Biology 343/Chemistry 443 -- Diet, Metabolism, and Disease **Spring 2015**

Peter Kuhlman

Welcome to what I hope will be one of the most challenging -- and rewarding -- classes of your college career! Please view this syllabus both as an introduction to the course and as an explanation of why I have designed the course this way. I'll be frank -- my syllabi tend to be long ("syllabooks", perhaps), and probably more long-winded than necessary, but I feel that it's very important that you understand my educational philosophy in order to get the most out of this class. Accordingly, I strongly encourage you to read the whole thing, so that you have a good sense for what's coming in the next fourteen weeks. And please let me know if there's anything in this syllabus that you either don't understand or don't agree with. It's my belief that you'll be in the best position to learn Biochemistry if we can honestly discuss both the learning process and the content of the course.

What I want to achieve in this course this semester:

We'll be exploring a topic this semester that is part of the fabric of everyday life -- how the food molecules that you eat impact your health. To be quite frank, I hope that through engaging with this material, you will never see your food or your body the same way again. I hope that you when you consider concepts like 'food' and 'diet' and 'fitness', you'll do so with a greater appreciation for what they mean on the biomolecular level.

Along the way, I want to help you learn to *think* like a Biochemist, and learn to *learn* like a Biochemist. What does that mean? It means I want to...

- give you a *true working familiarity* with the logical approach to asking questions about your world that we term "the scientific method". That methodology is far more than a set of steps for designing laboratory experiments. It is a way of interacting with life and with information.
- give you an appreciation for how scientific questions are asked and answered, from the initial idea to the description of the project to the delineation of a detailed, workable experimental plan.
- stimulate your hunger for information about the biochemical world.
- give you the confidence to pick up any scientific journal article, extract the information you need from it, and share your analysis of the article with others.
- equip you with some of the tools you will need to teach *yourself* about other aspects of biochemistry as you encounter them in your future journeys. These tools will include techniques for finding information, techniques for performing experiments, and techniques for analyzing and presenting your data.
- give you tools and motivation to *critically* investigate your world for the rest of your life. If you want to do what it takes to acquire those tools, we will have lots of fun together and you will be richly rewarded intellectually (and on your transcript!).

Fundamental to my approach to this class is a firm belief in the Liberal Arts approach to learning. At its core, this philosophy states that learning is not so much a process of accumulating information as a process of developing ways to examine and make sense of information. Therefore I most decidedly do NOT view my role as teacher to be the person who tells you all there is to know about the subject of biochemistry. Rather, I strive to be the person who encourages you to think critically about biochemical information, who helps you to construct your own view of the natural world.

In keeping with the goals described above, the most important elements of your grade in this course will depend on how sophisticated your biochemical logic is, and on how well you can learn new information. That is to say, I will be looking not so much at how well you have mastered the specific material covered in class, but rather how well you have mastered the tools a working scientist uses to learn and analyze new information.

To excel in this class, you will have to

- prepare for each class
- read and listen *critically* and question what you don't understand or don't believe
- listen actively and think creatively
- be willing to take chances, be willing to be wrong in front of your classmates
- take the initiative to prepare more than the minimum for any class or assignment, ask questions that you'll never get the chance to show me you can understand, and practice on your own. These activities are ones you'll engage in privately, but their outcome will be a sophistication and scientific comfort level that will be clear whenever you go out into the scientific public space.

To support you, I will

- talk as little as possible, and ask lots of questions
- structure this class to optimize your engagement at every level
- do my best to give you frank feedback frequently
- provide a gradient of evaluation points, starting with low-cost-to-failure and building to culminating exercises where a high level of knowledge and analytical acumen will be rewarded
- be available for those students who take the initiative to seek me out. I have set aside 3 hrs of flexible "office hours" per week. I will also be available for half an hour after every class to answer questions, respond to issues raised in class, and design homework exercises based on what we did in that specific class. That's an additional two hours per week during which you can ask me questions or bounce ideas off of me. Use it!

Who I am and how to get in touch with me:

Instructor:	Peter Kuhlman
Office:	Ebaugh 117
Phone:	587-6698 (if you let this ring, it will get forwarded to my cell phone -- or voicemail if I'm not immediately available -- so if you really need to get in touch with me, don't hesitate to call) You're welcome to call at any hour of the day or night (though I reserve the right to not answer at some of those hours!). If you want to text me instead, you may do so at 740-644-7460; the same (lack of) restrictions apply.
E-mail:	kuhlman@denison.edu
Office hours:	To optimize our opportunities to meet outside of class hours to discuss any questions or difficulties you're having, I don't have regular "office hours", but instead set up individual and group appointments. I'll make every effort to ensure that you and I can find a time to meet outside of class hours to discuss any topics that are of concern to you.

Course resources:

Textbook:	*None*. In this class we will be learning about biochemical science at the true cutting edge. As the cutting edge is, by its very nature, a moving target, no textbook can present a good picture of it. Nevertheless, textbooks can give you useful background information and can summarize important experimental findings. Consequently, you will be using a variety of texts, including the textbook you used in your introductory biochem class, to sketch the outlines of each scenario and technique we explore. Then, to fill in that picture, our class sessions will rely primarily on published research and review papers.
Laboratory Manual:	Your laboratory experiments will be true experiments and not tried-and-true exercises. Therefore a key element of the laboratory experience will involve learning how to design experiments so that the results are as informative as possible. Moreover, there will be times when different individuals in your lab group will be conducting very different experiments, and your group may be doing things that no other group is doing. Due to this dynamic situation, there will be no lab manual *per se*. Rather, I will provide you with the instruction manuals for any commercial kits that we use for your projects, and I will introduce you to print and online resources for other biochemical techniques. I may be able to share with you my notes for some experiments, and you will need to seek out protocols for some experiments. It is my hope that by the end of this course

you will be comfortable with the steps required to replicate an experiment from a published paper without ever having done that sort of experiment before.

People: In this course you may be going boldly where you (and I!) have never gone before, but you will not be in true *terra incognita*: there will always be people at Denison or somewhere in the world who have studied this material and done similar experiments before. And that's the case with most of the knowledge and most of the experiments we encounter in our scientific lives. Therefore it's important that you begin to appreciate how to go about finding and contacting the people who know what you need to know. We won't spend a lot of time on this aspect of experimental science, but hopefully we'll get you started…

Course meeting time:

Our class will meet every Monday, Wednesday, and Friday from 10:30 to 11:20, and on Friday afternoons from 1:30 to 4:20. Think Friday afternoon labs are a downer? I hope and expect that you'll find this one's an exception!

We'll start out with several weeks of classroom meetings during "lab" time, and in the middle part of the semester, your individual experimental responsibilities may require visits to the lab outside of scheduled class time. Because of the structure and goals of this class, we'll be doing some "lab" things during times we're scheduled to be in the classroom, and some "classroom" things during times we're scheduled to be in the lab. Real life and real science are like that -- they rarely conform to tidy segregation of tasks.

Learning from your mistakes:

I believe very firmly that learning is an iterative process; very few of us get things exactly right the first time through, and there is often a great opportunity for learning in repeating an assignment after receiving feedback on it. This philosophy underlies much of my approach to grading and point values for assignments in this class. I want you to feel that you can learn and benefit from your mistakes, that you will be rewarded for getting it right the second time around. This approach to learning is built into the grading structure of this class in two ways:

- most graded assignments in this class will be preceded by (optional) non-graded opportunities to try your hand at the same sort of skill or analysis
- for all graded assignments except the final lab report and the final exam, you may revise an assignment and submit it for reconsideration; your final grade for that assignment will be the average of your original and revised scores. (For an assignment on which you receive a grade of 50% or less, you are *strongly* encouraged to revise and submit the assignment for regrading.)

In the same vein, if you receive any assignment back on which any part of one of your answers has been marked in orange highlighter, you should interpret this as a particular invitation to come talk to me and then revise your answer and submit it for regrading. Typically this will indicate that I had trouble understanding the logic behind your answer, or felt that you answered a different question from the one I asked. In any event, this indicates that I think you have a better grasp on the material than your answer shows, and I'd like to give you another chance to demonstrate your mastery.

In any resubmission situation, please

- ensure that you include the original graded version of the assignment so that I can compare my original comments with your revised version. Resubmissions that are not accompanied by the original version will not be regraded. **I strongly encourage you to make a copy of your original assignment before giving it back to me, so that you have it to study from.** *Resubmissions get the lowest priority on my grading to-do list, and I won't guarantee getting them back to you before the end of finals week.*
- ensure that you carefully address the deficiencies of the original. I try to put care and time into the comments on your assignments when I hand them back, with the intent that my comments will help you think more carefully about your work. Revised versions that come back to me with the original problems un-addressed are likely to receive a less-than-generous review. If you have any questions about my comments, by all means come to talk with me about them *before* making your revisions.
- be aware that I grade *at least as stringently* on revisions as on the originals -- on the revision, I assume that

you understand my expectations, so I am less likely to give you the benefit of the doubt when your intent or procedure is not clear from your work.

- as indicated above, your final grade for the assignment will be the average of your original and revised grades. With a substantial improvement over the original assignment, this can make a very meaningful difference in your overall grade.

Finally, it would be naive to think that simply copying down answers off of someone else's paper, or writing down what someone else tells you, constitutes learning from your mistakes. While *I* won't be able to judge whether a correctly revised answer shows that you've *really learned* the subject matter, *you* should be able to make that assessment. I strongly encourage you to ask yourself that question honestly every time that you hand in revised answers. If you are not honest with yourself about this, you could get a rude surprise on the final exam, which is worth more points than all the other tests put together, and on which you only get one opportunity to show me what you truly have learned.

Due dates and deadlines

Let's face it. We're all busy, and we all find ourselves in the nasty situation from time to time where we have more things to do than we have time to get them done. It's a very real part of the modern lifestyle. With that in mind, and in an effort to avoid holding you to a standard that's higher than the one to which I hold myself, here's my policy on handing things in on time: if you hand any assignment in after the deadline but before I have time to grade it, there will be no cost for your tardiness. If you hand in an assignment after the due date, and up to one week *after I have graded* that assignment for your classmates, there will be an automatic 12% deduction in your score (that is, the max you can get for a late submission is 88% instead of 100%). I hope that you never find yourself turning things in later than that, but if you do, your score will drop an additional 12% for every additional week *after I grade* the assignment.

Scientific Writing

Several of the assignments for this course involve writing. In science, as in nearly all aspects of professional and personal life, clear and effective communication skills are a tremendous asset. I encourage each of you to take advantage of the campus Writing Center to improve your written communication skills. Although there is a widespread perception that writing in the sciences is somehow "different" from writing in other disciplines, I regard that as a myth. Styles certainly differ between fields, but the fundamentals of good communication are nearly universal. The Center is a free resource available to all Denison students. Student writing consultants from many majors help writers one-on-one in all phases of the writing process, from deciphering the assignment, to discussing ideas, to developing an argument, to finalizing a draft. Because proofreading is a last step in that process, writers should leave plenty of time for getting their ideas right before expecting proofreading help. Consultants also can help writers with personal documents, like job and internship applications. The Center is located on the fourth floor of Barney-Davis Hall; a satellite location is in the Reference section of the Library (the Entry level). Go to the Writing Center website at http://denison.edu/academics/support/writing-center to see their current hours or make an appointment to meet with a tutor.

Special Needs

Different students come to this class with different training, different backgrounds, and different abilities. If you feel that because of personal factors you would benefit from some modification of course procedures, such as special test-taking arrangements, I ask that you contact me privately *at your earliest convenience*. Also, please note that reading is the pre-eminent way of taking in information in science. If you have difficulty reading, please make an appointment to see me at your earliest opportunity.

I will work with you and with the Academic Support and Enrichment Center (Doane Hall, room 104) to optimize your learning experience. Certain accommodations will require verification of disability based on documentation on file in the Academic Support office.

Laboratory:

For the laboratory portion of this class, you'll engage in a group research project, culminating in a written research report in the format of a typical scientific research paper. Each group will conceive, design, and carry out an original project within the parameters of one of a selection of "sandboxes" that I've selected to help you learn to think about key course concepts as you would if you were a professional scientist in this field. It's my very great hope that you'll find this fun, challenging, and liberating -- enabling you to spread your scientific wings and explore what it really means to be a biochemist. In your daily activities in the lab, in your oral lab progress reports, and in your final written paper, I will hold you to a high standard of intellectual accountability -- your ability to rigorously explain your hypotheses, defend your choices, and interpret your results in terms of molecular-scale mechanisms will be paramount in my assessment of your work.

Lab safety is of high importance. That's not to say that working in a chemistry/biochemistry lab is a dangerous business, per se, but rather that there are risks and it is critical that we all avoid those risks where possible by practicing good lab behavior.

General Safety Instructions

1. Know the locations of all safety equipment such as fire extinguishers, eye-wash fountains, safety showers, and fire blankets.
2. Never taste chemicals.
3. No smoking, eating, or drinking is allowed in the laboratory.
4. Extra clothing and books should be placed on the racks provided, out of aisles and off of work surfaces.
5. Report all injuries, no matter how trivial.
6. Never perform unauthorized experiments.
7. Handle chemicals with caution:
    - read labels carefully
    - use only what is needed
    - leave reagents in their proper location, *appropriately closed*
    - dispose of waste and excess materials in the proper manner
    - clean up spills immediately, *especially at balances*

Eye Protection

1. Approved eye protection must be worn at *all* times in the lab. For this class, you'll be provided with safety glasses, but you may always use your own safety glasses or goggles, provided you first get approval from your instructor.
2. For hygiene reasons, students are discouraged from sharing goggles.
3. It is each student's responsibility to know where the eyewashes are in each laboratory and how to use them.
4. Face shields will be available for experiments that involve unusual risk.
5. Students are strongly encouraged not to wear contact lenses in the laboratory. Those who feel they need to wear contacts should inform their instructor so that appropriate help can be given in case of an accident.

Proper laboratory Attire is a very important way to minimize the potential danger to you of accidents that can occur in any laboratory. Therefore, I will insist that you observe the following clothing guidelines AT ALL TIMES:

- no open-toed or open-top shoes are allowed in the laboratory
- no shirts that expose your midriff nor above-knee skirts, shorts, or dresses are allowed in the laboratory unless they are worn underneath a lab coat -- *your skin should be protected from shoulder to knee*.
- hair long enough to hang forward should be tied back.

If you cannot meet these requirements in the lab, I will send you back to your room to change your clothing. I don't do this to aggravate you or because I want to enforce a particular style of dress, but rather because I believe that it is far more important to be safe in lab than to be fashionably dressed in lab.

Academic and personal honesty

My most fundamental assumption about this class is that you are here to learn. All feedback that I provide you and all the learning opportunities that I set up are predicated on that assumption. For you to effectively learn, and for me to effectively advise you on your learning, you must be honest with me and with yourself about what you do and do not know. I will attach no stigma to your admission that you don't understand something. Indeed, that admission is the first step down the road to mastery of this course.

In 2008, the DCGA and the Denison University faculty agreed to a set of policies envisioned and largely crafted by Denison students. This set of policies, known as the Code of Academic Integrity, "provides a means of assuring that values essential to learning—trust, responsibility, and ethics—are promoted and maintained by all members of the Denison community." (this quote is taken from the description of the Code at http://denison.edu/academics/curriculum/integrity) I encourage you to become well acquainted with the Code; it not only governs how Denison deals with academic dishonesty (more on that in a minute), but it also provides a call to take greater personal responsibility for creating the learning environment that you want to experience at Denison.

If the atmosphere of trust and learning that I try to create in this class is compromised by individuals behaving in an academically dishonest manner -- for instance, passing off someone else's work as their own (which includes posting class materials to websites like CourseHero) -- I will be deeply disappointed and quite upset. Academic dishonesty is tantamount to intellectual theft. This standard applies to all work ranging from simple lab assignments to the final exam. I recommend that you carefully read the Denison University Code of Academic Integrity (at the URL listed above), the Academic Dishonesty Policy as printed in the student handbook, and the section in the Bedford Handbook entitled "Citing sources". Neither ignorance nor carelessness is an acceptable defense in cases of plagiarism.

The grade penalty associated with a confirmed case of dishonesty will ordinarily be a score of zero for that assignment. Furthermore, by Denison policy, I must refer every act of academic dishonesty to the Associate Provost, and violations may result in failure of the course, suspension, or expulsion.

Don't be foolish. Engaging in dishonest behavior in order to bring your grade up from a B to an A, or to save yourself some time, is simply not worth the cost. It saddens me every time that I catch a student cutting corners like this, because the cost is so disproportionate to the potential gain. And I'm sorry to say that I've had to turn in at least one student for academic dishonesty almost every semester for the past several years. Don't join their ranks. Be proud of what you've learned, not what you've gotten away with. Be honest.

How will your learning be assessed?

As I currently envision the course (and subject to feedback from you), there will be a variety of opportunities for you to demonstrate to me your mastery of course concepts; these will probably add up as follows:

Preparation for in-class discussions	5 pts x 14 sessions =	70 pts
Lab projects		
group progress reports	10 pts x 2	20 pts
research report (solo)		100 pts
Take-home problem sets	50 pts x 3 =	150 pts
Final oral exam (focusing on the interpretation of experimental data)		200 pts
Subjective evaluation of attitude and performance, including lab performance (reflecting engagement in the class, responsible contribution to collaborative class sessions, lab progress reports, response to constructive criticism, &c)		60 pts
TOTAL		600 pts

Please note:

- The problem sets account for less of your course grade than the final exam. I've done this for three reasons. First, it reduces the stress associated with each problem set. I hope that you will take these as opportunities

to learn and think creatively. Second, it allows you to learn from your mistakes -- you can do poorly on a problem set, but if you learn what you did wrong and you address your deficiencies, then you will have the chance to score well on the final and come out of the class with a grade that reflects *what you learned in the end*. Third, this scoring system reflects my belief that what you know at the end of the semester is really important -- I don't want to encourage you to master material for one problem set and then immediately forget it. Rather, I want to reward you for truly learning the material and for integrating each new topic into your mental picture of how the world works.

- I hope that this will be abundantly obvious as we go along, but let me state it explicitly here: I make no distinction between "class" concepts and "lab" concepts in this course. Indeed, I expect you to fully integrate these two portions of the class in your "lab" and your "class" assignments.

- Grades will be assigned *roughly* according to the scale below. Note that I may change the scale so that it more accurately reflects what I feel to be the performance of members of the class. For instance, if everyone does poorly on the tests and if I conclude that it is because I did something wrong, then I will likely adjust all grades upward from the following distribution. On the other hand, if I think that the tests are sufficiently challenging but everyone does very well and is earning "A" marks, then I will be pleased as punch and am *un*likely to change the scale. For the most part, you may consider these to be the most demanding standards that I am apt to apply.

90% and up	flavors of A
80 to 89%	flavors of B
70 to 79%	flavors of C
60 to 69%	flavors of D
below 60%	F

- Finally, I wish to make clear my interpretation of letter grades.

  I recognize that the way we assign grades in American higher education is not perfect, or even wonderful. It is, however, a necessity of our education system, and a way to communicate between student, faculty, and outside constituencies -- employers, med school admissions committees, etc -- about how well you met the goals of this class. I will try very hard to ensure that all grades that I give in this class are based on careful, principled evaluation. I also try to ensure that I apply fair standards to all students in my class. Again, however, I recognize that there are many desirable learning attributes -- persistence, creativity, and positive outlook, to name only a few -- that aren't well captured in a simple letter grade. If you ever ask me for a narrative evaluation or letter of recommendation, I'll be sure to comment at length on these other facets of learning.

  In the same vein, I want to acknowledge up front that I don't give grades for effort, per se. Hard work, diligence, and motivation are indispensable for good learning. But they don't, in themselves, *constitute* good learning or high achievement. And good learning and high achievement are the things that are primarily reflected in my grading. Let me give a few examples that may illustrate what I mean. Not everyone can play in the (W)NBA when they grow up, regardless of how many hours they practice or whether they've wanted to be a professional basketball player all their life -- most of us are simply not blessed with the build or the native athleticism that would require. Nor can everyone be a doctor, or a stand-up comic, or an opera singer. You must have aptitude AND attitude AND proper training AND a whole lot of focused effort.

  That said, I believe that every one of you *is* capable of getting an "A" in this class. You would not be here at Denison if you had not already demonstrated the ability to learn, the ability to rise above your peers in achievement. But for you to truly excel in this class, other things may have to be sacrificed along the way. Many of us decide that those sacrifices are not worth the goal. And that's OK; choosing not to devote yourself heavily to chemistry this term will not make you a failure in my eyes, and it shouldn't make you view yourself as a failure either. But if you *do* choose to strive for excellence and you choose to devote the resources of time and effort to get there, then I will be your caddy, your ball boy, and your coach. I will work by your side -- for long hours if necessary. That's a promise.

For two perspectives on the factors needed to achieve excellence (in any endeavor), I encourage you to read:
http://www.nytimes.com/2006/05/07/magazine/07wwln_freak.html
http://www.nytimes.com/2009/05/01/opinion/01brooks.html

I view an "F" as a strong indication that the level of preparation and/or commitment brought to the class by a student are incompatible with the goals of this course. I hope not to give your class any "F"s.

I view a "D" as an indication that a student is passing the class, but performing well below my standards and failing to achieve a substantial portion of the course goals. Usually, this means that the student is performing well below her or his true abilities. In effect, a grade of D signifies that a student took this class, but didn't learn enough to be able to build on it in subsequent classes, so I strongly recommend any student who earns a D in this class to retake this class to solidify their learning before taking a class that lists this class as a prerequisite. I hope not to give your class any "D"s.

I view a "C" as notice that a student is doing a fair job. Frequently, this means that the student is present but not fully motivated or engaged. A "C" student is doing adequately but probably came to the class with insufficient preparation and/or has not committed the personal resources to learn most effectively.

I view a "B" as a very respectable grade. The student who earns a "B" may be trying very hard but still struggling with mastery of the material, or may be working less hard and stopping short of achieving excellence.

I view a "B+" as an indication that a student is doing a truly good job. This grade indicates to me that the student is expending significant care and effort to ensure that s/he is learning the material.

I view an "A-" as a very good grade. I do not give this grade lightly or without evidence that a student is nearly approaching mastery of the ideas and techniques of this class; this grade indicates that a student has met my expectations for the course.

I view an "A" as an indication of true excellence. In order to achieve an "A" in my course, a student must demonstrate to me that s/he has not only committed the necessary resources to master the material, but also that s/he is *aggressively engaging the questions that we explore*. This is a grade to be proud of, a grade to be earned by serious work and mental sharpness.

The single biggest difference that I have found between “A” and “B” students over the years is that students in the former group take a much more active role in the course and demonstrate a *personal commitment to excellence* in learning.

Course Outline

I. Review of key themes in protein regulation from Chem 258
(one week)

II. Introduction to metabolic pathways, their interplay, and their regulation
(~4 weeks)
Problem set #1

III. Inputs -- food
(~4 weeks)
A. Diet and metabolism (and disease), the big picture
B. Beyond a simplistic view of over-eating; from "*how much* we eat" to "*what* we eat"
C. Cross-talk: how our bodies process our food
D. When a sugar isn't just a sugar and a fat isn't just a fat:
different metabolic fates of chemically similar molecules
E. We're not alone in here: what the critters living inside us do to our food and our health
F. Diet and Metabolism: the state-of-the-art in 2015
Problem set #2

Interlude (re-entry from Spring Break): Diet versus "diets"

IV. Diet and Disease
(~3 weeks)
A. Demographic patterns in obesity and disease
B. Diet and Diabetes
C. Diet and Heart Disease
D. Diet and Cancer
E. Diet and Disease: the state-of-the-art in 2015
Problem set #3

V. Outputs -- exercise interventions
(~3 weeks)
A. Exercise and metabolism (and disease), the big picture
B. Exercise in the modern world: how much is enough?
C. When a calorie burned isn't a calorie burned:
different metabolic outcomes for different (calorie-equivalent) exercise regimens
D. Diet, exercise, metabolism, and disease: what have we learned?

Final exam: one-hour, one-on-one oral interview; by appointment, May 6 - 12

Diet, Metabolism, and Disease: Laboratory Activities

Week	**Objectives**
1	Asking Biochemical Questions: experimental design, and the nature of scientific information and communication Finding biochemical answers, part I: gaining comfort with the biochemical literature Formation of groups for research projects
2	Finding biochemical answers, part II: common experimental questions we ask in biochemistry and molecular biology Research group brainstorming on project ideas
3	Finding biochemical answers, part III: controls and concerns Research group chalk-talks and super-group feedback
4	Generate finely detailed experimental plan
5 - 11	Execute research projects brief sessions on the culture of science, including *telling scientific stories* *knowing (and citing) what your peers are doing* *writing a research paper* *submitting a manuscript for review* *model systems in 21st century biology* *Cool Science Fridays*
	Individually-written reports on group research projects due April 15
12	Peer review workshop on preliminary research reports
	April 23: Chem 258 pep-talks
13	Prepare for week 14 show-and-tell Last-minute data gathering, as needed
14	Celebrating Our Science: group oral presentations on research projects Lab clean-up
	Final research reports due May 4