PeerLearn

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What is it?

How does it help you succeed in BIOL 150?

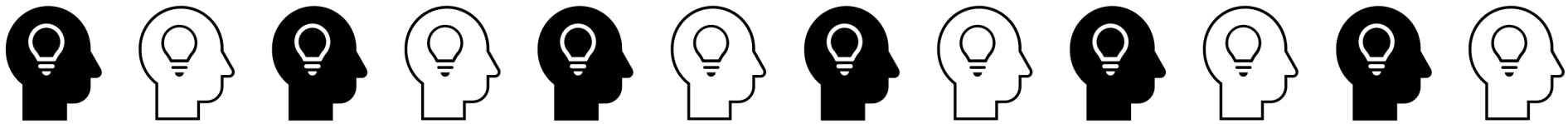
PeerLearn: what is it and how does it work?

The purpose of PeerLearn:

- ✓ Feel confident in course concepts
- ✓ Apply concepts to real-world studies organized by BIOL 458
- ✓ Bonus marks for BIOL 150 students

How it will be set up:

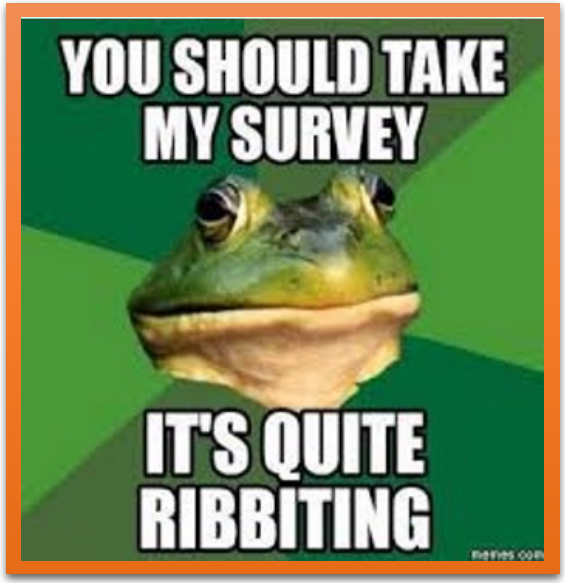
- ✓ PeerLearn Surveys
- ✓ Discussion Boards
  A. Provide Study questions
  B. Answers to your questions
- ✓ Mark/Recapture study
- ✓ Exponential Growth study



Surveys and Discussion Boards

Surveys (2%)

- ✓ 1% Beginning of term (Oct 4)
- ✓ 1% End of term (Nov 29)



Discussion Board

- ✓ You post questions about exponential growth
- ✓ BIOL 458 students provide answers and resources to your questions
- ✓ BIOL 458 students provide helpful study questions

This survey has been approved and reviewed by the UW Research Ethics Board and the CTE (Centre for Teaching Excellence)

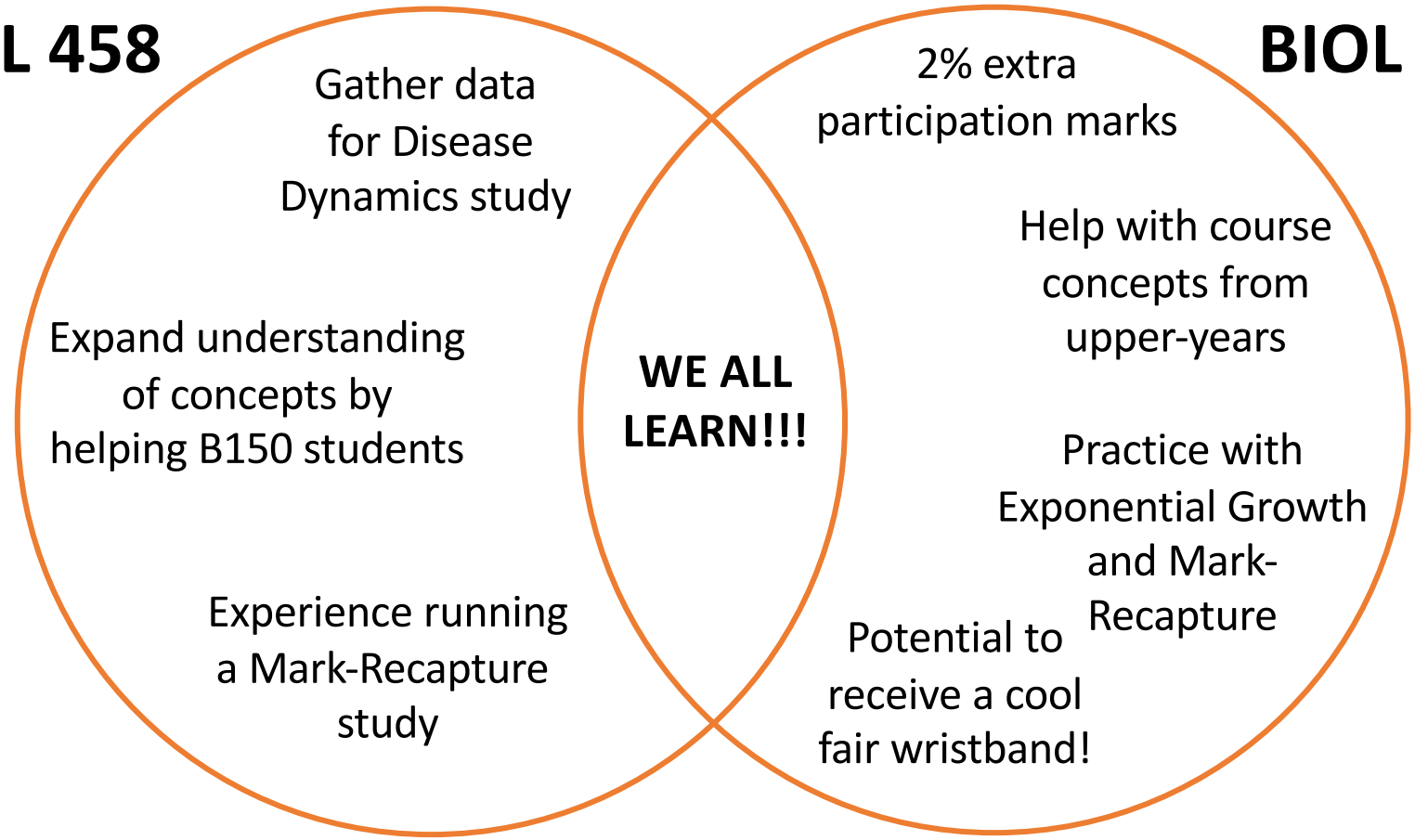
Exponential Growth Study: PeerLearn App

- ✓ App used to estimate disease transmission rates
- ✓ App will track your movement
- ✓ NO PERSONAL INFO will be recorded
- ✓ We will report back to you on our findings

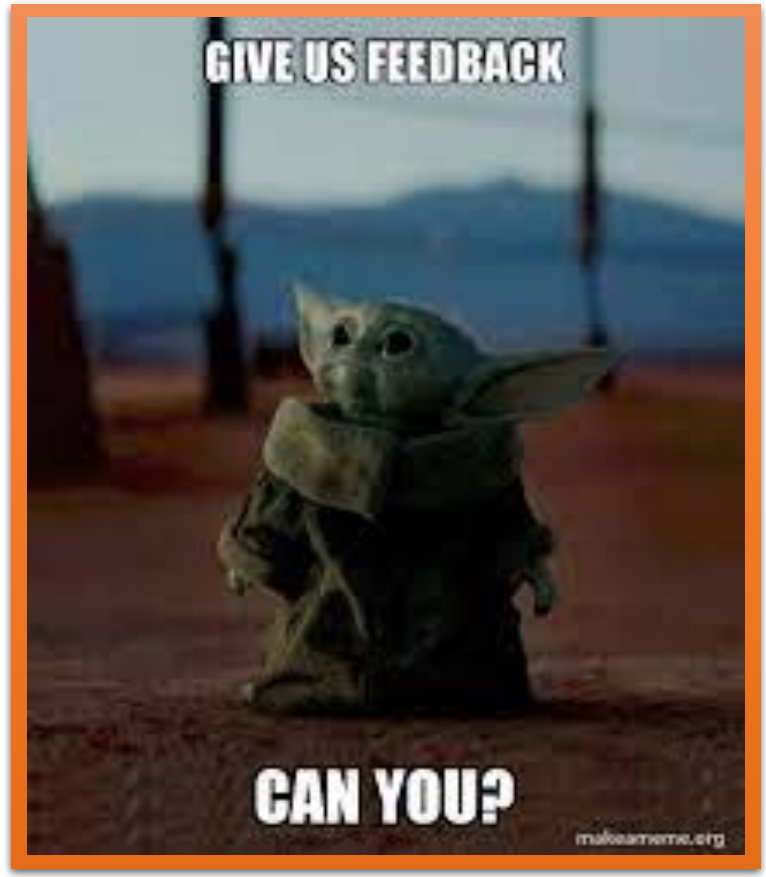
PeerLearn

ALL DATA IS COMPLETELY ANONYMOUS!

You give us this, we give you that..

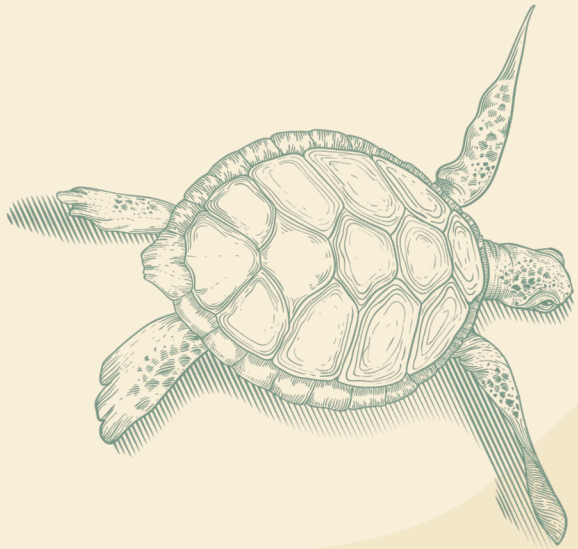


Thank you for your time!



Quantitative Ecology

Introducing Mark Recapture

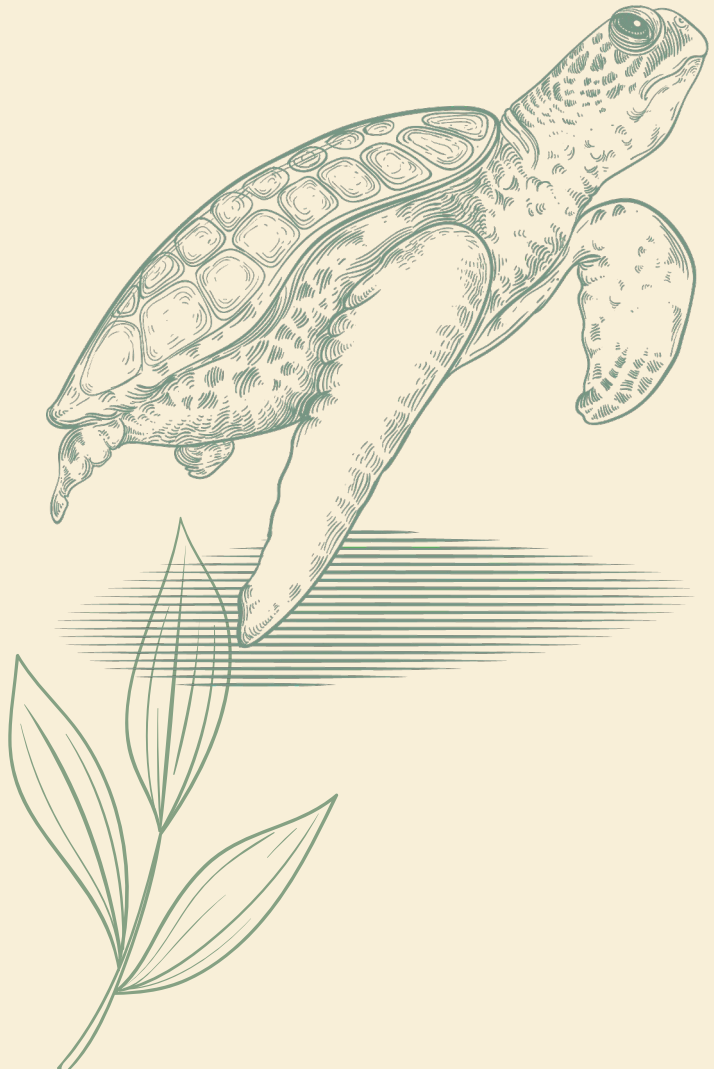


Kirsten Van Goethem, Ashley Ferns, Lisa Hoard

October 4, 2023: Group 1

What is Mark Recapture?

- Mark-recapture is used by biologists who want to estimate population size of mobile organisms
- This can be done by predicting/estimating the true population using a subset of a population
- Allow biologists to come up with a variety of hypotheses:
  - H_0: Species is decreasing over time
  - H_0: Species is increasing over time, etc.



Real World Example: Leatherback Turtles

- Example Species: Leatherback Turtles at Matura Beach, Trinidad (Hodge, 2004)
- In order to do a mark-recapture with Leatherback Turtles, biologists would:
    - Capture and mark all Leatherback Turtles found in first round of searching
    - Do the second search in the same location, and count all Leatherback Turtles that were previously marked, as well as new ones found

(Hodge, 2004)

Leatherback Encounters in 1999

Turtles Marked at Sample Event 1 =

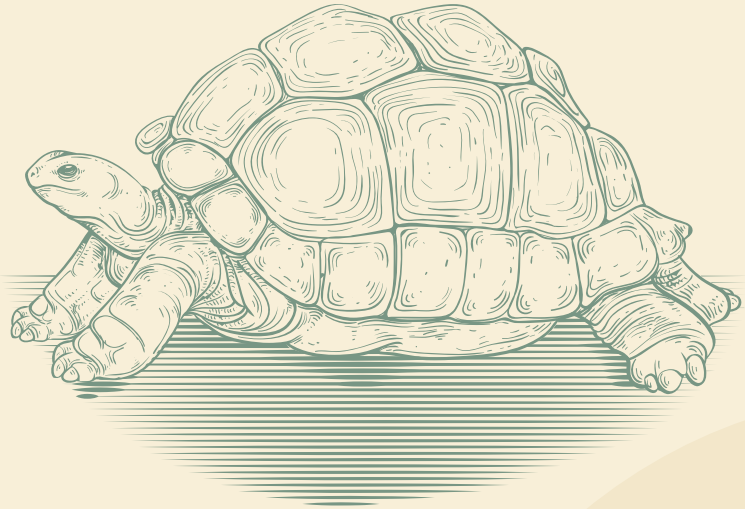
873

Total Turtles Captured at Sample Event 2 =

562

Marked Turtles at Sample Event 2 =

362



Estimating the true population (N)

Total individuals sampled the second time

Number marked in first sample

$$N = \frac{n_2}{m_2/m_1}$$

Number marked at second sampling

Probability of detection

$n_2 = 562$

$m_1 = 873$

$m_2 = 362$

- This allows us to calculate an estimated population size

$$\text{Estimated population size} = \frac{\text{number captured}}{\text{Probability of detection}} = \frac{n_2}{m_1 / m_2}$$

$$\text{Probability of detection} = \frac{\text{\# of marked captured}}{\text{total marked}} = \frac{m_1}{m_2}$$

(Hodge, 2004)

Leatherback Encounters in 1999

Turtles Marked at Sample Event 1 (m_1):
873

Total Turtles Captured at Sample Event 2 (n_2): 562

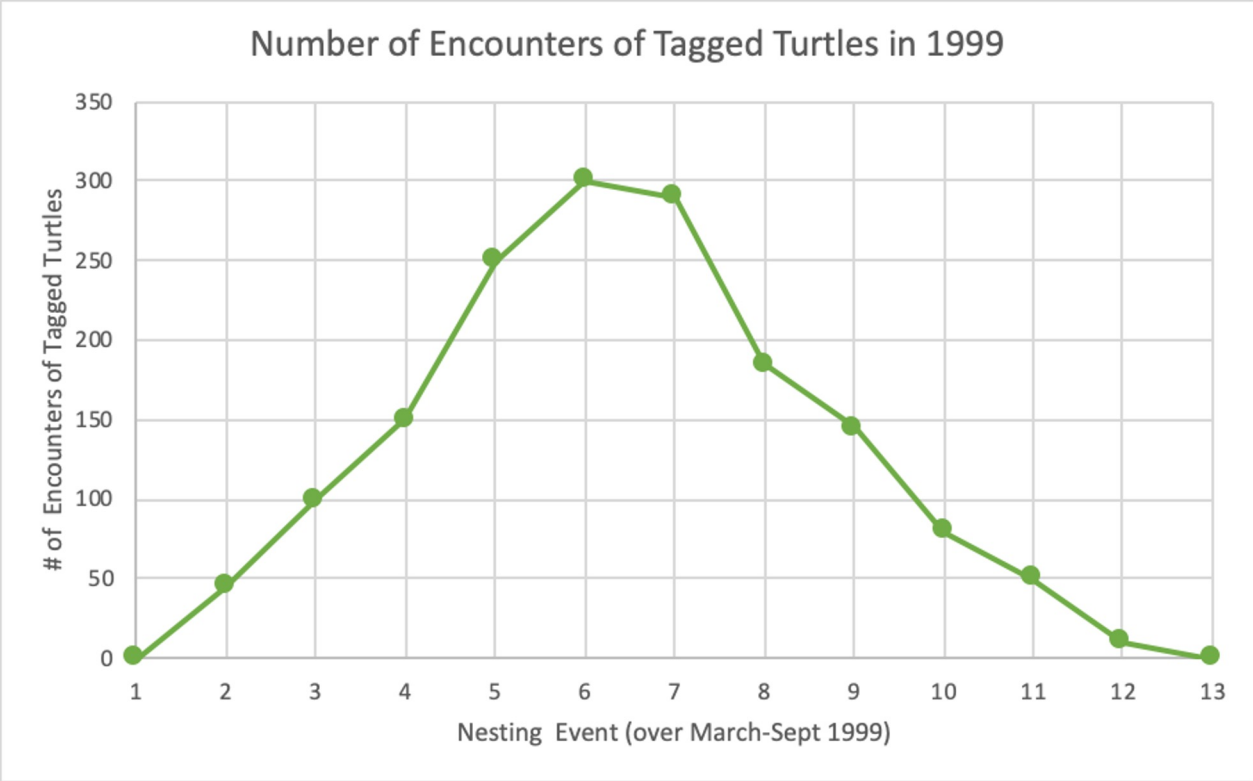
Marked Turtles at Sample Event 2 (m_2):
362

$$N = \frac{n_2}{m_2/m_1}$$

$$N = \frac{(562)}{(873/362)}$$

$$N = 1355.32 \text{ individuals}$$

Why is this Important?



Mark recapture is a common method used in tracking the movement and population of endangered species

(Hodge, 2004)

Why Does This Interest You?

You're the Turtles

We're going to use BIOL 150 students to conduct a mark-recapture.

Turtle Stickers

When you enter class, you were given a turtle sticker. You are marked!

Leaving Class

When you leave class, we will recount some of you, as our second round. We will then estimate the population size of BIOL 150.

Questions?

Resources

Cuddington, K. 2023. BIOL 458: Methods of Estimating Population Size. University of Waterloo, pp. 1 - 46.

Cuddington, K. 2023. BIOL 458: Mark Recapture and Likelihood. University of Waterloo, pp. 1- 64.

Hodge, C. 2004. MARK-RECAPTURE ESTIMATION OF THE LEATHERBACK SEA TURTLE (*Dermochelys coriacea*) NESTING POPULATION AT MATURA BEACH, TRINIDAD. *Master's project, Duke University.* https://dukespace.lib.duke.edu/dspace/handle/10161/241

slidesgo. 2023. Science Subject for Elementary - 3rd Grade: Turtles Google Slides Theme. *Freepik Company.* https://slidesgo.com/theme/science-subject-for-elementary-3rd-grade-turtles#search-turtle&position-2&results-35&rs=search

Action Item: PeerLearn survey 1

- Email with survey 1 link in the next few days
- 5-10 minutes of your time for each survey (early Oct & late Nov)
- Receive 1% participation for each survey
- Participation is optional: alternate task in November for 2%
- Your instructor WILL NOT KNOW what you have chosen to complete

This study has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Board (REB #41431).

If you have questions for the Board contact the Office of Research Ethics, at 1-519-888-4567 ext. 36005 or reb@uwaterloo.ca.