

Making and interpreting population graphs**I. INTRODUCTION:**

It is not always possible to study populations first-hand. This being the case, you will carry out this investigation using data collected by field biologists to learn about population dynamics. The **objectives** for this investigation are:

- (1) Learn how to make graphs of population data
- (2) Interpret graphs of populations and determine which populations are expanding (growing), declining ("shrinking"), and are stable.
- (3) Explain fluctuations ("ups and downs") in populations using the 4 "determiners" of population growth.
- (4) Recognize slow growth life history pattern and rapid growth life history pattern populations on graphs.

II. PROCEDURES:

Three sets of population data will follow. Please read the procedures accompanying each set and graph the data accordingly. Then, answer the questions that accompany the data.

A. COTTON MOUSE DATA. This data shows the number of mice trapped per 100 traps set per night.

DATE	Number of mice caught per 100 traps
Sept 24, 1949	25
October 9	45
October 30	38
December 4	30
January 7, 1950	20
February 16, 1950	14
March 12	13
April 16, 1950	8
May 8	7
June 16	11
July 16	4
August 16	13

1. Label your vertical axis "Number of mice per 100 traps per night".
2. The range on the vertical (y) axis should range from 0-50
3. Label the horizontal axis "Date" Spread the twelve dates equal distance apart along the horizontal axis (x)
4. Make points for each date. Connect points with a ruler to construct a line graph
5. Answer these questions on a sheet of lined paper. **PLEASE DO NOT WRITE ON THIS CLASS SET OF DATA!!!!** Please

Answer questions in a sentence form.

- What is the difference between an open and closed population?
- During which season (fall, winter, spring, summer) does the natality seem to be highest? Explain.
- What is mortality? Emigration?
- During which season (fall, winter, spring, summer) is the mortality and emigration highest? Explain.

B. Ring-necked pheasant data. This data shows the changes in a population of pheasants *on an island* for 5 years after their introduction. Note that there is a spring and fall number for each year.

- Label the y axis "number of pheasants" Range is 0 to 2000
- Label the x axis spring, fall, and year.
- Locate the 12 points on the graph
- Connect all 12 points using a ruler.
- Using a colored pencil, connect only spring points to spring points, skipping the fall numbers. You will have two graph lines on this graph!!!!

Year	Season	Pop. Size	Year	Season	Pop size
1937	Spring	8	1937	Fall	40
1938	Spring	30	1938	Fall	100
1939	Spring	90	1939	Fall	425
1940	Spring	300	1940	Fall	825
1941	Spring	600	1941	Fall	1520
1942	Spring	1325	1942	Fall	1900

6. Questions:

- Why do the regular fluctuations between spring and fall number occur? (consider natality and mortality, here)
- Looking at the graph of spring-to-spring numbers only, is the pheasant population expanding, declining, or stable? Explain your answer.
- Is this population an open or a closed population? Explain how you know.
- What is the name for the type of growth pattern on your graph for the spring-only numbers?

C. "Mystery organism population data: Graph the data as instructed.

Year	Spring	Summer	Fall	Winter
1995	564	14, 598	25, 762	127
1996	750	16, 422	42, 511	102
1997	365	14, 106	36, 562	136

- Does the mystery organism have a rapid or slow growth life history pattern?
- Are the huge declines in population caused by biotic or abiotic factors?