BIO 201 A – Cell Biology

Syllabus

Spring 2020

Lectures: MWF 9:00 - 9:50 AM, Norton 112
Professor: Dr. Lara Hutson
Office: Cooke 317
Email: larahuts@buffalo.edu
Office Hours: Mondays and Tuesdays 12:00-1:00 PM in **Cooke 651.** My office hours are group question-and-answer forums. To discuss private matters, please email me to set up an appointment.
TA Help sessions/Office hours: To be posted in UB learns "Office Hours" content area

ABOUT BIO 201

What is life? In BIO 201 we will explore this question and learn how cells – the basic structural unit of life – capture, transform, and use energy to maintain homeostasis, grow, and reproduce. In lab you will learn many of the techniques used in cell biology, and by the end of the semester you should understand what types of questions can best be answered with each of the different techniques.

IMPORTANT INFORMATION REGARDING LAB SECTION ENROLLMENTS

You should be registered for either a Hybrid or a Traditional lab for this course, depending on your major or intended major. Hybrid labs have 'H' at the end of the section number (e.g. A13H); traditional labs have 'T' (e.g. A04T). For Hybrid labs your TA will explain how to register for Late Nite Labs at your first lab meeting, and for Traditional labs you will need the BIO 201 Lab Manual 6th Edition, available at the UB Bookstore.

REQUIRED MATERIALS

1. **Textbook:** "Life: The Science of Biology," 11th Edition by Sadava, Hillis, Heller, & Hacker (2017) available in a variety of formats for purchase or rent. It is also available as a three-volume set, of which only Volume 1 is used in BIO 201. BioPortal Access is <u>not</u> required. (Note: The same textbook is used for BIO 200, BIO 201, and BIO 303.)
2. **Reef/iClicker registration** by the 2nd week of classes. Instructions to register will be posted in UB learns. Make sure you register for BIO 201 A (9:00 AM) Spring 2020. IMPORTANT: If you want credit for participation, you must register using your first and last names **as they are listed in HUB** and your **UB email address**. Download the App BEFORE coming to class!
3. **All lab sections:** A composition book to be used as a lab notebook.
    - **Students in traditional 'T' labs:** *BIO 201 Lab Manual* 7th Edition, Hutson. Pub. Hayden McNeil, 2020 (available for purchase at UB Bookstore: ~$60). You must use the 7th Edition or you will not be allowed to participate in lab. Personal protective equipment (PPE) will be provided in lab.
    - **Students in hybrid 'H' labs:** Labster subscription. You can register the first time you access the labs, ~$60. Other information and computer requirements are provided in the lab UB learns site.

LECTURES

- Lectures are your primary source of information for this class. **Student who attend class regularly score ~10% higher on exams that students who do not.** For schedule and reading assignments,

see the **Master Schedule** posted in Course Information.

- A number of the lectures will follow a "**Flipped Classroom**" format. For all of these you must complete the reading and video assignments and answer the questions in the Flipped Classroom assignment posted in UB learns prior to coming to class that day. This allows time in class for a more in-depth discussion and practice of challenging material. All Flipped Classrooms are listed in **Bold Red** in the Master Schedule.
- **Lecture slides** will be posted in the "Lectures" folder of the "Course Documents" section of UB Learns by 5 PM on the day before class. It is strongly recommended that you print these out and bring them to lecture.
- **Lecture recordings** will generally be posted under Classroom Recordings in UB Learns. WARNING: Do NOT rely on lecture recordings as your primary source of information, as lecture recordings sometimes fail.
- **Class participation:** Use the Reef/iClicker App to answer in-class questions. Each question is worth 0.4 points - 0.2 pts for participation + 0.2 pts for correctness). On Flipped Classroom days, each question will be worth a total of 0.2 pts (0.1+0.1 pts). Questions during the first week of the semester will not count towards the final score. **★ DO NOT contact me for make-up points if you forget your device, experience technical problems, or miss lecture: It is not feasible for me to provide make-ups. If you have problems with the App, contact Reef customer support. ★**

HOMEWORK

- Online homework assignments will be posted most weeks in UB learns Assignments. **Homework is due at 11:45 PM Sunday nights** with the exception of a few weeks where there is no homework. Each assignment is worth 5 points and the lowest score is dropped in calculating your final grade (11 Homeworks @ 5 pts each, lowest HW score dropped = 50 pts possible). The are NO extensions or make-ups for missed homework assignments.
- Each homework assignment is comprised of ten randomly-selected questions from the previous week's lectures. You get three attempts to do each homework assignment before the due date, and the highest score of the three will be recorded.
- After the due date, the homework assignment will be re-posted for practice. In the week before each exam a 50-question practice exam from the collected homework questions will also be posted.

EXAMS

- Three lecture exams cover lecture material only. Exam 1 (Lectures 1-10) is **in class WEDNESDAY, FEB. 19.** Exam 2 (Lectures 11-24) is **in class WEDNESDAY, APRIL 1.** Exam 3 (Lectures 25-40) is **7:15-8:45 PM FRIDAY, MAY 15.** Note; Exam 3 is NOT cumulative.
- **Format**: All exams are multiple choice. You MUST bring, a dark pen and/or pencil, and photo ID to every exam. NO cell phones, calculators, or cheat sheets are allowed. When you arrive at an exam, **place all materials and phones (silenced or off) in your bag, and your bag in the front or back of the room. You must sit in your assigned seat. Anyone found with any of these items during the exam or who is not sitting in their assigned seat will receive a zero on the exam.**
- **Make-up policies**: If you know that you must miss an exam, you must contact me at least **2 weeks before the exam**. All make-up exams will be administered *before* the scheduled exam. In the event of a medical emergency, you must contact me **within 24 hours of the missed exam**. You may receive a make-up exam only if you provide me with **official documentation from your medical provider** of

the emergency. **If you have a final exam conflict with Exam 3, you will receive an email after Spring break about scheduling a make-up. If you miss Exam 3 due to an emergency, you must take an incomplete in the course and make up the exam at a later date, either during Summer session or next Spring semester.**

- **Scores:** Exam scores will be posted to UB Learns as soon as they are available. It is your responsibility to check your scores when they are posted. If you believe there is an error in your score, you must pick up your exam, check your Answer Sheet against the posted Key to confirm the error, and contact me as soon as possible with your **section (BIO201A), your first and last name, your ID number, and the specific nature of the error**.

COMMUNICATION

- **email:** Please use your UB email for all course-related correspondence and check your UB email regularly. If you need to email me or any of the TAs, please write BIO201A at the beginning of the Subject line, and follow basic email etiquette (for more information see Professional email etiquette). I can be addressed as Dr. Hutson, Dr. H, Professor Hutson, or any reasonable variation of either of these.
- **UB learns:** Most of the information you need for the course will be posted to UB learns, and all assignments are submitted through UB learns, so check UB learns regularly. You have a separate lab UB learns site for lab stuff.

LABS

Labs meet beginning **in the second week of the semester** and **attendance is mandatory**. More information about lab can be found in the "About BIO201 ___ Labs" document in your lab UB learns site. All communication about labs should be through your lead TA.

GRADES

Point breakdown for BIO 201 sections A and C:

Assessment instrument	Info	Points
Exam 1	Lectures 1-10	100
Exam 2	Lectures 11-24	140
Exam 3	Lectures 25-40	150
Flipped classroom assignments	9 @ 2 pts each, drop lowest	16
iClicker questions*	~110 @ 0.4 pts each	44
Weekly homework (UB learns)	11 @ 5 pts each, drop lowest	50
Lecture subtotal		***500***
Lab subtotal		*160*
GRAND TOTAL		***660***

*Numbers are approximate. All points earned above and beyond 44 will serve as extra credit.

Final letter grades are based on the scale below:

A: 93.3-100.0%	B: 83.3-86.6%	C: 73.3-76.6%	D: 60.0-66.6%
A-: 90.0-93.3%	B-: 80.0-83.3%	C-: 70.0-73.3%	F: <60.0%
B+: 86.6-90.0%	C+: 76.6-80.0%	D+: 66.6-70.0%	

There is no curve in this class, and aside from any extra credit assigned during the semester, there is NO extra credit. NO EXCEPTIONS.

HOW TO SUCCEED IN THIS CLASS

- **Read the syllabus!**
- **Print out Course Schedule** from the Syllabus and keep it with you at all times!
- At minimum, skim **all reading and video assignments** before the class for which they are assigned.
- **Attend all classes** and **pay attention.** If you miss iClicker questions during class, go back after class to figure out why.
- **Print out lecture slides and bring them to class. Take notes** and mark topics that are confusing.
- **Review and rewrite notes within 48 hours**, to clarify confusing topics and fill in the gaps by referring to the textbook and lecture recordings. Write down questions to take to office hours and/or help sessions.
- **Create your own glossary:** define all terms that are new to you or difficult. Update the glossary after every lecture.
- **Do all homework carefully. Attempt to get everything right the first time.** Review as necessary for practice.
- **Attend Office hours and/or Help sessions**. Bring your questions and stay engaged.
- **Complete practice exams as if they are exams** (i.e. timed in a classroom setting without notes). When you grade yourself, figure out WHY you got questions wrong. Figure out not only why the correct answer is correct, but why each of the incorrect answers are incorrect. Incorrect answers are often the correct answer to a similar question. Try to figure out what!
- **Utilize Extra Resources and always download and study Extra Slides** posted in UBlearns**.**
- **Check your UB email and UBlearns regularly.** Critically important announcements are usually posted to UBlearns.

ACADEMIC INTEGRITY

Academic dishonesty, as defined in the UB Academic Integrity Policy, is grounds for course failure. **Cheating or plagiarism on exams, homework, quizzes, or lab reports will result in a zero on that assignment/exam and will be reported to the Senior Vice Provost for Academic Affairs**. Any subsequent case of academic dishonesty will result in course failure.

DISABILITY ACCOMMODATIONS

If you require accommodations to enable you to participate in this course, please contact the Office of Accessibility Resources (60 Capen Hall: 645-2608) during the first week of class. They will provide you with information, review appropriate arrangements, and provide you with a letter explaining any necessary accommodations. If you need accommodations for lectures or exams, provide me with a copy of your letter as soon as possible. If you require accommodations for lab, provide a copy of the letter to your lab TA by the end of the 2nd week of classes. You will schedule your exams at the Office of Accessibility Resources either **beginning or ending at the same time as the scheduled in-class exam**. If this is not possible you must contact email me as soon as possible.

INCOMPLETES

Incompletes will only be received by students in good standing (not failing) who have an unavoidable and documented reason that they cannot complete the course in this semester. Upon receiving an incomplete, a student must complete the course when it is next offered (usually in the summer). Arrangements to receive an incomplete must be made before the end of the semester. Please refer to the University Policy on Incompletes for more information.

IMPORTANT DATES

- Monday, Feb. 3: Last day of Add/Drop
- Mar. 16-21: Spring break
- Friday, Apr. 17: Last day to Resign (R will appear on transcript)
- Friday May 8: Last day of classes
- Monday May 11-Saturday May 16: Finals week

See also Registrar's Office Calendar.

REPEATING THE COURSE

BIO 201 is a "limited enrollment" course, which means that the enrollment in these courses is limited by the number of student positions available. Consequently, self-registration in these courses in the Fall and Spring semesters may be limited to those students who are taking the course for the first time. Students who plan to repeat the course for any reason should plan to register for the course in the Summer. Repeat enrollment is defined as previously enrollment in the course at UB, or who transferred an equivalent course to UB, receiving a letter grade of 'A', 'B', 'C', 'D' or 'F' and qualified values thereof (e.g. 'A-', 'D+'); or a grade of 'P', 'S', 'U', 'I', 'J', 'N', or 'R', unless the student has taken an Administrative Withdrawal for an entire semester (grades registered as 'W').

OTHER RESOURCES AVAILABLE TO STUDENTS

Office	Services	Eligibility	Contact Information
Undergraduate Academic Advisement	• Unlimited free tutoring at Academic Success Centers • Unlimited free online tutoring • Center for Excellence in Writing • Mathematics Help Center • Other tutoring resources by program	Available to all students	Various locations. http://advising.buffalo.edu/help/tutoring.php
Wellness Education Services	• Healthy Eating • Life & Learning Workshops • Stress reduction • Substance use support • LGBTQ wellness	Available to all students.	114 Student Union 716-645-2837 http://www.buffalo.edu/studentlife/who-we-are/departments/wellness.html

	• Rape & sexual assault prevention and awareness		
Student Support Services (SSS)	• Tutoring and academic coaching • Grant funding • Workshops and events • Peer mentoring • Borrow laptops	Students who are low-income, first generation, or have a disability. US Citizen or Permanent Resident. Working on first bachelor's degree (or equivalent).	215 Norton Hall 716-645-2732 sssinfo@buffalo.edu http://www.cpmc.buffalo.edu/sss/ Students must apply online.
Collegiate Science & Technology Entry Program (CSTEP)	• Academic and career counseling • Individualized and group tutoring • Workshops/seminars • Scholarships and research funding	NY State and US citizen or Permanent Resident from Underrepresented groups or economically disadvantaged pursuing a licensed, health-related profession, or a career in STEM. Minimum GPA 2.5.	222 Norton Hall 716-645-2234 CSTEP@buffalo.edu http://www.cpmc.buffalo.edu/cstep/index.php
Office of Equity, Diversity, and Inclusion	• Ensures compliance with UB's policies covering discrimination, harassment, accommodations, equal opportunity, and child protection	All students. Students may file complaints or seek assistance and accommodations.	406 Capen Hall 716-645-2266 http://www.buffalo.edu/equity.html
Counseling Services	• Free individual and group counseling • Workshops • Crisis intervention • Information for international students	All students	120 Richmond Quad, Ellicott Complex 716-645-2720 http://www.buffalo.edu/studentlife/who-we-are/departments/counseling.html Crisis Services 716-834-3131
Judicial Affairs and Student Advocacy	• Refer students who are exhibiting concerning or disruptive behavior, or a student in distress • Enforce UB rules, regulations, and policies • Mediation services • Student advocacy	All students	9 Norton Hall 716-645-6154 http://www.buffalo.edu/studentlife/life-on-campus/community/rules/violations/student-wide-judiciary.html
Orientation, Transition & Parent Programs	• UB Transition Specialists – answers questions, connects students to campus resources and assistance • Transfer ambassador program	All students. Programs specific to new or transfer students.	Suite 112 Student Union 716-645-3351 http://www.buffalo.edu/studentlife/who-we-are/departments/orientation.html
Veterans Services	• Veterans lounge • Navigate benefits and services • UB Student Veterans Association	Veterans	101 Allen Hall 716-829-5586 http://www.buffalo.edu/studentlife/who-we-are/departments/veteran.html
International Student and Scholar Services	• Information for getting started at UB as newly admitted students • Immigration and visa • Social security and income tax • Cultural information and life in Buffalo and at UB • Workshops and events	International students	210 Talbert Hall 716-645-2258 iss@buffalo.edu https://www.buffalo.edu/international-student-and-scholar-services.html
Health Services	• Medical care and student health • Workshops and informational videos	All students	Michael Hall 3435 Main Street 717-829-2564 http://www.buffalo.edu/studentlife/who-we-are/departments/health.html

BIO 201 A and C Schedule

Schedule is tentative and may be subject to change. Any changes will be announced in class. **Read all reading assignments and view assigned videos before coming to class. Flipped classrooms are listed in bold red and require additional outside work before coming to class.**

Week	Date	Lecture Topic	Reading (Sadava, 11th Ed.)	Lab
1	***The Chemical Basis of Life***			*NO LAB*
	1/27	1: Introduction	Ch. 1 pp. 1-19	
	1/29	2: The Chemistry of life	Ch 2. pp. 22-38; Videos: Crash Course Biology #1 and #2	
	1/31	3: Biological Macromolecules; Amino acids	Ch. 3, pp. 41-45; Video Crash Course Biology #3	
2	2/3	4: Amino acids, proteins, and protein structure	Ch. 3, pp. 45-52	Lab 1
	2/5	5: Protein folding (Flipped Classroom #1)	Ch. 3, review pp. 41-52 incl. Figure 3.10A and 3.10B	
	2/7	**6: Carbohydrates; Lipids (Flipped Classroom #1)**	**Ch. 3 pp. 54-62; Video: Crash Course Biology #3**	
3	**2/10**	**7: Nucleic Acids, Origins of life (Flipped Classroom #2)**	**Ch. 4 pp. 65-79; Video: Crash Course Biology #10 (through 8:49 only)**	Lab 2a
	Cells			
	2/12	8: Origins of Life (cont.); Bacteria	Ch. 5 pp. 81-92; Crash Course Biology #4 (#5 optional)	
	2/14	**9: Evolution of Eukaryotes; Organelles (Flipped Classroom #3)**	**Ch. 5 pp. 105-107, 92-95; Ch. 6 pp. 126-127**	
4	2/17	10: Endomembrane system; Pulse-Chase Experiment	Ch. 5 pp. 95-98; Video: Cell Organelles 2 Cytoskeleton	Lab 2b
	Wed. 2/19 - EXAM 1 (Lectures 1-10)			
	2/21	11: Cytoskeleton and Molecular Motors	Ch. 5 pp. 98-103, including 5.20A and B; Video: A Day in the Life of a Motor Protein	
5	2/24	12: Membranes, Diffusion, & Osmosis	Ch. 6 pp. 118-123; Video: Transport in Cells: Diffusion and Osmosis	Lab 3
	2/26	**13: Membrane transport (Flipped Classroom #4)**	**Ch. 6 pp. 118-126; Video: Transport in Cells: Active Transport**	
	2/28	14: Cell signaling	Ch. 7 pp. 131-141	
6	3/2	15: Cell signaling (cont.)	Ch. 7 pp. 132-141 (cont.)	Lab 4a
	Energy, Enzymes, and Metabolism			
	3/4	**16: Energetics and ATP (Flipped Classroom #5)**	**Ch. 8 pp. 150-163**	
	3/6	17: Enzymes	Ch. 8 pp. 157-163	
7	3/9	18: Regulation of enzyme activity	Ch. 8 pp. 163-169	Lab 4b
	3/11	19: Overview of metabolism; glycolysis	Ch. 9 pp. 172-176; Video: Crash Course Biology #7	
	3/13	20: Aerobic metabolism: Pyruvate oxidation and the Krebs Cycle	Ch. 9 pp. 176-179; Video: Krebs!	
March 17-25 - Spring Break				

8	3/23	21: Electron transport system, ATP Synthase	Ch. 9 pp. 179-182	Lab 5
	3/25	22: Anaerobic metabolism and regulation	Ch. 9 pp. 184-189	
	3/27	**23: Photosynthesis: light-dependent reactions (Flipped Classroom #6)**	**Ch. 10 pp. 193-202; Video: Crash Course Biology #8**	
9	3/30	24: The Calvin Cycle; Review	Ch. 10 pp. 202-205	Lab 6
	Wed. 4/3 - EXAM 2 (Lectures 11-24)			
	Genes and Heredity			
	4/3	25: Cell Division, The Cell Cycle, and MPF	Ch. 11 pp. 213-219	
10	**4/6**	**26: Mitosis (Flipped Classroom #7)**	**Ch. 11 pp. 219-224; Videos: Chromosome and Kinetochore, Kinetochore and Mitosis**	Lab 7
	4/8	27: Spindle assembly checkpoint; Aneuploidy		
	4/10	28: Other cell cycle checkpoints and cancer	Ch. 11 pp. 234-237	
11	4/13	29: Cytokinesis; Apoptosis	Ch. 11 pp. 224, 233-234	Lab 8
	4/15	**30: Meiosis (Flipped Classroom #8)**	**Ch. 11 pp. 226-233; Video: Crash Course Biology #13**	
	4/17	31: Heredity	Ch. 13 pp. 266-270	
12	4/20	32: DNA Replication	Ch. 13 pp. 270-275 (up to but not including "There are two steps...") plus Experiment pp. 276-277; Videos: Matthew Meselson and Meselson and Stahl Experiment Animation	Lab 9
	4/22	**33: Mechanisms of DNA replication (Flipped Classroom #9)**	**Ch. 13 pp. 275-282; Video: Crash Course Biology #10 (8:49 to end)**	
	4/24	34: Mutations, DNA damage, and repair	Ch. 13 pp. 282-283	
13	4/27	35: Genes and transcription	Ch. 14 pp. 288-295; Video: Crash Course Biology #11 (through 7:47)	*NO LAB: Weather Makeups*
	4/29	36: mRNA processing; Transcriptional Regulation	Ch. 14 pp. 298-301; Ch. 16 pp. 336-344	
	5/1	37: The Genetic code	Ch. 14 pp. 295-298	
14	5/4	38: Cracking the Code; Translation	Ch. 14 pp. 301-304	Lab final
	5/6	39: Translation (cont.)	Ch. 14 pp. 304-306; Video: Life Science - Protein Synthesis	
	5/8	40: Protein Trafficking	Ch. 14 pp. 307-309	
Finals	**Friday, May 15, 7:15-8:45 PM - EXAM 3 (Lectures 24-40); Location TBA**			

BIO 201 Learning Outcomes

#	Program learning outcome	Depth	Specific outcome objectives for BIO 201	Assessed
1	Provide Breadth of knowledge of basic principles and concepts	2	A. The Chemical Basis of Life: i. Identify the characteristics of life; ii. Identify hierarchy of biological macromolecular structure (monomers -> polymers -> higher-order structure) and how structure relates to function	Exams
			B. Cells: i. Identify organelles and match organelles to function. ii. Know cell membrane properties and be able to predict what kinds of molecules can diffuse through cell membranes; iii. Understand principles of osmosis; iv. Distinguish between different membrane transport mechanisms; iv. Know how cells communicate with each other using signal transduction	Exams, Lab final
			C. Energy, Enzymes, and Metabolism: i. Recognize basic differences in metabolism between different types of organisms, ii. Recognize advantages of aerobic metabolism and photosynthesis; iii. Identify reactants and products of major metabolic pathways; iii. Recognize what enzymes do and do not do.	Exams, Lab final
			D. Genes and Heredity: i. Differentiate between sexual and asexual reproduction; ii. Differentiate between mitosis and meiosis; iii. Recognize mechanisms by which cells translate genotype to phenotype; iv. Differentiate between DNA Replication, RNA Transcription, Protein Translation	Exams, Lab final
2	Depth within specialized areas	0		
3	Provide an understanding of experimental design and methodology	2	A.i Recognize and use scientific method correctly; ii. Be able to formulate testable hypotheses	Lab final
			B. i. Understand and be able to come up with positive and negative controls; ii. be able to interpret different control sample results for a variety of experiments	
			C. i. Correctly perform basic laboratory calculations; ii. use Excel to record, analyze, and graph data; iii. recognize relationship between sample size aand standard deviation	
			D. i. Read and use micropipettes and serological pipettes correctly; ii. Use a microscope correctly and calibrate an ocular micrometer, iii. Identify which technique(s) is/are appropriate to answer different biological questions	
4	Develop approaches for integration of information	2	A. i. Recognize relationships between cell biology, thermodynamics, and chemistry; ii. Understand cells communicate and respond as part of an organism or population	Exams
5		2	A. i. Recognize the difference between anecdote and data	Exams

	Encourage critical thinking and hypothesis building		B. i. Analyze and interpret quantitative and qualitative data from real and hypothetical experiments	Lab final
			C. i. Be able to formulate original, testable hypothesis; be able to design and interpret results of controls	Lab final
6	Provide skills in scientific communication	1	A. i. Be able to clearly explain results of and conclusions from experiments (written); ii. Be able to explain biological concepts and definitions correctly in a few words	Lab final
7	Provide contemporary information	1	A. Understand the basis of science in daily life	Exams
8	Encourage appreciation of scientific values	1	A. Know and abide by UB Academic Integrity rules; B. Use appropriate lab safety and sterile technique	Lab

BIO 201 SLI Learning outcomes

SLI Learning Outcome	**Specific outcome objectives for BIO 201**	**Delivered through**	**Assessment instrument**
1) Demonstrate detailed scientific knowledge across multiple scales. (For example, molecular to atomic).	Demonstrate understanding of hierarchy of biological macromolecule structure and roles in cellular life; understand and apply thermodynamic principles of energy transduction; understand advantages, disadvantages, and adaptations of multicellularity	Lecture	Exam 1
2) Demonstrate understanding of and employ the scientific method.	Understand, be able to express, and apply all aspects of the scientific method to all labs; design controlled experiments and formulate original hypotheses	Lab	Lab Final
3) Demonstrate an understanding that science is a continuous process and that our understanding of scientific phenomena has changed across time.	Understand the significance of the Miller-Urey Experiment and follow-up experiments improved and modified our understanding of the origins of life	Lecture	Exam 1
4) Apply scientific principles to solve real-world problems.	Apply knowledge of cell biology to novel situations, both real and hypothetical	Lecture, Lab	Exams 2-3; Lab final
5) Identify key ethical issues in scientific practice.	Demonstrate appropriate safety practices regarding self, others, and environment; Submit original work	Lab	Lab final
6) Distinguish scientific information from pseudo-scientific information and demonstrate an understanding of the nature of legitimate scientific debate.	Distinguish between statistically meaningful and anecdotal information	Lab	Lab final