

**BIS 381: History of Life**  
**Interdisciplinary Arts and Sciences (IAS)**  
**University of Washington, Bothell, Spring 2010**

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Office Hours:  
MW after class  
or by appointment

## Description

We examine the principles of evolution by studying the fossil record, focusing on how past events shaped today's biodiversity. We will start with the formation of the Earth, covering bacteria, algae, land plants, marine and terrestrial invertebrates and vertebrates, and today's environmental changes. Much of our learning is hands-on through lab exercises that employ fossil specimens and computer tutorials. We also divide into teams that develop case studies to explore how different aspects of the fossil record relate to popular culture. My goal is to replace a number of the current readings with these case studies in future iterations of the course—so your work will become the vehicle through which future UWB students learn about the History of Life.

We also explore the unfortunate controversy that surrounds evolution in the U.S.A. By applying scientific tests to "intelligent design" we see that the arguments are creationist and stem from faith not logic.

Class meets Mondays and Wednesdays from 11:00 am to 1:05 pm in room UW2-141. The course counts for Natural Worlds (NW), Individuals and Society (I&S) and Quantitative Skills and Reasoning (QSR) credit.

## Course Texts

All texts are available online through e-reserves or through open-access internet sites. Our E-res site is <https://eres.bothell.washington.edu/eres/coursepass.aspx?cid=1280>.

Two additional texts are on physical reserve for your reference:

Miller, K. R. *Finding Darwin's God : A Scientist's Search For Common Ground Between God And Evolution*. 2002. Perennial, New York.

Scott, E.C. *Evolution vs. Creationism: An Introduction*. 2005. University of California Press, Berkeley.

The Understanding Evolution website also has lots of wonderful information. If you want to brush up on anything, I strongly recommend you check out their website: <http://evolution.berkeley.edu/>.

## Skills and Outcomes

These outcomes reflect the learning goals for the Interdisciplinary Arts and Sciences Program: think about how this course provides you with opportunities to think critically, share leadership and collaborate in your learning, conduct interdisciplinary research and communicate your scholarship both orally and in writing. My aim is to teach you about



the History of Life, but also to help you prepare for the portfolio you will compile in your senior seminar. Upon successfully completing this course, you will be able to

- Summarize the history of life on Earth, and be able to communicate clearly about it.
- Understand how intelligent design and other forms of creationism threaten chemistry, geology, geography, and astronomy in addition to biology.
- Appreciate that understanding the history of life fosters a deeper understanding for every-day experiences, like cooking, talking to neighbors about evolution, and thinking about biodiversity.
- Be comfortable presenting data and interpreting graphs.
- Conduct and present research while working with a team of people, ensuring that everyone contributes his or her strengths.

## How to Succeed in this Course

- Attend class. Arrive on time.
- Participate. Complete the readings before class, enter into discussions, ask questions when you are confused, and help your classmates master the material. Provide feedback to me and to your classmates so we can learn as a team.
- Become familiar with the course's website and gradebook on Catalyst ([catalysttools.washington.edu/](http://catalysttools.washington.edu/)). I will post all of your assignments there, and that's where you'll turn in your assignments.
- Complete assignments on time. Assignments are due at the beginning of lecture. Extensions to the original deadline are possible, but *must be granted in writing two days before the deadline*. I will not accept late assignments
- Don't use cell phones in class.
- Use your computer in class to help you complete your course work. If you are using your computer inappropriately (e.g., e-mail, Facebook, browsing on unrelated topics), I will ask you to leave so that you aren't distracting other students.
- Practice academic integrity. Don't plagiarize. The UWB Academic Affairs defines plagiarism as "Using another person's original words, ideas, or research, including material found on the Internet, in any academic exercise without properly crediting that person." See <http://www.uwb.edu/academic/policies/academic-conduct> for more information.
- When you have questions, use class time, office hours, and e-mail to obtain answers. I try to answer email messages within 24 hours, except on weekends and holidays. I encourage face-to-face meetings to receive one-on-one help or to discuss any topic in greater depth. I will answer questions pertinent to a particular assignment up until 5 pm the day before it is due. Please let me know if you're struggling. I want you to enjoy this material as much as I do.
- I encourage students with disabilities to contact me so we can arrange accommodations. Please contact Rosa Lundborg at Disabled Student Services as well. She can be reached at 425.325.5307, TDD 425.352.3132, [rlundborg@uwb.edu](mailto:rlundborg@uwb.edu) or [dssuwb@u.washington.edu](mailto:dssuwb@u.washington.edu).

## Evaluation

Assignment	Points
Quizzes on labs	24
Discussion questions (answered in your blog)	15
Case Study	30
Talking to your neighbor	16
Participation, Miscellaneous Homework	15
<b>Total</b>	<b>100</b>

Use the table below to convert your points to a grade. Note that the bins in this table overlap, affording me some flexibility in how I determine your grade. Thus, if your performance improves drastically, or if I feel that your assignments do not reflect your clear and innovative thinking, I will boost your grade. However, once grades are assigned, I will not change them!

Your points	94 – 100 %	90 – 94%	86 – 90%	82 – 86%	78 – 82%	74 – 78%
Grade	3.9-4.0	3.6-3.9	3.2-3.6	2.8-3.2	2.4-2.8	2.0-2.4
Your points	70 – 74%	66 – 70%	62 – 66%	60 – 62%	<60%	
Grade	1.6-2.0	1.2-1.6	0.8-1.2	0.7	0.0	

## Assignments

*Please note that I do not accept quotations in ANY written assignments. I want you to practice paraphrasing scholarly writing. For every quotation that you use, I will deduct 5% from your grade. Whenever you write, be sure to cite your sources properly. We'll use APA style in this class. The library has prepared a quick guide to help you follow this format: <http://www.lib.washington.edu/help/guides/43APA.pdf>.*

## Labs

Before you come to class, be sure to read the lab handout. I'll assess your mastery of each lab with a quiz. All of the labs involve quantitative and symbolic reasoning.

### 1. Timeline lab

Collaborate as a whole class to construct a timeline that depicts the history of Earth and major events in the history of life. We'll refer to this timeline throughout the quarter.

### 2. Preservation lab

Examine different paths that lead to the preservation of fossils, like being covered by mud, getting transported down a river and turned into rock.

### 3. Playing with specimens

Analyze a variety of fossils, and answer questions about the specimens that encourage you to think about how they were preserved and what we can infer about their lifestyle.

#### 4. Radiometric dating lab

Study the radioactive decay of different elements, and apply this decay system to determine the age of different rocks.

#### 5. Extinctions and biases in the fossil record

The fossil record is biased. It is an imperfect record of the organisms that lived in the past. We will use the Cretaceous-Tertiary extinction as a case study for exploring some of the numerical techniques that paleontologists can use to become aware of and work with these biases instead of being stifled by them.

#### 6. Hominid skulls lab

Measure and compare the attributes on the skulls of chimpanzees and hominines to gain insight about the origin of variation from this lab.

### Discussion questions

You will need to complete the readings and answer the associated discussion questions on your course blog before each class begins. I'll read about 10 blogs to prepare for each class, ensuring that I hit each person's blog at least four times—the gamble for you is that you don't know when I'm going to grade your blog...because I'm determining the order randomly. It could be the first two weeks of the quarter, it could be the last two weeks, or it could be any combination in between.

I've prepared a separate handout for you on how to set up your blog. See the Course Documents section of your course website.

### Case Study

With a group of three or four other people, you'll identify any theme related to the History of Life—other than the creationist controversy—that you want to explore in more detail. For example, you may want to study how quickly humans are evolving (see Hawks et al 2007 in the optional readings), the evolution of flower plants (see Pennisi 2009 in optional readings), or whether proteins for *T. rex* have truly been discovered as claimed by Asara et al. 2007 in optional readings). You may also draw on the fossil discoveries you and your classmates present, and you can check for additional ideas the Understanding Evolution website.

You will develop a case study that explores that theme. The story will unfold as a series of short chapters, each of which asks students to reflect on a series of questions. More details will follow, but for now, realize that part of your grade will be based on how your group perceives your contributions to the project. Also, note of the following due dates:

April 26: Case study topic and group contract

May 5: Chapter outlines, first group reflection

May 19: Presentation to class

May 24: Completed case study

Jun 2: Second group reflection

Our librarians can help you find useful articles. The reference desk is staffed whenever the library is open, but I highly recommend talking to Rob Estes, the science librarian. Contact him by e-mail (REstes@uwb.edu) to set up an appointment.

### Talking to your neighbor

Someone you know (a neighbor, friend, or family member) applied for information about the origin of life from the Discovery Institute, a Seattle-based think tank dedicated to

promoting Intelligent Design (the new creationism), and then approaches you with questions. Your friend is genuinely curious why you claim that intelligent design doesn't make scientific sense. How do you respond? Work independently to develop a script of this conversation. Because you and your friend/neighbor/family member have access to the internet, you can use the web to find data and claims from "both sides" to add to your script. I recommend using the text on reserve by Scott as one of your sources. Remember to cite everything!

I will evaluate the assignment by the strengths of the arguments you make and the data you present. Please restrict yourself to 4 double-spaced pages.

### Participation, Miscellaneous Homework



Our class sessions will largely be held through discussion, and thus it's imperative that you arrive prepared. Class participation is essential so that everyone can learn. Sometimes preparing for class involves completing homework assignments.




### Extra Credit

For 10 points of extra credit on your case study grade, you can write a short article to entice UWB students to visit the "Life and Times of Washington State" exhibit or "Cruisin' the Fossil Freeway" at the Burke Museum of Natural History and Culture. In 200 words or less, detail the single most exciting aspect of the exhibit. Describe it in enough detail to convey what you learned. Convince your audience that the material you learned is relevant to their lives.

For info about the Burke, see <http://www.washington.edu/burkemuseum/>. Admission is free for UW students.

### Proposed Outline

Prepare this...	...by	In Class
	M Mar 29	Introduction Powers of ten
Gonick 2001 Timeline display	W Mar 31	Timeline
Zimmer 2009a, Origin of Life Zimmer 2010, What the rocks say Syllabus quiz (online) Plagiarism quiz (online)	M Apr 5	Origin of life
McGhee 1984	W Apr 7	Preservation lab 
What Darwin never knew (online NOVA documentary at <a href="http://www.pbs.org/wgbh/nova/beta/evolution/darwin-never-knew.html">http://www.pbs.org/wgbh/nova/beta/evolution/darwin-never-knew.html</a> )	M Apr 12	Basics of evolution
Lab handout	W Apr 14	Quiz: preservation Playing with specimens 

Your fossil discovery assignment	M Apr 19	Amazing new fossil discoveries Quiz: specimens
Lab Handout Pre-lab Zimmer 2010, Radioactive clocks	W Apr 21	Meet in UW1-120 Radiometric dating 
Leslie 2009 Zimmer 2009b, Eukaryotes Case study topics, group contract	M Apr 26	Photosynthesis and Eukaryotes
<a href="http://ublib.buffalo.edu/libraries/projects/cases/alien/alien_evolution.html">http://ublib.buffalo.edu/libraries/projects/cases/alien/alien_evolution.html</a> Zimmer 2010, Lighting the Cambrian fuse	W Apr 28	Cambrian explosion Quiz: radiometric dating
Lab handout Pre-lab Zimmer 2010, Radiations and extinctions (excerpt) Signor & Lipps	M May 3	Meet in UW1-120 Extinctions 
Case study chapter outlines Group reflection I Extinct lab blog posting	W May 5	Group meetings, consult with Becca
Carnell and Price, in review	M May 10	Paleoclimatology and Global Climate Change Quiz: extinctions
Price, in prep Pre-lab	W May 12	Skull lab 
Zimmer 2010, The tree of life	M May 17	Mosaic evolution Quiz: skull lab
	W May 19	Group presentations
Case study Miller 2002a: 81-128	M May 24	Controversy I
Miller 2002b: 129-164	W May 26	Controversy II
	M May 31	Memorial Day Holiday – No class
Scott 2002 Group reflection II	W Jun 2	Controversy III
	M Jun 5	<b>Talking to your neighbor due by 11 am online. No exceptions.</b>