

A Proposal for Biology 1107 as a Quality Enhancement Course

Department of Biology

Course: Biology 1107 (General Biology II Laboratory)

Instructor of Record: Rachel Ratcliff

Proposed Semester of Implementation: Summer Session II 2006

Background Information

Biology 1107 (General Biology II Laboratory) is a new course in the Biology department. It is an integration of the Introductory Botany and the Introductory Zoology laboratories that were offered as two of our freshmen laboratory courses up until the Fall 2004 semester. We have since moved from a three semester sequence (Introductory Cellular/Molecular Biology, Introductory Botany and Introductory Zoology) to a two semester sequence (General Biology I and General Biology II) with the second semester, General Biology II, dealing mostly with organismal/field biology. 1107 is a stand alone laboratory course that has as its co-requisite the lecture course 1307 (General Biology II). This course, along with its corresponding lecture course, meets the general education requirement for a laboratory science as well as being a core requirement for biology majors. Until now, the class has been held in a teaching laboratory with students studying preserved specimens. It is hoped that changes to the laboratory curriculum will not only improve the student's performance in the laboratory course but will also bolster their experience in the lecture class. From the grades and comments I have collected so far, it is evident that the students are having a difficult time with the volume of material covered during the second semester of General Biology. Their grades have been some of the lowest I've seen. I have already made a few changes to the curriculum, and I feel that a more engaged, "hands-on" approach to the material would be beneficial to the students and aid them in the learning process. I've already initiated two field trips as extra credit trips, and I have gotten positive feedback from the students. I think these proposed changes will help the students master the course material, while also raising the level of understanding and interest in organismal Biology. I hope to encourage the students to enjoy learning in many contexts.

Proposed Engagement Activities

New Engagement Activities

- 1) Class Field Trip to Site 55 – Site 55 is the Biology department's research station on Baffin Bay and is 25 miles from campus. It has been difficult to utilize the natural resources we have there, because of the problem of getting students back and forth. I have taken a couple of classes out to the research site, requiring them to drive their own vehicles. At site 55, students can collect plants for a small plant collection I now require for the course. I point out plants and plant structures as we go along a trail system established in the summer of 2004. I'd like to better develop this field trip and to use our research station more. In the future I may find that going out to site 55 and also to the Corpus Christi Botanical Gardens is unnecessary and that only**

one of these field trips is needed. It would be helpful to be able to drive the students out in vans to the research station. This semester I took two sections of the 1107 laboratory out to site 55. It is possible, within a three hour lab period, to drive out, collect plants and drive back to campus without having to rush. Some of our advanced Biology courses do use the site.

- 2) A class field trip aboard the KATY, a research vessel owned and operated by the Marine Science Institute located in Port Aransas, Texas - On this vessel, students will travel along the intercoastal waterway into bays and channels around Port Aransas. They will take water samples and analyze them for oxygen content, salinity and nutrients. Students will also make plankton tows and trawl the bottom for organisms. The students will catch organisms that we will have studied in the laboratory. This will be a fantastic opportunity for our students to get to see these animals live, in situ, in their natural environment. They will also have access to a professional staff that specializes in Marine Biology. I intend to schedule the trip before their laboratory practical covering the invertebrate animals. Our department has used the KATY for advanced courses, so we are aware of its utility in “hands-on” learning.
- 3) Physiology experiment using the blackworm (*Lumbriculus variegates*) – Students will get to design, conduct and present the results of their own research involving the affects of certain drugs on the pulse rate and behavior of the blackworm. I learned of this laboratory exercise when I went to an ABLE (Association for Biology Laboratory Education) conference this past summer. I believe it is the type of engagement activity needed in our laboratory courses to engage our students in science. Students will also write up their research, in the style of a professional journal article, to be turned in for a grade. (See Appendix II)
- 4) Project with the Gladys Porter Zoo – The Gladys Porter Zoo in Brownsville, Texas has agreed to collaborate on a project for our 1107 students. We do not know the specifics, but will likely be part of their Students Teaching Students program. This would mean our students would spend an afternoon learning about one aspect of the Zoo, such as animal medicine, or perhaps learning about a particular group of vertebrate animals. The students would then be apart of teaching a slightly younger group of students what they’ve learned.
- 5) Field Journal – Students will be required to keep a field journal of all field trips taken by the class and any other assigned trips. Students will include the location of the field trip, weather conditions at the time of the trip, sketches of the habitat as well as a written description of the location. They should record the activities conducted on the trip, the animals and plants identified, along with their correct taxonomy, and their own impressions and observations. They will turn in their journal throughout the semester for grading. Journaling has been used successfully in some of our upper level courses.

Engagement Field Trips that Have Already Been Implemented–

- 6) Class trip to the Corpus Christi Botanical Gardens – I already take this trip with interested students and allow them to earn extra – credit points by attending and writing a brief summary of the trip. This trip gives me a chance to show the students some of the plants we are studying in the laboratory within a different context. We are able to discuss some of the differences between native and non-native plants. We also look at some of the adaptations some of our native plants have for dealing with a hot, dry environment. The Gardens also give us an opportunity to look at some structurally unique plants.**

- 7) Wetlands field trip with the Texas State Aquarium – The students and I, along with guides from the aquarium, go on a short canoe trip that takes us out to a spoil island. Students practice several different field techniques while out on the island such as seining for fish and determining soil types at different locations. They identify plants and estimate % cover of certain vegetation on the island. It is a good ecology field trip that integrates both plant and animal biology. I have done this field trip with other laboratory courses and just recently with this particular course.**

Time Line for Developing the Course

The course will be developed during the Spring 2006 semester. The course will be implemented during the Summer Session II of 2006. It will then be offered in the Fall of 2006, making modifications as needed for the long semester. The improved course will then be offered each semester.

Required Materials for the Course

A Photographic Atlas for the Biology Laboratory, 5th edition, by Kent M. Van De Graaff & John L. Crawley, 2005 will be required as a resource for the students.

This course does not yet have a manual. I have been putting together supplements week to week for them. I hope to edit and compile these supplements into a lab guide/manual for this course. I have done this for Biology 1106, the General Biology I Laboratory.

Students will also need to purchase a field journal. The particular type will be specified in class.

Assessment Measures

This will be the second time this class has been taught in the summer, so I will have grades/data from Summer 2005, to use for assessment. I chose a summer semester, also, because I will be working with only two sections of the 1107 laboratory. I do plan to carry over the improvements made to this course into the long semesters. Along with grades from Summer 2005, I also have grades from two long semesters for this laboratory. Students will also be given the same Pre –test and Post -test given to all 1107 classes. The same practical type tests will be used to assess the basic knowledge of plant and animal structure, function and taxonomy. An assigned plant collection will also assess the student’s understanding of plant structures. Student comprehension of the laboratory material will also be assessed through the student’s field journal and written papers over certain laboratory exercises. Long –term assessment may be made by determining how many 1107 students remain biology majors after taking the 1107 course, how many students become Biology majors after taking the course, and how many Biology students switch to another major after taking the course. I believe we can make this course a reason why students would want to become Biology majors.

Budget A (Ideal Budget)

I respectfully request:

\$3,000.00	-	For ¼ release time to develop the course along with a laboratory manual/guide for the course during the Spring 2006 semester.
\$1,000.00	-	Travel for students to all required field trips (includes vehicle rental and fuel)
\$ 800.00	-	Cost for taking two classes out on the KATY (research vessel)
\$ 500.00	-	Project with the Gladys Porter Zoo
\$ 800.00	-	For travel to a conference concerning pedagogy in laboratory courses
\$ 150.00	-	Supplies for physiology experiment using the blackworm
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6,250.00	-	Total requested

Further explanation of requests:

Last June I attended an ABLE (Association of Biology Laboratory Education) conference, at Virginia Tech. The conference focused solely on teaching Biology in the laboratory. It was at this conference that I received the material for the blackworm laboratory I’m proposing to do in 1107. I also learned what other universities are doing around the country in relation to their freshmen Biology curricula. June 2006, the conference will be held in Indiana at Purdue University.

In regards to release time, having ¼ release time during the Spring 2006 semester would allow me to work on a laboratory manual for 1107 as well as providing time to develop field trips, class assignments and also for establishing parameters for meaningful assessment.

Budget B (Needed Budget)

I respectfully request:

\$1,000.00	-	Travel for students to all required field trips (includes vehicle rental and fuel)
\$ 800.00	-	Cost for taking two classes out on the KATY (research vessel)
\$ 500.00	-	Project with the Gladys Porter Zoo
\$ 150.00	-	Supplies for physiology experiment using the Blackworm
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\$ 2,450.00	-	Total requested

Biology Department Commitment

The Biology department has committed to matching up to \$2,000.00 toward the first offering of the revised 1107 course. After the initial offering of the course, if there is evidence of increased learning and enthusiasm for the course material, the Biology department will continue to support the course.

Summer Session II 2006

WEEK OF:

TOPIC

1. July 5th & 6th Introduction, Lab Policies, Safety,
Diversity: The Kingdoms of Life
Kingdom Protista: The Plant & Animal –Like Protists
2. July 10th & 11th **Kingdom Plantae:** Alternation of Generation
The Lower Plants (Nonvascular & Seedless Vascular Plants)
Vegetative Plant Organs
3. July 12th & 13th **Kingdom Plantae:** The Higher Plants (Gymnosperm and Angiosperm Plants)
Reproductive Plant Organs
- July 15th *****tentative trip to the Corpus Christi Botanical Gardens *****
4. July 17th & 18th **Laboratory Practical # I**
Site 55 field trip: Work on Collecting Plants for Plant Collection
5. July 19th & 20th **Kingdom Animalia: Survey of Invertebrate Animals** including representatives of the
Phyla: Porifera (the Sponges), **Cnidaria** (includes the jellyfish), **Platyhelminthes** (the flatworms), **Nematoda** (the roundworms), **Rotifera** (the rotifers), **Mollusca** (includes the clam, squid, octopuses) **Annelida** (includes marine worms and earthworms), **Arthropoda** (includes insects, crayfish and much more!), and **Echinodermata** (includes the starfish and sea urchins)
Dissections with identification of internal and external structures required of certain selected animals.
- July 22nd ***** go out with TMSI on one of their research vessels to collect samples of marine life in local bays and along the intercoastal waterway.
6. July 24th & 25th **Practical # 2**
Kingdom Animalia: Physiology Experiment using the Annelid, *Lumbriculus variegates* -
Students design, conduct and present their own experiment involving the affects of certain drugs on the pulse rate and behavior of said worm.
6. July 26th & 27th **Kingdom Animalia:** Phylum Chordata: Subphylum Vertebrata
Comparative vertebrate dissections: The Shark (Class: Chondrichthyes) and Rat (Class: Mammalia) Systems
Comparative Lab Report over the two vertebrate systems
- July 29th ***** Tentative field trip with the Texas State Aquarium – Wetlands Field Trip*****
7. July 31st and Aug. 1st Project with the Gladys Porter Zoo
8. Aug. 2nd & 3rd Complete project with the Brownsville Zoo

Students receive a one hour credit and grade for this laboratory course.

Explanation as to how the students will earn their grade:

Possible Point Breakdown:

15 pts.	Practical #1
15 pts.	Practical #2
10 pts.	Plant collection
10 pts.	Physiology Experiment & Presentation
10 pts.	Write-up of Research
10 pts.	Comparative Anatomy Paper
15 pts.	Field journal
15 pts.	Zoo project
100pts.	Total possible points

Appendix I

Current Syllabus for 1107

BIOLOGY 1107

General Biology II
Laboratory

Texas A&M University - Kingsville

Fall - 2005

DEPARTMENT OF BIOLOGY

BIOLOGY 1107 - LABORATORY SCHEDULE - Fall 2005

Week of:	TOPIC
1. Aug. 29 th	Introduction, Lab Policies and Safety Kingdoms of Life Kingdom Protista: Plant and Animal - like Protists
4. Sept. 5 th	Alternation of Generation Lower Plants and Vegetative Organs Quiz #1
5. Sept. 12 th	Higher Plants – Gymnosperms and Angiosperms Reproductive Plant Organs
6. Sept. 19 th	Field Trip to Site 55 Gathering Specimen for Plant Collection Quiz #2
6. Sept. 26 th	Practical 1
7. Oct. 3 rd	Animal Kingdom - Animal Morphology Phyla: Porifera & Cnidaria Plant Collection Due
8. Oct. 10 th	Invertebrate Animal Dissections Quiz #3
<i>Oct. 15th – tentative extra-credit field trip with the Texas State Aquarium</i>	
9. Oct. 17 th	Tissues: Epithelial, Connective, Muscular and Nervous Lab Report over this lab Quiz #4
10. Oct. 24 th	Practical 2
11. Oct. 31 st	Phylum Cordata + Tissues
<i>Nov. 5th tentative extra-credit field trip with the Texas State Aquarium</i>	
12. Nov. 7 th	Begin Comparative Vertebrate Dissections: The Rat and the Shark: The heart, brain and external anatomy Comparative Lab Report over this Lab
13. Nov. 14 th	Continue Comparative Vertebrate Dissections
10. Nov. 21 st	Final Practical Comparative Lab Report Due

Students receive a one hour credit and grade for this laboratory course. Your lab grade is based on a possible 100 points:

20	possible points from 2 lab reports (each report is worth 10 pts.)	A grade of "A" = 90 – 100 points earned
20	possible points from 4 quizzes (each quiz worth 5pts.)	A grade of "B" = 80 – 89 points earned
30	possible points from 2 practical exams (each practical worth 15 pts.)	A grade of "C" = 70 – 79 points earned
20	possible points from the Comprehensive Final Practical	A grade of "D" = 60 – 69 points earned
10	possible points from assigned Plant Collection	
<u> + </u>		A grade of "F" = < 60 points earned
100	Total possible points	

Instructor of Record:

Rachel Ratcliff, Laboratory Coordinator
 Email: kfrer00@tamuk.edu
 Tel: (361) 593 – 3504
 Office: 105
 Office Hours: 8:30 – 10:30 MTWRF

Required Resources: None

**COLLEGE OF ARTS AND SCIENCES
 POLICY ON UNDERGRADUATE SCIENCE LABORATORY INSTRUCTION**

All undergraduate laboratories will be taught and/or supervised by a qualified faculty member. If needed, student assistants can be hired to assist the faculty member in operating the lab(s). The faculty member is directly responsible for the operations of the lab and assigns the final grade for the lab. Student assistants will not write or prepare any lab quizzes or exams, however, they may administer and grade the quizzes or exams, grade lab reports, and turn grades over to the faculty member.

**GENERAL LABORATORY POLICIES
 Biology 1107
 Summer II 2005**

Course Descriptions:

Biology 1107 (General Biology I Laboratory) - This course gives a laboratory experience that focuses on laboratory techniques such as microscopy, methods of data collection and data analysis. The experience reinforces and promotes an understanding and appreciation of plant and animal structure and function as well as the diversity that exists in both the plant and animal kingdoms.
Pre – or Corequisite: BIOL 1307

Course Objectives:

Biology 1107 (General Biology I Laboratory) - Students in Biology 1107 will: develop an understanding of and the ability to use the scientific method. Students will gain a better understanding of animal and plant physiology and structure as well as diversity within the kingdoms Plantae and Animalia. Students will develop microscopy skills as well as other laboratory skills that aid in observation and data collection. Students will be able to design and conduct experiments, and to summarize an experiment in a written lab report.

General Education Requirements

This course helps to fulfill the general education requirements of Texas A&M University – Kingsville, for graduation with a baccalaureate degree by satisfying one of the laboratory components in the area of the Natural Sciences.

Student Learner Outcomes:

Biology 1107 (General Biology II) – At the successful completion of this course, students will: (1) gain an understanding of basic plant and animal anatomy and function, (2) gain/improve microscopy skills, (3) be able to design and conduct an experiment and (4) improve writing skills.

Assessment of Student Learner Outcomes

Gaining an understanding of basic anatomy and physiology

This outcome will be assessed by quizzes and by a mid-term and final exam. The quizzes and tests will utilize animal models, jarred specimen, preserved specimen, live specimen and slides of various kinds of animal and plants to assess the student's understanding of structure and function. The students will also be observed and helped, while working in small groups, by the laboratory assistant. This observation, along with appropriate questioning and dialog, will help to assess the students' level of understanding.

Gaining microscopy skills

Many laboratory periods involve the proper handling and use of the microscope. Successful completion of the laboratory exercises will indicate that the student has gained and/or improved their microscopy skills. The laboratory assistants will observe students as they use the microscopes, and they will correct errors or misunderstandings in the microscope's proper use. Quiz and test questions will also address the proper use and care of the microscope.

Being able to design and conduct an experiment

Three weeks are dedicated to students designing, conducting and writing up a plant growth experiment that the students will turn in for a grade. The students will also conduct an animal physiology experiment that they will write up in a formal report and present.

Improving writing skills

Students are required to write two formal laboratory reports each semester. The first report is proof-read, corrected and turned back to the student with a grade assigned. The student then is allowed to make corrections and turn their paper in for a final grade. Rewriting and making the necessary corrections on the first draft help to improve writing skills which is indicated by raised grades on the laboratory report. Improved grades on the second lab report, where there are no rewrite privileges, also indicate improved writing skills.

BIO 1107 Meets Tues. & Weds at 1:00pm – 3:50pm and Tues. at 4:00 – 6:50 in Room B107

Attendance

Attendance is **MANDATORY!** In the interest of consistency and less confusion, we recommend you make every attempt to attend your regularly scheduled lab. However, in the event that you are unable to attend your scheduled laboratory you **MUST** notify your laboratory assistant immediately. Your Lab Assistant must have some record of notification from you at least 30 minutes **BEFORE** the lab begins. Even if you have some unavoidable accident, you must get word to your Lab Assistant as soon as possible.

In addition, please leave a message on the voice mail service of **Rachel Ratcliff**, Freshmen Laboratory Coordinator (**361 593-3504**).

All Lab Assistants have mail boxes in the departmental office that can also be used for communication.

FAILURE TO CONTACT YOUR LABORATORY ASSISTANT AND RACHEL RATCLIFF **BEFORE** LAB WILL RESULT IN A ZERO FOR THAT WEEK'S QUIZ OR ASSIGNMENT. However, you will be allowed to attend another lab.

- 1) In order to make-up a missed lab, you must contact your Lab Assistant before your lab begins
- 2) In order to make-up a missed lab, you **MUST** contact Rachel Ratcliff (You may leave a message on my voice mail.), and she will notify your Lab Assistant.
- 3) If you attend a lab other than your regularly scheduled lab, you will take the lab quiz of that particular Lab Assistant, and it is **YOUR** responsibility to verify the transfer of ANY grades from the make-up lab to your regularly scheduled lab.
- 4) Lab reports are due at your regularly scheduled lab time!!!

Tardiness is not acceptable. We have limited time to complete the lab exercises, so you must be **ON TIME!!** Quizzes are administered **IMMEDIATELY** at the **BEGINNING** of the lab period. **ONCE A QUIZ HAS BEGUN, YOU MAY NOT COME IN LATE AND TAKE THE QUIZ FOR CREDIT. MAKE-UP QUIZZES ARE NOT GIVEN.**

Safety

- A. Every student is required to review the on-line version of the ***Chemical Hygiene Plan for Texas A & M University*** and sign an affidavit to that affect.
- B. Goggles must be worn during certain laboratory exercises. (The Lab Assistants will announce when they are needed.) Students coming to lab without goggles will **NOT** be allowed to attend that lab and will receive a zero for that particular lab quiz!

FAILURE TO FOLLOW THESE SAFETY GUIDELINES MAY RESULT IN EXPULSION FROM THE LAB AND A GRADE OF "F".

Quizzes, Laboratory Reports and Tests

The Department of Biology has a zero tolerance policy regarding cheating of any kind. Evidence of any form of cheating will be reviewed by the Lab Assistant, Lab Coordinator and Chair of the Department. If review of the evidence indicates a student cheated, that student will receive an "0" for that particular assignment. A second incident will result in a "F" for Biology 1107. All cheating incidents will be reported to the appropriate authorities.

A. Quizzes

For every quiz, questions will come directly from the laboratory manual and/or the lab supplements/handouts given during the previous week's lab AND some questions may cover material to be studied in that day's lab.

Quizzes are written by the Freshmen Lab Coordinator and administered and graded by the Lab Assistants. No make-up quizzes will be administered.

B. Lab Reports

You may earn a rewrite on the first lab report.

A significant part of the lab grade will be determined by the quality of lab reports. Failure to complete one of the lab reports on time and as instructed can potentially have an irrevocable effect on your lab grade.

ALL LAB REPORTS MUST BE:

1) TYPED. Hand-written papers will NOT be accepted and will result in a zero and will be ineligible for a rewrite.

2) TURNED IN AT THE BEGINNING OF YOUR REGULARLY SCHEDULED LAB. LATE REPORTS WILL NOT BE ACCEPTED AND WILL RESULT IN A ZERO FOR THAT REPORT.

3) WRITTEN FOLLOWING THE GENERAL FORMAT DISCUSSED ON THE PAGE ENTITLED, "Lab Report Format". Digressions from the set format will result in loss of points. Each lab is accompanied by a supplement which specifically details what information needs to be included in the lab report.

4) PERFORMED **INDIVIDUALLY!** All lab reports are to be solo efforts. If there is any copied material from another individual's report or another source that is not properly cited, the offending student/s will receive a ZERO/S for that report and lose eligibility for a rewrite if it is the first report. Here is some advice: **1. DO NOT WRITE YOUR LAB REPORT IN THE PRESENCE OF OTHER STUDENTS!! 2.**

DO NOT SHARE COMPUTER DISKS. Discuss answers, results etc., but do not write the report together. Use your own words and heads to compose **YOUR** report.

*******A SECOND CHEATING INCIDENT WILL RESULT IN A ZERO FOR THE OVERALL COURSE.**

C. Tests

BIO 1107 laboratories will include 2 laboratory practicals and a comprehensive final (prac). Together, these three tests make up nearly half of the total possible points for the course. You will need to do well on these exams. Make-up tests will only be given in emergency situations.

"Comprehensive" means the exam will include questions covering material over the course of the ENTIRE semester. Keep this in mind as you work through the semester!

D. Spelling

Spelling counts! Lab Assistants are instructed to subtract points for misspelled words in lab reports, on quizzes and tests. ANY scientific names **MUST** be spelled correctly and underlined (or *italicized*), otherwise these errors are treated as misspellings.

Final Comments

The laboratory curriculum is NOT designed to prepare you for the lecture part of the course. Therefore, please do not expect topics covered in lab and lecture to be concurrent....we can guarantee they won't be most of the time! Your lab experience is designed to give you some hands-on association with material discussed in lecture and you may also use lab time to get extra help with lecture material from our Lab Assistants.

Please Note the following from your Student Handbook:

Students with disabilities

Students with disabilities, including learning disabilities, who wish to request accommodations in class, should register with the Services for Students with Disabilities so that appropriate arrangements may be made. In accordance with federal laws, a student requesting special accommodations must provide documentation of their disability to the SSD coordinator.

Academic Misconduct: You are expected to practice academic honesty in every aspect of this course and all other courses. Students that engage in academic misconduct are subject to University disciplinary procedures. Forms of academic dishonesty include:

- 1) Cheating, plagiarism, collusion or other forms of academic dishonesty.
- 2) Fabricating information to falsify results obtained from a research or laboratory experiment.
- 3) Unauthorized possession of examinations, reserved library materials, laboratory materials, or other course related materials.
- 4) Unauthorized changing of grades on an examination, in an instructor's grade book, or on a grade report

Nonacademic Misconduct: The University respects the rights of professors to teach and students to learn. Maintenance of these rights requires campus conditions that do not impede their exercise.

Campus behavior that interferes with (1) the instructor's ability to conduct class, (2) the ability of the other students to profit from the instructional program, or (3) the general rights of others will not be tolerated. An individual engaging in such disruptive behavior may be subject to disciplinary action. Such incidents will be adjudicated by the Dean of Students under nonacademic procedures.

Sexual Misconduct:

- Sexual harassment of students and employees at Texas A&M University-Kingsville is unacceptable and will not be tolerated. Any member of the university community violating this policy will be subject to disciplinary action.
- Sexual assault is a felony under the criminal laws of the State of Texas and will not be tolerated at Texas A&M University-Kingsville. Any such act committed by a TAMUK student is a violation of the University's Student Code of Conduct and subject to disciplinary action. Texas A&M University-Kingsville is committed to providing an educational atmosphere in which students can achieve their goals and maximum potential.

Students with Cell Phones: Please turn your cell phone off while in class. In case of an emergency, when you need to leave your phone turned on please step outside of the laboratory to take your call.

GENERIC LAB REPORT FORMAT FOR BIOLOGY 1107

Lab reports are designed to summarize experiments and the results from those experiments. In addition, conclusions based on the results should allow you to apply your newly acquired knowledge to new situations and questions.

This hand-out is a GENERAL guide to the format we use in BIOL 1106. Specific information in each report will vary according to the lab activity. There are some basic rules for writing lab reports, as follows:

A STRANGER SHOULD BE ABLE TO READ YOUR REPORT AND: 1. *understand the nature of the experiment*, 2. *duplicate the experiment(s) exactly as you did them*, 3. *compare his/her results with those you presented in your report* and 4. *understand your conclusions based on the experiment(s)*.

Lab reports will be graded using the following criteria: 1) the outline discussed below is followed EXACTLY! 2) any questions, etc. are answered correctly and completely 3) in the judgment of the instructor, a thorough and honest effort was made by the individual.

ALL LAB REPORTS ARE TO BE HANDED IN UPON ARRIVAL THE FOLLOWING WEEK! LATE REPORTS WILL NOT BE ACCEPTED AND WILL RESULT IN A ZERO! *You are allowed to complete a rewrite of only the first lab report. However, eligibility for this privilege requires fulfilling #4 of the criteria for grading stated above.*

When a rewrite is submitted, the first draft must be submitted also, or the rewrite will not be accepted and the original grade stands. A completed rewrite is one which CORRECTLY addresses ALL of the points deducted initially. If only a set of corrections, or the first draft with scribbled corrections is turned in, the rewrite will not be accepted. In this case, you will get the grade determined for the first draft! A REWRITE MEANS "WRITTEN AGAIN!". Drawings need not be redrawn, UNLESS there was an error associate with any particular drawing, in which case the drawing(s) are required to be redrawn.

Also, please note that computer-generated drawings or pictures are NOT ACCEPTABLE! If you are required to draw cells with certain organelles labeled, we expect you to draw these yourself...it helps in the learning process! Xeroxed or computer-generated drawings will negate rewrite privileges.

LAB REPORTS ARE TO BE DONE INDIVIDUALLY! ANY DUPLICATION OR EVIDENCE OF COPYING WILL RESULT IN AN AUTOMATIC ZERO AND A REPEATED INCIDENT WILL RESULT IN AN "F" FOR THE OVERALL LAB GRADE.

The general format for the lab reports is as follows:

Title page:

This page should include: 1) the title of the lab as outlined on your syllabus, 2) your name, 3) your lab section, 4) the date the lab is due and 5) the names of the people in your lab group.

THE BODY OF THE REPORT SHOULD BE WRITTEN IN THE PAST TENSE AND IN THE PASSIVE VOICE (3rd PERSON)!!!

I. Introduction

The introduction should include: 1) background information which gives the reader an overview of the topic covered in the lab exercise and 2) the purpose of the lab.

II. Materials and Methods

Materials:

Give a list of all equipment, reagents, solutions and specimen needed to conduct the laboratory.

Methods:

The procedure should tell the reader how you did the experiments step by step. Unless otherwise directed, it is acceptable to cite your lab manual and particular laboratories for specific instructions. Please refer to the sample lab report for proper citation style. **HOWEVER, ANY ADDITIONS OR OMISSIONS FROM THE MANUAL OR LAB SUPPLEMENT PROCEDURE MUST BE DOCUMENTED IN THIS SECTION.**

III. Results

- a. The results should **REPORT ONLY** measurements, observations, etc. without any discussion.
- b. Data tables/graphs should be placed in this section.
- c. Answers to certain questions required for the lab maybe included in this section

IV. Discussion

a. This section of the report is the most important. It includes: 1) interpretation of the data (why did your results turn out the way they did?), 2) problems with the experiment and what should have happened, and 3) what you learned from the experiments.

b. Normally, you will be given a set of questions in the lab supplement to help guide your discussion. **DO NOT WRITE OUT DISCUSSION QUESTIONS AS YOU DO IN THE RESULTS SECTION!** The discussion should be in essay form

V. Literature Cited

List all reference used to write up your laboratory report.

AFFIDAVIT OF UNDERSTANDING

I, _____, have read the preceding document thoroughly and understand all rules and expectations associated with the Biology 1107 lab, *particularly those rules referring to cheating*. I also understand the Lab Coordinator reserves the right to adjust this lab guide as she deems necessary and that I am responsible for noting and adjusting to any changes from the schedule and/or protocol listed in this guide.

Signed _____

Date _____

Please return to your Lab Assistant after you sign and date this. Thanks!

Appendix II

**Abstract for the Proposed Physiology Laboratory
using the Blackworm (*Lumbriculus variegates*)**

This Is Your Blackworm, This Is Your Blackworm on Drugs – Any Questions?

Kelly Bohrer, Biology Department, University of Dayton, OH

Blackworms (*Lumbriculus variegatus*) are excellent organisms for studying the circulatory system and the effects of drugs on this system for three main reasons: their skin is transparent making it easy to observe pulsation rates, drugs quickly diffuse through the skin of blackworms thus providing immediate effects, blackworms are easy to maintain in a laboratory. In blackworms, the dorsal blood vessel pumps oxygenated blood from the posterior to the anterior end by muscular contractions in each segment. At any time, several pulsation waves travel the length of the worm at a constant rate. Much like in humans, the pulsation rate is regulated by the nervous and endocrine systems. Since many drugs affect these systems (e.g. nicotine mimicking natural neurotransmitters), they can affect the rate of pulsation in bloodworms. In this investigative lab, students observe blackworm pulsation rate in normal conditions and observe how pulsation rate is affected by drugs.

This lab stresses scientific process skills as well as the blackworm circulatory system. Part I is designed to teach blackworm handling and viewing procedures and to guide the student through initial observations of the blackworm's behavior and circulatory system. Part II is a student-led investigation in which the students decide what drug to test the effects of and then design and run their own experiments. The students write up their investigations as an informal report and orally present their design, results, and conclusion at a later date.

This lab is currently an introductory, non-major's two hour lab, but it can be expanded in many ways for three hour and more advanced labs. During this workshop, participants will perform the investigation, learn blackworm handling and preparatory procedures, experience some of the expansions (including making the microscope viewing plates), and discuss other possibilities for using blackworms in their labs (toxicology, environmental effects, Q10, etc.).