

Name: _____

Date: _____

Class: _____

IB Environmental Systems and Societies

Testing the Validity of the Lincoln Index Using a Simulation

The Lincoln Index:

It's difficult or often impossible to count each individual in a population. Instead, we can use different methods to estimate the population. One technique is to use the capture-mark-release-recapture method, and use the Lincoln index to calculate the estimated total population.

In this practical, you are going to test the validity of the Lincoln index by using a known population. You are going to use seeds to represent the organisms. Here you are using a model to test a real system; you are *simulating* the Lincoln index.

Research question

How accurate is the Lincoln index in predicting population size, based on a model using a known number of seeds?



Procedure

1. Collect a known “population” of seeds, and put them into an “ecosystem” (a cup/beaker). To do this, count out 100 seeds and put into a cup.
2. “Capture” a random selection of the population. Do this by grabbing a small, random, handful of the seeds and putting them on the table.
3. Count the number of seeds and mark them (e.g. with a marker pen).
4. Return your marked individuals back to the original beaker
5. “Recapture” by repeating step 2.
6. In your recapture, count the number of seeds present, and the number of marked seeds present.
7. Record you raw data in the table.
8. Conduct a repeats, time permitting.
9. Share the **raw** data of your classmates. (This is equivalent to doing a number of repeats)

Results table

	Test number					
	1	2	3	4	5	6
n_1						
n_2						
m_2						
N						



Assignment

- Present your findings as a formal report. The report must be typed.
- In your report you should include the following sections:
 - Aim (2-3 sentences)
 - Research question, already provided (1 sentence)
 - Analysis (including all data processed data and calculations, and a few sentences summarizing it) Note: Raw data should also be included in your report, possibly in the same table as the processed data or in an appendix section.
 - Conclusion (a few sentences)
 - Evaluation (a few paragraphs)
- You will be marked on: RAC, DEV and COM criteria. USE THE MARKING CRITERIA WHEN WRITING YOUR REPORT.
- A few helpful hints:
 - Consider how you will process your data to answer the research question. Think about creating an average, perhaps finding the percentage difference between the true and estimated population values.
 - Use the marking criteria provided and check if you've included everything that is required.
 - For your conclusion, refer back to the research question and make sure you answer it.
 - In your processed data include an average value as well as a range (what was the highest and lowest value for population?)
 - Do any other statistical analysis if you can/if appropriate.

