



## Laboratory Practice in Biological Anthropology Anthropology 350 ~ Fall 2018



**Professor:** Warren Wilson

**Tel.:** 403-220-2665

**Office:** ES 852

**Teaching assistant:** Colin Dubreuil ([cjdubreu@ucalgary.ca](mailto:cjdubreu@ucalgary.ca))

**TA's Office hours:** 0:00-0:00 in ES XXX and by appointment

**Lecture/Lab:** Thursday 14:00-16:45, ES 743

**E-mail:** [wwilson@ucalgary.ca](mailto:wwilson@ucalgary.ca)

**Office hours:** Wednesday 10:30-12:00 and by appointment

### Course Description

Where, when, and how did humans originate? Why do we fall in love? What can we learn from the skeletal remains of prehistoric peoples? Why do almost a fifth of Canadian university students have difficulty functioning due to depression or anxiety? How should we raise our children? Are we unique among animals? Why do we have such big brains? Why do we share so much in common with other primates and what might this tell us about who we are today? This course is designed to help us to answer these questions by providing a concentrated, hands-on introduction to human biology, the human place in the animal kingdom, and the evidence for human evolution.

We will begin with a consideration of the **scientific method** and **evolutionary theory**. A thorough understanding of both is essential as they provide the foundation upon which biological anthropologists base their work. We will then cover **human genetics** at the molecular and population levels. Next we will learn to identify **human skeletal** remains, which will help us to understand the lives of prehistoric human populations and provide a basis for subsequent sections on the fossil evidence for human evolution. In order to help us understand our place in the natural world, we will next turn our attention to **biological classification** and **comparative studies**. With the understanding that we share recent ancestors with other primates, we will then study non-human **primate ecology**. Primate ecology can help us to determine whether aspects

of our behaviors and mental capacities reflect ancestral evolutionary heritage or are new features evolved or socially acquired by our lineage. Subsequently, we will cover **the evidence for human evolution** and the **major developments in the evolution of our species**. This consideration of the evolution of humans should help us to understand modern human biology, our relationship with the rest of the natural world, and possibly inform our future action as a species. In our last meeting, we will return to the consideration of contemporary human biological variation via **anthropometrics**, a suite of tools that biological anthropologists use to document patterns of health in groups.

## Learning Objectives

### Overall course learning goal:

Background: A group of politicians\*, physicians, attorneys and business professionals complain to the university curriculum committee that biological anthropology is a waste of time for any student to take, claiming that the topics covered are too weird, have no bearing on the issues currently facing humanity and the environment and provide the students with no marketable skills upon graduation.

\* [I'm not making this up.](#)

Goal: You will be able to convince the university curriculum committee that the work done by biological anthropologists provides useful insights to enable us to better develop solutions to current challenges and requires skills that do, in fact, render students more for careers either outside of or within the discipline of biological anthropology.

### Specific content goals:

Upon the conclusion of this course you will be able to . . .

- 1) list ways of knowing and use one of these, the scientific method, to critically evaluate conclusions made about the relationship between variables;
- 2) provide a clear explanation of cellular reproduction, protein synthesis, and the inheritance of traits;
- 3) provide a clear explanation and examples of the mechanisms that drive change in species over time (e.g. natural selection, sexual selection, genetic drift, gene flow, and mutation);
- 4) identify the types, features, sex, side, and several lesions of human skeletal remains;
- 5) cognizant of cultural sensitivities, explain why we should or should not continue to study human skeletal remains;

- 6) explain to taxpayers why the Canadian government should continue to fund research on non-human primates (e.g. How, exactly, might this work be relevant to the people of Canada?);
- 7) delineate the evidence for human evolution (For example, if you meet somebody at a bar who argues that humans originated 6,000 years ago through divine intervention, you will be able to suggest a different explanation for human origins, based on fossil, genetic, archaeological, and paleoenvironmental evidence.);
- 8) explain to physicians how the study of human variation in contemporary peoples by biological anthropologists might enable us to generate more effective health interventions.

## Course Conventions

**1. Lab/Lecture/Discussion:** In order to meet the goals of the course you have to come on time to every class. Be prepared for discussion and the lab by reading what is assigned for the day. You are responsible for lecture material and any announcements concerning changes in schedule, etc.

**2. Reading:** Readings and labs will be posted at least one week before each class. Keep in mind that you are not finished with the reading assignment until you thoroughly understand it. This will sometimes require you to read an assignment more than once. An effective way of ensuring comprehension is to read the assignment then go back through it and summarize its main points in your learning journal. Both the learning journal and online quizzes will provide you with an opportunity to reflect upon the assigned readings.

**3. Electronic Devices:** Except when required by lab activities, the use by students of computers, cell phones, or other personal electronic devices in the classroom is not permitted. *Why not?* This rule is based on research which finds that most students using a computer in the classroom attempt to multitask and students who are multitasking during class have less understanding and recall of what's being discussed. As well, students who are in direct view of a multitasking peer scored lower on a test compared with those who were not. Even when multitasking is blocked, researchers find that students who take notes on a computer generally perform worse than students who take notes by hand: laptop users are generally creating a transcript of the lecture, while those taking notes by hand were synthesizing the information. This is often apparent in my meetings with students who have used their computers to create an almost verbatim record of what I said in class, but are unable to grasp what I sought to convey.

**4. Evaluation:** The metrics used in this course are designed to assess different types of knowledge and to ensure that my TA and I can determine where students might benefit from additional assistance. The marking components are as follows:

Lab reports: Weekly we will collect and grade your lab report. Your lab report will be graded using letter grades. For any credit, your lab report must exhibit intellectual investment on your part. Answers for, example, must show critical thinking on your part, be

supported with a sound rationale and data where required, and be in your own words, not those of your lab partners. The “Lab Report Grading Rubric” can be found in the Course Documents section of D2L. Familiarize yourself with the grading rubric and criteria for each letter grade prior to attending the first lab.

Lab participation: We meet only 13 times during the semester and your attendance and active participation is required at each meeting. Clearly, participation in lab requires that you’ve pre-read the lab and work as a team with your group to cover the steps in the lab. My TA and I will weekly evaluate your participation in laboratory activities by observing how actively engaged you are in the lab. If you are not actively engaged in the lab, you will earn no points for that lab.

Weekly quiz: Weekly, you will take short, quizzes consisting of questions about the content of reading assignments, as well as questions that ask you to reflect on what you are learning, such as describing the most interesting thing you learned from the reading. Do not cut and paste text from the readings or work with a classmate to answer the questions; rather, answer the questions in your own words. How long should your quiz answers be? This depends, but **all answers should manifest intellectual investment on your part.** Some can be answered with a brief sentence, while others require more. For example, if you answer question one of quiz one (“How is social science research done?”), by stating that “It seeks to understand how humans operate as social animals without overgeneralizing on the basis of personal experience.” --that would be a good start, but a few more sentences, including an example, would be required to demonstrate that you understand this way of knowing. In some cases, there will be no single or clear answer. What I expect is that you give each question a lot of thought and respond accordingly. Either my TA or I will evaluate your work on the quizzes to help us to determine how well you understand the material.

Learning journals: You will keep a learning journal online that encourages you to reflect on what you learned from the assigned readings. Weekly, we will discuss your answers in small groups then as a class. How long should your journal be? Again, the answer is, “it depends”. **The journal is for you but must evidence effort on your part.** I'll review your journal weekly to see that you are exerting this effort and to determine whether or not you are grasping the concepts.

Lab practicals: Your knowledge of the material covered in this course will be evaluated, in part, via lab practicals (AKA a lab test). In lab practicals you will have to identify actual items such as fossils, bones, structures of DNA, etc. that you’ve studied in lab. For example, you may be given a particular bone and asked to name it, the side of the body from which it came, and other information it might provide. Note that on each practical you should expect some items that you haven't seen in lab, such as a new model, a different bone, or fossil. In some cases, your lab practical may also include an essay question.

Class discussions: This class provides a rare opportunity for students to discuss the material both in groups and as a class. These discussions are designed to enhance your critical thinking, active listening, and public speaking skills. Active participation requires that you come prepared to each class, having done the readings, completed your learning journal and online quiz beforehand. I will call on students at random to teach us about the topics

covered in the readings that week. Note that in a number of cases there will be no single, correct answer for the questions we will consider. Moreover, I encourage you to share with us what may seem to be the crazy ideas hiding in your. It's part of the learning process and will likely help all of us to think about the topic differently. If you, like most folks, are nervous about speaking in public, this small class is a great place to start to overcome this fear. Your TA and I will evaluate your participation in these discussions weekly.

Note, that *we will not accept late lab work, journals, or quizzes.*

Your final grade will be calculated as follows:

Component	Percentage of Overall Course Grade
Lab reports <sup>1</sup>	16%
Primate ethology lab	4%
Lab participation <sup>2</sup>	10%
Weekly quiz & learning journal	18%
Lab practicals	42%
Class discussions	10%

<sup>1</sup>This does not include the primate ethology lab report.

<sup>2</sup>Students who have two or more unexcused absences, will earn no points for overall lab participation.

Letter grade assignment: At the end of the course, the numerical marks will be summed and a final letter grade will be assigned based on the following basis:

Percentage range	Letter grade	Percentage range	Letter grade
95 or higher	A+	68-72	C+
90-94	A	64-67	C
85-89	A-	59-63	C-
81-84	B+	54-58	D+
77-80	B	50-53	D
73-76	B-	49 or lower	F

Per the [University of Calgary Calendar](#), an “A” is earned for “superior performance, showing comprehensive understanding of subject matter”. Superior performance is, by definition, extremely rare. More common is the grade of “B” which is earned for “clearly above average performance with knowledge of subject matter generally complete”. More common still is the grade of “C” which is earned for a “basic understanding of the subject matter”. If you require clarification on letter grade assignments, please see me within the first two weeks of the semester. Keep in mind that, you have paid for the opportunity to learn, not a grade. As such, my TA and I do our utmost to ensure that you have the best learning opportunity possible in this course.

You must provide advance notice to me if you are unable to attend a lab or take a lab practical. Each lab requires a great deal of time to set up so *missed labs cannot be made up*. All requests for deferral of a lab practical or assignment for health reasons must be accompanied by

written documentation as outlined in the University Calendar and should be obtained while you have the physical or emotional problem rather than after recovery. Deferred lab practicals or assignments may be allowed in the following circumstances: illness, domestic affliction, or religious conviction. Travel arrangements and misreading of the syllabus are not valid reasons for missing a lab, a lab practical, or incomplete or late assignments. If you have missed a lab practical for a legitimate reason, you will be able to take a make up lab practical as close to the original lab practical as possible. The date and location will be at the convenience of the Department of Anthropology and Archaeology. Deferred lab practicals or assignments will not be granted if it is determined that you have not shown just cause.

Please note that requests to defer term work past the end of a term go through the [Student Success Centre](#) and must be processed by the deadlines that are established in the University of Calgary Calendar. To defer term work, complete the required [form](#) and submit it to the Faculty of Arts Associate Dean (Students) through the [Student Success Centre](#). To make an appointment with the Associate Dean, phone (403) 220-3580. Only the Associate Dean approves requests for deferrals which extend beyond the end of a term. Neither your TA nor I are involved in such decisions.

A passing grade is not required on any particular component for the student to pass the course as a whole; that is, a student may fail, for example, the “Class Discussions” or any other component and, assuming their overall average percentage earned for the course is above 49, they will pass the course.

**6. Academic Accommodation Policy:** The purpose of academic accommodation is to provide students with documented disabilities equal opportunity to master the essentials of a post-secondary education. Students with disabilities at the University of Calgary have met all admission requirements but may have done so with the use of accommodations. Similarly, they are expected to meet all academic and non-academic requirements. Adaptive technology and other academic accommodations do not relieve students of their responsibility to develop the essential skills and abilities expected of all students.

Students with a disability, who require academic accommodation, must register with the [Student Accessibility Services](#) (MacEwan Student Centre 452, telephone 220-8237). Academic accommodation letters need to be provided to me *and* your lab TA no later than fourteen (14) days after the first day of class. It is a student’s responsibility to register the Student Accessibility Services and to request academic accommodation, if required.

**7. Retrieving Assignments:** The Freedom of Information and Protection of Privacy (FOIP) legislation disallows the practice of having students retrieve assignments from a public place, e.g., outside an instructor’s office or the Department main office. Term assignments must be returned to students individually, during class, or during the instructor’s office hours; if a student is unable to pick up her/his assignment s/he may provide the instructor with a stamped, self-addressed envelope to be used for the return of the assignment.

**8. Office Hours:** I enjoy having visitors during my office hours and am happy to schedule additional times as necessary. These hours are yours and I encourage you to take advantage of them, whether you are having difficulty with some aspect of the course, or if you would like to discuss in greater detail something that was touched on in class.

**9. E-mail:** Students are encouraged to use the lecture/lab periods and office hours to ask questions. For after-hours questions, the use of email is acceptable. Please write 'ARKY 203' in the 'Subject' portion of the email. The TA and I receive numerous e-mails. By clearly identifying the subject of your email, you will help us reply more efficiently to your emails. While I will do my best to reply to your message as soon as possible, I will generally be unable to do so on weekends or holidays. Overall, I attempt to reply to all messages within four days. If the TA or I think that your question and related answer is of general interest, we may decide to post them on the course Desire to Learn class website (your name will not appear).

**10. Writing across the Curriculum:** Writing skills are not exclusive to English courses and, in fact, should cross all disciplines. The University supports the belief that throughout their University careers, students should be taught how to write well so that when they graduate their writing abilities will be far above the minimal standards required at entrance. Consistent with this belief, students are expected to do a substantial amount of writing in their University courses and, where appropriate, instructors can and may use writing and the grading thereof as a factor in the evaluation of student work. The [Writing Support services](#) provided by the in the Student Success Centre can be utilized by all students who feel they require further assistance.

**How might this course increase my marketability when I'm looking for a job?**

Transferable skills: This course will require working in teams to solve problems, creativity, research, critical thinking, analyzing the relationship between variables, creating a persuasive argument, active listening, and presenting your conclusions to an audience. See also <http://www.americananthro.org/AdvanceYourCareer/Content.aspx?ItemNumber=1782>, & <http://www.americananthro.org/LearnAndTeach/ResourceDetail.aspx?ItemNumber=13046>.

Jobs appropriate for people with anthropology degrees:

<http://www.americananthro.org/AdvanceYourCareer/Content.aspx?ItemNumber=1783>  
<https://www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-degree/anthropology>,  
<https://www.utm.utoronto.ca/careers/careers-by-major-anthropology>, &  
<https://prezi.com/vmvomt3sj3fd/this-is-anthropology/> (Note, this presentation repeats itself a bit toward the middle. If you persist, you'll get through it to more interesting stuff!).

## Schedule

Date	Lab	Topic	Reading <sup>1</sup>
Sept. 6	n/a	How do we know what we know? Social science, anthropology, and biological anthropology	your syllabus!, The Open University (2009)- The Social Sciences, Rice & Salzman (2011)- Ch. 1-4
Sept. 13	1	Physiological homeostasis, stress, science, and human variation	The Open University (2009)- The Social Sciences, Rice & Salzman (2011)- Ch. 5, Zimmer & Emlen (2016)- Ch. 1
Sept. 20	2	Forces of Evolution: Natural Selection	Zimmer & Emlen (2016)- Ch. 2, Creation (2009 film), HHMI (ND, finch video)
Sept. 27	3	Molecular Genetics	Bragg (2001)-podcast, Zimmer & Emlen (2016)- Ch. 5, HHMI (ND)- finch video, film: <a href="#">"Creation"</a>
Oct. 4	4	Population genetics & Inheritance of traits	Lewis (2008)- Ch. 15
Oct. 11	5	Forces of Evolution: Hardy-Weinberg, Genetic Drift (Founder Effect)	BBC & Rosling (2010), Smith (2014), Anywhere Math (ND), article of choice
Oct. 18	6	<b>Lab Practical # 1 (covers Labs 1-5)</b> Human skeletal biology I	Grimaldi, J (2009), BBC (2010), Salt (2009), Written in Bone, Keenleyside & Lazenby (2015)
Oct. 25	7	Human skeletal biology II	Keenleyside & Lazenby (2015), Barry (2017), 2 articles of choice
Nov. 1	8	Human skeletal biology III	Preston (2014), Thompson (2015), articles of choice
Nov. 8	9	Primatology- <i>You go to the zoo on your own any time prior to Nov. 16. On Nov. 16, you will turn in your work and discuss your findings.</i>	Williams (2010)- Ch. 5, Marks (2011)
Nov. 22	10	<b>Lab Practical # 2 (covers Labs 6-8)</b> Paleoanthropology: Oligocene to Pliocene	First Primates (2008), Marks (2018)
Nov. 29	11	Paleoanthropology: Genus <i>Homo</i>	Your Inner Monkey (2014), Wilson (2003), Warinner (2013)
Dec. 6	12	<b>Lab Practical # 3 (covers Labs 9-11)</b> Human biology- anthropometry	Keenleyside & Lazenby (2015), Wilson (2018)

<sup>1</sup> Details concerning the assigned readings, podcasts, and videos can be found in the Question Sets & Journal Assignments for each week in D2L. Readings, podcasts, and videos assigned may change during the semester if I find a better source. Both the Question Sets & Journal Assignments and your labs will be posted in D2L at least one week prior to each lab. Note that you must read the lab for each week prior to each lab.



## Course Bibliography

(Readings, podcasts, and videos assigned may change during the semester if I find a better source. If they do change, you will be notified at least one week prior to the due date for the assignment.)

### Class 1:

Your syllabus! – read & understand this before moving on to your other readings.

The Open University (2009, podcasts) The Social Sciences. 2009. The Open University. You may either listen to the podcasts (8-10 minutes each), read the transcripts, or both! Both are found at each URL provided below.

**Track 1:** *Social Sciences - what are they?* (<http://www.open.edu/openlearn/society-politics-law/sociology/social-science>)

**Track 2:** *Development of the social sciences - How the social sciences developed in response to challenges to traditional systems of belief* (<http://www.open.edu/openlearn/society-politics-law/sociology/social-science?track=2>)

**Track 3:** *Complementary approaches* (<http://www.open.edu/openlearn/society-politics-law/sociology/social-science?track=3>)

**Track 4:** *The Influence of Social Science* (<http://www.open.edu/openlearn/society-politics-law/sociology/social-science?track=4>)

Rice and Salzman. 2011. *Thinking Anthropologically*. Prentice Hall. New Jersey. Chapters 1: Introduction to Thinking Anthropologically, Chapter 2: What anthropologists look for – patterns; and Chapter 3: Thinking holistically, Chapter 4: Thinking Theoretically.

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### Class 2:

The Social Sciences. 2009. The Open University. You may either listen to the podcasts (8-10 minutes each), read the transcripts, or both! Both are found at each URL provided below.

**Track 5:** *Knowledge - what is it?* (<http://www.open.edu/openlearn/society-politics-law/sociology/social-science?track=5>)

Rice and Salzman. 2011. *Thinking Anthropologically*. Prentice Hall. New Jersey. Chapter 5: Using science to think anthropologically.

Zimmer and Emlen. 2016. *Evolution – Making Sense of Life*. Roberts and Company, Colorado. Chapter 1: The whale and the virus- how scientists study evolution.

Lab 1: The Scientific Method and Human Biological Variation

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### **Class 3:**

Zimmer and Emlen. 2016. Evolution – Making Sense of Life. Roberts and Company, Colorado. Chapter 2: From Natural Philosophy to Darwin - a brief history of evolutionary ideas.

[Creation](#) (2009) – This is a film about Darwin and how his relationship with his wife and children influenced his work. The DVD of this film is available in the reserve section of the library. If you would prefer to rent the movie, it can be found at, [Amazon](#), [iTunes](#) and [DVD.com](#) among other sites.

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### **Class 4:**

Bragg, Melvyn (2001) [Genetics](#) (27 minutes)

Zimmer and Emlen. 2016. Chapter 5: Raw material – heritable variation among individuals. Roberts and Company, Colorado.

HHMI (ND) [The Origin of Species: The Beak of the Finch](#)

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### **Class 5:**

Lewis, R (2008) [Human Genetics](#), McGraw Hill. Chapter 15-Changing allele frequencies.

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### **Class 6:**

BBC & Hans Rosling. 2010. [The Joy of Statistics](#) (1 hour)

Smith, Alan (2014) [Why You Should Love Statistics](#) (13 minutes)

One research article of your choice from the American Journal of Physical Anthropology, American Journal of Human Biology, The International Journal of Primatology, or Journal of Human Evolution. You can access articles in these journals via the U. Calgary [library website](#). Print and bring your article of choice to class.

*Recommended:*

Anywhere Math (ND) [Introduction to Statistics](#) (12 minutes)

If you do watch this, pay attention to the question: “What is a statistical question?”

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### **Class 7:**

Grimaldi, J (2009) [Decision to come on girl's skeleton](http://www.gazetteandherald.co.uk/search/4083964.Decision_to_come_on_girl___s_skeleton/). The Wiltshire Gazette & Herald, UK.  
[http://www.gazetteandherald.co.uk/search/4083964.Decision\\_to\\_come\\_on\\_girl\\_\\_\\_s\\_skeleton/](http://www.gazetteandherald.co.uk/search/4083964.Decision_to_come_on_girl___s_skeleton/)

BBC (2010) [Druids reburial appeal rebuffed](http://news.bbc.co.uk/2/hi/uk_news/england/wiltshire/8606323.stm).  
[http://news.bbc.co.uk/2/hi/uk\\_news/england/wiltshire/8606323.stm](http://news.bbc.co.uk/2/hi/uk_news/england/wiltshire/8606323.stm).

Salt, A (2009) [The ethics of studying human remains](https://alunsalt.com/the-ethics-of-studying-human-remains-c71dafde7466)  
<https://alunsalt.com/the-ethics-of-studying-human-remains-c71dafde7466>

[Written in Bone](http://anthropology.si.edu/writteninbone/) (video- 9 minutes) <http://anthropology.si.edu/writteninbone/>

Keenleyside, A and Lazenby, R (2015) *A Human Voyage: Exploring Biological Anthropology*. 2<sup>nd</sup> Edition. Nelson Education. USA. Pp. 339-345.

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### **Class 8:**

Keenleyside, A and Lazenby, R (2015) *A Human Voyage: Exploring Biological Anthropology*. 2<sup>nd</sup> Edition. Nelson Education. USA. Pp. 360-367.

Barry, Dan (2017) [Ireland Wanted to Forget. But the Dead Don't Always Stay Buried](#). *The New York Times*. October 28. Please read the article and watch the 11.5 minute video embedded in the article.

Two readings of your choice. Please see Quiz question #5 for details.

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### **Class 9:**

This week, you have one assigned reading and an optional video, but are mostly on your own to research NAGPRA and the peopling of the Americas. Please see your quiz questions for details.

[Preston, Douglas 2014. The Kennewick Man Finally Freed to Share His Secrets](#). Smithsonian Magazine.

Thompson, Helen 2015. [Genome Analysis Links Kennewick Man to Native Americans](#). Smithsonian.com.

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### **Class 10:**

Williams, FL (2009) Exploring Biological Anthropology. Oxford University Press. Ch. 5: Living Primates, pages 57-69.

Marks, J (2011) The Alternative Introduction to Biological Anthropology. Oxford University Press. Ch. 7: Is that an ape in your genes, or are you just glad to see me? (On the Place of Humans in the Natural Order).

Marks, J (2011) The Alternative Introduction to Biological Anthropology. Oxford University Press. Ch. 8: Apes run around naked, live in trees, and fling their poo. Do you? (on the relevance of apes to understanding humans).

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### **Class 11:**

Text in the assignment: “Comparative Morphology of Primates”

Video (14 minutes): [First Primates](https://ed.ted.com/on/wnJxgHP3) (2008) NOVA scienceNOW.  
<https://ed.ted.com/on/wnJxgHP3>

Marks, J (2018) The Alternative Introduction to Biological Anthropology. Second Edition. Oxford University Press. Ch. 10: If history is humanities, and evolution is science, what is paleoanthropology? (on the assumptions of a diachronic science).

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### **Class 12:**

Shubin, Neil . [Your Inner Monkey](#). (2014) PBS (55 minutes)

Wilson, W (2003) Game. In: *Encyclopedia of Food and Culture*. Editor in Chief: Solomon H. Katz, Charles Scribner’s Sons, Vol. 2, pp. 93-96.

Warinner, C (2013) [Debunking the paleo diet](#). TEDx OU (23 minutes)

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### **Class 13:**

Keenleyside & Lazenby (2015) A Human Voyage. Nelson Education. pp. 322-331 and Box 16.2

Wilson, Warren (2018). Anthropometry in *The International Encyclopedia of Biological Anthropology*, Wenda Trevathan (ed). John Wiley and Sons, Inc.

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