Conducting Successful Labs

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UC Merced TA Orientation
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with
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What Do We Mean by “Lab”? 

- Types of Labs at UC Merced 
  - Dry Labs
    - Physics, Computational Biology, Math
  - Wet Labs
    - Biology, Chemistry, Engineering
By the end of this session, you will be aware of how to:

- Share expectations
- Build a respectful learning environment
- Thoughtfully and carefully plan each lab session
- Collaborate with your fellow TAs
Activity: What Can We Learn About Teaching Labs from Experience?

3 minutes:

- Find a partner or two
- Discuss your experiences as a student or teacher in a laboratory setting
- Identify teacher and/or student behaviors that made it enjoyable and successful
- Identify frustrations you have had
- Prepare to share responses
Defining Relationships with Students & Learning Expectations
Respectful Learning Environment

- Everything should be designed to develop thinking skills and to achieve predetermined and transparent learning outcomes

- All students participate in the lab and support each others’ learning

- All students are respectful of their colleagues

- Promoting collaboration among students while helping them recognize the difference between collaboration and their own work

- Students express their learning in their own words even if they have worked in groups
How Do We Create a Respectful Learning Environment?

- It all comes down to preparation!
  - Learn Students Names
  - Share Expectations
    - Teaching Philosophy
    - Learning outcomes
    - Grading (rubric, example assignments, ask permission)
    - Course policies
    - Lab safety
Planning Activities to Achieve Desired Learning

- Start with...
  - What do I want my students to learn?
  - Design activities to achieve this

- A Few Examples...
  - Ice breaking activities
  - Lab safety
  - Academic Honesty
Activity: How Might you Teach the Syllabus?

5 minutes

- Learning outcome: Students will be able to describe key course expectations and policies

- Working in pairs, develop an activity to enable students to achieve this outcome?
Course Goal

- Students will learn to pipette.

Student Learning Outcomes

Students will be able...

- to *explain* how to use a pipette including basic sterile techniques.
- to *pipette* a range of volumes accurately.
- to use pipettes and *apply* proper sterile techniques to successfully *set-up* PCRs and *load* gels.
What are the Key Elements of an Organized Lab Session?
Preparation!

- General student learning outcomes
  - Conceptualizing lab, not just highlighting little facts
  - Collecting necessary data for lab write-up, understanding expectations
- Participation
Preparation!

- Know what the students are supposed to learn and why, i.e. identify learning outcomes
- Connections with course materials
- Preparing pre-lab lecture or activities
  - Getting students to engaged, asking ‘why?’
  - Decide how to introduce the lab most effectively
  - Making sure the students are prepared
- Preparing extra material to emphasize areas of difficulty
- Be an authority on the material
Planning ahead so that students are prepared to achieve the outcomes

- Students have read lab manual
- Prelab exercises, quizzes
- Flow chart of the experiment
- Students actively explain to each other
Anticipating pitfalls in experiments

- TAs have completed the lab themselves, preparing yourself for the material

- Communicating with lab coordinator, other TAs

- Running lab in a timely manner
Running an Instructive and Meaningful Semester of Labs
Collaborate with Your Fellow TAs

- Sharing workload
  - Identifying learning outcomes
  - Lesson planning
  - Developing rubrics

- Standardized scoring and learning across classroom and student perceptions of fairness

- Group grading

- Communication! Troubleshooting!
Exchange Feedback

- For students
  - Grading (rubrics)
  - Timely, critical evaluation of students work
  - Making sure the students understand their mistakes

- For TAs
  - Assess student learning – are they achieving the outcomes?
  - Evaluations
    - Brief questionnaire- mid-semester, after every class
  - Video, resources from CRTE
You should now be aware of how to
- define expectations
- build a respectful learning environment
- plan each lab session
- collaborate with your fellow TAs

Being prepared is the most crucial aspect of being an effective laboratory TA.
Resources

- [cte.umdnj.edu/traditional_teaching/traditional_laboratory.cfm](cte.umdnj.edu/traditional_teaching/traditional_laboratory.cfm)
- [honolulu.hawaii.edu/intranet/committees/FacDevCom/guidebk/teachtip/teachtip.htm](honolulu.hawaii.edu/intranet/committees/FacDevCom/guidebk/teachtip/teachtip.htm)
- [www.yale.edu/graduateschool/teaching/resources.html](www.yale.edu/graduateschool/teaching/resources.html)
- [oic.id.ucsb.edu/ta-handbook/chapter-3/lab-sections-ta](oic.id.ucsb.edu/ta-handbook/chapter-3/lab-sections-ta)