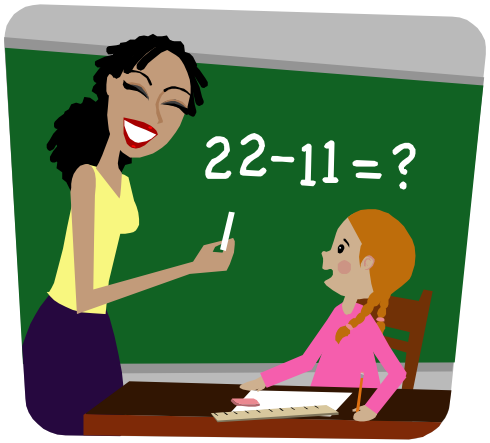
Biology 306 Advanced Ecology



Instructors: Gary Bradfield - Lectures
Mary O'Connor - Lectures
Malin Hansen - Learning Activities
Wayne Goodey - Labs

TAs: Biol 304 & 306

Bill Harrower	Steve Henstra	Liz Kleynhans	Iain Caldwell	Tom Porteus
Robbie Lee	Sarah Fortune	Frances Robertson	Youhua Chen	Peter deKoning

Textbook: Cain Bowman & Hacker (2008) "Ecology".

Vista site: Course outline, missed exam policy, etc.

Course structure + evaluation

- **Lectures (70%)**

  Two Mid-terms (25%) + Final exam (45%)

- **Labs (20%)**

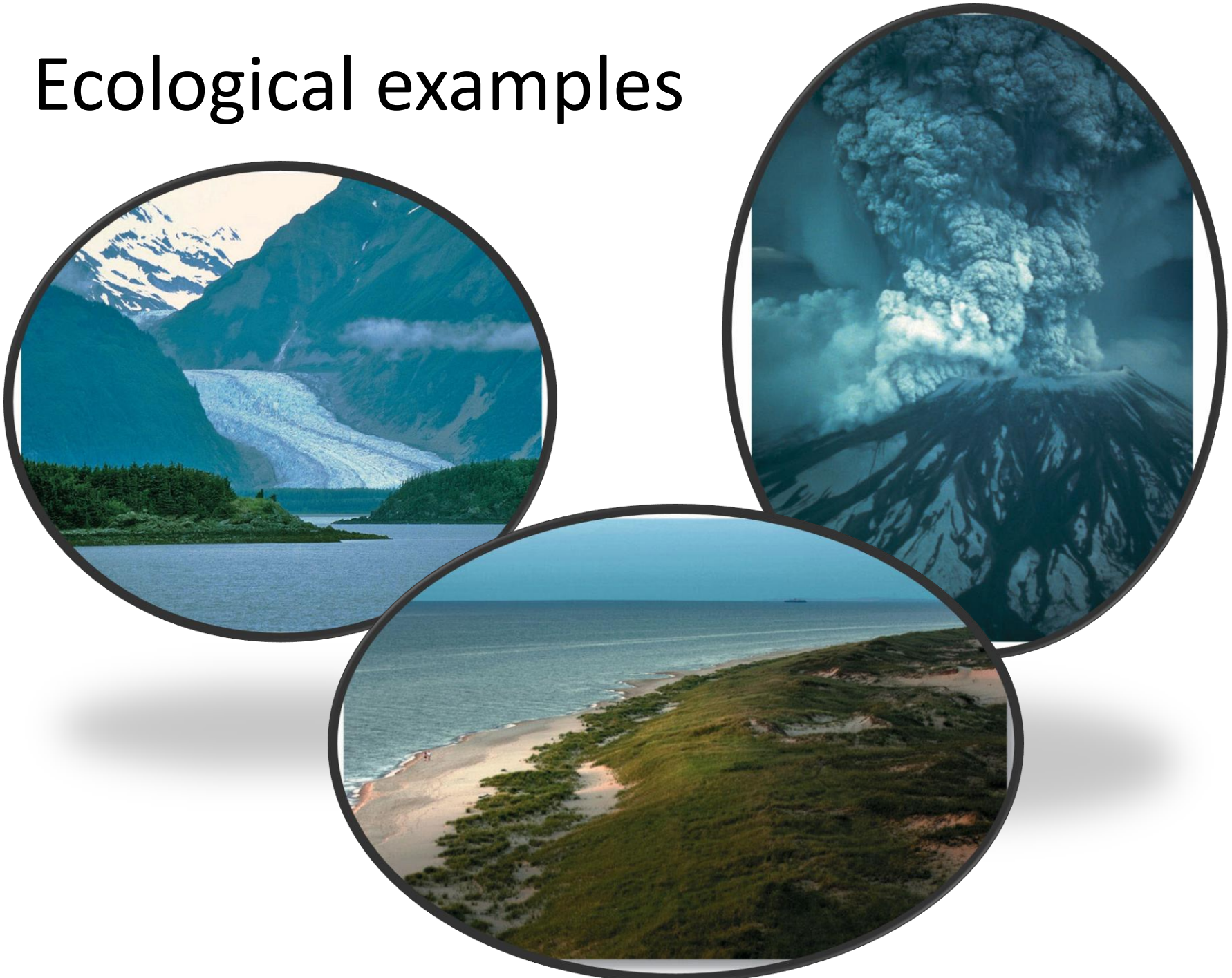
  Three field labs

- **Participation (10%)**

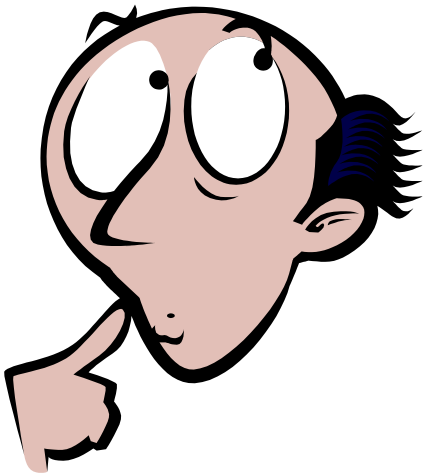
  Learning activities (4%) Clickers (4%)

  Surveys (2%)

Ecological examples



Biol 306 “Big questions”



A. Why do species differ in their population dynamics?

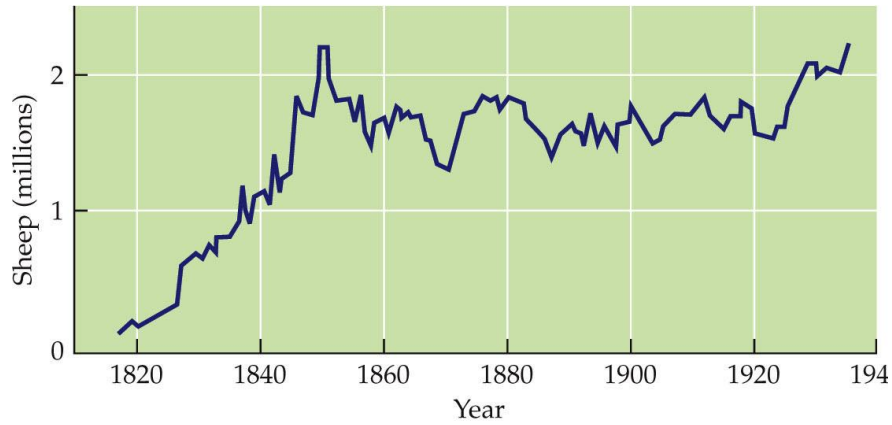
B. How do species coexist?

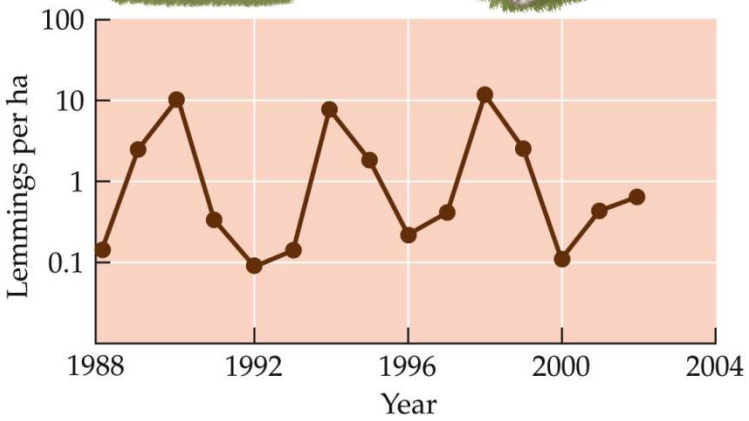
C. Are communities stable?

D. How much biomass is produced, and what is its fate?

Question A: Why do species differ in their population dynamics?

Stochasticity at the population level: environmental vs demographic





COLOGY, Figure 10.4

ECOLOGY, Figure 10.8

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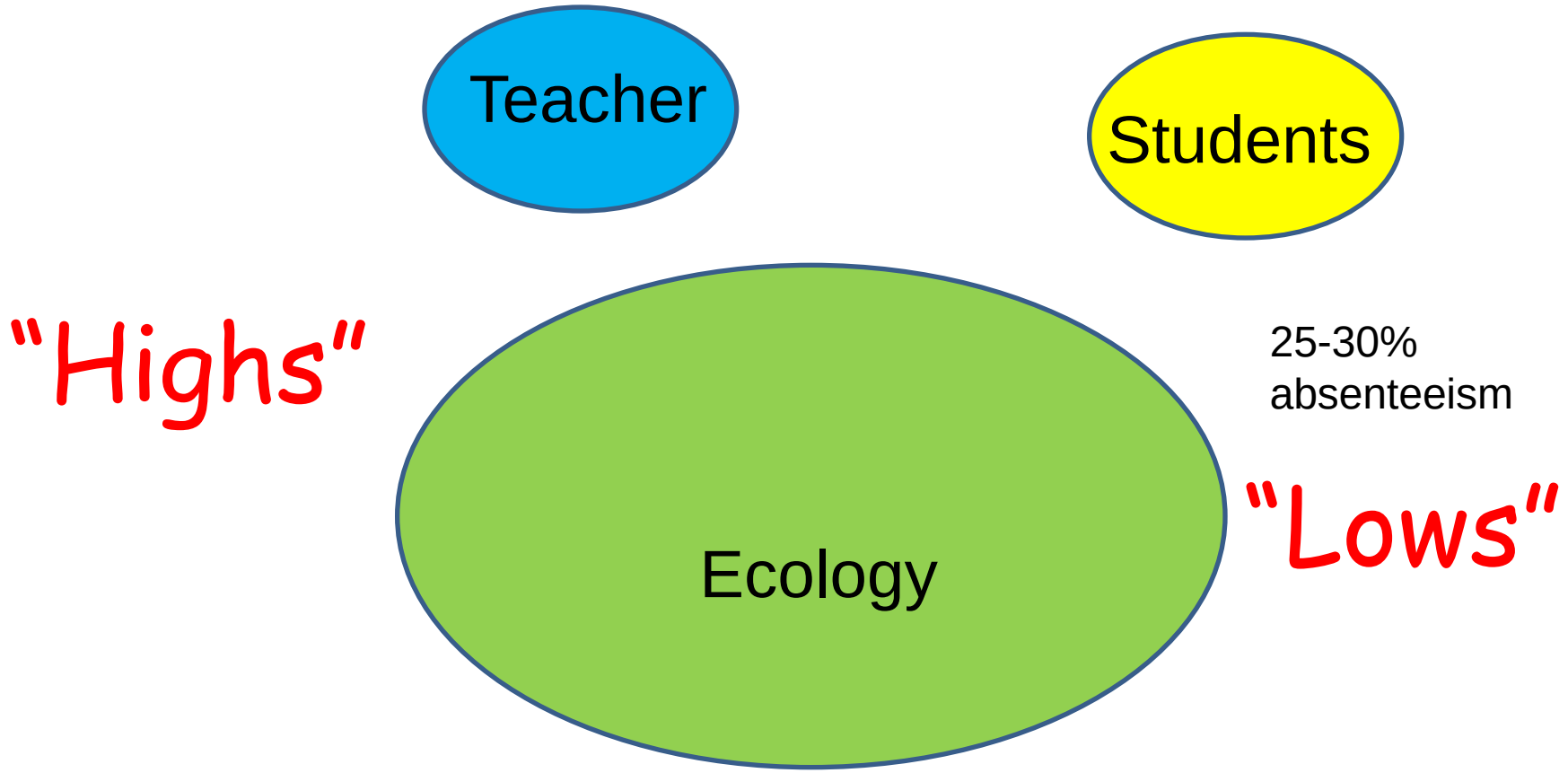
"Dynamics" result from multiple causes

An “evolution” of my approach to teaching…

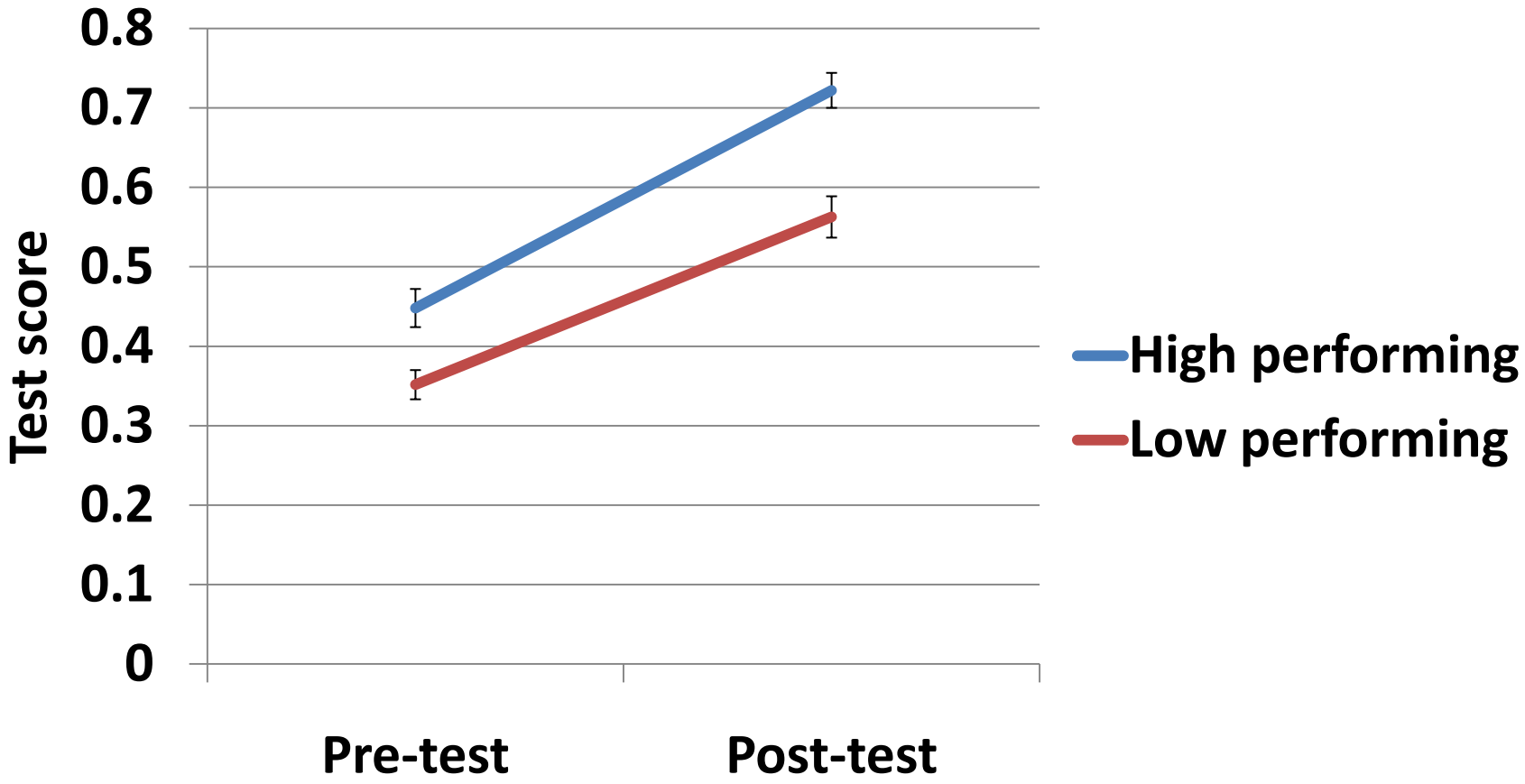


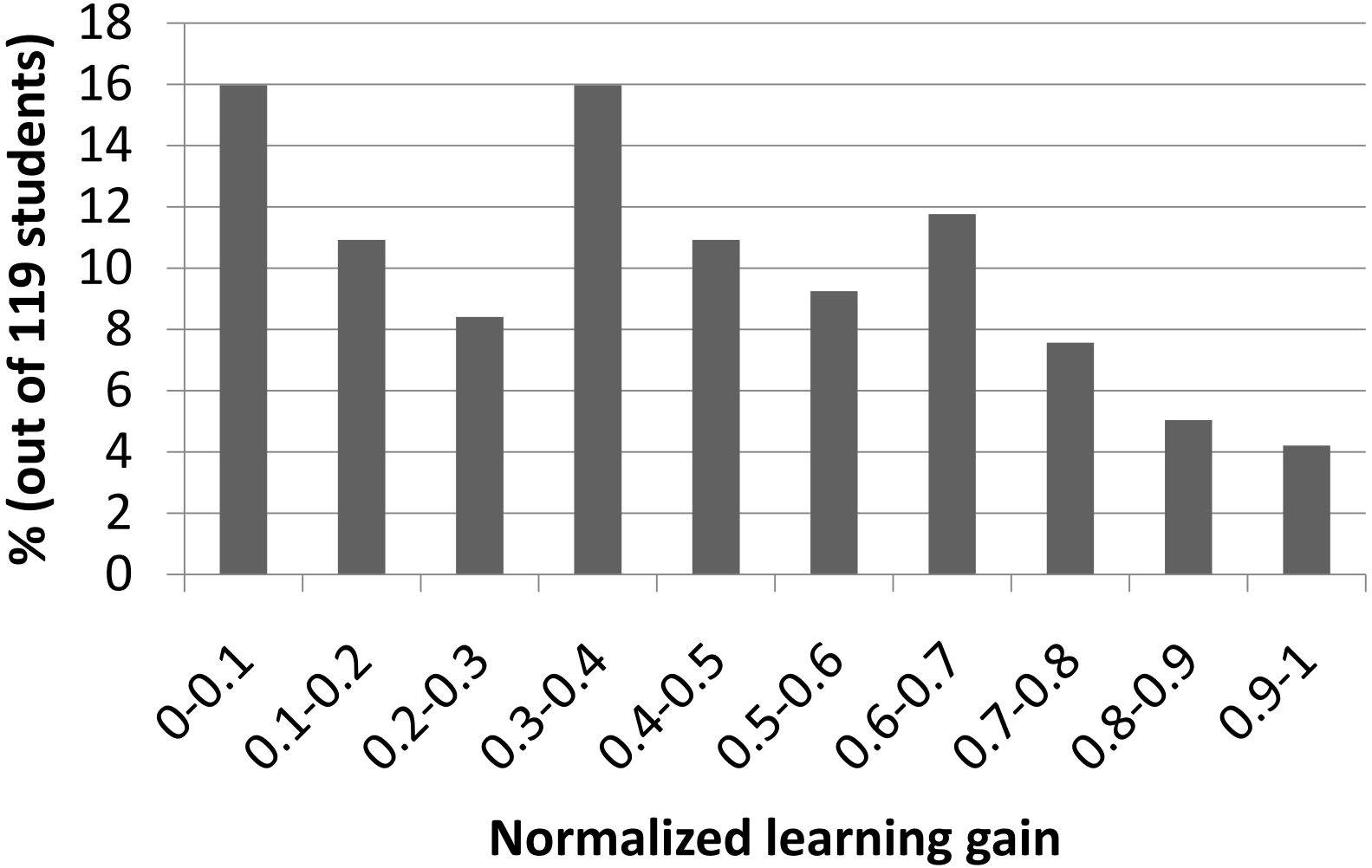
"Ah-ha's"

Conceptual surveys…

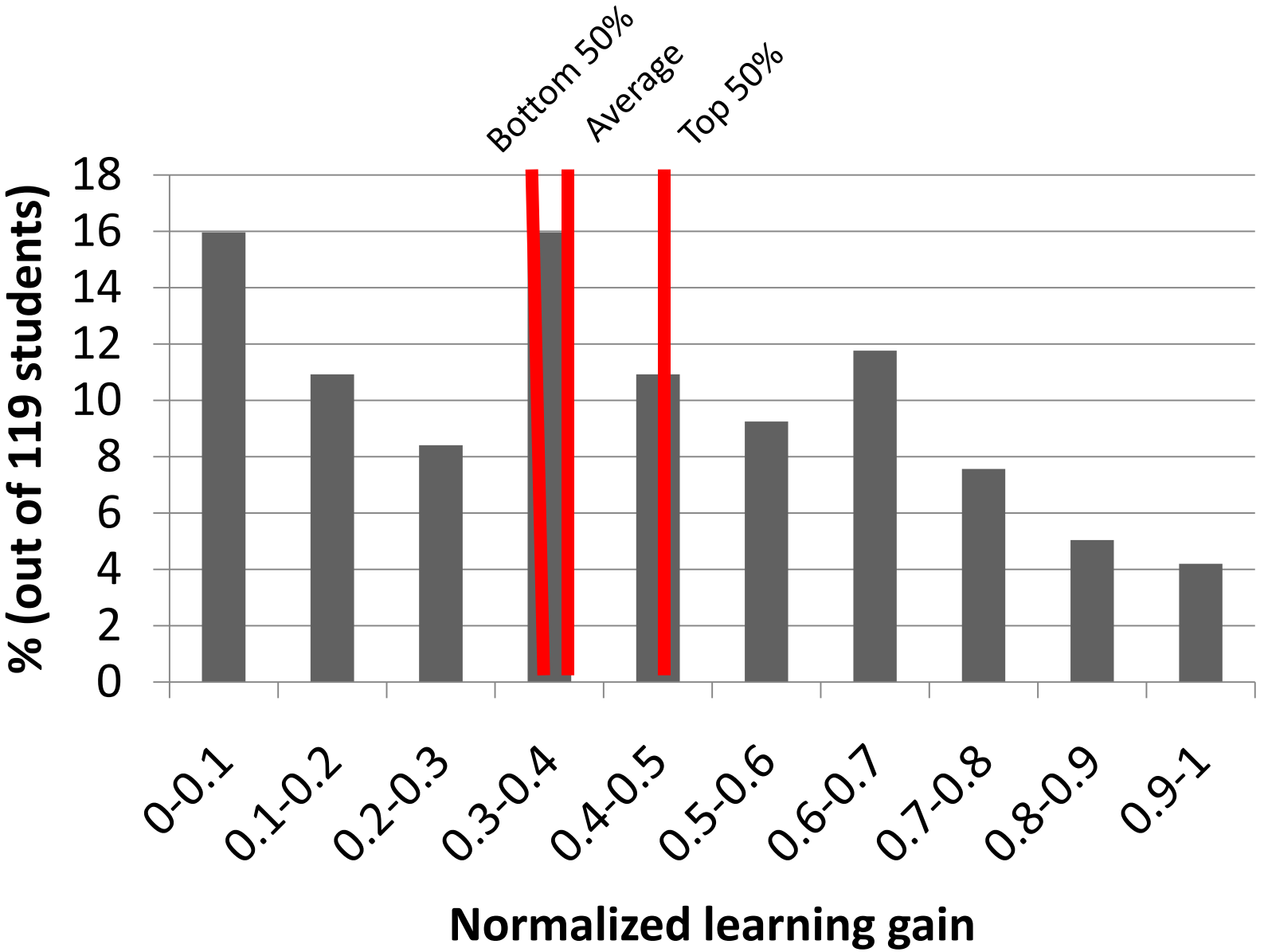
- Density dependence
- Population regulation
- Stochasticity
- Interpreting graphs & data tables
- Translating theory to actual examples
- Designing experiments to test hypotheses

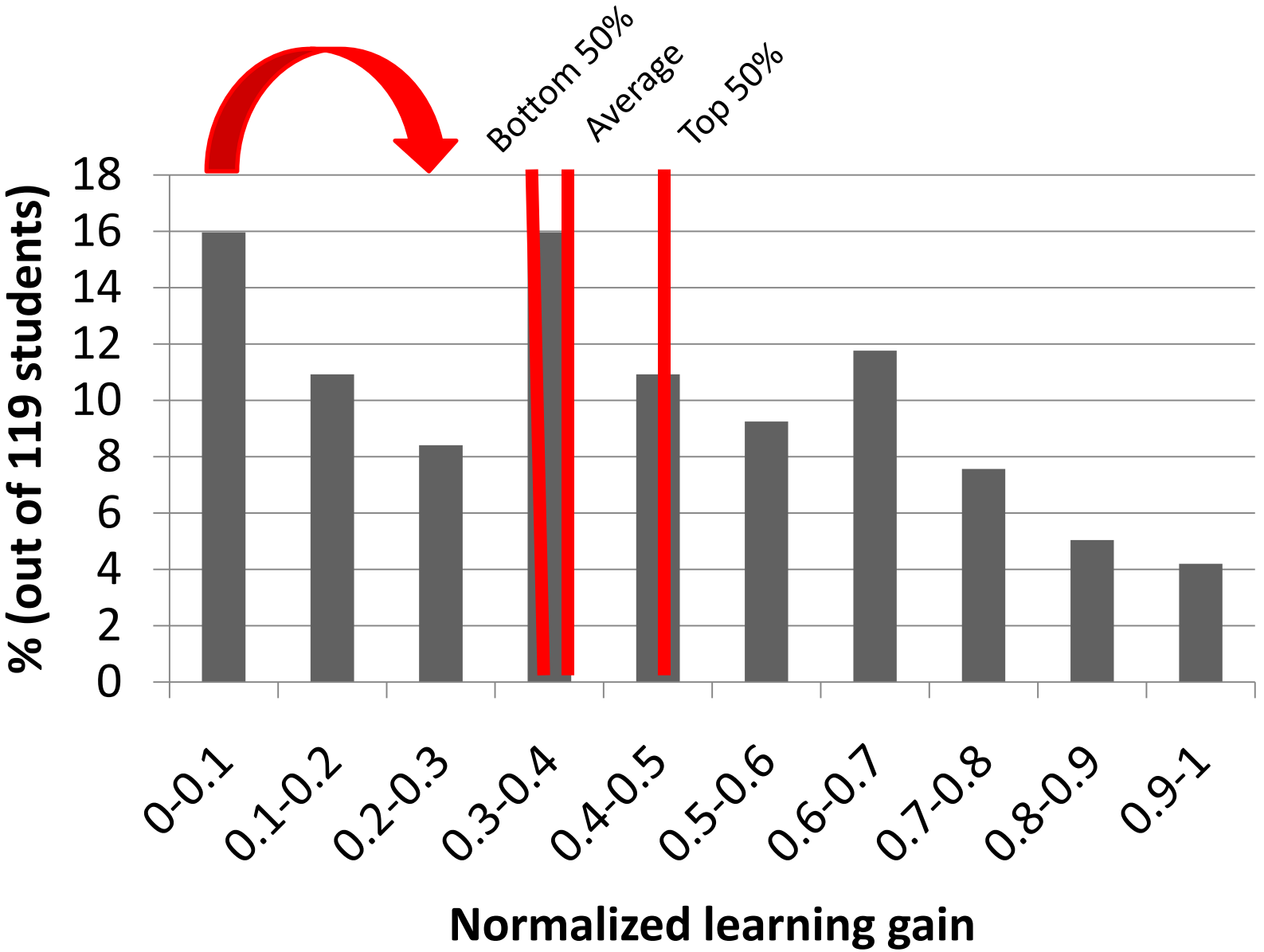
What have we learned from using a conceptual survey in BIOL 306?





Normalized learning gain =
(Post-test score-pre-test score)/ (total possible score-pre-test score)


Bottom 50%
Average
Top 50%
% (out of 119 students)
18
16
14
12
10
8
6
4
2
0
0-0.1
0.1-0.2
0.2-0.3
0.3-0.4
0.4-0.5
0.5-0.6
0.6-0.7
0.7-0.8
0.8-0.9
0.9-1
Normalized learning gain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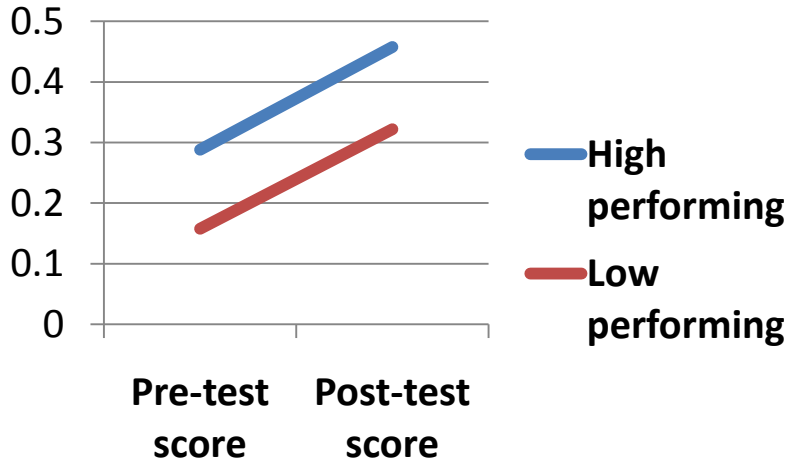
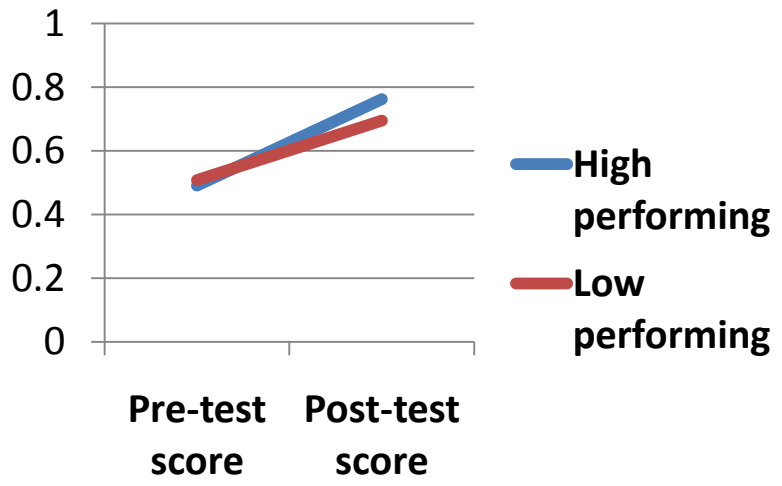
0.7-0.8
0.8-0.9
0.9-1
Normalized learning gain

Tracking learning of fundamental concepts

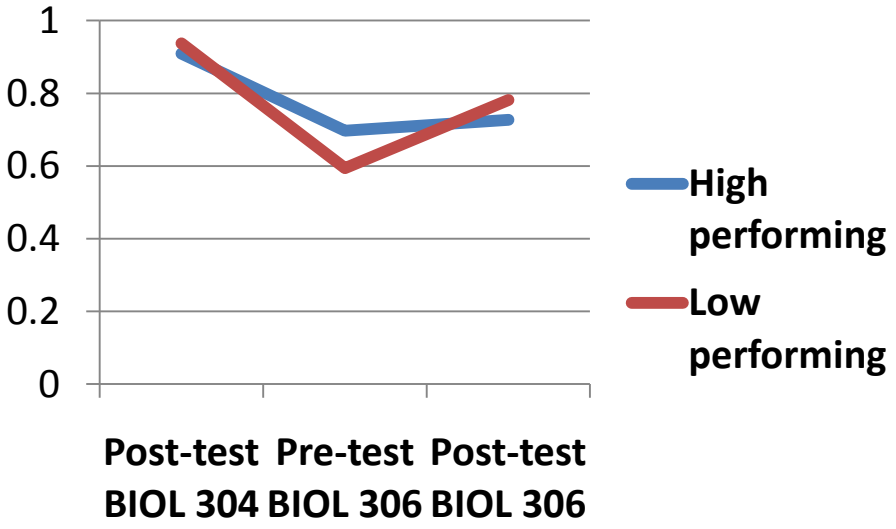


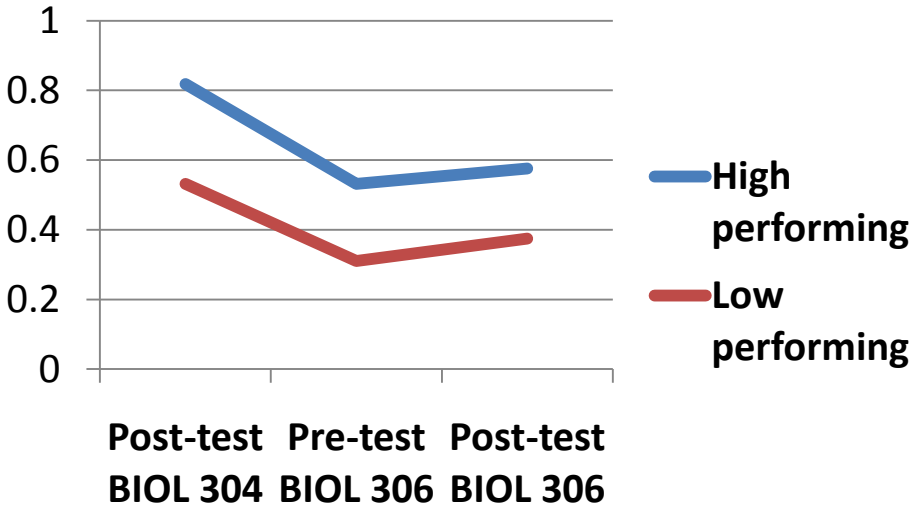
Stochastic vs. deterministic processes



Lotka-Volterra competition model

Tracking the retention of fundamental concepts





Density dependent processes

Population regulation