

# Activity: Discovering Sampling Distributions

In this activity you will be creating random samples to simulate a probability density distribution. We will create distributions of data ( $x$ ), and see how they differ from the distribution of the average ( $\bar{x}$ ).

## Setup

- Sit in groups of 4 (and 1 group of 2)
- Get out a blank piece of paper. You will be writing information you need for Hw07 here.
- Each group of assigns one person to be a *roller*, one a *recorder*, and a *plotter*.
- The *plotter* get a blank plot from Dr. D. and the number of dice specified in the top right of the page.
- The *recorder* opens the spreadsheet in the 07 Foundations for Inference/Simulation folder in Google Drive.
  - All other computers are put away

## Phase 1: Create a random sample of $x$ 's

- The roller rolls all dice and report the values to the recorder and the plotter.
- The recorder enters the data into their assigned column.
- The plotter draws a dot above the value on the x-axis on the top graph. Stack the dots for repeated rolls vertically.
- Collect as much data as you can in 5 minutes.
- Draw a smooth line over the top of the data points to make a "density" curve.
- Write down a description of the distribution of the  $\bar{x}$  on your blank paper. Discuss location, shape, spread.

## Phase 2: Create a random sample of $\bar{x}$ 's.

- Change rolling/recording/plotting rolls
- The recorder enters the value of each die roll into the colored cells ( $x$ ).
  - The mean will automatically be calculated and displayed in the gray box.
  - Record this calculated average in the xbar column and tell this number to the plotter.
- The plotter plots this  $\bar{x}$  (mean) as a dot on the bottom graph.
- Collect as much data as you can in 10 minutes.
- Draw a smooth line over the top of the data points to make a "density" curve.
- Write down a description of the distribution of the  $\bar{x}$ 's on your paper. Discuss location, shape, spread.

## Wrap up

- Take a picture of your plot.
- Upload to the 07 Foundations for Inference/Simulation folder in Google Drive.
- Name this file with your 'group' name (e.g. 4d10)