LB 144
Introductory Organismal Biology

Week 4
Get Ex. 11 (Article Dissection) stamped

Experimental Design Review
1. Approach – Experimental or observational
2. Control
3. Treatment
4. Replicates
5. Sample size
6. Randomization
7. Variables
8. Statistics – later!
Experimental Design Review

Last week’s quiz asked about termites and how they follow trails using their different senses.

How would you isolate whether or not they are using 1 sense as opposed to another when following trails? Let’s say you want to know whether they use sight or smell – what would you need to do?

An experimental design EXAMPLE

- **Treatments**: what we are testing for some effect
- **Control**: using as a standard

Example: Effects of pollutants on fish locomotion
- **Control**: water only
- **Treatment**: water with added pollutant
- **Variables**: fish locomotion, pollutant concentration
An experimental design EXAMPLE

How would you do randomization and replication?
How many trials would you run (n = sample size)?
Why are each of these things important?

Using the vocab you know and what we just talked about, write a paragraph that describes a good experimental design for the fish locomotion example. USE YOUR NOTEBOOK FOR THIS!
Outline of the day

- The scientific literature
- Ex 11 – Article Dissections
- Ex 12 – Writing a scientific abstract
- Brainstorming about your projects

Lab Learning Goals

- Science process skills
- Effective and cooperative teamwork
- Communication
  - Speaking
  - Reading
  - Writing
  - Thinking
Scientific Communication

Scientists can share their research by:
1. Giving oral presentations
2. Presenting research posters
3. **Publishing scientific literature in professional journals**

Scientific Literature

- **Primary**: Reports findings of new research (exps or observational studies), peer-reviewed
- **Secondary**: Summarizes primary literature, no new results, peer-reviewed
- **Tertiary**: More general summary of scientific literature (textbook), not peer-reviewed
- **Peer-review**: Rigorous review process where experts evaluate the soundness of a scientific article
How to cite scientific articles

- Format varies from journal to journal
- For this class use format in appendix C of c-pack

Citation example:

References Cited Section Format –FROM C-PACK (Appendix C Page 125-126)

Journal articles:

Single Author:

Two Authors:

Multiple Authors:

*NOTE: DO NOT change the order in which the authors are listed in a specific journal article.*

If the source was published in an online ONLY journal (THERE ARE NOT MANY OF THESE!):
Ex 11: Article dissection

1. Compare your answers.
2. Come to consensus on the correct answers.
3. Decide who will report out for your team.
   a) Number 2
   b) Number 3
   c) Numbers 4-5
   d) Number 6
   e) Numbers 7-8
4. Turn in 1 per team

Scientific Literature: The Abstract

• “Mini-Paper”

• Summary of research

• Way to quickly determine whether or not research is pertinent to your study

• Used at conferences in program schedule
Example Abstract
Murkey, L., N. Seymour, and A. Sylvester. Behavioral differences between male and female *Sciurus carolinensis*.

Intro

We observed individual and group behavior patterns of Eastern gray squirrels (*Sciurus carolinensis*) to study tendencies and relationships between males and females. We tested the hypothesis that male squirrels will spend more time eating and interacting with other squirrels and less time grooming as compared to female squirrels that will spend more time grooming and less time eating and interacting. Nine treatments were conducted that observed the squirrels near the Michigan State University library. The treatments spanned a three-day period during which both male and female squirrels were studied separately for twenty minutes each. For all treatments, we recorded time spent eating, grooming, and interacting. Our study found that male squirrels spent more time interacting (mean = 12.3±1.3 as compared to 8.9±2.2 min, p = 0.03) and females spent more time eating (22.7±4.1 as compared to 12.2±3.6 min, p = 0.003) while the time spent grooming was the same for both males and females (32±7 and 30.5±5 min, p = 0.09). This research adds support to the idea that sex plays a role in determining squirrel behavior.
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Ex 12: Writing an abstract

1. Find the article
2. Read the article individually
3. Write an abstract as a team
4. Turn in 1 per team
The LB144 research project timeline

- Formulate hypotheses and predictions related to either pond/lake ecosystems or bird feeding behavior, SEPT/OCT
- Design an experiment or field study to test your hypotheses, early OCT
- Write and revise a research proposal, OCT
- Collect, analyze, and interpret data, and OCT/NOV
- Visually and orally present the research results during a poster session. NOV/DEC

Homework

- Re-Read: article from ex 11 – look for helpful citations and ideas
- Do a lit search & brainstorm project topics
- Complete: Ex 13a individually
- Pre-read: Ex 13b-Ex 17

Exercise 1 due November 14 – see pre-approved seminar list on class website
Section 1, 2, 4 - LB144 research

*Bird Foraging Behavior: Brainstorming and Lit Searching*

Section 3, 5, 6 - LB144 research

*Freshwater Benthic Ecosystems: Brainstorming and Lit Searching*