

## Strategies for Effective Teaching in the Laboratory Class

Adapted from Allen, O'Connell, Percha, Erickson,  
Nord, Harper, Bialek & Nam (2009)

As a GSI you are transitioning from a student to an instructor, from someone whose responsibility was to learn in the lab class to someone who now helps others learn in the lab class. You will need to develop your own teaching style, your own way of interacting with students, and your own set of actions that determine the learning atmosphere of the classroom. Use these do's and don'ts to help you think about what you can do to be a successful new instructor:

- *Classroom Attitude:* Do choose to enter the classroom with a good attitude that exudes interest in your subject and excitement for learning about this subject. As an instructor, you now have the ability to set the tone for the entire class and how students will treat each other. See page 57 on “Constructing and Maintaining Authority in the Inclusive Classroom” for continued discussion of this topic. Don't patronize, criticize, or be sarcastic with students about their prior knowledge or current interests even as a joke— you are there to help them develop and get them interested in learning more through encouragement and support.
- *Classroom Diversity:* Do choose to embrace the diversity of students in your classroom, recognizing that everyone comes to the university setting with his/her own social and cultural history. Consider collecting information about your students' experiences and background knowledge to learn more about your students. Create a classroom where every student can succeed in science by making yourself available to answer student questions, using a variety of examples (visual and verbal), and encouraging students to exchange ideas with one another. See p. 52 on “Diversity Issues for the Instructor: Identifying Your Own Attitudes” for more information on this topic. Don't overlook instances of disrespect towards yourself or another student. Assert authority and state that nothing less than maturity and respect for all will be tolerated in your classroom.
- *Classroom Timing:* Start and end the class on time. Outline what parts of the lab should be completed by identified checkpoints and be clear about which activities need to be completed during class time. Periodically announce what sections students should be working on at a given time. As an instructor you want to acknowledge that students complete their work at different rates but you do want everyone to finish on time. You will want to aid the groups that are lagging behind or having difficulty with procedures. Don't wait to start the lab until everyone shows up, as this will encourage lateness. Be consistent and prompt about starting, and this will naturally promote the importance of arriving on time.
- *Laboratory Overview:* Do introduce the laboratory using a brief, but well organized overview of the important concepts for the current subject and the lab procedures that will help the student successfully complete the experiment. Create “Lab Tips,” or notes on the board or in a handout with suggestions for achieving success. Consistently provide short overviews that are focused on making links between the class concepts and the necessary lab skills to get started. This approach will help convince your students that your lab overview is relevant and useful and that they should pay attention to it. Don't assume that you need to explain every procedure in detail before students begin the lab. If students expect the GSI's overview to provide all the details, then some students will stop preparing for lab and rely heavily on their GSI instead of learning on their own.
- *Laboratory Demonstrations:* Do start class by demonstrating key techniques or equipment operation or describing the location and handling of special materials. Gather people close to focus them on what you are doing and to ensure that everyone can see and hear. Again, keep it brief, focus on the key terms and functions that are in the procedures, and use the demonstration to generate excitement about the laboratory. Don't attempt to demonstrate equipment you have not practiced using. While it is okay to make mistakes during your demo and instructionally important to describe how you made the mistake, it is best to familiarize yourself with the equipment operation prior to the demonstration.
- *Board Work:* Do use the whiteboard/chalk board to clearly organize the key information for the day, as it is important for an instructor to provide visual cues to support verbal information and directions. Organize the information on the board using boxes for important ideas or key formulas and number procedural items to make them easy for reference throughout the laboratory. Leave your key points on the board for students to reference during class. These points can aid you when answering student questions later in the laboratory class.

- *Laboratory Instruction:* Do maintain an active role and consistent pace of interaction throughout the laboratory period so that students learn what to expect from you as an instructor. Include several moments of whole class instruction at key points in the laboratory. When you are asked the same question three times, or three groups have the same problem, it is likely that other groups will have the same question or problem as well. Gain everyone's attention and use this moment to provide targeted "just in time" instruction or feedback for everyone. During the class, move around the room to make yourself accessible to students, focusing equal time on groups that ask and those that don't ask for help. Be aware of the progress of all student teams, address students by name whenever you get the chance, and listen to what is being said in groups to help you anticipate and diagnose instructional problems. Don't assume that since a group is quiet, they know what they are doing. You can diagnose a laboratory problem early on by observing what is being done or said in seemingly on-track groups. It is always useful, and never unappreciated, to approach a group and prompt them with "Tell me what you are doing..." to find out if they are on the right track.
- *Laboratory Roles:* Do remind your students that you have a role to play as an instructor—you are there to facilitate their learning and this role requires you to act differently than you would if you were a peer. This means you will push them to take responsibility for their own learning, you may answer a question with a question to get them to think about an idea, or you may tell them "try and see what happens..." to foster learning. Remind them that you are doing this to help learning and to develop their own expertise, not just to be difficult. Don't be vague or unclear about what you are doing, or unsupportive in your actions. At other times you do just need to show students how to do something, or just provide an answer to help students move past a sticking point. A good lab instructor provides a mix of guided support.

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## 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.