INTRODUCTION TO SHELLFISH BIOLOGY

Fish 310
Biology of Shellfishes

Lab Outline

- Introductory material
  - Lab syllabus
  - Lab safety
  - Animal Care
  - Field Trips
- Shellfish Introduction
  - Phyla
  - Phylogeny
- Laboratory Methods
  - Microscopes
  - Experimental design

Lab Safety

- No food or drink (this includes gum)
- No cell phones in lab
- Always wear closed toed shoes
- Put scalpel blades in the sharps container.
- Handle preserved specimens and shells carefully. Rinse tools off before and after use

Animal Care

- Handle all animals gently
- Wash your hands before touching animals (removes lotion, etc)
- Keep live animals in the water and avoid temperature, oxygen, and light shock
- Don't feed the animals
- Don't mix instruments used with live and dead animals; clean the instruments
- Handle preserved specimens and shells carefully

Field Trips and Important Dates

- April 29/30 – Union Bay Reserve Field Trip**

  ** late return

- Weekend Field Trip- attendance is mandatory
  - May 18th (Sunday) –Alki Beach Field Trip
    - We will leave UW at 9am and will be back by 4pm
- Species report – Midnight before your lab section (May 28/29)
- Lab Midterm – May 5/6
- Lab Final – June 2/3

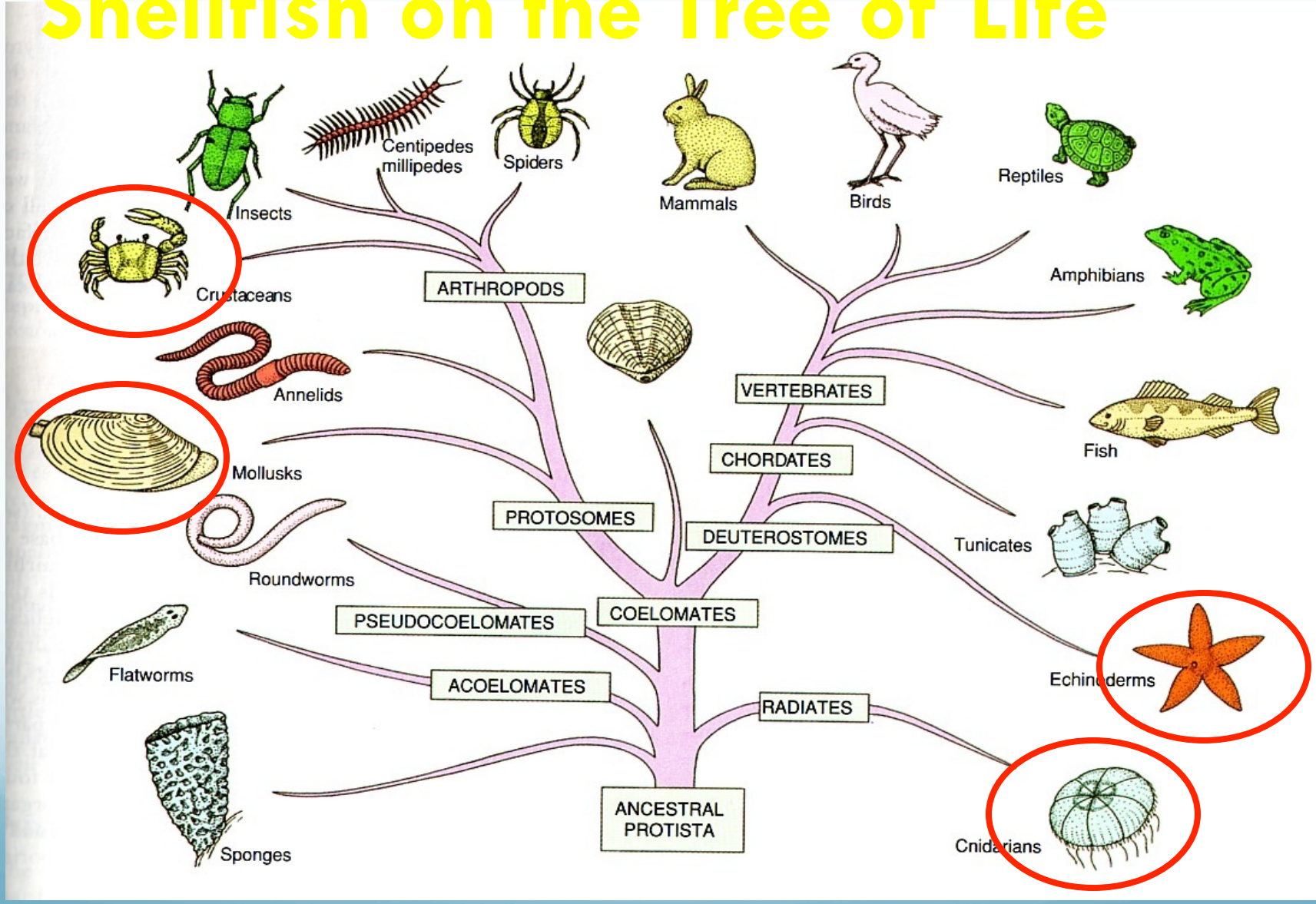
Lab objectives

- Look at representatives from different phyla we'll examine in this class
- Define common features and differences
- Practice using microscopes
- Talk about experimental design

Shellfish

How do you define "shellfish?"

Shellfish on the Tree of Life

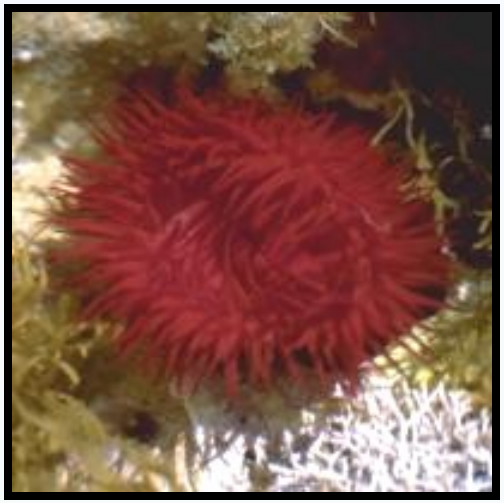


Four Phyla

- Cnidaria
- Mollusca
- Arthropoda
- Echinodermata

Cnidaria

Biology4kids.com



http://www.hero.ac.uk/resources/C_Coral_vs_cricket_300.jpg

Mollusca

Arthropoda

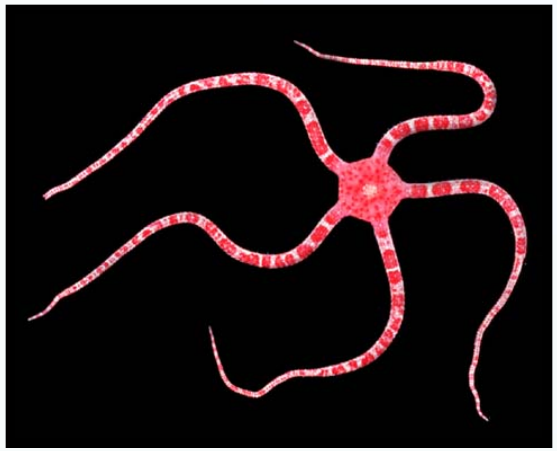
http://img.metro.co.uk/i/pix/2007/07/Lobster_450x388.jpg

http://www.naturalsciences.org/education/deepsea/images/cancer_crab.jpg

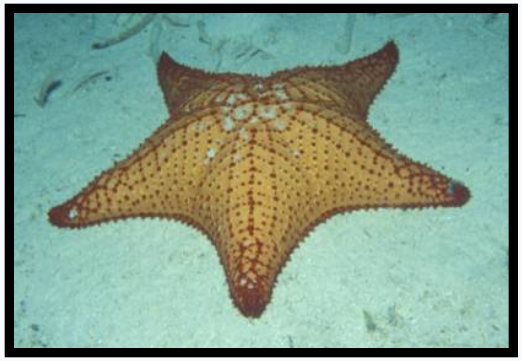
www.whoi.edu/page.do?pid=10897&i=6701&x=35

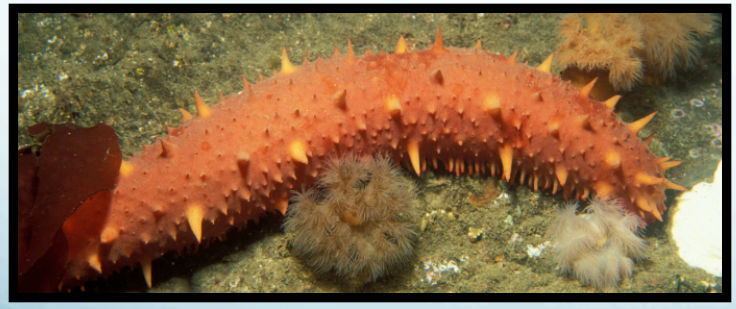
http://sitefly.com/users/21496/pictures/grass-shrimp.jpg

Echinodermata



G. Jensen





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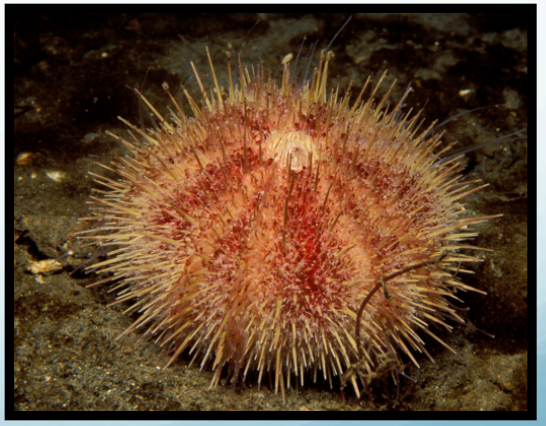


G. Jensen

Classification by Evolutionary Relationships: the Linnaean System

• Domain	Eukarya	Planet
• Kingdom	Animalia	Continent
• Phylum	Mollusca	Country
• Class	Bivalvia	State
• Order	Filibranchia	City
• Family	Ostraeidae	Street
• Genus	*Crassostrea*	*Family Name*
• Species	*gigas*	*Given name*

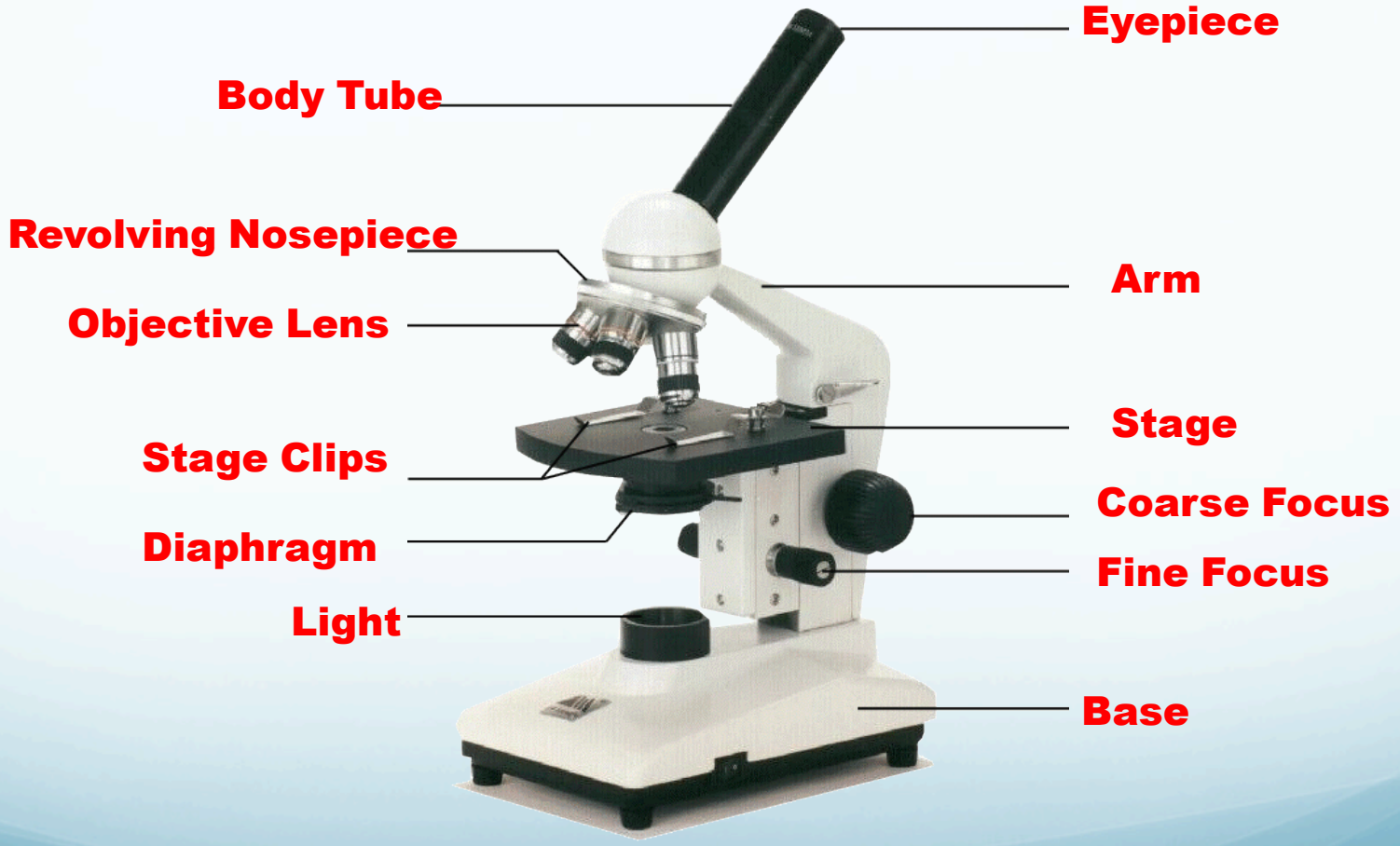
Things to notice about organisms:

- Symmetry
  - Bilateral symmetry
  - Radial
- Cephalization
- Sensory Structures
- Segmentation
- Appendages

Microscope Care

- Always carry with 2 hands
- Always start and end with the 4X objective
- Do not remove slides with the high power objective in place - this will scratch the lens!
- Only use lens paper for cleaning
- Do not force knobs
- Always store covered
- Keep objects clear of desk and cords
- Always power off when not in use

Microscope Parts



Using the Microscope

- Make sure objective lens is at the lowest power setting- 4X
- Place slide on microscope
- Secure slide in place
- Use coarse focus to adjust

Using High Power

- Follow steps to focus using 4X
- Change to higher magnification lens
- Do **NOT** use the coarse focusing knob!!
- Use fine focus knob to bring the slide into view
- Do **NOT** use the 100X oil immersion objective without further training

Troubleshooting

- **1. Image is too dark!**
- *Adjust the diaphragm, make sure your light is on.*
- **2. There's a spot in my viewing field, even when I move the slide the spot stays in the same place!**
- *Your lens is dirty. Use lens paper **only** to carefully clean the objective and ocular lens.*
- **3. I can't see anything under high power!**
- *Remember the steps, if you can't focus under 4X you won't be able to focus anything under high power.*
- **4. Only half of my viewing field is lit, it looks like there's a half-moon in there!**
- *You probably don't have your objective fully clicked into place.*

Clean Up

- Store microscope with 4X objective in place
- Wrap cords and cover microscopes
- Wash slides in the sink and dry them, placing them back in the slide boxes to be used later
- Throw coverslips away in sharps container

Designing a Research Experiment

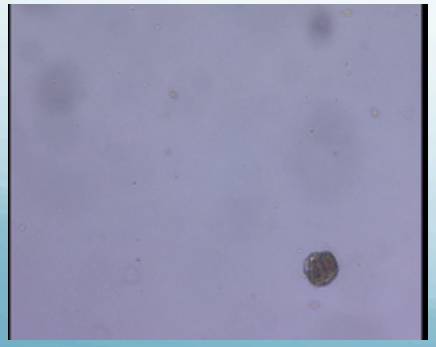
- You will be designing and conducting your own experiments over a 1 week period
- The goal of these experiments is to understand the effects of ocean acidification on aquatic invertebrates
- You should begin thinking about your experiment before the next week
- You should be in a group of 3-4 students

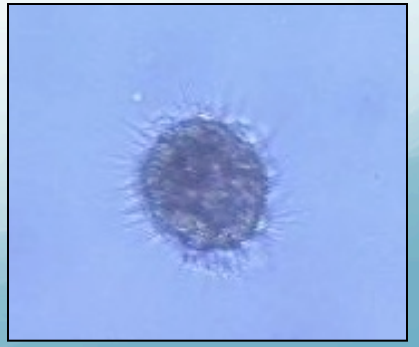
Designing a Research Experiment

- Hypothesis
- Data Collection
- Results & Statistics
- Writing your lab report

Designing a Research Experiment

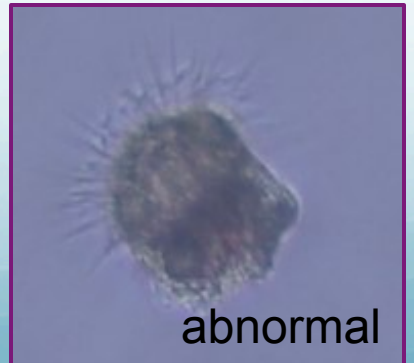
- Hypothesis: Changes in oceanic pH affect the immune function of larval Pacific oysters
- *Or* phrase like a research question: How does ocean acidification affect the immune function of larval Pacific oysters?

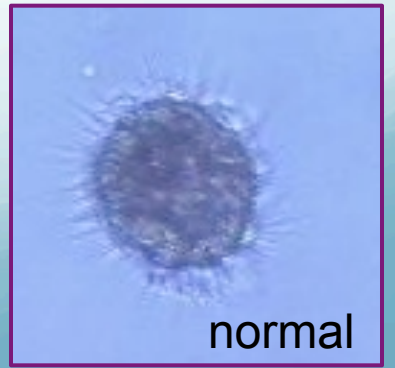




Designing a Research Experiment

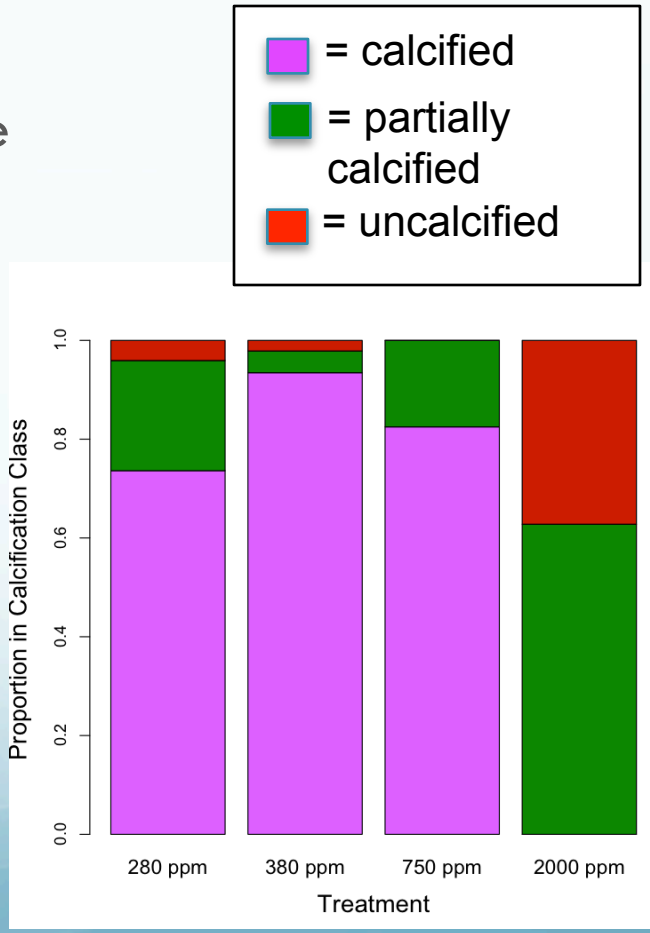
- Data Collection
  - Daily mortality
  - Daily larval collection for gene expression
  - Daily assessment of larval morphology
- Results & Statistics
  - Compare between treatments: mortality, morphology, expression levels of genes involved in the immune response





Writing Your Lab Report

- Background research
  - What have other scientists discovered about the effects of OA?
  - How does your research contribute to the overall body of knowledge?
- What statistics should you use?
  - What statistics have other researchers used?
  - Ask your TAs!
- Take good notes



TO DO BY NEXT LAB

- Form your groups and start thinking about your research project. Weds/Thurs next week we will create detailed plans.
- Make sure you can make the hatchery field trip on April 28 or 29.
- Plan on attending Alki beach field trip on Sunday May 18th.
- Start thinking about your species profile video!