Chapter 15

Effective Methods of Training Biology Laboratory Teaching Assistants IV: The Use of Skits, A Teaching Plan, and Dealing With Plagiarism And Grading

Ann S. Lumsden[1] and Judith G. Morgan[2]

[1]Department of Biology
Florida State University
Tallahassee, Florida 32306-1100
(850) 644-6826
lumsden@bio.fsu.edu

[2]Biology Department
Emory University
Atlanta, GA 30322
JMORGAN@biology.emory.edu

Ann Lumsden received her BS (biology) from Millsaps College, MS (biology education) from University of Central Florida, and PhD. (Education) from Florida State University. She is a faculty member in the Department of Biological Science at FSU where she coordinates the lecture and labs for the Non-major Biology Program. This program serves 4600 students per year. Ann teaches several biology courses at Florida State. She is the Faculty Director and founder of the Department of Biological Science Teaching and Learning Workshop. Ann is the author of the laboratory manual, *From Cells To Salt Marshes*, published by Pearson Publishing. Ann was Chair of the Host Committee for the 1998 ABLE meeting at Florida State.

Judith Morgan received her BA in Biology at Milligan College and her Master's at the University of Virginia and Ph.D. at the University of Texas. Since 1978 she has served on the faculty in the Biology Department of Emory University where she directs the Introductory Biology Laboratory and Coastal Biology Programs. She is co-author of the laboratory manual, *Investigating Biology*, published by Benjamin/Cummings Publishers. She has been an ABLE member since 1986, and chaired the Host Committee for the 1994 ABLE meeting at Emory.

Reprinted From: Lumsden, A. S., and J. G. Morgan. 2003. Effective methods of training biology laboratory teaching assistants IV: The use of skits, a teaching plan, and dealing with plagiarism and grading. Pages 223-238, in Tested studies for laboratory teaching, Volume 24 (M. A. O'Donnell, Editor). Proceedings of the 24th Workshop/Conference of the Association for Biology Laboratory Education (ABLE), 334 pages.

Contents

Introduction

This workshop was a continuation of a dialogue on training teaching assistants that began at the 21st ABLE Conference as a major workshop (Haag *et al.* 1999) that covered TA Training programs, and continued as a workshop at the 22nd conference (Dickey et al. 2000) that focused on methods for preparing TA's to facilitate learning in the classroom effectively. Last year at ABLE 2001, (Berkelhamer and Cordon (2001) focused on training assistants to grade consistently. This year we added ideas that work with teaching assistants at any university no matter what size or type. We gave an overall summary of the respective University programs and then a summary of our departmental programs. We also added some ideas that work in our teaching/learning workshops that each of you could add to your workshop (training) curriculum -- two skits -- one about the first day of class and the other about ethics in dealing with students. We also added a Teaching Plan, and guidelines for dealing with plagiarism and grading. The skits were done in the session and then discussed, and each of the topics were discussed by all in attendance.

Many of the ideas presented in the previous ABLE Workshops 1999, 2000, and 2001, are used by faculty from many of our colleges and universities to help orient and train new graduate students and seniors or adjuncts to teach in the university setting. Most of the teaching by graduate students and seniors is done in the laboratory setting and some in the lecture classes. Many of the biology graduate students are from biology programs that offered no education classes or workshops on teaching, dealing with students, grading, or any of the topics covered by our ABLE Workshops. This series of workshops will give you ideas for setting up and presenting a training program or workshop at your university. As Michael Flachmann (California State University-Bakersfield) wrote in the Teaching Professor, March, 1994, "Good teaching is a journey rather than a destination." We will move along on that journey in this article to help each of you improve your teacher training or teaching workshop.

Teacher Training Workshops

Florida State University Workshops

Workshop for All New Graduate Students

Florida State University offers a three-day teaching workshop for all new Graduate Students. The workshop speakers come from all of the departments on campus and are experts in areas like testing, evaluation, large class activities, small group discussions, handling the challenging student, active learning, how students learn, and many other topics for young new teachers. This workshop is held in the conference center on campus and is run by the Office of Instructional Development Services (IDS). Many departments require their new graduate students to attend. Biology Graduate Students attend the Department of Biological Science Workshop instead of this one. The faculty and Staff of IDS have produced a Teaching Handbook entitled *Teaching at FSU,* which is on the CD that was handed out at ABLE 2002 during this Workshop.

Workshop for All New Graduate Students and Seniors Who Will Teach in the Department of Biological Science

The Department of Biological Science at Florida State University requires a week long (40 hour) Teaching and Learning workshop for all of the new graduate students and seniors who will teach in the department (40-50 per year). The curriculum includes topics covered in the University Workshop plus biology specific topics like how to run a lab. The workshop is the week before school begins, and is held in a multimedia classroom in one of the biology building on campus. Breakfast rolls, orange juice, and coffee are served in the morning and lunch each day at noon, snacks of popcorn and soda are served twice a day. In addition to the University Teaching Booklet, two other booklets have been developed specifically for biology graduate student teachers. The Departmental booklets were also on the CD handed out at ABLE during this workshop. The outline for the workshop is below.

FLORIDA STATE UNIVERSITY
DEPARTMENT OF BIOLOGICAL SCIENCE
OUTLINE FOR TEACHING WORKSHOP

Monday, August 19, 8:30 a.m. - 4:30 p.m.

8:30	Meet at 421 Carothers Hall
8:30	A. **Welcome: Dr. Ann S. Lumsden** *(Department of Biological Science)*
8:30 – 9:30	B. **Welcome and Introduction to the Department of Biological Science:** **Dr. Tom Roberts**, *Chairman, Department of Biological Science*
9:45	C. **Orientation**: 1) Name game and map 2) Seminar, outline, and objectives 3) Assignments
	Break
11:00	D. **Preparation**: **Dr. Ann S. Lumsden** 1) Lesson plan 2) Components of effective presentations 3) Syllabus (course outline, etc.) 4) Practice of the lesson

12:00 E. **Lunch**

1:00 F. **President**: **Sandy D'Alemberte**

1:45 G. **Skit by Biology Players** – "The First Day"

2:15 H. **The First Day of Teaching**:
1) Self introduction
2) Introduction to the course and text
3) Ice breaker and roll call
4) Course outline
5) Getting started

3:15 I. **Self Test**: Your Learning Style

3:45 J. **Course Info** – Introduction

Tuesday, August 20, 9:00 a.m. - 5:00 p.m.

9:00 A. **Review Monday**: **Dr. Ann S. Lumsden**
Introduce Today's Agenda: **Dr. Ann S. Lumsden**

9:15 B. **Learners: Dr. Jeff Garis, *Director, Career Development Services, The Career Center***
1) Learning styles
2) Different kinds of learners
3) Your learning style and teaching style

10:15 C. **Learning: Dr. Ann S. Lumsden & Andy Zwolinski**

11:15 D. **Movie**: Speaking Effectively to One or One Thousand
1) Importance of speech
2) Body language
3) Self concept
4) Attitude

E**. Video Order**: Sign Up on Board

12:00 F. **Lunch**

12:30 G. **Videotaping of Each Participant**
(introducing self: name, hometown, high school, college, interests, major professor at FSU, Ph.D. or Masters, area of study; 2 minutes)
1) Procedure: taping, viewing, and evaluation of these participants, repeated until entire group has been taped.
2) Evaluation
a) Preparation
b) Presentation
c) Evaluation forms

2:00 H.. **University Welcome** for All New Graduate Students (We will go by vans)

3:15 I. **Videotaping** (cont'd) for Graduate Students if needed

Wednesday, August 21, 9:00 a.m. - 3:30 p.m.

9:00 A. **Methods of Instructions**: **Dr. Ann S. Lumsden**
1) Lecture
2) Questions to use with lecture
3) Questions to lead a discussion
4) Films, slides, overhead projection
5) Labs
6) Field trips
7) Other student involvement

B. **Examples from the Department of Biological Science** (Room 208 Biology Unit 1)

9:30 - 9:50 1) **Preparation for Teaching: Dr. Marc Freeman**, *Professor*
10:00 - 10:20 2) **Teaching: Dr. Tim Moerland**, *Professor*
10:30 - 10:50 3) **Chalk Talk in Teaching: Dr. Ross Ellington**, *Professor*
11:00 - 11:20 4) **Graduate Student Teaching Responsibilities:**
Dr. George Bates, *Professor, Associate Chairman for Graduate Studies*

11:45 C. **Summary and Reflection**: **Dr. Ann S. Lumsden** (Carothers Hall)
1) Which presentation was the easiest for you to follow?
2) List one objective of each presentation.
3) What was the strongest characteristic of each presentation?
4) Were there weaknesses in these presentations?

12:00 D. **Lunch**

1:00 E. **Examples from the Department of Biological Science** **(**Room 228 Conradi Building)

1:15 - 1:35 1) **New Faculty on Teaching: Dr. Greg Erickson,** *Professor*

1:40 - 2:00 2) **Personal Teaching Hints: Dr. David Quadagno**, *Professor*

2:05 - 2:25 3) **Teaching: Dr. Richard Mariscal**, *Professor*

2:30 - 2:50 4) **Lecture with Overheads: Dr. Tom Keller,** *Professor*

3:15 F. **Summary and Reflection**: **Dr. Ann S. Lumsden**

Thursday, August 22, 9:00 a.m. - 5:00 p.m.

9:00 A. **Methods of Instruction**

9:00 - 9:20 1) **Questioning: Dr. Trisha Spears**, *Research Faculty*

9:25 - 9:45 2) **Teaching: Don Griffin**, *Graduate Student (Dr. Hansen's Lab)*

9:50 - 10:10 3) **Laboratory: Jill Holliday** *Graduate Students (Dr Steppan's Lab)*

10:15 - 10:35 4) **Teaching: Richard Chi,** *Graduate Student (Dr. T. Keller's Lab)*

10:40 B. **Ethics**

Skit: Shonna and Brian Storz*, Graduate Students*
(Dr. Tschinkel's Lab, Dr. Travis/Dr. Steppan's Lab)

PANEL OF THE FOLLOWING:

1) Dr. Angela Lupo-Anderson, *Office of* *VP Academic Affairs, Associate Dean of The Faculties*
2) Ransom McClung, *Office of Inspector General.* *Director of Investigation*
3) Dr. Robin Leach, *Associate Dean of Student Affairs*
Cheating, Harassment, Faculty or Student Confrontations, Ethics

11:45 C. **Discussion of Morning Topics & Ethics Skit**: **Dr. Ann S. Lumsden**

12:00 D. **Lunch**

12:30 - 1:30 **E. Evaluation: Dr. Marcy Driscoll**
(Department Chair, Department of Educational Research)
1) **Tests and Testing:**
a) What to test (use of the objectives)
b) Constructing a test
1) multiple choice
2) essay
3) completion
4) labeling
5) matching
c) Cheating

d) Grading and scoring
e) Grades other than Tests
f) Course Info, Web, Papers, Lab Write-up, Journal, etc.

1:45 - 5:00 F. **Videotaping** of Each Participant Teaching a Mini-Lesson

1) Each participant chooses something to teach using lecture combined with questions, lab,demonstration, slides, board, or overhead.
2) Participants are videotaped presenting their mini-lessons (5 minutes each).
3) One evaluator does a written evaluation during the presentation.
4) One evaluator reviews the participant's video in Room 425, 430, or 432 Carothers

Friday, August 23, 9:00 a.m. - 2:00 p.m.

9:00 – 10:00 **A. Portfolio: FSU Online, Dr. Jeff Garris**

10:00 B. **Videotaping** (cont'd)

12:00 C. **Lunch**

12:30 D. **Summary**

1) Evaluation
2) **Certificate Presentation: Dr. George Bates**
   Associate Chairman, Department of Biological Science
3) Dessert is served

Training skits

We presented the two skits: “The Ethics Skit” and “The first Day of Class” during the ABLE Workshop. Both of these are done by 2nd and 3rd year graduate students and discussions follow each skit. The scripts for the skits are attached.

ETHICS SKIT- *One male, teacher; one female, student*

Teacher [Brian] is at a desk reading...

Student [Shonna] comes bounding in full of excitement... (hugs teacher) her parents have been here on the day before and she has a t-shirt for Brian and had a good time with her parents.

(The debate team at FSU had a debate over the weekend in Gainesville... they were gone from Friday afternoon until Sat. afternoon... an overnight trip. The teacher [Brian] drove the group down in a van and they stayed at a motel and ate out Fri. night and had wine or beer or whatever with the meal (Brian bought it). The student [Shonna] has been on the debate team for a year and a half, and now is taking one of the required courses for her major... taught by Brian!)

Shonna sits on Brian's desk and tells Brian about her Sunday and time with her parents and her sister made the t-shirt and it will look great on him. She holds it up to him... He's a little embarrassed... He likes the t-shirt and keeps it... He offers to pay for the shirt... She says "oh no! My sister makes them all the time and I get to give them away to our friends. Our CLOSE friends!" Shonna goes on about her sister and her parents and that her parents took her out to eat last night, but with no wine!!! (looking at Brian in a teasing way) He is embarrassed again and changes the subject...

Brian: "Shonna, I'm sitting here working on grades for your class... (the one Brian teaches and Shonna is taking for credit and in her major) You did not hand me your paper on Friday before we left for Gainesville... I need it today or it is LATE!

(Shonna looks a little shocked) "You know where I've been... practically every hour... I'm a good student, and you know it will be a great paper. I make A's in my major... I'll get it to you by Friday of this week. You'll just love it! It's a great topic and the paper will be great!" (She's all smiles and cuteness)

Brian is very serious) "Shonna, the class is your responsibility... You knew the paper was due since the first day of class. It is an assignment listed on the syllabus and it's a large part of your grade. It was due last Friday. Because Jon has been in the hospital, I'm allowing him to turn his in today... by 4:00pm. And that is when your paper is due also. I'm looking at your grades in this class and so far you have a "C" right now. This paper will mean the difference between a "C" and a "B" for you.

Shonna: "A 'C'!!?!! Are you crazy?!!! I don't make C's!!! In any class and certainly not in this easy... USELESS CLASS!!!! Everyone should be making an A and certainly all of us who are on the debate team! Our team made an Excellent debate ranking over the weekend. What do you want from us?"

Brian: "Shonna, your grade in class and your performance in debate are two separate things. You must get your paper in today or get and "F" on it... Everyone else got their papers in, even the debate team members."

Shonna: " Well, maybe you have forgotten how drunk you were and that we had to drive for you to get us all back to the motel, safely. AND YOU BOUGHT THE BOOZE FOR US..... .....UNDERGRADUATES.....UNDER AGE!!!!!!! Wouldn't your chairman like to hear all about that? I worked like crazy for you during the weekend... surely you can cut me a little slack like being a few days late on this silly paper.

The End.

Follow with a discussion about all of the issues in the skit! This could have been a biology field trip or an office outing or lab outing with faculty and students...

FIRST DAY TEACHING SKIT*- John Keeghan teacher*
Amy, Will, Edzai, John, and Andy; students

Teacher comes in looks around, says hello, and immediately launches into lecture.

Four students (2 talkers, class clown, and questioner) are already seated.

Late Student runs in after lecture has begun and crosses room to find a chair (very disruptive). Teacher is oblivious and continues in-depth lecture.

(**Freeze the action and have discussion about what might have been a better way to handle this!)**

A lost student wanders in, interrupts teacher's lecture to try to locate a room. Teacher is obviously upset about the interruption and sends the lost student out with lots of protesting from the student.

(**Freeze the action and have discussion about what might have been a better way to handle this!**)

About this time, one of the girls is applying makeup and notices a friend in the mirror. The two begin a conversation that gets loud enough for the teacher and the other students to take notice. The teacher stops lecturing to chastise the two talking students. The students nod and gesture like they will stop. As soon as the teacher resumes the lecture, they begin talking again.

(**Freeze the action and discuss the handling of this and other situations like this)**

The next student interrupts the teacher to ask about having a syllabus to follow. When the teacher ignores the student, the student asks, what is the teacher's name?

(**Freeze the action and discuss suggestions to prevent this happening**)

At some point one student leans too far over in his chair and falls out. The teacher handles this very poorly.

(**Freeze the action and talk about emergencies in your institution and what to do...)**

Finally, an irritated student (late student might have to do this, too) pipes up, you are going too fast. You are going on and on and I can't find what you are talking about in the book. I have the book and I read the first chapter. You haven't mentioned anything that is in the first chapter.

(Freeze the action and talk about any other suggestions for this new teacher or any new teacher on the very first day!)

Teaching Assistant Training at Emory University

Teaching Assistant Training and Teaching Opportunity

Emory University has a teaching assistant training program for all entering graduate students of all disciplines called Teaching Assistant Training and Teaching Opportunity (TATTO). This is a 3.5-day course given in August, just before the semester begins. It includes workshops on topics such as "Using Discussion in Teaching," "Using Writing in Teaching," and "Using Technology in Teaching." Plenary sessions deal with "Life in the Professorate," "Ethics and Academic Honor," "Evaluating Teaching Performance," and a session entitled, "Why Didn't Someone Tell Me." For more information about this training program, contact the Emory web page, http://www.emory.edu/GSOAS/tatto.html.

Teaching Assistant Training in the Biology Department

In addition to the TATTO program, the Biology Department has a one-day orientation for persons who will be the teaching assistants for the introductory courses. An outline of that orientation day follows.

A ONE-DAY TEACHING ASSISTANT ORIENTATION
Biology Department, Emory University

9:00 – 9:30 Coffee and Get Acquainted

9:30 – 9:50 Welcome and Introductions

The chairman of the department introduces the faculty involved in the general biology program and the teaching assistants. He discusses the professional position of the teaching assistant and the role they would be playing in the teaching of the general biology course. He describes the expectations of the department in relation to their role. He also discusses the importance of the assistantship in their professional development and the importance of having teaching experience in the competitive academic job market.

9:50 – 10:30 Administrative Business

The director of laboratories describes:

- the organization of the laboratory program
- the time and format for weekly teaching assistant meetings
- how TAs will be evaluated by students and the lab director
- additional TA responsibilities (grading, holding review sessions, etc.)
- the importance of uniformity in teaching effort, testing, grading, and fulfilling student expectations

10:30 – 10:50 Dealing with Students

An experienced TA and graduate student describes the typical Emory student – their goals, academic level, energy level, and general attitudes toward the laboratory experience. Following this discussion the laboratory director discusses how to handle situations of disagreement, criticism, and confrontation.

10:50 – 11:00 Break

11:00 – 11:30 The Role of the Lab in a Science Course

A faculty member (preferably someone involved with the course, but not the lab director) leads a discussion of the purpose of having lab. They ask the new TAs to tell about some of their best experiences in undergraduate laboratories. They are then asked to give reasons why these were particularly good experiences. The faculty member then proceeds from this introduction to a discussion of what makes a meaningful laboratory experience. The faculty member then describes Emory's specific goals in the laboratory program. He or she points out that the basic objective is that students learn the process of "doing science" by learning basic laboratory skills, by designing (when possible) and performing meaningful scientific experiments, and by developing their observational skills. As these basic objectives are being met, students will learn the principles and concepts of biology.

11:30 – 12:00 The Learning Process: How Students Learn

Most teaching assistants will have had no experience in pedagogy. In this session a faculty member leads a discussion of Bloom's Taxonomy of Educational Objectives: Cognitive Domain (see handout). The main objective of this discussion is to make TAs aware that they will be teaching students at several levels of learning. Much of their teaching will be at the lowest level of learning, that is, the "memory" level. They should constantly push their students toward higher levels of learning, that is, levels of "translation" and "interpretation," as described by Bloom.

12:00 – 1:30 Lunch

A hardy (in our case Southern) meal is catered, brought to the Biology Building. Use this time for good food and casual conversation, helping to begin building a team mentality. TAs may not know each other and this also helps them get to know the faculty involved in the course on a more casual level.

AFTERNOON SESSION: PRACTICAL LABORATORY EXPERIENCES

1:45 – 2:15 Types of Laboratory Experiences

The laboratory director begins the session by defining the three types of laboratory experiences that students will have throughout the semester. There will be *"Directed Investigations"* where traditional exercises are reconstructed to involve students in the process of science. Traditional lab topics, (for example, Enzyme Kinetics), are presented in a format where students are given introductory information from which they develop hypotheses and then predict the results of experiments previously designed. Students then collect data and summarize it in tables and figures of their own construction. The students must then accept or reject their hypotheses, based on their results.

"Thematic Investigations" are more like traditional observational labs, but they are constructed to incorporate unifying themes in biology. An example would be an study of invertebrates performed in such a way that students are continually prompted to think of the results of their observations (investigation) in terms of big themes such as "structure and function" and "evolutionary relationships."

"Open Ended Investigations" are labs where students propose one or more hypotheses, design experiments, and perform the experiment, collecting data and processing that data. These labs usually require that students report their findings in scientific paper format.

2:15 – 2:45: Role-Play. Teaching "Directed Investigations"

Once students understand the differences in the three styles of labs, a faculty member and an experienced TA play the roles of the TA and the assistant TA in the laboratory. All other TAs and faculty members are the students.

Perform an actual exercise from the lab manual to illustrate teaching a "Directed Investigation."

2:45 – 3:00 Break

3:00 – 3:30: Role-Play. Teaching "Thematic Investigations."

An experienced TA and a faculty member model teaching an actual exercise from the laboratory manual as other TAs and faculty are the students. Students make observations but come to conclusions about some theme of biology; for example students try to answer the questions:

How is structure is related to function? How can observations of morphology lead us to come to conclusions about evolutionary relationships?

3:30 – 4:00: Developing a Teaching Plan for laboratories

The laboratory director gives all TAs a blank copy of a "Teaching Plan for Laboratories." She then discusses the purpose of the plan, and asks the TAs to write a Teaching Plan for one of the exercises just performed.

4:00 Dismissal

Teaching Plans

The Teaching Plan that is discussed in the last session is designed to help teaching assistants organize and teach each laboratory. An example of a blank and then a completed Teaching Plan for the Enzyme lab follows.

Enzymes: Teaching Plans for Laboratories

MAIN CONCEPTS AND OBJECTIVES:

SPECIFIC CONTENT:

MATERIALS, ACTIVITIES, METHODOLOGICAL CONTENT AND TECHNIQUES

ORDER OF THE LAB

CLASSROOM MANAGEMENT

STUDENT DEVELOPMENT

LAB SAFETY PRECAUTIONS:

DISCUSSION AND SUMMARY

EVALUATION

The completed Teaching Plan might look something like this:

Enzymes: Teaching Plan for Laboratories

MAIN CONCEPTS AND OBJECTIVES:

Concept: Scientific method. Students will be able to describe the typical format used in scientific investigation.

1. Concept: Scientific writing. Students will practice writing the Results section of a scientific paper.
2. Concept: The activity of enzymes. Students will describe enzyme activity and how it may be modified by varying such factors as enzyme concentration, pH, and temperature.
3. Concept: Enzyme inhibition. Students will differentiate between competitive and non-competitive inhibition.

SPECIFIC CONTENT:

1. Although the information is not stated in the text of this exercise, students should know the scientific method and the sections of a scientific paper or report.
2. Terminology: *enzyme, substrate, catalyst, cofactor, coenzyme, competitive and non-competitive inhibition, dependent variable, independent variable, and control*

MATERIALS, ACTIVITIES, METHODOLOGICAL CONTENT AND TECHNIQUES

(numbers refer to laboratory objective)

(1) Practice proposing hypotheses, making predictions based on hypotheses, testing hypotheses, collecting and processing data, discussing results and coming to conclusions.

(2) Review information about writing a Results section in a scientific paper, specifically, recording data, explaining results, drawing graphs, determining dependent and independent variables.
(2) Write a Results section of a scientific paper using the data from one of the laboratory experiments.
(1, 4) Determine if phenylthiourea is a competitive or non-competitive inhibitor of catechol oxidase.
(1, 3) Test the effect of varying enzyme concentration on rate of salivary amylase activity.
(1, 3) Determine the optimum pH for salivary amylase activity.
(1, 3) Determine the optimum temperature for salivary amylase activity.

ORDER OF THE LAB

1.	The instructor introduces enzymes, major concepts and objectives.	15 min
2.	The instructor reviews scientific method, formulating hypotheses and making predictions (refer to Lab Topic 1).	5 min
3.	Perform Exercises 2.1 and 2.2.4.	30 min
4.	Discuss results of Exercises 2.1 and 2.2.5.	10 min
5.	Each student team performs one of the three experiments on amylase activity (Exercise 2.3, A, B, or C.)	75 min
6.	Designated students report and discuss results of the amylase experiments. All experiments should be discussed.	25 min
7.	The instructor reviews scientific writing, specifically writing a Results section and making graphs (refer to Lab Topic 1 and Appendix A).	15 min
8.	Describe the assignment, due next week. Students will use data from one of the experiments in 2.3 and write a Results section.	5 min

For a two-hour lab: omit student reports (6), the instructor's review of scientific method and scientific writing. The assignment could be provided as a handout.

CLASSROOM MANAGEMENT

Students work in groups of 4. All groups carry out Exercises 2.1 and 2.2. Assign one experiment (A, B, or C) from Exercise 2.3 to each student group. Students will choose one person to report their group's results to the class. You will probably have two groups doing each experiment. Have only one report unless groups have conflicting results. Supply overhead acetates and Vis-a-Vis pens for students to use in their presentations.

STUDENT DEVELOPMENT

In addition to learning enzyme concepts, students will develop skills in scientific method, organizational and laboratory techniques, and data processing. Those students who give the oral reports will practice communication skills. Students will be asked to give reports in various labs throughout the year. Try to provide opportunities for all students to present at least once.

LAB SAFETY PRECAUTIONS:
Instruct students to:
1. Avoid contact with all solutions. The buffers can burn the skin. Catechol and PTU are both poisons. Disposable gloves are unnecessary while performing experiments if precautions are taken.
2. Wash hands thoroughly after each experiment.
3. Notify the instructor immediately if a spill occurs. The instructor should use disposable gloves, paper towels, soap and water to wipe up spills. Dispose of all towels in a plastic bag and place in the trash. If the instructor is not available, students should clean up spills as directed in the lab manual.

DISCUSSION AND SUMMARY

The instructor leads students in discussing the results of Exercises 2.1 and 2.2. Students report and discuss the results of Exercise 2.3.

EVALUATION

The instructor should informally note the quality of students' laboratory skills. Students will submit a Results section in the format of a scientific paper to be graded. Test concepts on the next laboratory exam. To reduce opportunities for cheating, vary assignments among lab sections and/or in subsequent years. For example, have one lab section write a Discussion section.

Dealing with Plagiarism

It is very important that students have a clear understanding of the meaning of plagiarism in your classes. Because different classes may differ in the definition and penalties for plagiarism, you should make clear your definition of plagiarism, and the penalties for plagiarism in your class. The following is a copy of a handout that we give students for the first assignment in the Introductory Biology Lab writing program at Emory University.

Plagiarism and Academic Honesty

What is plagiarism?

The Merriam-Webster Dictionary (1974) defines plagiarism as passing off "as one's own the ideas or words of another."

In laboratory we define plagiarism in a broader sense. In the most extreme form, plagiarism is taking a lab report or a paper written by someone else and turning it in as you own. In a less obvious form, plagiarism is using the ideas, phrases, or sentence structure of another source (usually a journal article or a book), implying that what you have written is your own.

McMillan (1988) says there are at least four acts of plagiarism:

1. "Stealing" or using someone else's paper
2. Using another person's data or ideas without acknowledgment
3. Copying the exact words of another and putting these in a paper without quotation marks and citation

4. Using works similar to that of another source, but passing it off as you own

More often than not, plagiarism is unintentional. It may happen as a result of the way you take notes. If you take notes by copying word-for-word the text of the original source, it is easy to forget that these notes are not paraphrased. If you do copy a source directly, you should enclose the notes in quotation marks to remind yourself that this is a quotation. If this text is then used in your paper, you should again use quotation marks and proper citation. Using direct quotes, however, misses the point of reading references. When you read references you should synthesize what you are reading, asking how this applies to the theme of your study, and then integrate ideas in your own words.

In lab, you will be using other people's work as you write the Introduction section of your scientific paper. As you prepare the Introduction, read several references, ask yourself the meaning of what you have read, synthesizing, comparing, analyzing, and criticizing the ideas of the author in relation to your particular experiment. Put the ideas you have taken from the references into your own words and record all information about the references that you will include in the References Cited or Bibliography section of your report. If you take notes on note cards, do not write the authors' ideas word for word, but use your own words.

You will work in teams as you perform the experiment for your scientific paper. We will allow members of your team to collaborate on the Materials and Methods and Results sections of your paper. However, the Introduction, Discussion and Conclusion sections of your paper must be your own personal original writing.

You should indicate your team members in an "Acknowledgments" section between the Discussion and Literature Cited sections of your paper. Your wording in the Acknowledgments sections might be something like the following: "I would like to thank my laboratory partners, ... (list all teammates) for assistance in writing the Materials and Methods and Results sections of this paper."

What will happen if you plagiarize in your lab report? The following will be reported to the college honor council:

- Copying a paper from a Bio 142 student in a previous year or from another student in this year's class
- Copying a section of a paper from a previous year or from another student

If you fail to properly cite references in your report, your grade will be lowered depending on the discretion of your teaching assistant.

We used the following works in the preparation of this plagiarism discussion:

Gray, Lori S., Jean Dickey, and Robert Kosinski. 1988 "Writing Guide." Clemson University, Clemson, South Carolina.

McMillan, Victoria E. 1988. *Writing Papers in the Biological Sciences*. St. Martin's Press, New York.

Woolf, Henry Bosley, editor. 1974. *The Merriam-Webster Dictionary*. Simon and Schuster, Inc., New York.

Grading Scientific Papers or Lab Reports

We have found the following grading rubric to be useful in our scientific writing program. It ensures that students know the criteria that will be used to determine their grade, and all teaching assistants grade relatively uniformly. Teaching assistants fill in one of these sheets for each student's paper, and then they keep these in their files for future reference. We give a copy of this rubric, minus the point values, to each student before they begin writing the scientific paper. It can then be used as a checklist as they complete the paper.

LABORATORY REPORT EVALUATION

- Follows format: all sections present and clearly labeled 2 _____
- Report neat, typed, grammatically correct 3 _____
- Writing style concise, logically sound 4 _____
- Title appropriate; title page formatted correctly 3 _____
- Quality of experimental design 3 _____

INTRODUCTION

- Quality of background explanation 4 _____
- References cited in correct format (Last name of author, year) 2 _____
  (Minimum, 3 references)
- Appropriate hypothesis, predictions 2 _____
- Statement of experiments to test the hypothesis 2 _____

MATERIALS AND METHODS (written in past tense)

- Description of materials, procedures, and the experimental situation 3 _____
- Description of the types of observations and controls 3 _____
  (report should give enough detail that a reader could repeat the experiment)

RESULTS (actual results observed, not what <u>should</u> have been observed

- Results reported accurately 4 _____
- Tables, graphs, drawings quality; clear labels, captions 6 _____
  Minimum, one graph and one table. Graphs must be computer generated.
- Data presented and analyzed appropriately (e.g., chi square,
  mean, averages, percent differences calculated, etc.) 2 _____
- Summary of results in paragraph form 3 _____

DISCUSSION

- Quality of data interpretation 4 _____
- Data related to the question or hypothesis 3 _____
- Conclusions drawn and supported by data 4 _____
- Further experiments suggested 2 _____

ACKNOWLEDGEMENT (acknowledge your teammates) 1 _____
REFERENCES CITED

- Format correct 2_____
- Minimum, three references; one a primary journal article 3_____

Total/65_____

LATE PENALTY (-5 POINTS FOR EVERY DAY LATE): (-) _____
(Reports are due at the **beginning** of your lab on the assigned day.)