

Animal Physiology (Bio 350) Fall 2014

Lecture Instructor: Dr. Robin Cooper

Email: RLCOOP1@email.uky.edu

If you email me, please allow up to 48 h for a response. Be sure to include **BIO 350** in the subject line of the email so the email will not be mistaken for junk mail.

Office Phone: (859) 257-5950

Office Location: Room 226 Biology

Website: <http://web.as.uky.edu/Biology/faculty/cooper/default.htm>

Laboratory Instructor: Dr. Melody Danley

Email: mlda227@uky.edu

If you email me, please allow up to 48 h for a response. I do not generally check my email in the evenings or on the weekends. Be sure to include **BIO 350** in the subject line of the email so the email will not be mistaken for junk mail.

Office Phone: (859) 257-1053

Office Location: MDS 125 (in same building where the labs are taught)

Graduate Teaching Assistants

Mr. Farid Yaghouby f.yaghouby@uky.edu

Shreyas Joshi shreyas.joshi@uky.edu

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General Course Information

Credits: 4 credit hours

Lecture Location: Room 116 Biology

Lecture Time: Tuesdays and Thursdays 9:30 to 10:45 AM

Lab Location: Multi-Disciplinary Science Building *Multi-Disciplinary Sci Bldg-Rm 155B-MDS*

Lab Times vary as follows:

Labs:

Section 001: 9:00-11:50 Monday

Section 002: 12:00-14:50 Monday

Section 003: 15:00-17:50 Monday

Section 006: 9:00-11:50 Wednesday

Section 005: 12:00-14:50 Wednesday

Section 004: 15:00-17:50 Wednesday

Students must attend only that lab section in which they are officially enrolled. If you are absent for your regularly scheduled lab time, you may not "just show up" for a different section to make-up the missed lab. If you show up unannounced and without instructor consent for a different lab section, you will be asked to leave.

Course Description: An introduction to the basic principles of animal physiology. An elementary discussion of the major vertebrate organ systems including nutrition, metabolism, respiration, circulation, excretion, muscle contraction, peripheral and central nervous system, and endocrine function emphasizing homeostasis. Lecture, three hours; laboratory, three hours.

Course Prerequisites: BIO 150-153 or equivalent introductory biology sequence, BIO 315, and CHE 105, CHE 107.

Official Course Text

Eckert Animal Physiology: Mechanisms and Adaptations, Fifth Edition, by David Randall, Warren Burggren, and Kathleen French.

<http://www.whfreeman.com/newcatalog.aspx?isbn=0716738635>

Other Course Materials

You will need a scientific calculator for lecture and laboratory activities. A calculator should be brought to all lectures and labs. Use of the calculator function on a cell phone or computer is not acceptable, and will not be allowed during quizzes or exams.

There is no separate lab manual to purchase. All lecture and lab hand-outs are available for download by accessing the course website or black board or Google sites as indicated below.

For lecture content:

<http://web.as.uky.edu/Biology/faculty/cooper/Bio350-Fall2014/TEACHING350FALL2014.htm>

For lab content:

<https://sites.google.com/site/bio350animalphysiology/>

For graded work and grades:

All lab reports are submitted in electronic format through Blackboard's Safe Assign link. All grades (lab and lecture) are posted in Blackboard's gradebook.

Organization of Bio 350 Animal Physiology: This course includes both lecture and lab components. The lecture content is organized, presented and overseen by Dr. Robin Cooper. The laboratory content is organized and overseen by Dr. Melody Danley. In addition, each laboratory section has one TA (graduate teaching assistant) that will help guide students through the hands-on portion of the lab, as well as grade all lab submissions. Content presented in lecture and laboratories are expected to be integrative such that content on assessments in lecture or the lab can be mixed. No laboratory section will have an advantage over the others as quizzes are different for each section and lecture exams are constructed so as not to cover content that particular sections might not have been exposed to.

The "manual" for the lab exercises is posted online within the web page for each experiment. There is no separate lab manual to purchase. You will be responsible for printing out or having, in some means, the protocol to use for each laboratory period. Hard copies will not be provided. We cannot guarantee that the laboratories will have internet access during the lab period, so come prepared with a copy on your personal computer or a hard copy.

BIO 350 Grade Progress

Grades for all exams, labs reports, journal submissions, and quizzes will be made available through Blackboard. Space is also provided in the table below for you to track your progress through the course.

| Item | Max point value | Your Points Earned |
|--------------------------------|-----------------|--------------------|
| Exam 1 | 100 | |
| Exam 2 | 100 | |
| Exam 3 | 100 | |
| Exam 4 (Final Exam) | 150 | |
| Lab total points | 280 | |
| Lecture participation | 20 | |
| | | |
| | | |
| | | |
| Total Points for Course | 750 | |

Final course are assigned based on the total points accumulated during the semester. Final course grades are assigned as follows:

675 points to 730 points = A

600 points to 674.9 points = B

525 points to 599.9 points = C

450 points to 524.9 points = D
Less than 449.99 points = E

Components of the grade

Mid-semester Exams 1, 2, and 3: Exams will cover material from lectures, assigned readings, associated labs, and other assigned topics. Exams dates are given on the topical outline below. Mid-semester exams are not cumulative. Content for the exams comes from both lecture and lab material, and may be composed of multiple choice questions, short answer, essay, and/or fill-in-the-blank questions. Scantron forms will be provided for you. Bring a #2 pencil and your UK ID with you to each exam. **NOTE: You might not be permitted to take an exam if you do not have your UK ID with you.** Exam results and answer keys will be posted on Blackboard following the exam date.

Final Exam: The final exam (Exam 4) is cumulative and will cover any and all material from the entire semester. The final exam will be composed of multiple choice questions, short answer, essay, and fill-in-the-blank questions. Content for the exam will come from both lecture and lab material.

Lecture participation 20 points: This grade is based on your name being called in class to answer questions and participation in presenting information from group discussions. Your name will be drawn at random. If you are not present you will lose 2 points for each time your name is called. Your name may never be called during the semester and if so you automatically are given the 20 points.

Labs: Labs activities are completed during every full week throughout the semester. There are no lab sessions during the first two weeks of the semester (due to the partial lecture week and Labor Day holiday) or during Thanksgiving Week. Lab activities are organized into four units. Each unit focuses on a specific physiological system being covered in the lecture. The units include: Nervous System, Cardiovascular System and Muscles, Renal System, and Respiratory System. During each unit, one to two basic lab sessions will introduce students to the fundamental concepts of the topic as well as experimental techniques used in that area of physiology. During the final lab session of each unit, students will conduct independent experiments of their own design, using knowledge and skills acquired during the basic lab sessions.

For each basic lab session, students will be required to complete and turn-in worksheets that include data, statistical analyses results, graphs/tables, and discussion of the meaning of the results. Lab instructors will help guide students through the analyses and the discussion of these worksheets. Worksheets are worth up to 15 points each.

For each Design-Your-Own-Lab session, students in each section will work as a team to design an experiment, collect data and determine appropriate analyses. These sessions are intended to give students the opportunity to learn how to design an experiment, to utilize the techniques learned in lab, to apply scientific and critical thinking skills, and to write a research style report similar to that required for scientific publication. Each student will then be required to write-up a lab report (independently) on the experiment conducted by their section. Reports are due on Fridays of the following week. The due dates are listed on the lab schedule at the end of this syllabus. A brief introduction that includes the hypothesis, a methods section that identifies the design of the experiment and statistical analysis performed as well as the results (what was found) and discussion (what does it mean). Reports must be computer generated, and properly formatted. Statistical analysis is REQUIRED and discussion of the analysis is expected. No hand written reports (including graphs/tables) are allowed. Reports 1 and 2 are worth up to 30 points. Report 3 is worth up to 40 points.

Q: What if I miss lab and don't have an excuse? Can I still turn-in the report or the worksheet?

No. Students that miss the hands-on portion of the lab as a result of an unexcused absence, or those failing to provide proper documentation for absences, or those that do not submit work by the submission deadline will not be allowed to make-up the missed work, submit a lab report for credit, take a make-up quiz, or submit work late. Furthermore, students that are absent from lab are not eligible to receive points for any worksheets or reports based on the in-lab work. Late or ineligible assignments submitted as a result of unexcused absences will not be accepted. Such submissions (if submitted anyways) will receive an automatic **zero points!**

Q: What if I have a documented excuse for missing lab? What should I do?

First, send Dr. Danley an email. You will need to provide documentation of your absence. For lab related non-emergency absences, you must notify Dr. Danley at least 7 days in advance of the absence. Make-up labs are typically scheduled for Friday morning of the same week during the excused absence. After this point, the lab materials will be put away and it may not be possible to make-up the lab.

For emergency-related absences, students must notify Dr. Danley no later than 48 hours after the missed exam or lab. Acceptable documentation must be submitted no later than 3 days, after missed assignment/exam. Excused, missed work must be completed within one week (7 days) of the original scheduled due date, unless other arrangements have been made with the TA/instructor.

Q: Where do I turn in my lab reports?

All lab reports must be submitted online through the Safe Assign link available on Blackboard. A separate link will be made available for each lab report due. After the deadline for the report has passed, the link is automatically deactivated, and is no longer available.

Q: I've been trying to submit my report through Safe Assign but I keep getting error messages. The deadline is approaching quickly. What should I do?

If you are unable to successfully submit your report through Safe Assign, you can email a copy of the report in MS Word format, to your TA BEFORE THE DEADLINE has passed. Late submissions will not be accepted. Failure to submit your lab reports will negatively affect your lab points, and can negatively affect your overall course grade.

Q: Are there sample lab reports available somewhere?

Yes! Two sample reports will be posted on BIO 350 lab website. The rubrics and report writing guidelines used by the TA's for grading the lab reports will also be available on the website.

Lab Quizzes: Each basic lab exercise has a pre-lab quiz associated with it. Questions for each quiz come directly from the pre-lab questions at the beginning of each lab protocol. The questions address lecture and laboratory content related to the laboratory exercises. Each quiz is worth 5 points.

Lab Quizzes are given during the first 10 minutes of lab. If you are late and the quiz is in progress, you will not be given extra time. If you arrive more than 10 minutes late to lab, you will not be permitted to take the quiz.

Q: What if I miss lab due to an unexcused absence? Can I make-up the quiz?

No. Students that miss the hands-on portion of the lab as a result of an unexcused absence, or those failing to provide proper documentation for absences in a timely manner, or those that do not submit work by the submission deadline will not be allowed to make-up the missed work, submit a lab report for credit, make-up the quiz, or submit work late. Late assignments submitted as a result of unexcused absences will not be accepted. Such submissions (if submitted anyways) will receive an automatic **zero points!**

Q: What if I am running late to lab, can I come in late and still do the lab?

Lab quizzes are given during the first 10 minutes of the lab session. If you come while the quiz is in progress, you will not be given extra time. If you arrive after the lab activity is already underway and you do not have a valid and documented excuse, you will not be permitted to complete the lab, you will be marked absent, and you will not be eligible to complete any quizzes, worksheets or reports associated with the lab session.

General Course Policies

1. Return of Graded Materials

Graded materials will not be handed back during lecture, nor will they be left in the halls or any other public location. To maintain privacy and minimize class disruption, all graded materials (other than online content) are available by stopping by my office during normal office hours, or immediately following lecture. Other pick-up times are available by appointment. In accordance with University procedures, graded materials will be held for up to one semester after the end of the course. Final exams are not returned: however, students are free to stop by my office to look over their exam.

2. Questions Regarding Scores or Grades

If you have a concern regarding your posted score/grade for a lab assignment or exam, you have 1 week (7 days) from the day the scores are posted to contest that score. After one week, the score will not be changed. It is your responsibility to check your scores and follow-up in a timely manner. We are happy to fix any errors or irregularities in grades within reason. If you feel that there was an error in grading your exam, you must submit your request in writing, detailing which questions you feel are in error and why your answer(s) should receive additional credit. For instance, if there is information in the text book that supports your answer, quote the information from the book and provide the page and paragraph number. All requests must be submitted within 1 week of posting of the answer key in order for the scores to be changed.

3. Rescheduling Lecture Exams or Labs

Students with documented excusable absences are allowed to make up missed exams or lab activities according to the following guidelines: For excused non-emergencies, students must notify the instructor at least 1 week (7 days) before the excused absence.

For lecture related excused, non-emergency absences, the student must notify Dr. Robin Cooper at least 7 days in advance of the absence.

For lab related non-emergency absences, the student must notify Dr. Melody Danley at least 7 days in advance of the absence. Make-up labs are typically scheduled for Friday morning of the same week during the excused absence. After this point, the lab materials will be put away and it may not be possible to make-up the lab.

For emergency-related absences, students must notify Dr. Danley no later than 48 hours after the missed exam or lab. Acceptable documentation must be submitted no later than 3 days, after missed assignment/exam. Excused, missed work must be completed within one weeks (7 days) of the original scheduled due date, unless other arrangements have been made with the TA/instructor.

For lecture, if you miss an EXAM #1, 2 or 3, you will have to make up the missed exam in the hour immediately following the 1st hour of Exam #4. These make-ups will be comprehensive over the entire textbook.

If you miss two lecture exams you will be encouraged to take an incomplete in the course.

In all cases, you must present a doctor's note, or other (as outlined above) to the instructors within 3 calendar days of missing any exam.

There is no make-up exam for Lecture EXAM #4 (Final). If you miss the final, you will not be able to take an incomplete in the course without discussing with us the reasons for missing the exam, and then filling out and signing an incomplete form with the department. If we feel an incomplete is warranted, we will determine the conditions necessary to satisfy the incomplete at that time.

For excused and documented absences, this course adheres to the University policy as follows:

- A. Illness of the student or serious illness of a member of the student's immediate family. The instructor shall have the right to request appropriate verification.
- B. The death of a member of the student's immediate family. The instructor shall have the right to request appropriate verification.
- C. Trips for members of student organizations sponsored by an academic unit, trips for University classes, and trips for participation in intercollegiate athletic events. When feasible, the student must notify the instructor prior to the occurrence of such absences, but in no case shall such notification occur more than one week after the absence. Instructors may request formal notification from appropriate university personnel to document the student's participation in such trips.
- D. Major Religious Holidays. Students are responsible for notifying the

instructor in writing of anticipated absences due to their observance of such holidays no later than the last day for adding a class.

E. Any other circumstances which the instructor finds reasonable cause for nonattendance. Students missing class-work due to an excused absence bear the responsibility of informing the instructor about their excused absence within one week following the period of the excused absence (except where prior notification is required), and of making up the missed work. The instructor shall give the student an opportunity to make up the work and/or the exams missed due to an excused absence, and shall do so, if feasible, during the semester in which the absence occurred.

Failure to follow this procedure on the part of the student will result in an automatic **zero points** for the missed assignment or exam! Special note: **Make-up exams will be composed of a different set of questions compared to the in-class exams given, and will contain short-answer and short essay questions.**

4. Punctuality

During lecture, please do not arrive late or leave early. This is disruptive for me and for the other members of the class. If you must enter late or leave early to lecture, please sit near the exits to minimize class disruption. Get your materials out and be ready to take notes **before** you enter the classroom (i.e. do not rummage through your book bag looking for paper and a pen after you've come in 20 min late).

For lab, quizzes are given during the first 10 minutes. If you are late, you will not be given extra time. If you arrive after the lab activity is already underway and you do not have a valid and documented excuse, you will not be permitted to complete the lab, you will be marked absent, and you will not be eligible to complete any quizzes, worksheets or reports associated with the lab session.

5. Academic Honesty

Cheating or committing acts of plagiarism on any graded material is not tolerated in this course! All students are expected to uphold a basic standard of academic honesty as outlined by the University of Kentucky Senate Rules (<http://www.uky.edu/USC/New/SenateRulesMain.htm>).

University Senate Rules Regarding Plagiarism (SR 6.3.1)

– **Plagiarism:** All academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about a question of plagiarism involving their work, they are obliged to consult their instructors on the matter before submission.

When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording or anything else from another source without appropriate acknowledgment of the fact, the students are guilty of plagiarism.

University Senate Rules Regarding Cheating (SR 6.3.2)

--**Cheating** is defined by its general usage. It includes, but is not limited to, the wrongfully giving, taking, or presenting any information or material by a student with the intent of aiding himself/herself or another on any academic work which is considered in any way in the determination of the final grade. The fact that a student could not have benefited from an action is not by itself proof that the action does not constitute cheating. Any question of definition shall be referred to the University Appeals Board.

Charges of an academic offense will be made against any student that cheats or commits plagiarism on any graded course material. Penalties for such an offense will be assessed according to the University Rules regarding Academic Offenses. For more information regarding specific procedures, visit the website http://www.uky.edu/Faculty/Senate/rules_regulations/index.htm and click on any of the "University Senate Rules" links.

6. Classroom Behavior, Decorum and Civility

As a student engaging in a myriad of intellectual pursuits, you are expected to maintain a level of dignity and respect towards faculty, staff, and fellow students. You are expected to value differences among all members of our academic community. You have the right to take reasoned exception and to voice opinions contrary to those offered by the instructor and/or other students (S.R. 6.1.2). Equally, a faculty member has the right -- and the responsibility -- to ensure that all academic discourse occurs in a context characterized by respect and civility. Acceptable decorum and civility does not include attacks of a personal nature or statements denigrating another on the basis of race, sex, religion, sexual orientation, age, national/regional origin.

TURN OFF YOUR CELL PHONE! Use of cell phones, iPods, or other similar electronic devices for non-class related activities while class is in session is not allowed. Do not read newspapers, work on other assignments, or carry on conversations during class. Audio recorders for lecture are permitted. Laptops for use in taking notes are also permitted, so long as the privilege is not abused.

7. Disabilities and medical conditions

If you have a documented disability that requires academic accommodation, please contact Disability Resource Center so proper arrangements can be made. To receive special accommodations in this course you must provide a Letter of Accommodation from the Disability Resource Center (Room 2, alumni Gym, 257-2754; email to jkarbes@email.uky.edu) for coordination of the campus disability services available to you.

8. Additional Lab Guidelines

An essential component of learning in physiology requires the use of live animals. It is impossible to demonstrate the full extent of possible responses through textbooks readings or lectures. As emerging professionals, it is expected that all students will demonstrate respect and maturity when working with these animals. If any disrespect or intentional cruelty is inflicted upon the animals, it may be reason to be expelled from the course with an "I" (incomplete), "W" (withdrawal), or automatic "E" (failing grade) depending the timing and degree of the offense.

No horse play, cutting up, playing around, etc. is allowed in the laboratory. There are many students coming and going in the lab throughout the day and materials are sometimes shuffled around. Squirting someone with a solution in a syringe or a bottle can be dangerous. You might "know" it is water but another person does not. A 3M KCl solution can easily be mistaken for water, and can be very harmful if squirted by accident into someone's eye.

We may use a fixative in the lab. The fix solution is a Bouin's solution (Prepared with saturated picric acid, formaldehyde and acetic acid; Sigma-Aldrich Co.). Some people are very allergic to the vapors of formaldehyde. If you know you are allergic please inform the instructor (Dr. Danley) as soon as possible so we can make alternative plans. The fix solution is to remain in the vented hood.

Every student will have to have completed the on line safety test and bring to the lab on the 1st day of your section meeting time. It is an easy test and you can take it multiple times until you get a 100 %. Either save and email your TA, or print it out and bring it to the first lab of the semester. The TA will check you off for having completed the exercise. The website for the safety test is:

<http://ehs.uky.edu/classes/chemhyg/chemclass.php>

Lecture Schedule FALL 2014 Biological Sciences, Rm. 116 Tuesday & Thursday 9:30 -10:45 AM

| Lecture, Day, | Date, | Topic Reading, Lecturer |
|---------------|-------|-------------------------------------------------------------------------------------------------------------------------|
| 1 | Th... | 8/28 Introduction to course and physiology..... Chapt 1&2, 3 |
| 2 | T | 9/2 Molecules, Energy and Biosynthesis Chapt 3 |
| 3 | Th | 9/4 Membranes, Channels and Transport/ Physical basis of neuronal function..... |
| Chapt. 4, & 5 | | |
| 4 | T | 9/9 Physical basis of neuronal function Chapt. 5 |
| 5 | Th | 9/11 Physical basis of neuronal function & start on Chapter 6..... Ch. 5/6 |
| 6 | T | 9/16 Communication along and between neurons Ch. 6..... |
| | Th | 9/18 Exam 1 Ch1- 6 parts (100 points) |
| 7 | T | 9/23 Communication along and between neurons..... Ch. 6 |
| 8 | Th | 9/25 Communication along and between neurons Ch. 6 |
| 9 | T | 9/30 Sensory Mechanisms..... Ch. 7 |
| 10 | Th | 10/2 Sensory Mechanisms Ch. 7 |
| 11 | T | 10/7 Sensory Mechanisms/ Organization of Nervous System Ch. 7-8 |
| 12 | Th | 10/9 Muscle Ch. 10 |
| 13 | T | 10/14 Muscle & Behavior Ch 10 |
| 14 | Th | 10/16 Muscle & Behavior..... Ch 10 & maybe Ch 11 (exam review) |
| | T | 10/21 Exam 2 Chs 6-10 and maybe Ch 11 (except Ch 9) (100 points) |
| 15 | Th | 10/23 Behavior..... cont. Ch 11 |
| 16 | T | 10/27 Endocrine ...Hypothalamus-Pituitary Chapt. 9 (muscle topic ...ppt) |
| 17 | Th | 10/30 Thyroid, parathyroid, adrenal and pancreas Chapt. 9 |
| 18 | T | 11/4 Wrap up endocrine Chapt. 9 |
| 19 | Th | 11/6 Cardiovascular Chapt. 12 |
| 20 | T | 11/11 Cardiovascular Chapt. 12 (here). |
| 21 | Th | 11/13 Cardiovascular / Respiration Chapt. 12 & 13. If you are interested in heart development ppt |
| | T | 11/18 Exam 3 Chs 11, 9, 12 (100 points) |
| 22 | Th | 11/20 Respiration Chapt. 13 |
| 23 | T | 11/25 Respiration Chapt. 13 |
| | Th | 11/27 Holiday - Thanksgiving |
| 24 | T | 12/2 Respiration / Ionic and Osmotic Balance.....Chapt. 13 &14 |
| 25 | Th | 12/4 Ionic and Osmotic BalanceChapt. 14 |
| 26 | T | 12/9 Ionic and Osmotic Balance/ DigestionChapt. 14 &15 |
| 27 | Th | 12/11 Digestion / Heat and adaptationsChapt. 15-17 |

Monday 12/15/14 FINAL EXAM @ 10:30 A.M-12:30 PM room 116 (150 points)
(<http://www.uky.edu/registrar/content/final-exam-schedule-fall-2014>)

Fall 2014 Lab Schedule

| Lab Week | Description | Pre-lab Quiz | Write-up | Write-up Point Value | Submission Deadline | Data Analysis |
|---------------|-----------------------------------------------------------|--------------|-----------|----------------------|---------------------|---------------------------------------------------|
| Sept 8, 2014 | Intro to Physiology Lab – Glucose Control Pathway | 5 | Worksheet | 15 | End of Lab | Means, Std Error, and Graphing, Std Curves |
| Sept 15, 2014 | Nervous System 1: Resting Membrane Potentials in Crayfish | 5 | Worksheet | 15 | End of Lab | Regression, p-value and r-squared interpretation |
| Sept 22, 2014 | Nervous System 2: Ventral Nerve Cord Activity in Crayfish | 5 | Worksheet | 15 | End of Lab | Paired t-test, p-value interpretation |
| Sept 29, 2014 | Nervous System 3: Design your own Experiment | None | Report 1 | 30 | Fri, Oct 10 | Varies |
| Oct 6, 2014 | Frog Heart and Muscle (pending IACUC approval) | 5 | Worksheet | 15 | End of Lab | Regression, p-value, and r-squared interpretation |
| Oct 13, 2014 | Human EKG Part 1: Resting, Exercise, and Dive Reflex | 5 | Worksheet | 15 | End of Lab | One-way ANOVA, p-value interpretation |
| Oct 20, 2014 | Human EKG Part 2: Design your own experiment | None | Report 2 | 30 | Fri, Oct 31 | Varies |
| Oct 27, 2014 | Human Renal Part 1: (data collection) | 5 | Worksheet | 15 | End of Lab | None |
| Nov 3, 2014 | Human Renal Part 2: (data calculations and analysis) | None | Report 3 | 40 | Fri, Nov 14 | Varies |
| Nov 10, 2014 | Human Respiration Part 1: Gas Partial Pressures | 5 | Worksheet | 15 | End of Lab | Paired t-test, p-value interpretation |
| Nov 17, 2014 | Human Respiration Part 2: Lung and Dead Space Volumes | 5 | Worksheet | 15 | End of Lab | Paired t-test, p-value interpretation |
| Nov 24, 2014 | No labs scheduled - Holiday | None | No lab | No lab | No lab | No lab |
| Dec 1, 2014 | Human Respiration: Design Your Own Experiment | None | Worksheet | 20 | End of Lab | Varies |

Labs are held in the Multidisciplinary Science Building (625 Rose Street) Room 155 b

Additional content for the labs can be found on the BIO 350 lab website at:
<https://sites.google.com/site/bio350animalphysiology/>