Biology 115X - Fundamentals of Biology I  
Spring 2019

Instructor  
Dr. Denise Kind  
E-mail: dmkind@alaska.edu  
Office: Murie 223C  
Office phone: 474-6298  
Meetings, Questions, Study Help: e-mail to set up a  
time, or stop by M 10:30-11:30am or W 1-2pm  
Pronouns: she/her/hers

TAs  
Ms. Shawnee Kasanke  
Ms. Sophie Weaver  
Contact and office hours information available in  
Blackboard.

Lectures  
TR 9:45-11:15am in Murie Auditorium

Laboratories  
Labs are held in Murie 211. Check the schedule of classes for your section.

Course Materials  
Text  
Cummings. Hardcover, loose-leaf, or electronic version.

Web Sites  
Course materials, information, and assignments will be posted on UAF's  
Blackboard system. To log in, go to classes.alaska.edu and log in using your  
UAF ID and password. If you are using Blackboard for the first time, click  
on the link for first-time users for information. Assignments will require  
the ability to watch online videos and submit work online. UAF has  
student computing facilities that are available to you if you need them.

We will use Google Drive in lab to share research data for lab. We will use your  
UA e-mail address for this. You can log into your UA account at  
https://www.alaska.edu/google/ to access your UA mail and Google Drive.

Lab manual  
Provided. You will need to get a 3-ring binder to put it in.

TurningPoint® clicker  
The Bookstore carries clickers that are compatible with the receiver we use  
(ResponseCard RF). I also allow the use of the ResponseWare app on  
phones. Note, however, that if your phone becomes a distraction – to you,  
me, or those around you – I reserve the right to require you to switch to a  
clicker so that you can put your phone away during class. You must have a  
device ID and a current license/subscription code entered in Blackboard  
for your responses to count. Instructions for setting up your Turning  
Account and registering your clicker are in the “Course Documents” folder  
in our class Blackboard site.

Course Pre- / Co-Requisites  
Enrollment in Biology 115X requires placement in Math 107X or higher, placement in English 111X or higher, and  
concurrent enrollment in or prior successful completion of (C- or better) Chemistry 105X. Students who do not  
meet these conditions will be dropped from the course during the first week of lab.

Course Description and Objectives  
Course Description  
Introduction to the principles of biology for science majors, with emphasis on chemistry of life, cell structure,  
metabolism, genetics, and animal form and function.

Broad Course Goals  
(1). To increase your scientific knowledge. Biology 115X is the first semester of the year-long introductory biology  
series. BIOL 115X focuses on structure and function from the molecular level to the organismal level. This includes  
the chemistry of life, cell structure and function, genetic architecture and the flow of information in cells, and
animal structure and function (plant structure and function is covered in BIOL 116X). By the end of this course, you should have an understanding of the basics of cell and molecular biology, gene replication and transmission, cellular respiration and photosynthesis. You should also have a basic understanding of animal physiology and development. Perhaps most importantly, you should understand how these topics are connected. For example, an understanding of energy metabolism requires you to understand how cells and enzymes work but also informs the structure of the lungs, the heart, and the circulatory system. When you can fit individual pieces of information into a larger context, you will understand them more thoroughly.

(2). To increase your understanding of how science is conducted. This course will also teach you about the scientific method and how to design, conduct, and interpret experiments. You will learn how to formulate and test hypotheses, basic lab skills, lab safety, and data presentation and interpretation. The lab reports you will write are modeled after scientific papers to give you an understanding of how scientific results are communicated. You will also gain experience with searching for, reading and interpreting the scientific literature. This knowledge base and skills will prepare you for further work in the sciences. They will also enhance your ability to analyze and critically evaluate biological issues as they relate to society and your own life.

(3). To enhance your awareness of the impact of biology on society. Biology changes extremely rapidly, and this is one of the reasons that it is such an exciting science. For example, DNA technology allows us to investigate questions today that would have been impossible to address even ten to twenty years ago. New advances and discoveries are constantly being made, published and in some cases, used to create or redefine public policy. It is important to be able to critically evaluate both scientific literature and reports of scientific discoveries by the news media. Results of scientific studies are used to establish public policies that affect many individuals. Therefore, a good understanding of science is essential for making sound decisions regarding public policy.

Broad Course Learning Objectives
- Characterize the structure and function of cells, including the main classes of biological molecules, the processes by which cells obtain and use energy, and the function of intracellular structures.
- Describe and diagram how cells grow and reproduce, including the processes by which information in DNA is replicated and used to make protein and the manner by which cells divide through mitosis and meiosis.
- Describe major structural characteristics of animals and how various structures function, both at the organismal and cellular level.
- Demonstrate the ability to form a biological hypothesis, design an appropriate test, and interpret simple biology data to reach a logical conclusion.
- Effectively and accurately communicate scientific findings by writing formal scientific papers, preparing posters, and giving oral presentations. Explain and interpret findings to describe their biological significance and place them in context with published research.

Policies

Grading
Grades will be based on the percentage of total points earned out of the total possible points based on the scale below. I round following standard rounding (.0 to .49 rounds to the lower whole number; 0.5 to 0.99 rounds to the higher whole number).

<table>
<thead>
<tr>
<th>Grade</th>
<th>% of Total Points</th>
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<tbody>
<tr>
<td>A+</td>
<td>96-100</td>
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<tr>
<td>A</td>
<td>90-95</td>
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<tr>
<td>A-</td>
<td>88-89</td>
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<tr>
<td>B+</td>
<td>86-87</td>
</tr>
<tr>
<td>B</td>
<td>80-85</td>
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<tr>
<td>B-</td>
<td>78-79</td>
</tr>
<tr>
<td>C+</td>
<td>76-77</td>
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<tr>
<td>C</td>
<td>70-75</td>
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<tr>
<td>D</td>
<td>60-69</td>
</tr>
<tr>
<td>F</td>
<td>0-59</td>
</tr>
</tbody>
</table>
The point breakdown for this course is approximately as follows and may be subject to change:

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exams (3 at 150 pts each)</td>
<td>450</td>
</tr>
<tr>
<td>Two-hour final exam (cumulative)</td>
<td>200</td>
</tr>
<tr>
<td>Laboratory assignments, reports</td>
<td>350</td>
</tr>
<tr>
<td>*see lab manual for point breakdown of lab assignments</td>
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</tr>
<tr>
<td>Homework (14 at 10 pts each, lowest 1 dropped)</td>
<td>130</td>
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<tr>
<td>Class preparation (24 at 4 pts each)</td>
<td>96</td>
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<tr>
<td>Class participation (25 at 2 pts each)</td>
<td>50</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>1286</strong></td>
</tr>
</tbody>
</table>

**Course Structure and Assignments**

**Class Preparation**

Before each class, you are expected to complete the pre-class assignment. These assignments will be posted in Blackboard by the end of the day after class and will be due by 9:00am the day of the next class. These assignments often include watching a short video, screencast, etc. or completing a short reading assignment, then answering questions. Allow yourself enough time to complete them carefully. They are essential preparation for class, and you should bring your notes on these assignments with you to class. The purpose of these assignments is to have you learn some of the more straightforward background before you come to class so we can focus on achieving deeper, more thorough understanding of the key concepts rather than rushing through things. Multiple years of data show that there is a correlation between how students do on the pre-class assignments and how they do on exams, so take your time, do them well, and learn from them.

**Class**

Active attendance is expected. Announcements of upcoming exams, assignments, or any changes to the class or lab schedule will be made at the beginning of class, and you are responsible for that information.

During class, we will use a variety of active-learning techniques shown to enhance student learning. This will include the use of clickers. Answering clicker questions and participating in other learning activities is how you earn points for class participation. Bring your clicker to EVERY class. I use clicker questions and in-class activities to assess basic understanding, to review, and to push you to think further about certain topics. Clickers give us the opportunity to quickly assess your level of understanding, and either move on or offer additional explanations. **Clickers and in-class activities will give you regular, ongoing feedback about how well you are understanding the concepts in the course so that you can ask questions and study accordingly.**

You must be present in class to earn clicker points; **giving your clicker to another student to use in your absence is considered academic fraud and will result in disciplinary action** (see the section on Academic Honesty). You will not be penalized for wrong answers but you will get more out of the exercises if you try your best to answer correctly. **It is your responsibility to ensure that your clicker is operating properly.**

The use of laptops, tablets, and other personal electronic devices is not normally permitted during class; exceptions to this policy are granted solely at the discretion of the instructor. These devices can be very distracting and limit learning in the class.

**Homework**

Homework will be posted in Blackboard and can be accessed through the link in Blackboard. **Homework will be due by Monday at 11:59pm.** Homework assignments will be designed to help you review important topics or to give you a chance to test how well you understand a particular topic; I will not assign you busy work that is just a way to earn points. Homework is ALWAYS open-note and open-book. I strongly encourage you to use the homework as a study tool. Try to figure out the answer without looking at your book or notes (this is called “retrieval practice” and research has shown that it increases understanding and retention of material). Then, before you submit your answer, check it yourself using your book, notes, and the hints that are included in the assignment. Once you are confident it is correct, submit the answer. If you were incorrect, try to figure out why before you answer again. You may discuss the problems with others to help you think them through, but you may not obtain the answers from others. All work you submit must be your own work and the product of your own understanding.
Lab Assignments
The schedule and point value of lab assignments is detailed in the front of your lab manual. Many lab assignments will be completed in Blackboard. For assignments that must be brought with you to lab or submitted in Blackboard, I will post a reminder assignment in Blackboard that includes directions on where/how to submit the assignment. Your TA will also point out upcoming assignments each week in lab. Lab assignments are due by the start of your regular lab section each week unless you have a pre-arranged absence and will attend an earlier lab or make-up time, in which case the pre-lab work is due at the start of your lab make-up.

Exams
You are expected to take all exams at the scheduled time. Check the exam schedule carefully and plan your appointments and travel around the course schedule. I do not normally grant requests for early or make-up exams to accommodate Spring Break or summer travel; you are expected to schedule around coursework. Exams will contain various types of questions, and may include multiple choice, matching, and short answer. Exams are cumulative, as new material builds on previous learning that you are expected to retain.

Absences
Scheduled absences
For absences caused by a conflict with a University-sanctioned activity (for example, participation in a competition as a UAF athlete), you must notify me in advance of the absence. The participation points for missed lectures can be excused. Any other work missed, including exams and labs, must be made up prior to the absence. This means that you must notify me far enough ahead of time to enable you to complete the work before you go. Other types of scheduled absences are generally not accepted: you are expected to schedule around class, particularly exams and labs.

Unscheduled (emergency) absences
If an emergency arises that prevents you from getting to class, an exam, or a lab, you must inform me before the start of class or lab by e-mail or phone (leave a message if you can’t reach us). If an emergency prevents you from contacting me ahead of time (e.g. you were unconscious and being rushed to the emergency room), you must get in touch as soon as possible once the emergency is resolved. Make-up exams and labs are not guaranteed; they are granted at the instructor’s discretion. Make-up exams, when granted, must be taken as soon as possible after the exam, and it is your responsibility to schedule the make-up. If you miss an exam or lab without contacting me prior to the start of the exam or lab, you will receive a zero on the missed exam and the entire lab. You should expect to provide documentation of the emergency.

Late work
Late work is not accepted. Any work turned in after it is due will be recorded as a zero, including all assignments submitted on-line. If anything is to be handed in to your TA, it will be collected at the beginning of the period in which it is due. Extensions on work must be requested in advance from the instructor, and are granted only under extenuating circumstances and emergencies. Extensions are never granted on pre-lab exercises because the pre-labs provide the essential background that will enable you to successfully complete the lab exercise. They must be done prior to lab.

Labs
You are required to attend the lab section in which you are officially enrolled. You are expected to be on time to labs; there will be consequences to your lab grades if you are repeatedly late. You must be present for the entirety of a lab in order to earn any credit for the work on that lab; in other words, if you aren’t at lab one week, you can’t turn in the work associated with that lab and will receive a zero on it unless it was an excused absence and you completed a make-up lab. For multi-week labs, you must be present for all weeks of the lab to earn credit on the work associated with the lab.

Safety
You are expected to learn how to perform all lab work safely; lab safety guidelines for the lab section and for specific exercises will be provided to you in lab. You will be held to them, and the consequences laid out in the lab manual will be enforced. Failure to work safely in the lab and follow procedures as given will result in dismissal from lab, with no opportunity to make up the lab or earn credit for the work associated with it. Food, beverages, and personal electronic devices - particularly headphones and cell phones - are strictly
prohibited in lab. Learning to work safely is a key part of learning to do lab work, and is a skill you are expected to develop and use in this course.

**Academic honesty**

Academic dishonesty will not be tolerated. You are expected to be familiar with the UAF Student Code of Conduct (available on-line and in the UAF Catalog) and to follow it at all times. Failure to read the Code of Conduct is not a valid excuse for violating the tenets. The use of any reference materials (notes, books, other people, etc.) or assistance of any type on exams is academic dishonesty. Obtaining an extension on work or delaying an exam through false pretenses is also academic dishonesty. Giving your clicker to someone else or using someone else's clicker is academic dishonesty. Providing someone with the answers to homework assignments, taking answers from someone else on homework, doing homework for someone else, or allowing someone else to do your homework is academic dishonesty. Although you may work with a lab partner or partners during lab, all work and reports that you turn in must be entirely your own, individual work - presenting someone else’s work as your own is plagiarism, a form of academic dishonesty. This applies to all parts of a report, including figures and tables, and to all on-line and other assignments. Any instances of these or any other types of academic dishonesty will result in a grade of zero on the work, forwarding of the incident to the appropriate University personnel, and may also result in an F in the course and/or expulsion from the University.

**Student Protection & Services**

Every qualified student is welcome in my classes, and I am committed to providing equal access to this course for all students. If you require accommodations, please inform me during the first week of class so I can accommodate your specific needs. Accommodations cannot be provided retroactively; they can only be provided from the time you notify me onward. As needed, I am happy to work with you, disability services, veterans services, rural student services, etc.

Students at this university are protected against sexual harassment and discrimination (Title IX), and minors have additional protections. The University of Alaska Board of Regents have clearly stated in BOR policy that discrimination, harassment, and violence will not be tolerated on any campus of the University of Alaska. I am required to report certain types of misconduct to the appropriate authorities if I notice them or if they are disclosed to me. For more information on your rights as a student and the resources available to you to resolve and/or report problems, please go to www.uaf.edu/handbook/.

**Getting Help with Course Material**

I will not know if you are having difficulties with the course material unless you tell me. I want to help you; my primary role in this course is to help you understand biology. I would love to see everyone do well in the course. Ultimately, however, how well you do in the class is not up to me; it is up to you. You have to gain the understanding for yourself. If there is anything I can do to help you, PLEASE ASK! If you have questions or are finding that you are struggling with a particular topic, assignment or question, there are several things you can do.

- If you have a question during class, ask! Don't let me plow on ahead if you're lost. If one person is confused, usually 95% of the class is.
- Talk to me after class or during office hours, or make an appointment.
- Talk to your TA.
- Talk to a classmate. Setting up study groups and explaining things to each other can be very helpful.
- If it is a brief question, e-mail me.

Ask for help right away! I'm happy to answer your questions and help you succeed in the course, and so is your TA.
**Tips for success in Biology 115X**

There is no magic secret to doing well in Biology 115X (or any other course). The following list contains advice from previous students who have successfully completed this course:

- Always do the reading listed in the schedule prior to class and spend enough time on class preparation assignments. Take notes on these assignments and make them part of your course notes.
- Stay focused during class; put away your electronics and other work. Take notes during class. Ask questions when you have them.
- After class each day, go over the slides and add to your notes. Make sure everything still makes sense.
- When possible, work on assignments ahead of time so you have time to ask if you get stuck on something. You can work in Murie so you can stop by to ask questions.
- Read the objectives and see which ones you can work through after each class. Use the objectives as a study guide.
- When you study, make your own study guide from your notes and use that to test yourself on the material. Make the effort to understand the material as opposed to simply memorizing it.
- Don't fall behind! Plan enough time into your schedule to do a good job on the labs and homework and to do the reading and study.
- Try to answer the blue questions in the book, and check your answers in the back. They're a good indication of whether you understand or not.
- Study. Study regularly. Study a little every night. It will be easier to just keep up than to get caught up. If you're reviewing the material regularly, last minute studying is just a refresher. Don't wait for review sessions to be offered to study.
- If you’re not a “test taker” be sure to do very well on everything else. Don’t give away easy points.
- Do the pre-lab assignment and read the entire lab exercise at least two hours before lab. Do the post-lab right after lab, while it's still fresh in your mind. Spend enough time on the pre-lab and post-lab assignments.
- Pay attention to what your TA says at the start of lab. Ask questions. Get clarification before you start.
- Talk to your TA about your write-ups as you’re working on them. This will help you make sure you’re meeting expectations.
- Don't be afraid to ask questions! The instructor will help you. Your TA will, too.

Be engaged in the subject matter. Challenge yourself. Think about how biology affects your life and the world around you. This should be exciting!
This schedule is subject to change; changes will be announced in class. Refer to the lab manual for a more detailed lab schedule. Readings are in Freeman’s *Biological Science* (6th ed.). The reading listed for a given class should be read before coming to class.

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Reading (Ch.)</th>
<th>Homework (Due M. @ 11:59 PM)</th>
<th>Lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>T, Jan. 15</td>
<td>1-Pre-assessment / Chemistry of Life</td>
<td>1.1, 1.2, 1.5, 2.1 – 2.3</td>
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<td>NONE</td>
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<td></td>
<td>R, Jan. 17</td>
<td>2-Proteins &amp; Enzymes</td>
<td>2.5, 3, 8.1-8.4</td>
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<td>2</td>
<td>T, Jan. 22</td>
<td>3-Nucleotides &amp; Carbohydrates</td>
<td>4, 5</td>
<td>HW 1</td>
<td>Lab 1: Enzyme Dynamics 1</td>
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<tr>
<td></td>
<td>R, Jan. 24</td>
<td>4-Lipids &amp; Membranes</td>
<td>6</td>
<td></td>
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</tr>
<tr>
<td>3</td>
<td>T, Jan. 29</td>
<td>5-Cellular Respiration: glycolysis &amp; citric acid cycle; fermentation &amp; oxidative phosphorylation</td>
<td>8.5, 9</td>
<td>HW 2</td>
<td>Lab 1: Enzyme Dynamics 2</td>
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<tr>
<td></td>
<td>R, Jan. 31</td>
<td></td>
<td>9</td>
<td></td>
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<tr>
<td>4</td>
<td>T, Feb. 5</td>
<td>7-Photosynthesis: Calvin cycle</td>
<td>10.1 &amp; 10.4</td>
<td>HW 3</td>
<td>Lab 1: Enzyme Dynamics 3, Lab 2: Cellular Respiration Simulation</td>
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<td></td>
<td>R, Feb. 7</td>
<td>8-Photosynthesis: Light Reactions</td>
<td>10.2 &amp; 10.3</td>
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<td>5</td>
<td>T, Feb. 12</td>
<td>EXAM 1</td>
<td></td>
<td>HW 4</td>
<td>Lab 3: Cellular Respiration &amp; Photosynthesis 1</td>
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<td></td>
<td>R, Feb. 14</td>
<td>9-Cell Structure &amp; Function</td>
<td>7, 11.1</td>
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<td>6</td>
<td>T, Feb. 19</td>
<td>10-Mitosis &amp; the Cell Cycle</td>
<td>12</td>
<td>HW 5</td>
<td>Lab 3: Cellular Respiration &amp; Photosynthesis 2</td>
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<td></td>
<td>R, Feb. 21</td>
<td>11-DNA Synthesis; Gene Structure &amp; Function</td>
<td>15, 16.1 &amp; 16.2</td>
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<td>7</td>
<td>T, Feb. 26</td>
<td>12-Transcription &amp; Translation</td>
<td>16.3 &amp; 16.4, 17</td>
<td>HW 6</td>
<td>Lab 3: Cellular Respiration &amp; Photosynthesis 3, Lab 4: Gene Expression</td>
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<tr>
<td></td>
<td>R, Feb. 28</td>
<td>13-Gene Expression – Prokaryotes</td>
<td>18</td>
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<td>8</td>
<td>T, Mar. 5</td>
<td>14-Gene Expression – Eukaryotes</td>
<td>19, cumulative</td>
<td>HW 7</td>
<td>Lab 5: Paper Discussion</td>
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<td>R, Mar. 7</td>
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<tr>
<td>9</td>
<td>SPRING BREAK – NO CLASSES</td>
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<tr>
<td>10</td>
<td>T, Mar. 19</td>
<td>15-Genes and Genomes</td>
<td>20</td>
<td>HW 8</td>
<td>Lab 6: GM Foods 1</td>
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<td></td>
<td>R, Mar. 21</td>
<td>16-Animals: Form &amp; Function</td>
<td>39</td>
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<tr>
<td></td>
<td>R, Mar. 28</td>
<td>18-Animals: Circulation &amp; Respiration</td>
<td>42</td>
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<tr>
<td>12</td>
<td>T, Apr. 2</td>
<td>19-Animals: Water &amp; Electrolyte Balance</td>
<td>40</td>
<td>HW 10</td>
<td>Lab 6: GM Foods 3, Lab 7: Mammalian Anatomy 1</td>
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<td></td>
<td>R, Apr. 4</td>
<td>20-Animals: Nervous System</td>
<td>43</td>
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<tr>
<td>13</td>
<td>T, Apr. 9</td>
<td>21-Animals: Movement &amp; Senses</td>
<td>44, 45.1, 45.3 cumulative</td>
<td>HW 11</td>
<td>Lab 7: Mammalian Anatomy 2</td>
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<td>R, Apr. 11</td>
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<tr>
<td>14</td>
<td>T, Apr. 16</td>
<td>22-Animals: Chemical Signals &amp; Reproduction</td>
<td>11.3-11.4, 46, 47.1</td>
<td>HW 12</td>
<td>Lab 8: Anatomy: Cell Structure &amp; Function</td>
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<td>R, Apr. 18</td>
<td>23-Animals: Meiosis &amp; Life Cycles</td>
<td>13</td>
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<tr>
<td>15</td>
<td>T, Apr. 23</td>
<td>24-Animal Development</td>
<td>47.3-47.4</td>
<td>HW 13</td>
<td>NONE</td>
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<td>R, Apr. 25</td>
<td>25-Wrap-Up, Special Topics</td>
<td>TBD</td>
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<tr>
<td>16</td>
<td>T, Apr. 30</td>
<td>FINAL EXAM, 8:00-10:00am</td>
<td>cumulative</td>
<td>HW 14</td>
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