

ABSTRACT NUMBER

1

Student Author(s): Aleighia M. Barker
Department(s): Biological Sciences
Teaching Mentor(s): Lisa D. Parks
Title of Presentation: Development of an Introductory Biology Lab Testing Insects Response to External Stimuli

Biology 181 and 183 are introductory biology courses that most first year life science majors take. Over the past ten years, Biology 183 has grown from 60 to over 300 students per semester. Because of this growth and our need to keep the labs current, labs are continually being changed, updated, or replaced. My project was to design and teach a new lab on insects' response to external stimuli. In this lab, the students tested the behavior of pill bugs and lady beetles when exposed to five different external stimuli. Using two-sided chambers, the insects were tested when exposed to: red vs. white, dark vs. light, cold vs. room temperature, wet vs. dry soil, and acidic vs. basic conditions. The students recorded and discussed their findings. Based on their findings, they were able to discuss what kind of environment each of the insects preferred and they were able to speculate on what time of year the insects were likely to be found. This lab was tested last semester with sixty students. After evaluation from the teaching assistants and students, the lab was refined and is now being taught to all BIO 183 students.

ABSTRACT NUMBER

2

Student Author(s): Jennifer L. Barry
Department(s): Biological Sciences
Teaching Mentor(s): Ted H. Emigh
Title of Presentation: Tutorial Videos for GN 411

Genetics is a difficult field of science in that it concerns abstract concepts and events not easily observed in the world around us. Genetics 411, Principles of Genetics, is often a science major's first encounter with genetics and its abstract concepts. Due to the fast pace and large size of this class, many students do not sufficiently understand each topic before moving on to the next one. My role in assisting this class was to create tutorial videos with the purpose of increasing understanding and test grades using teaching aides that catered to all three learning styles, auditory, visual, and kinesthetic. To make the videos as focused and effective as possible, I graded the previous semester's exams in order to identify the students' most frequent problem areas. Grading the tests myself, and taking time to carefully assess each one, allowed me to understand where and why the students were making mistakes. The videos incorporated both the information gained in grading the tests and information about different learning styles. Through the use of clay, mnemonic devices, and detailed drawings I reexplained all of the commonly misunderstood abstract topics. I was able to create videos that catered to every student's learning style and simultaneously focused on the course's difficult areas. The results of the videos' effectiveness will come from an in-depth comparison of tests taken by students who watched the videos and those that did not.

ABSTRACT NUMBER

3

Student Author(s): Ashley L. Bashioum
Department(s): Biological Sciences/Genetics
Teaching Mentor(s): Wendell H. McKenzie
Title of Presentation: Intertwining Human Life and Genetics for Students in GN 301:
Genetics in Human Affairs

Genetics in Human Affairs (GN 301) is an introductory genetics course that exposes students to the practical applications of genetic principles in human life. The course incorporates lectures, videos, and guest speakers to illustrate the intimate level at which genetics is intertwined with human affairs. I chose to complete my ALS 498 and 499 Honors project by serving as the coordinating teaching assistant for this class under the leadership and guidance of Dr. Wendell H. McKenzie. The duties of my position included helping teaching assistants with grading, recording all graded assignments, leading review sessions prior to each test, introducing guest speakers, creating test questions, and one-on-one tutoring as needed. I was also responsible for posting recently published genetic articles gathered by students to heighten awareness of the progress in this discipline.

To further increase the students' knowledge of the role of genetics in human life, I published two issues of a newsletter entitled "The Double Helix: A Newsletter to Intertwine Human Life and Genetics." The goal of these publications was to expand on expressed student interests and to outline important breakthroughs that had arisen in the field of genetics. I also used this newsletter to provoke student interaction with the course website and further exploration of additional genetic websites.

Through my efforts in this leadership position, I am confident that I have increased awareness of genetic principles and their numerous effects on human life. Genetics affects everyone in some way, and in accordance with the course material, I contributed to the students' realization of this fact. I also feel that I helped impress upon the students the significance of the rapidly expanding field of genetics both now and in the future.

ABSTRACT NUMBER

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Student Author(s): Robert T. Blackwood
Department(s): Biological Sciences
Teaching Mentor(s): Lisa D. Parks
Title of Presentation: Internal Transport: Electrocardiography (ECG) Pulse & Blood Pressure

Electrocardiograms (ECG) are frequently used throughout the medical field as a tool for evaluating and diagnosing heart problems. To help students gain knowledge about this widely used tool, I designed a lab for BIO 183 that gives students the opportunity to observe and interpret an ECG at varying body positions and activities. Additionally, students also learned how to take blood pressures and dissect the internal structures of a sheep's heart. Students were also required to understand the significance of the diastolic and systolic measurements and trace blood flow through the sheep's heart. The lab began with an introduction to the conduction system of the heart and the components of an ECG. Students then divided into groups of four and one person from each group was connected to the ECG recorder. The student connected to the recorder lied down and another student recorded an ECG with the use of BIOPAC software. Then the student went from a lying position to a standing position and another ECG was recorded. Subsequent recordings were taken during deep breathing and after the student exercised. After all the recordings were finished, the students compared the four ECG's with the use of BIOPAC software and recorded any changes in the ECG components. From these changes, students were able to correlate how the heart's activity changed due to varying activities and positions.

ABSTRACT NUMBER

5

Student Author(s): Sarah D. E. Bowen
Department(s): Biological Sciences
Teaching Mentor(s): Marianne Niedzlek-Feaver
Title of Presentation: Women's Health

The Women's Health Class, offered through Health Promotions at North Carolina State University, educates females about important health issues. The class contains information about examinations offered at the NC State Student Health Center, such as the self-breast examination, the pap smear, the pelvic examination, and the rectal examination. Contraceptive options, proper condom use, and proper diaphragm use are also discussed. NC State females were required to take the one-and-a-half hour class before receiving a pap smear examination or a prescription for contraceptives. Beginning next semester, the class will no longer be required. Because of the class's importance and value, a CD-ROM has been developed which contains all of the information offered during the Women's Health Class. The CD-ROM contains text, graphics, still pictures, and movies. The movies contain demonstrations on the self-breast examination, the pap smear, proper diaphragm use, and proper condom use. The CD will be available through the Health Promotions office and the Health Promotions website.

ABSTRACT NUMBER

6

Student Author(s): Bonnie M. Brenseke
Department(s): Animal Science
Teaching Mentor(s): William L. Flowers
Title of Presentation: Factors Contributing to Success

The objective of this study is to determine the factors that contribute to success in the Introduction to Animal Science course. This course is a freshmen level required course and for many, if not most, it is the first experience with taking a course dealing with animal science. The results of this study should be useful for instructors of courses, similar to ANS 150, in which students are first semester freshmen and have limited backgrounds with the subject matter. In addition, it could also be used at the beginning of the semester to help students develop strategies for being successful in the course.

This course includes a three-hour lecture and a three-hour lab. Students grades are based on quizzes (4), lecture examinations (2), laboratory practicals (2), and a final examination (1). In addition to this information, the frequency and type of contacts (email, office visits, class attendance, etc.) students have with the instructors as well as their NCSU Admissions Index (AI) have been recorded for the past 4 years (n=405 students). For the purposes of this study, the Admission Indices are considered to be reflective of students' academic potential and the frequency and type contacts representative of their work ethic and personal initiative. One outcome of this project is that I will be able to evaluate statistically the relative importance of a student's academic potential and their work ethic for a course in which students are essentially the same in terms of their previous knowledge.

I predict that although past experience and high academic potential are good indicators of success, these will not be as important as good work ethics such as working hard, coming to class, and taking the initiative to get help when needed.

ABSTRACT NUMBER

7

Student Author(s): Kateri A. Duncan

Department(s): Biological Sciences

Teaching Mentor(s): Thomas R. Wentworth

Title of Presentation: Enhancement of Writing Activities in the Ecology Laboratory

Scientific papers are important to the scientific community because they are the principal medium for communicating information about various subjects to a large audience. Therefore it is imperative that students who take science classes understand how to interpret and write scientific papers. The laboratory of the introductory ecology course, Botany 365 (BO 365), is an excellent setting in which to emphasize scientific writing because the course allows students to perform their own research, interpret their data, and write a research paper about their findings. For the fall 2001 semester, BO 365 students were given a step-by-step approach to writing scientific papers. A series of assignments were incorporated into the laboratory manual; each assignment taught the students how to write a section of a scientific paper.

Through teaching assistant comments and student feedback, Dr. Wentworth and I were able to evaluate how well the modified assignments helped students learn about scientific writing. Though some individual assignments need revising, the new assignments seemed to help students develop their writing skills and will help future BO 365 students learn how to write scientific papers.

ABSTRACT NUMBER

8

Student Author(s): Jenny L. Hillman
Department(s): Biological Sciences
Teaching Mentor(s): Lisa D. Parks
Title of Presentation: Clinical Skills Projects Used in Physiology Course without a Lab Component

In a physiology course without a lab component, it is often difficult for students to apply knowledge gained from a textbook and conventional lectures. This project allows students to develop analytical skills such as clinical identification and diagnosis of system disorders. Through interactive group projects, students are able to apply their knowledge to specific patient cases. The class is divided into clinical groups of 3-5 students and a brief patient history is provided. Each group develops a line of questions for their patient. These questions are answered by a graduate or undergraduate student recruited for the role. Once this line of questions has ended, the groups are allowed time to consider the information and then return to ask for justifiable medical testing and results from the instructor. Students learn in a hands-on environment how to interpret blood work, hormone level profiles, X-rays, biopsy results, sonograms, ECG's, and cultures. After discussing these results, the clinical group develops a diagnosis that must be justified and a course of treatment. This can be readily adapted to a weekly problem session or worked into the course if space and time are limited.

ABSTRACT NUMBER

9

Student Author(s): Jessica P. Hooks
Department(s): Biological Sciences/Genetics
Teaching Mentor(s): Wendell H. McKenzie
Title of Presentation: Human Genetics Education for Gifted Students: Explore, Expand, Excite

In the Fall of 2001, students taking the Genetics in Human Affairs (GN 301) course had the opportunity to participate in a weekly recitation session based on peer presentations and discussions. The course has traditionally been a comprehensive study in the technical aspects of genetics as well as the effects of genetics on society as a whole.

Through this special option, open to those who wished to self-initiate the course as Scholars or Honors, students were exposed to an advanced discussion of controversial and influential topics in modern genetics and their broad-reaching impacts on the community as well as the individual. Each student was responsible for identifying a topic, presenting a brief synopsis of background information and the topic's effect on society, and leading the discussion that followed. Knowledge and insight obtained through these activities led to the construction of a final paper.

This opportunity also allowed the participants to take part in a small group situation where interaction with ones' peers was feasible and effective. Based on a Post-test given at the conclusion of the semester and the evaluations expressed in the students' papers, the program successfully accomplished its goals and gained the respect and support of the students involved. A long-term goal of this project is to create an independent Honors section of GN 301 using some of the techniques employed in this pilot program.

ABSTRACT NUMBER

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Student Author(s): Kurt W. Inman
Department(s): Biological Sciences
Teaching Mentor(s): Robert L. Beckmann
Title of Presentation: Undergraduate Teaching Assistant: Bio181L and 183L-Search and Insertion of a DNA Lab Protocol

Biology 181 and 183 are two introductory biological courses in the College of Agricultural and Life Sciences. Both of these courses contain a lab, Biology 181L and Biology 183L. In these labs, students are exposed to basic techniques and valuable laboratory skills. Students at this level, as of yet, have not been exposed to a vast amount of information on genetics and DNA. Having the ability to work along side a mentor and using advice from other faculty has allowed me to look beyond the scope of just being a student. This experience has allowed for a better understanding of DNA in the laboratory environment.

This presentation is based DNA in the laboratory. It will involve the method of researching DNA labs and will give some possibilities of DNA lab protocols that could be inserted into Biology 181 and 183 lab curriculums. Overall this teaching experience has allowed me to refine my communication skills. Using interesting DNA lab protocols will allow students to learn more about the application of DNA and about the future of genetics early on in his or her college career.

ABSTRACT NUMBER

11

Student Author(s): Amber J. Moshakos

Department(s): Biological Sciences

Teaching Mentor(s): Lisa D. Parks

Title of Presentation: Supplemental Group Projects for Human Physiology Course
Without a Lab Component

It is very difficult for students to completely grasp all concepts in a human physiology course that does not offer a lab component. Students lack the opportunity to apply their classroom knowledge through clinical simulations such as identifying and diagnosing diseases. In hopes to have students interactively apply their knowledge, I created three small group projects that were conducted during lecture class. The class was broken into small groups and each group was given one of the four patient scenarios that gave them the history, symptoms, and basic information about the patient. After reading the basic information of the case, students could then ask the provided “patient”, a fellow classmate or teaching assistant, questions about their symptoms and history. Students were then required to ask the “doctor”, played by the same student or teaching assistant, for specific tests they would like to see the results for based on the information they gathered from the patient. Blood work was always provided, which required students to apply their knowledge of basic blood components and the significance of the different levels to a diagnosis. Students were limited by the “HMO”, played by Dr. Parks, to prevent unnecessary tests being performed. Once they viewed the test results, students could then use their textbook and lecture notes to aide them in coming up with a diagnosis. After all three projects were completed, an evaluation was given to the students. The results of the evaluation show that the students felt that they benefited from this interactive learning project. They also commented that they would have liked to know how the correct diagnosis was concluded upon, and wished they could have had more group projects.

ABSTRACT NUMBER

12

Student Author(s): Rachael T. Overcash
A. Bartlett Evans
Peter S. Moeller

Department(s): Biochemistry, Zoology

Teaching Mentor(s): James A. Knopp

Title of Presentation: A New Hope Development of *Knopp's Notes: A Biochemistry Workbook*

Principles of Biochemistry, BCH 451, is considered one of the most difficult courses at NC State. Students struggle with the sheer volume, complexity and unfamiliarity of the material, and consequently have difficulty mastering the materials and concepts of biochemistry. Furthermore, biochemistry textbooks lack worked-through examples. To address these problems, three former biochemistry students, Bart Evans, Peter Moeller and Rachael Overcash, developed *Knopp's Notes: A Biochemistry Workbook* under the direction of Dr. James Knopp. This workbook contains practice problems, a full biochemistry glossary, mnemonic devices, worked-out examples, and metabolic charts. Through using this workbook students can be active participants in their learning experience.

It is subdivided into sections which sequentially follow the course. By completing the workbook the student has a study guide, an additional learning resource and a reference. The workbook was first available in the fall 2001. As teaching assistants during that semester, Evans, Moeller and Overcash sought to integrate lectures, the "hint sheets" and the workbook in the weekly problem sessions.

Throughout the semester two comprehensive and anonymous surveys provided evaluations of the workbook. The results of the surveys were used to revise it for the next semester. Based on these survey, 16% of students felt it was somewhat effective, 42% found it helped, 35% thought it very helpful, and 7% could not live without it. Overall, students' enthusiasm for the workbook and willingness to use it as a complementary study guide proved to increase their success in biochemistry.

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13

Student Author(s): Christina D. Owen
Department(s): Zoology
Teaching Mentor(s): Samuel C. Mozley
Title of Presentation: WebCT: Online Communication

This semester's 499H project was based on WebCT and on-line communication technologies. The project quantifies usage of computer technologies as a teaching strategy. This is accomplished by using a network of resources such as a discussion board, chat rooms, study question links, as well as many other interactive icons that promote communication and effective learning. Therefore, the resources of this website are aimed at not only improving grades, but more importantly "enhancing learning" and "accommodating more learning styles" (The Supplemental Instruction Supervisor's Manual, 1997).

A WebCT analysis survey was administered to the students, which supplied both objective statistics and subjective feedback. The students gave positive responses acknowledging the site's help in increasing their comprehension of course material and improving their study and note-taking skills. They specifically recognized the study question icon and discussion icon as two of the most valuable and helpful parts of the website. Objective statistics showed a correlation between log-on frequencies of at least 1 to 2 times a week with higher course grades. In conclusion, one main hypothesis of this project would be that certain tools on the website are productive teaching methods for many students. However, the subjective responses indicated its success for some could be inhibited by technological phobias or failure of electronic media to address different learning styles.

ABSTRACT NUMBER

14

Student Author(s): Lily K. Pemberton

Department(s): Zoology

Teaching Mentor(s): Nicholas M. Haddad

Title of Presentation: Population Growth in the Evolution, Ecology and Behavior Laboratory

Zoology 260, Evolution, Ecology and Behavior, discusses the factors that affect population growth as a part of the curriculum. The accompanying lab for ZO 260 has many labs where students examine population ecology using observational approaches. The lab that I designed is the first lab in the ZO 260 curriculum that provides an opportunity for students to investigate these concepts using an experimental approach. In this lab students examine some of the factors that affect population growth and development. The lab uses a model organism, a small plant called *Brassica rapa*, or "Fast Plants", that has been artificially selected for a very rapid life cycle. In this lab, Fast Plants were planted with varying plant densities. At the end of the six-week period, the full-grown plants were dried and the students measured the average biomass per plant, the average height per plant and the average seed count per plant for each of their pots. The accumulated class data was then used by students to determine the effects that population density, nutrient availability and acid rain had on plant growth and development. This lab reinforces what the students learn in the lecture portion of the course while also giving students exposure to experimental design. The lab adds to the overall quality of an already excellent curriculum for the ZO 260 lab.

ABSTRACT NUMBER

15

Student Author(s): Bailey E. Tart

Department(s): Animal Science

Teaching Mentor(s): J. Liv Sandberg

Title of Presentation: Equine Management: An Integration of Ideas

Students in the Equine Management (ANS 410) class learn about many different aspects of the horse world, including reproduction, nutrition, exercise physiology, and disease management. So much material is covered during the semester, I felt that it was difficult to pull together all that one learns and apply it to real-life situations.

With this in mind, I developed a series of eight small projects. Each project presented a situation a horse owner is commonly confronted with. Students were required to address the problem and thoroughly explain the solution in a well-written one-page paper. Topic covered ranged from reproductive difficulties, genetics, health care, and nutrition. I was responsible for creating the scenario, determining the correct answers, and grading the papers under the supervision of my mentor. The projects encouraged students to use class notes and any other available materials to come to a logical and well-reasoned conclusion to the scenario that would actually work in the "real world". Although it is additional work for the students, many have reacted positively to the projects because it forces them to apply all they have learned over the course of the semester.

In addition to creating the projects, I also have had the opportunity to be present for class and lab, assisting Ms. Sandberg in grading papers, setting up for labs, and leading study sessions. This has been a positive, wonderful experience working as a teaching assistant.

ABSTRACT NUMBER

16

Student Author(s): Robin L. Worrell

Department(s): Biological Sciences

Teaching Mentor(s): Harold F. Heatwole

Title of Presentation: Creating Zoology and Ecology Movies as Teaching Tools

Audio/visual technology in the college lecture has become almost expected by students as its use becomes more and more common. Often, professors put their lectures online, or present their material with Power Point including vividly colored pictures, charts, and photographs, as well as sound effects and computer features. These aspects of their teaching serve partly to keep students attention, but more importantly to stimulate their interest more tangibly. Zoology and other related sciences are fields which deal with the physical world and the behaviors and physiology of all the organisms in that physical world. A professor may talk about the extremely diverse and unique aspects of an animal or its behavior and make it an interesting lecture. However, to graphically see a vivid photograph of a tree frog's defensive coloration or to watch a movie clip of a fascinating mating ritual by a bower bird unquestionably sticks in a student's mind.

The purpose of my project was to take rough video taken by my professor (Dr. Hal Heatwole) and make it into interactive movies. The videos include a diverse variety of organisms and habitats from places such as Australia, Iran, Antarctica, India, and many others. Using programs like Adobe Premier, the video is then catalogued, edited, and organized into interactive movies. These movies may be presented as lecture material, made available online for students taking the course to access on their own computers, or made available to other professors around the country who may pick and choose clips from the movies that they wish to use in their lecture material.

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