WEEK 2
ESM 101 LAB

Forming a testable hypothesis

Field Trip #1

- In a natural area, such as Marquam Nature Park

http://www.fmnp.org/gallery/fomnp01.jpg

What is a hypothesis?

- A proposed answer to a scientific question
- A tentative assumption made in order to draw out its logical or empirical consequences and test its consistency with facts that are known or may be determined
- A proposition or set of propositions, set forth as an explanation for the occurrence of some specified group of phenomena
- A mere assumption or guess

We Need Meaningful Hypotheses

- Includes at least two proposed causes of a certain condition
- Should be able to disprove at least one aspect with measurements and data collected in the field
- Must have a meaningful understanding of the problem to formulate
- The investigator must NOT currently know the outcome of a test or that it remains reasonably under continuing investigation

- EXAMPLE: Plant biodiversity at Forest Park is more limited by dogs off leash than the presence of English Ivy.

MORE QUALITIES OF GOOD HYPOTHESES

- Supplies a testable mechanism
- Not unnecessarily complicated
- Conforms with existing knowledge
- Should be a way to show that the hypothesis is incorrect

Null Hypotheses

- A hypothesis to be tested and accepted or rejected in favor of an alternative; *specifically* ***: the hypothesis that an observed difference (as between the means of two samples) is due to chance alone and not due to a systematic cause***
- Be careful not to use this in a trivial manner, i.e to disprove what is obviously false
  - that doesn't move our understanding along

BAD QUALITIES…

- Question is not scientifically good or useful
- Question will never lead to or achieve a useful answer
- Question can not be proven one way or another
- The null hypothesis is trivial

GOOD or BAD?

- Which of these could you improve with tighter language?
  - The use of native cover crops in a vineyard will increase the carbon to nitrogen ratio in the A-horizon of the soil more than the use of non-native cover crops.
  - Salmon do not return to their native stream to spawn.
  - Plant biodiversity at Forest Park is not limited by the presence of English Ivy.
  - Tomato plants exhibit a higher rate of growth when planted in compost rather than soil.

Term Project

- Formulate a **meaningful** hypothesis for improving biodiversity in your green space.
- Collect data in support of or against your hypothesis.
- Provide recommendations based on the outcome of your field work.
- Provide additional research on the recommendations that are formulated.
- Detail the predicted consequences of your recommendations.