

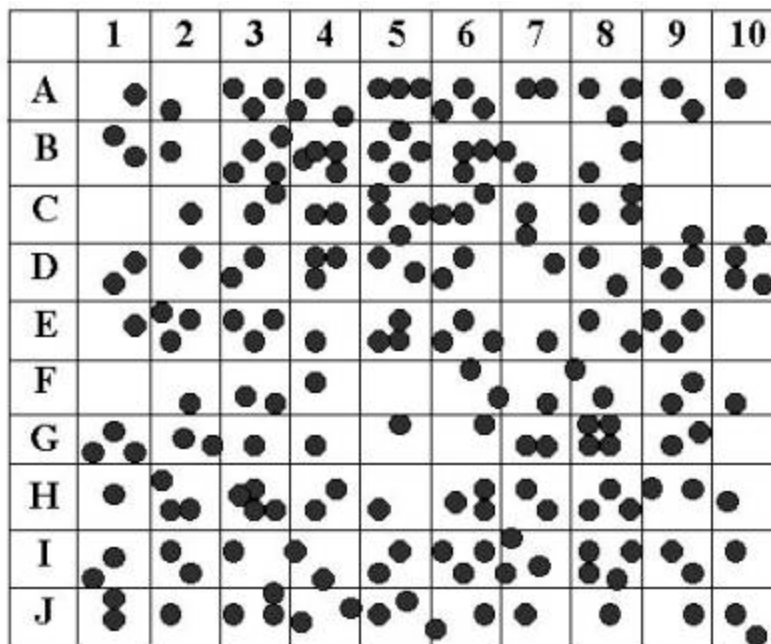
# Exercise 3A [Pre-Lab]

## Estimating Population Size

Adapted from Biology Corner

Scientists cannot possibly count every organism in a population. One way to estimate the size of a population is to collect data by taking random samples. In this activity, you will look at how data obtained from random sampling compare with data obtained by an actual count.

The grid shown below represents a meadow measuring 10 m on each side. Each grid segment is 1m x 1m. Each black circle represents one sunflower plant.



### Procedure:

1. On the last page of this pre-lab is a table with numbers and letters representing the grid segments in the “meadow” above. Cut the boxes apart, keeping numbers and letters separate. Place the numbers in a pile upside down on the table and the letters in another pile upside down on the table.
2. Randomly remove one slip from each pile. Write down the number-letter combination and find the grid segment that matches the combination. Count the number of sunflower plants in that grid segment. Record this number on the data table. Return each slip to its appropriate container.
3. Repeat step 2 until you have data for 10 different grid segments (and the table is filled out). These 10 grid segment will represent a sample.
4. Find the total number of sunflower plants for the 10 segment sample. This is an estimation based on a formula. Add all the grid segment sunflowers together and divide by ten to get an average number of sunflower plants per grid segment. Record this number in the table. Multiply the average number of sunflower plants by 100 (this is the total number of grid segments) to find the total number of plants in the meadow based on your sample. Record this number in your data table.

5. Now count all the sunflower plants actually shown in the meadow. Record this number in the data table. Divide this figure by 100 to calculate the average number of sunflower plants per each grid.

Sampling Data	
Grid Segment (number-letter)	Number of Sunflowers
Total number of sunflowers (add all quadrats sampled)	
Average per quadrat (divide total by 10)	
Estimate of total number of plants in meadow (multiply average by 100)	

Population Data	
Total number of sunflowers (count by hand)	
Average number of sunflowers per quadrat (divide total by 100)	

**Analysis:**

1. Compare the total number you got for sunflowers from the sampling to the actual count. How close are they?
2. Why was the paper-slip method used to select the quadrats?
3. Why do biologists use sampling?
4. Population sampling is usually more effective when the population has an *even dispersion* pattern. *Clumped dispersion* patterns are the least effective. Explain why this would be the case.
5. Describe how you would use Sampling to determine the population of dandelions in your yard.

1	A
2	B
3	C
4	D
5	E
6	F
7	G
8	H
9	I
10	J