

MARS 4910: Jan 28 / 30

Plan for Today:

- Introduction to Statistics with R
- Start presentations of research projects by groups:

Study Sites, Methods

Number of sampling days requested

Laboratory work / equipment requirements

Assignments for Next Week:

- Complete Research Plan (Due Feb 9)
- Work on Research Proposal (Due Feb 16)

The Research Plan & The Proposal

Research Plan:

- Points: 5% (MARS 4910) and 25% (MARS 4911)
- Due for MARS 4910 (By the end of Feb 9)
- Revised version Due for MARS 4911 Later

Research Proposal:

- Points: 5% (MARS 4910) and 25% (MARS 4911)
- Due for MARS 4910 (By the end of Feb 16)
- Revised version for MARS 4910 (Feb 25 / 27)

Research Plan I

Outline: Research plans must be identical for all members of a research team. They must include:

Names of collaborators working in the research group

Hypothesis being tested: Include the hypotheses, and the predictions derived from these hypotheses, which will be tested. For full credit, explicitly identify the independent and the dependent variables, and explain which ones are categorical and which ones are continuous.

Sampling gear needed - please be as specific as possible: (plankton nets, multi-corer, fish ID slates, wet-writing platforms, transect tapes, quadrats, sample jars, calipers, squirt bottles, sieves, formalin)

Research Plan II

Sampling locations (sites or stations):

Description: where is the site

Location: latitude and longitude

Timing: dates stations will be visited

Rationale: why was this site selected

Samples to be collected at each site:

List the steps involved and list of equipment needed to collect and process the samples. Consider potential hazards and steps to be taken to avoid those dangers

NOTE: You will be evaluated on the completeness, organization, readability, and clarity of your plan. Figures (Kaneohe Bay map showing station locations) and tables (dates, latitude / longitude, equipment) must be included.

Research Proposal

Outline: Each student will submit their own proposal.

Proposals will reflect the research plan and must include:

Title

Informative and (if possible) engaging

Introduction, at least 500 words.

Your primary goals are to: (i) establish that the study is of scientific interest, (ii) describe how your study relates to previous research, and (iii) present your hypothesis and objectives. The introduction follows a logical thread leading to the hypotheses.

Material not pertinent to hypothesis should not be included.

Proposal Introduction I

- Introduction follows logical thread leading to hypotheses:

Introduce the field of study you are dealing with

State why this topic is of scientific interest
(a BIG picture statement / a FACT / a PREDICTION
are useful to catch the attention of the reader)

State why / how study is related to previous research
(what observation lead to your specific hypothesis?)

Proposal Introduction II

State the *hypothesis* to be tested explicitly
(make sure you use the term *hypothesis*)



Think of your hypotheses as the sun and all other parts of the paper as planets orbiting and born from that sun.

Without the sun the planets are dark, cold, and dead; without good hypotheses, your paper will resemble those sunless planets, traveling aimlessly through space.

Proposal Introduction III

- Present the hypothesis in a broader context:

State the *hypothesis* to be tested explicitly
(make sure you use the term "*hypothesis*")

State how you will test this hypothesis
(make sure you use the term "testing")

State the reason why this work is important
(make sure you use the term "important")

Materials and Methods I

Materials and Methods, at least 400 words

Please refer to EV's writing guide for further suggestions:
Readers need to know how your methods will be used to test your hypothesis.

For each hypothesis: Provide clear description of your experimental design, sampling, and statistical procedures.

- Identify Dependent / Independent Variables (are they categorical / continuous ?)
- Underlying assumptions
- Steps used to implement any controls
- Computer software publisher and version

Controls

Question: How do we avoid the influence of "outside" factors and variability?

Source of Variability

1. Variability among experimental units
2. Random error in measurement of response variables
3. Change in conditions through time
4. Unsuspected side effects of treatment procedures
5. Bias of investigator
6. Chance influences on experiment in progress

Materials and Methods II

Analysis criteria (At least 100 words)

Component of Research Proposals, but typically not Research Papers. Include as a separate section following Methods.

NOTE: the word count for this section is not included with the Materials and Methods. *For each hypothesis, include the following information in the analysis criteria section:*

- The response variable(s) evaluated
- The statistical test used to evaluate the hypothesis
- The null / alternative hypothesis for each test
- The significance level you will use (alpha)

Materials and Methods III

Hazards (No word limit)

Following the Analysis Criteria Section.

Describe potential hazards involved in data collection and steps to be taken to avoid those dangers.

Not typically included in research proposals.

MARS 4910: Feb 4 / 6

Plan for Today:

- Complete research plan presentations
- Research Planning Discussion
- Research Proposal Discussion

Assignments for Next Week:

- Research Plan: Due Feb 9 - One Per Team
(email to: khyrenba@gmail.com)
(subject: "MARS4910 Research Plan")
- Research Proposal Intro & Methods (Due Feb 16)