Preparing to Run a Laboratory Class

Adapted from Allen et al. (2009) and Black et al. (1996)

This article describes what to do in advance to prepare for each lab class so that you can run the lab section effectively. These suggestions are meant to be applicable to laboratory classes in most disciplines. When in doubt about how to best support your laboratory class, check with your departments Graduate Student Mentor (GSM) or laboratory supervisor for more specific and detailed information.

Preparing for the Laboratory Class

Use this strategy list to think about your preparation for teaching in the laboratory class. It is a good idea to check with experience GSIs on these issues for each lab.

- *Know the concepts*: Refamiliarize yourself with the subject you will be teaching. Review and study the concepts on which the laboratory is based. Make sure you are familiar with the data analysis and necessary calculations.

- *Clarify concepts*: Be able to clearly state the primary goal of the laboratory and how it relates to the lecture theory. Create an outline of the main points or a handout that describes how these main points connect with the laboratory procedures. You do not need to repeat the lecture in lab! Laboratory coordinators suggest this overview should be around 5 minutes.

- *Know the procedures*: Perform the laboratory activity at least one week in advance. Follow along with the student manual to identify potential issues in the student directions or steps that might require extra time. If you are unsure of a procedure or how something works, ask a more experienced GSI or your laboratory coordinator for help.

- *Clarify Procedures*: Provide your students with "Lab Tips" on the board or in a handout with suggestions for success. Be ready to demonstrate any difficult procedures or uses of equipment. Think about what you can tell them up front and what is best demonstrated while they are working in the lab.

- *Identify Safety Issues*: Make note of any potential safety issues and think about how to clearly describe these to students. See p. 112 for more information on integrating safety into the laboratory.

- *Identify Equipment Issues*: A general knowledge of each piece of equipment is very useful, (e.g., its purpose, how to turn it on, in what units measurements are given, and whether a manual exists). Find out how to do any calibrations for the lab. Be familiar with the functions of all controls. Place tape over any controls that students should not change, or encourage them to do so for the sake of the experiment and check that they are properly reset at the end of lab. Have a plan for what students should do if their equipment does not work. Don't assume that everything works! Have a back-up plan for non-functioning equipment.

- *Think about time management*: When preparing the lab, keep in mind how long to allow for particular tasks. What should students be doing after a half hour, an hour, three hours? Try to anticipate any problems your students will have with budgeting their time on various sections of the experiment. Figure out how you can pace your students so they all finish on time.

- *Identify Potential Questions*: Think about what questions you can ask students before they begin. These questions can help students focus on the main goals of the laboratory and allow them to check their own understanding of the concepts and procedures. For suggestions on how to prepare a variety of questions see "Strategies for Managing Discussions with Groups in the Lab Class" on page 114 and "Typology of Questions" on page 98.

References

Allen, D., O'Connell, R., Percha, B., Erickson, B., Nord, B., Harper, D., Bialek, J., & Nam E. (2009). *University of Michigan Physics Department: GSI training course.* Ann Arbor, MI: University of Michigan Physics Department.

Black, B., Gach, M., & Kotzian, N. (1996). *Guidebook for teaching labs for University of Michigan Graduate Student Instructors.* Ann Arbor, MI: Center for Research on Learning and Teaching, University of Michigan.