

# Sampling: Takeaways

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## Syntax

- Sampling randomly a `Series` object:

```
### Sampling 10 sample points ###  
sample_10 = Series.sample(10)
```

```
### Sampling 500 sample points ###  
sample_500 = Series.sample(500)
```

- Making the generation of random numbers predictable using the `random_state` parameter:

```
### Sampling 10 sample points in a reproducible way ###  
sample_10 = Series.sample(10, random_state = 1)  
  
### Using a different value for `random_state` ###  
sample_10_different = Series.sample(10, random_state = 2)
```

## Concepts

- The set of *all* individuals relevant to a particular statistical question is called a **population**. A smaller group selected from a population is called a **sample**. When we select a smaller group from a population, we do **sampling**.
- A **parameter** is a metric specific to a population, and a **statistic** is a metric specific to a sample. The difference between a statistic and its corresponding parameter is called **sampling error**. If the sampling error is low, then the sample is **representative**.

- To make our samples representative we can try different sampling methods:
  - **Simple random sampling**
  - **Stratified sampling**
  - **Proportional stratified sampling**
  - **Cluster sampling**
- Simple random sampling requires us to choose the individuals in the populations randomly — all individuals must have equal chances of being selected.
- Stratified sampling requires us to organize our data into different groups (strata) and then sample randomly from each group. Unlike simple random sampling, stratified sampling ensures we end up with a sample that has observations for all the categories of interest.
- Proportional stratified sampling requires us to take into account the proportions in the population when we divide the data into strata.
- Cluster sampling requires us to list all the data sources (all the clusters) we can find and then randomly pick a few to collect data from. Once we made our choice, we can perform simple random sampling on each cluster.
- When we describe a sample or a population, we do **descriptive statistics**. When we try to use a sample to draw conclusions about a population, we do **inferential statistics** (we *infer* information from the sample about the population).

## Resources

- [The Wikipedia entry](#) on sampling.
- [The Wikipedia entry](#) on samples.
- [The Wikipedia entry](#) on populations.

