  - b) From the boarding list, randomly choose 5 people flying first class and 25 of the other passengers.
  - c) Randomly generate 30 seat numbers and survey the passengers who sit there.
  - d) Randomly select a seat position (right window, right center, right aisle, etc.) and survey all the passengers sitting in those seats.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

[illegible]

## Simple Random Sample

8



[illegible][illegible]

You might choose a cluster sample by choosing a homeroom at random, and sampling each student in that homeroom, or choosing a class at random and sampling all of the students in that class.

## Systematic Sampling

A systematic sample could be obtained from a list of all students at the school. Suppose you want to sample 50 students from a school of 500. Number the students 001 to 500. Generate a random number from 001 to 010, and start with that student. Every 10th student in the list becomes part of your sample.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.