

ABSTRACT NUMBER

1

Student Author(s): Erin G. Atwater

Department(s): Molecular and Structural Biochemistry

Teaching Mentor(s): James A. Knopp

Title of Presentation: Projects Designed for the Honors Students of
Biochemistry 451

Biochemistry 451, taught by instructor Dr. James Knopp, offers an honors option to those students wishing to study other related areas of biochemistry outside of the normal curriculum. Biochemistry is a very difficult subject to master, but by being able to relate normal topics covered in lecture to those topics of everyday life; students can get a deeper and better understanding of biochemistry. This semester's ALS 499 project allowed students to gain knowledge in the field of biochemistry and understand more about how the human body works and reactions that take place within the body. Such topics as vitamins, nucleic acids, HIV and diets were explored. The overall objective of this research was to carry out studies and analyses of several different projects designed for the honors students of biochemistry 451. Through assessment of the projects by questionnaires and surveys, I hoped to improve the students' understanding of biochemistry and show them the important role biochemistry plays in our everyday lives. Specific goals were to design several exercises, mainly 3-4, throughout the semester that required the honors students to research and presents a short essay on a given topic. These topics were presented to the class as well as graded by the students of 451. The projects were also assessed throughout the semester by surveys to understand how well the students enjoy looking at biochemistry from a different perspective. The students gave positive responses acknowledging their interest and enthusiasm of the subject matter researched. The grade distribution was also favorable. Students graded their fellow classmates on how well the report was researched, the organization of the report and presentation, and on thoroughness. The addition of the honors projects seemed useful in that students showed they had benefited in some way from the research done on the specific topics.

ABSTRACT NUMBER

2

Student Author(s): Heather L. Bennett

Department(s): Microbiology

Teaching Mentor(s): Geraldine H. Luginbuhl

Title of Presentation: ELISA Assay of *Agrobacterium tumefaciens* with Expression of Green Fluorescent Protein

The objective of this teaching research was to create an introductory immunology experiment for the General Microbiology Honors Laboratory, MB352H. The Koch's postulate project is a multipart experiment that was thought an ideal place to incorporate immunology. An Enzyme Linked Immunosorbant Assay using *Agrobacterium tumefaciens* C58 with an inserted green fluorescent protein was proposed. The appropriate strains and antibody were obtained. A protocol was developed for an Enzyme Linked Immunosorbant Assay using a dot blot technique. A conjugated primary polyclonal antibody for green fluorescent protein was used. The strain of *Agrobacterium tumefaciens* C58 tFLIR pGFP and *Agrobacterium tumefaciens* C58 G1 mini TN5 were obtained and used to inoculate sunflowers. Several antigen sample preparation techniques were tested and a protocol using toluene and water worked the best. The dot blot protocol was reduced from 3 hours to 2 hours. *Agrobacterium tumefaciens* strain C58 with plasmid tFLIR pGFP gave adequate results, whereas *Agrobacterium tumefaciens* strain C58 with G1 mini TN5 did not work well. The plasmid strain was inoculated in a sunflower and isolated to test retention of the plasmid. The immunoassay results were not as consistent and didn't give strong color as would be preferred for a teaching laboratory. Future research needs to address the specificity of the antibody. The antigen preparation protocol also needs more research to create a better reaction.

ABSTRACT NUMBER

3

Student Author(s): Melissa K. James

Department(s): Animal Science

Teaching Mentor(s): Kimberly D. Ange

Title of Presentation: Animal Rights vs. Animal Welfare: Dealing with Students' Misconceptions

Students often have misconceptions about the definition of a term or the ideas that go with it. This can present numerous problems for the student as well as potentially conveying ideas the student does not support or believe. It is the responsibility of educators to make the students aware. One such misconception is that of animal rights vs. animal welfare. Many students are unaware of the large differences in these two terms and may use the two interchangeably. In the Introduction to Companion Animals course at North Carolina State University, animal welfare and animal rights are discussed in detail. At the beginning of the term a survey was handed out to students with various animal ethics questions, including if they agree with animal rights or animal welfare. Toward the end of the semester after discussing the difference between the two terms in class, the same survey was again handed out to the students. After statistical analysis of the survey results, it was found that students showed differences in their opinions regarding animal rights and animal welfare as the semester progressed ($P < .005$). At the beginning of the year students responded with a 4.1 out of 5.0 (1.0 being that they did not agree and 5.0 being they completely agreed) that they believed in animal rights and a 4.0 for animal welfare. However, at the end of the semester the students responded with a 3.2 for believing in animal rights and a 4.5 for animal welfare. Results show that educators can help students to better understand controversial topics.

ABSTRACT NUMBER

4

Student Author(s): Abigail C. Lipsky

Department(s): Animal Science

Teaching Mentor(s): J. Liv Sandberg

Title of Presentation: Development of a Website for the NCSU Equine Educational Unit to be used in Association with ANS 306

ANS 306 is Equine Behavioral Modification. This class is centered on teaching students how to properly prepare and market horses. At the beginning of the class, students are assigned to an NCSU yearling horse. The students work with their assigned horse throughout the semester, learning how to train the young horse and learning the hands on techniques used to groom and care for the horse in preparation of sale. These activities include ground training, tacking up, ground driving, and accepting cues from the rider. The students are also taught promotion, sales, and marketing of the horses, including legal issues associated with the various sale methods used in the horse industry. An excellent form of advertising that has become very common in the sale of horses is the Internet. Students are taught how they can utilize the Internet to get information out about their horse. Previously, the NCSU Equine Educational Unit did not have a working website. My project was to design a website that would not only function to help students sell their assigned horses, but would also market the entire Equine Educational Unit. The website has sections that give information on Stallions, Facilities/Services, Babies, Classes, Horses For Sale, and Contact Information. The website serves as an example of equine marketing for students in ANS 306. Also, students can put pictures and descriptions of their horses up on the Internet in the "Horses For Sale" section. Ultimately, the website is serving both students in ANS 306 and the Equine Educational Unit by providing information to the public and advertising the sale of the unit's horses.

ABSTRACT NUMBER

5

Student Author(s): Jessica M. Lyons

Department(s): Animal Science

Teaching Mentor(s): Jeannette A. Moore

Title of Presentation: Nutrition of Domestic Animals (ANS 230): Online Study Materials

Nutrition of Domestic Animals (ANS 230) is an Animal Science course created to introduce students to understanding nutrients and nutritional requirements of animals, differences in digestion and digestive systems, and potential problems involved with feeding. I had three main goals as a lecture teaching assistant for this class: to help students better understand the material, to aid Dr. Moore in her teaching responsibilities, and to learn more about nutrition by teaching it. To meet these goals, I performed the regular duties of a lecture teaching assistant by attending class, taking notes, recording attendance, grading quizzes and exams, holding review sessions, and answering students' questions. Also, in order to help students understand the material, I posted the detailed notes from each lecture on the course website. Within the notes I often put links to handouts, diagrams, and other web pages in order to help students efficiently find supplemental information or in order to help them visualize a concept. Using WebCT, I posted self-grading online quizzes. I created multiple choice and short answer questions from the lecture notes or from old exams and quizzes. When the students completed a quiz, it would immediately show them their score and what they did wrong. These online components I posted for the class were easily accessible to students and were reported to be helpful in studying the material for the class.

ABSTRACT NUMBER

6

Student Author(s): Susannah M. Mitchell

Department(s): Animal Science

Teaching Mentor(s): Robert A. Mowrey

Title of Presentation: Get Informed: NCSU New Horse Owners' Short Course

In order to better serve the educational needs of equine enthusiasts the New Horse Owners' Short Course was developed and presented through the North Carolina State University Extension Horse Husbandry Program Equine Short Course and Clinic series. The short course was designed to provide the first time horse owner with an overview of essential information on horse management. Participants learned the basic management practices including nutrition, health care, hoof care, and handling. Necessary skills and topics of were also covered including how to select and evaluate potential horses, horse identification methods, horse recreational activities, trailer hauling and safety, equine behavior, and equine facilities. Participants also received a short course manual that consisted of detailed information and guidelines on these important topics. Individuals who completed the course were awarded a certificate and 0.7 continuing education credits. Equine enthusiasts and new horse owners from all over the United States attended the event.

I was given the opportunity to serve as an instructor in the New Horse Owners' Short Course on the topic of trailer hauling and safety. I developed PowerPoint slides and compiled multiple handouts to aid in the presentation. Individuals also participated in a question and answer session that helped them better relate to and deal with their own equine handling difficulties. I was also responsible for registration and manual development for the event. My experiences with the Equine Short Course and Clinic series at NC State have been extremely beneficial. Over a period of time I have been responsible for filing registrations for the short courses, checking-in participants during the actual events, compiling short course manuals, and calculating results from numerous short course evaluations. The knowledge and experience I have gained in the equine field through this program has been an extremely valuable tool in my undergraduate career.

ABSTRACT NUMBER

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Student Author(s): Mansoor Q. Sayed

Department(s): Biological Sciences

Teaching Mentor(s): Robert L. Beckmann

Title of Presentation: Development of Biology 183 Lab: Testing a Microorganism for Biological Processes

At North Carolina State University, Introductory Biology I and II (BIO 181 & BIO 183) provide students an in-depth examination of many life processes. Weekly laboratory sessions reinforce classroom instruction and provide opportunities for hands-on experiences, which bring tangible dimensions to concepts. In this Honors project, I designed a laboratory unit in which students will employ a common bacterial pathogen in their study of the concepts and processes of fermentation and respiration. Learning and applying the protocols of selected diagnostic tests, the students will determine if the bacterium is capable of fermentation and/or respiration. In conducting this experiment, students will integrate concepts and procedures in both gaining a comprehensive understanding of these life processes and characterizing an organism that directly impacts the quality of human life. Facility in these laboratory techniques will prove valuable as students progress to upper-level life sciences courses.

ABSTRACT NUMBER

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Student Author(s): Samantha C. Trull

Department(s): Zoology

Teaching Mentor(s): Sarah L. Ash

Title of Presentation: The Effectiveness of Dietary Assessment in a Human Nutrition Course

The course Introduction to Human Nutrition (NTR/ANS/FS 301) exposes students to a wide variety of scientific concepts and principles. However, because we all have to eat, it also gives them information that is immediately applicable to their daily lives. But putting that into practice can be difficult because situations can vary so much depending on habits, personal preferences, motivations and because most people do not know what changes they need to make in the first place. One particular assignment in the course, the "Food Diary" is designed to help students learn about their own diet as a first step in helping them put their knowledge into practice. However, the instructor has never actually determined to what degree students are in fact taking advantage of the assignment as both a learning tool and a means of making changes in their eating. I created a pre and post survey that focused on students' attitudes towards the assignment with respect to how accurately they thought they would be in keeping the diary and what they thought they would and did get out of doing the analysis. Through careful evaluation of the results from the surveys, information was gathered that can be used to help determine the usefulness of this assignment in students' understanding of human nutrition, especially their own.

ABSTRACT NUMBER

9

Student Author(s): Catherine M. Ward

Department(s): Chemical Engineering, Molecular and Structural
Biochemistry

Teaching Mentor(s): Amy M. Grunden

Title of Presentation: How to Accept Electrons: Timing for a Series of
Introductory Microbiology Labs

Introductory microbiology laboratories serve as key elements to reinforce concepts taught in class and promote thought about experimental design. Laboratory activities require a balance in instruction. Too much instruction limits learning opportunities because students simply follow recipes; while too little instruction makes labs frustrating, if not impossible, to perform in the allotted time. The General Microbiology Laboratory course MB 352 is the introductory microbiology laboratory course taught at NC State University. The honors version of this course (MB 352H/M) provides students an opportunity to participate in designing their experiments. I helped design a series of experiments that can be used in the course, planning both what students will do during class and what teaching assistants need to prepare ahead of time. Because I had little background in microbiology labs and sterile techniques, I made many laboratory errors. This allowed me to obtain a realistic estimate of the time it would take to perform a given experiment, the amount of preparation needed, and the level of detail required to instruct an introductory student. I modified several standard protocols to fit into 3-hour time blocks, the time allotted for an introductory lab. These experiments will be performed using the nonpathogenic bacterium *Escherichia coli* strain K-12 and its derivatives. These experiments include a growth study using different terminal electron acceptors, a transformation procedure to introduce recombinant DNA into the bacteria, and a beta-galactosidase assay to indicate what conditions are required to activate pathways that use electron acceptors other than oxygen.

ORAL PRESENTATION

Student Author(s): Liza M. Frake

Department(s): Biological Sciences

Teaching Mentor(s): Charles F. Lytle

Title of Presentation: Epidemic Plagues through the History of Man

Plagues in epidemic proportions have been a problem tormenting humans throughout history. One of the first plagues recorded was Smallpox that killed Ramses V in 1157 BC. In order to determine changes in the epidemiology of plagues over the past three centuries I gathered information from books and other scientific literature. Some of the major plagues over human history were the Bubonic Plague of 1348, Smallpox of the eighteenth century, Spanish Influenza of 1918 and AIDS affecting many people today. My research indicates that recent epidemics have been caused by viruses with high mutation rates and lacking a known cure, while epidemics of the past were largely caused by bacteria and with poor sanitation and treatment. Also it appears that today contagious diseases are spread by intimate contact between individuals while in the past diseases were spread by coughing or breathing rather than direct contact and/or exchange of body fluids by individuals.

ORAL PRESENTATION

Student Author(s): Megan A. Whitley

Department(s): Biological Sciences

Teaching Mentor(s): Robert L. Beckmann

Title of Presentation: Student Study Guide to Photosynthesis

The process of photosynthesis is fundamental to the life of a plant. Constituting the autotrophic producers at the bases of numerous food chains, photosynthetic plants are of continuing interest to the scientific community. As students enrolled in Introductory Biology II (BIO 183), many of my peers and I encountered considerable difficulty integrating details of the respective reactions into the comprehensive process. Through subsequent course work, I found that the immediate access to a worksheet greatly facilitated the learning of concepts. Incorporating both illustrations from PowerPoint slides used in the course lectures and questions from course exams, I created a worksheet for individual student use in the study of photosynthesis. Using their lecture notes, students will supply required information as they complete the skeletal outline of this worksheet, thereby engaging a more active role in the learning process. This worksheet not only will enhance understanding of the photosynthetic process, but will also introduce the student to a mechanism of supplemental study that may be applied in other academic courses.

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