

Name _____ Date _____ Period _____

THE LINCOLN INDEX

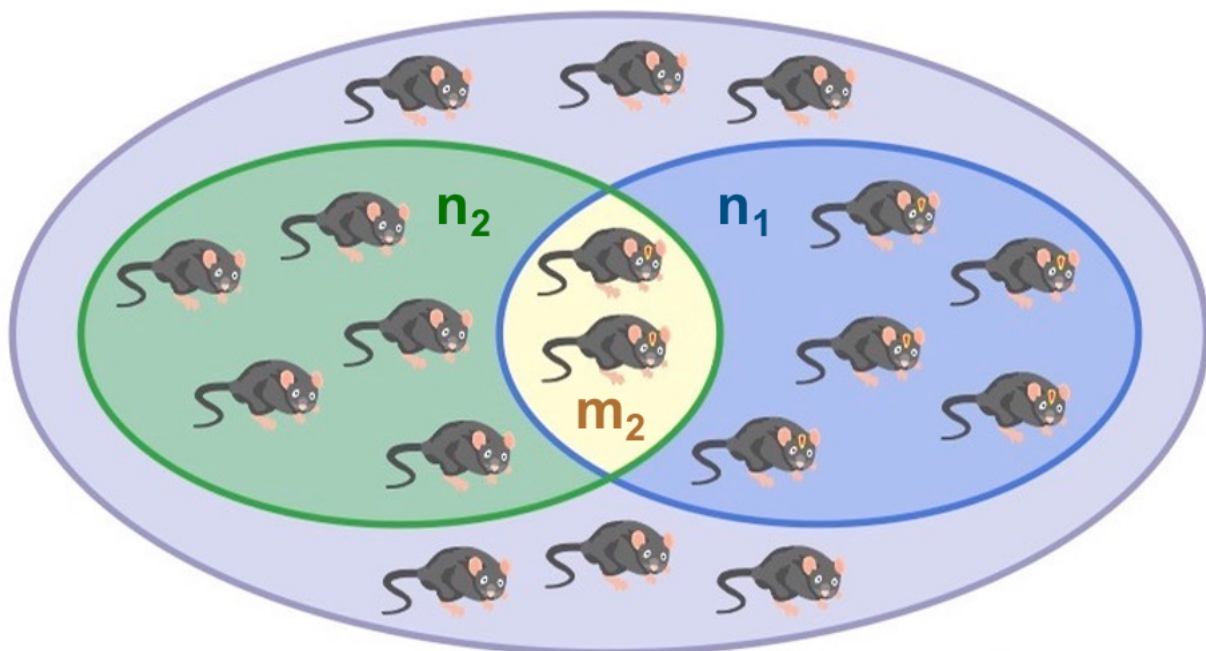
INTRODUCTION:

The Lincoln Index provides a way to measure population sizes of individual animal species. It is based on a capture-mark-recapture method. In theory, mark-recapture techniques involve sampling a population of animals and then marking all of the individuals captured in a recognizable way. The marked animals are then released back into the population and left to mingle for a suitable period of time. Once they have become thoroughly mixed into the population again, the population is resampled.

The assumption is then made that the proportion of marked animals in the second sample is the same as the proportion of marked animals to non-marked within the whole population. Enough time must be allowed to elapse for complete mixing to have occurred.

LINCOLN INDEX FORMULA:

$$\frac{m_2 \text{ (number marked in second capture)}}{n_2 \text{ (number collected in second capture)}} = \frac{n_1 \text{ (number collected in first capture)}}{\text{total population size}}$$



 Total Population  First Capture (n_1)  Second Capture (n_2)  Recapture (m_2)

PROCEDURE:

1. Obtain a set of at 40-60 singing rodent cards and spread them out face-down on your desk. Do not count the exact number of cards at this time.
2. Randomly "**capture**" 8-15 singing rodents and turn them over. Write down the number of captured rodents in the "**n₁**" column of the data table.
3. Using a dry erase marker, draw a line on the captured rodents to "**mark**" them.
4. Turn them back over and mix them back into the population. Make sure to evenly distribute the cards.
5. Randomly "**recapture**" another 8-15 rodents and turn them over. Capture a different number of rodents than you did in step 2. Record the total number of captured rodents in the "**n₂**" column of the data table.
6. Count the number of recaptured rodents (rodents with a mark on them). Record the number of marked rodents in the "**m₂**" column of the data table.
7. Estimate the population size based on your n₁, n₂, and m₂ values. Record your estimate in the data table.
8. Wipe off all the dry erase markings and return the cards to your teacher.

Data Table #1: Mark-Recapture Method

# of Individuals in 1 st Capture	# of Individuals in 2 nd Capture	# of Marked Individuals in 2 nd Capture	Estimate of Population Size	Actual Population Size
n ₁	n ₂	m ₂	(n ₁ *n ₂)/m ₂	

POST-LAB QUESTIONS:

1. What are some drawbacks to using the mark-recapture method?
2. Calculate the percent error for your population using the following formula:

$$\text{Percent Error} = \frac{|\text{Observed} - \text{Expected}|}{\text{Expected}} \times 100$$