

Review Sheet for Lab Exam

Here is a review sheet for the exam. The important terms, concepts and tests that we used in each lab are listed. This sheet is meant to supplement your studying, IT IS NOT A ROAD MAP! Any material in the Lab Notebook is fair game, but the exam will focus on the more important concepts and ideas rather than test your knowledge of what percentage of prairie dog colonies are infected with the sylvatic plague. Please read the lab notebook yourself, think about the objectives listed at the beginning of each lab section and what we did to achieve them. This includes:

What general hypothesis did we test?
What were our variables?
What equipment did we use to collect data?
How did we determine when/where to collect data?
How did we analyze our data?

In the past, students have done very well on this exam. Have fun studying and reviewing all of the great stuff we did this semester ☺

The Scientific Method

Making Observations:

Inductive vs. Deductive reasoning

Variables:

Continuous variable
Discrete variable
Categorical variable

Scientific Hypothesis:

A hypothesis is an explanation for a scientific observation. It is not a prediction!!

If you are asked to provide an “If..., then...” statement, you should organize it in the following way:

If...hypothesis..., then...prediction.

For example: I observe that Ponderosa Pines grow more vigorously on a northern slope than on a southern slope. I hypothesize that moisture limits tree growth. The “If..., then...” statement would be:

If ponderosa pine growth is limited by water availability, then growth rates will be greater in trees located on northern slopes vs. southern slopes.

Statistical Hypotheses:

Null Hypothesis:

The null hypothesis is a statistical hypothesis that predicts no difference between groups or no relationship between two variables.

Alternative Hypothesis:

The alternative hypothesis is a statistical hypothesis that predicts a difference between groups or a relationship between two variables.

Statistical tests

Descriptive Stats:

Mean

Median

Mode

Variance

Standard error

Standard deviation

Linear regression: tests relationship between independent and dependent variables

F-stat vs. F-critical

p-value

R²

Slope

Equation for line

T-test: compares 2 means to see if measured differences are statistically different

t-stat vs. t-critical

p-value

1 tail vs. 2 tail

Chi-square test: determines if frequency of observations differs between two samples.

χ^2 -stat vs. χ^2 -critical

p-value

Ponderosa Pine Lab

What is The Life Zone concept?

How does elevation affect growing conditions?

How did we measure height of trees?

How did we determine the diameter of trees?

How did we determine growth rate of trees?

What test did we use to look at the trend of growth rate at different elevations?

What test did we use to compare the mean height of ponderosa pines and the nearest non-ponderosa neighbor?

Isle Royale Lab: Population Growth

Population Growth Models:

Exponential Population Growth	$dN/dt = r_{\max}N$
vs.	
Logistic Population Growth	$dN/dt = r_{\max}N[(K-N)/K]$

Carrying Capacity (K)

The Stream Assessment Lab

Species richness vs. species diversity

What is the difference?

Can you identify populations that have equal richness but different diversity?

Shannon-Weiner Index

What does H' indicate

What does an H' value of 0 indicate? What about 4?

Jaccards Index

What does this index allow us to compare?

What does a JI value of 1 indicate? What about 0?

Estimate S and species diversity

What is the difference between Sobs and the estimator models?

What is the significance of uniques and duplicates?

How do you know when sampling is complete?

Stream Quality Index Score

What is the general method of this system?

What does a score of 1 indicate? What about 3.5?

Intermediate Disturbance Hypothesis Lab

Intermediate Disturbance Hypothesis

What does this hypothesis say? How did we test it?

Simpson's diversity index

What does it measure?

What do different values indicate?

Life History Tables: Columbia Cemetery

Survivorship curves: 3 types. Be able to draw them and describe them.

What is a life table?

What is the difference between static and dynamic life tables?

What is a cohort?

What is a mortality curve?

Prairie Dog Lab

Keystone Species vs. Ecosystem engineer

Rescue effect vs. refuge effect

Burrow density and dispersion

Dispersion statistics

What does variance/mean indicate?

What is indicated if $t\text{-stat} > t\text{-critical}$

Boundedness

Meta- population vs. local population

Conservation Biology

Genetic diversity

Species diversity

Ecosystem diversity

Species conservation approaches:

Small-population approach

Declining population approach

SLOSS

Be able to give a reasonable answer for all questions on page 144-145. There is no single “right” answer for these, but you need to know the terminology used to answer correctly.