

# BIOLOGY 112

Lecture 1

## INTRODUCTION

- COURSE POLICIES
- SYLLABUS
- LAB
- EVOLUTION PART ONE

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Office hours 3:30-5:15 W-3-017



My research: Ecology and Evolution of Marine Invertebrates (currently working on deep-sea clams and snails)

## COURSE POLICIES

- No cell phone use in class
- Please sit up front to facilitate discussion and see demonstrations
- Be courteous to your fellow classmates
- Only turn in your own work
- Attendance for lecture and lab is expected and necessary

## Syllabus

- BIOLOGY 112 is focused on the diversity of life (evolution, organism diversity, form and function, ecology)
- 3 in class lecture exams (lowest grade dropped) 40%
- Final exam (comprehensive) 22%
- Lab grades 36% (Lab reports, Prelabs, Lab practical)
- Iclicker questions 2%

## Required material

- Campbell 9th edition (8th is fine)
- A Photographic Atlas for the biology lab (6th edition) by Van De Graff and Crawley
- iClicker\*\*\*\*

## Lab

- Lab manual can be purchased at Quinn graphics LL 024 or downloaded from the course website
- Lab meets in McCormack 114 and 116
- See me after class if you are still on a waitlist

## LAB SECTIONS

| Day   | Section    | Time           | Room    | TA    |
|-------|------------|----------------|---------|-------|
| Wed   | 4          | 1:00PM-3:59PM  | M-1-114 | Sarah |
| Wed   | 2          | 5:30PM-8:29PM  | M-1-114 | Jon   |
| Thurs | 3          | 9:30AM-12:29PM | M-1-114 | Jon   |
| Thurs | 7<br>14554 | 9:30AM-12:29PM | M-1-116 | Mandi |
| Thurs | 1          | 2:00PM-5:00PM  | M-1-114 | Sarah |
| Thurs | 6<br>14555 | 2:00PM-5:00PM  | M-1-116 | Mandi |

## NEXT WEEKS LAB MEETS AT HMNH

- Harvard Museum of Natural History
  - Tickets will be passed out next class
  - READ Lab ahead of time
  - If you need to go back the museum is free on Sunday mornings
  - Take red line to Harvard Square stop
  - TA will be there to help you (ex. Wed night)
  - YOU WILL TURN IN THE ANSWERS TYPED THE FOLLOWING WEEK TO YOUR TA. (NOT PLAGERIZED)

## TA's

will be on bench outside Glass flowers

|  |  |  |
|--|--|--|
| <small>QuickTime™ and a decompressor are needed to see this picture.</small> | <small>QuickTime™ and a decompressor are needed to see this picture.</small> | <small>QuickTime™ and a decompressor are needed to see this picture.</small> |
| Sarah  | Jon  | Mandi  |
| Wed & Thurs<br>PM  | Thurs AM/<br>Sunday AM   | Thurs AM &<br>PM   |

## Phylogenetic Collection Lab

- The final lab of the semester will involve collecting organisms from different phyla
- DON'T wait until the last minute. Read it now and start your collections. It will be winter then. There will be less free things to find.

## EVOLUTION

Diversity of life explained by Darwin "Descent with modification"

Process: how does evolution occur

Pattern: what is the relationship between different forms of life

## CHARLES DARWIN



## Before Darwin

- *Scala Naturae*- Aristotle species are fixed and can be arranged in order
- Linnaeus- developed a system of classification. Binomial format for naming species

## Lamarck- 1809

- Put forth an idea that organisms change over time, but proposed the wrong mechanism
- *Inheritance of acquired characteristics*
- *Innate drive for complexity*
- Famous example of giraffes neck

Quick math and a discolorator are needed to see this picture.

Figure 22.5



## Darwin's observations

- Geographic relationship between species Galapagos Islands
- Different birds on different islands
- Different iguanas on different islands
- Different tortoises on different islands

### ADAPTATION

Figure 22.6

(a) Cactus-eater      (b) Insect-eater

(c) Seed-eater

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Land Iguanas-eat cactus source of fresh water

Marine Iguanas- only found in Galapagos eat seaweed

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Paul S. Hamilton photo

Paul S. Hamilton photo

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### Adaptation

- Traits that allow a reproduction or survival advantage in a particular habitat e.g. beaks in finches or camouflage

(a) A flower mantid in Malaysia      (b) A leaf mantid in Borneo

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### Observations of South American fossils

Fossils of marine organisms in mountains

Similarity fossil mammals to observed mammals

### Darwin's fossil mammals

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Fernicola et al 2009

### Artificial Selection

Figure 22.9

Brussels sprouts      Cabbage      Broccoli

Selection for apical (tip) bud

Selection for axillary (side) buds

Selection for flowers and stems

Selection for leaves      Selection for stems

Kale      Wild mustard      Kohlrabi

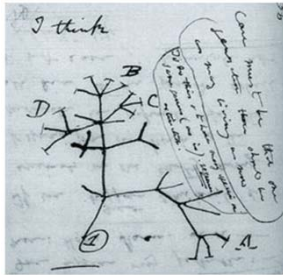
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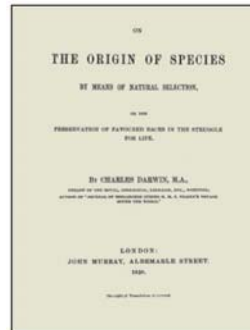
# Geology

- Geologists James Hutton and Charles Lyell perceived that changes in Earth's surface can result from slow continuous actions still operating today
- Lyell's principle of **uniformitarianism** states that the mechanisms of change are constant over time
- This view strongly influenced Darwin's thinking

Diversity of life can be explained by descent with modification



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- The unity of life
- The diversity of life
- The match between organisms and their environment