

Evolution Course At-A-Glance:

Week	Major Topic(s)	Key Questions	Readings	Events & Assignments	In-class activities and objectives:	Comp Lab?
01	The Origin of Evolution	<ol style="list-style-type: none"> 1. What were the earliest theories explaining evolutionary patterns? 2. Who were the prominent scientists who contributed to early evolutionary theory? 3. What led Darwin and Wallace to their theory of natural selection? 	Zimmer Chapters 1 & 2	<ul style="list-style-type: none"> ➔ Syllabus distributed ➔ LMS Warm-up Assignments discussed ➔ Follow-Up Questions due @ 5 pm EST 5 days after your class section meets 	<p>Group Activity: Why were Darwin's ideas revolutionary?</p> <ul style="list-style-type: none"> • Understand Darwin's ideas in the context of his time. • Explain how the positing of a feasible hypothesis sets up the potential for science. • Describe the ways that Darwin's ideas are still challenging to contemporary ideas. 	NO
02	Genes, Traits, & Evolutionary Change	<ol style="list-style-type: none"> 1. What is the genetic basis for traits? 2. Why is heritability a prerequisite for evolution? 3. What are the different patterns inheritance can take? 4. What is the role of mutation in evolutionary processes? 	Zimmer Chapter 5	<ul style="list-style-type: none"> ➔ Class visits a computer lab: remember to bring your Pratt ID!! ➔ Weekly Quiz ➔ Follow-Up Questions due @ 5 pm EST 5 days after your class section meets ➔ LMS Warm-up Assignments due, FRIDAY OF THIS WEEK @ 11:59 EST 	<p>Individual Activity: Discovering the genetic basis of traits</p> <ul style="list-style-type: none"> • Choose an organismal trait whose genetic basis is of interest. • Using internet and/or library research resources, find scientific evidence for the genetic basis of this trait. • Share your find with your classmates, identifying the nature of this evidence and what it says about the genetic basis of this trait. • Identify whether the evidence found by your classmates is reported in the primary, secondary, or tertiary literature. 	YES

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03	Natural Selection & Adaptation	<ol style="list-style-type: none"> 1. What is genetic drift and how does it cause evolutionary change? 2. What is natural selection? 3. How does natural selection produce adaptation? 4. Why is genetic diversity needed in order for evolution to occur? 5. How are behaviors adaptive? 	Zimmer Chapter 6 & p. 185-194 & 327-347	<ul style="list-style-type: none"> → Weekly Quiz → Follow-Up Questions due @ 5 pm EST 5 days after your class section meets 	<p>Individual Activity: Drift in Design</p> <ul style="list-style-type: none"> • Identify ideas about how genetic drift works embedded in an animated video short. • Explain how various “design elements” have been used to communicate these ideas to the viewer. <p>Group Activity: Putting adaptations to the test</p> <ul style="list-style-type: none"> • Describe the important features of a trait that might make it adaptive, explicitly explaining how that trait might increase the probability of surviving and reproducing. • Come up with up with a hypothesis as to how this trait evolved by telling an “evolutionary story”. • Devise a plan to test this hypothesis using an experiment, a comparative study, or some other scientific means. 	NO
04	Sex & Reproduction	<ol style="list-style-type: none"> 1. Why do some organisms reproduce sexually? 2. How is sexual selection different from other forms of natural selection? 3. What roles do conflict and cooperation play in reproduction? 	Zimmer Chapter 9	<ul style="list-style-type: none"> → Class visits a computer lab: remember to bring your Pratt ID!! → Weekly Quiz → Follow-Up Questions due @ 5 pm EST 5 days after your class section meets 	<p>Individual Activity: How the Guppy Got Its Spots</p> <ul style="list-style-type: none"> • Describe the diversity pattern of male and female guppies across a variety of different habitats. • Use virtual experiments to test hypotheses explaining this diversity pattern. • Explain how guppy diversity patterns emerge from the simultaneous action of natural and sexual selection. 	YES

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05	Speciation	<ol style="list-style-type: none"> 1. What is a species? 2. How do we identify different species? 3. What is the evolutionary process that generates new species? 4. What drives the patterns of species diversity that we observe across the earth's ecosystems? 	Zimmer Chapter 10	<ul style="list-style-type: none"> → Class visits a computer lab: remember to bring your Pratt ID!! → Weekly Quiz → Follow-Up Questions due @ 5 pm EST 5 days after your class section meets 	<p>Group Activity: Depicting mechanisms of speciation</p> <ul style="list-style-type: none"> • Discuss how your assigned mechanism of speciation (allopatry, ring speciation, or sympatry) can produce distinct species. • Represent your assigned mechanism as a concept map that includes: <ul style="list-style-type: none"> • The sequence of events that leads to speciation; • A clear definition of the factor(s) that allow speciation to occur; • An explanation of how pre- and post-zygotic reproductive barriers evolve; and • Examples of species that have emerged by your assigned mechanism. • Share your concept map with your classmates. 	YES
06	The Fossil Record	<ol style="list-style-type: none"> 1. How does geological knowledge contribute to our understanding of evolution? 2. How are fossils used to reconstruct evolutionary histories? 3. What were some of the major evolutionary innovations of early life? 4. What are "fossil intermediates" and why are they important? 	Zimmer Chapter 3	<ul style="list-style-type: none"> → Weekly Quiz → Follow-Up Questions due @ 5 pm EST 5 days after your class section meets → How the Guppy Got Its Spots Lab Report due, FRIDAY OF THIS WEEK @ 11:59 EST 	<p>Group Activity: Homology, Analogy, and/or Homoplasy?</p> <ul style="list-style-type: none"> • For a variety of paired species, identify a similar trait. • Decide whether this shared trait represents homology, analogy, and/or homoplasy. • Use evidence to explain why this similar trait does or does not represent homology, analogy, and homoplasy. 	NO
07	Midterm Exam taken <u>in class</u> on the LMS.			<ul style="list-style-type: none"> → Class visits a computer lab: remember to bring your Pratt ID!! 	n/a	YES

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08	The Tree of Life 1	<ol style="list-style-type: none"> 1. What is a phylogenetic tree? 2. How do we classify extant organisms based on their evolutionary history? 3. How do changes in genes lead to evolutionary diversification? 	Zimmer Chapter 4 & p. 194-198	<ul style="list-style-type: none"> → Class visits a computer lab: remember to bring your Pratt ID!! → Weekly Quiz → Follow-Up Questions due @ 5 pm EST 5 days after your class section meets 	<p>Individual Activity: Flowers and Trees</p> <ul style="list-style-type: none"> • x • x • x • x 	YES
09	The Tree of Life 2	<ol style="list-style-type: none"> 1. How is DNA evidence used to construct phylogenetic trees and differentiate species? 2. How does horizontal gene transfer complicate our understanding of evolutionary trees? 3. What is evolutionary convergence? 	Zimmer Chapter 7 & p. 198-209	<ul style="list-style-type: none"> → Class visits a computer lab: remember to bring your Pratt ID!! → Weekly Quiz → Follow-Up Questions due @ 5 pm EST 5 days after your class section meets → Choice Video for Week 10 should be registered on the LMS by FRIDAY OF THIS WEEK @ 11:59 EST 	<p>Individual Activity: Great Transformations Questions</p> <ul style="list-style-type: none"> • x • x <p>Group Activity: Why is there so much diversity?</p> <ul style="list-style-type: none"> • x • x • x • x 	YES
10	Coevolution	<ol style="list-style-type: none"> 1. What is coevolution? 2. What is the connection between symbiosis and coevolution? 3. What ecological interactions produce coevolution? 4. How do we find evidence for coevolution? 5. How does artificial selection differ from natural selection? 	<ul style="list-style-type: none"> ▶ Zimmer Chapter 12 ▶ One CHOICE video 	<ul style="list-style-type: none"> → Weekly Quiz → Follow-Up Questions due @ 5 pm EST 5 days after your class section meets → Flowers and Trees Lab Report due, FRIDAY OF THIS WEEK @ 11:59 EST 	<p>Group Activity: What kind of coevolution?</p> <ul style="list-style-type: none"> • To identify the type of coevolutionary relationship maintained by a pair of species by assessing the net cost or benefit of the interaction to individuals of each species. • To explain and justify the categorization of a particular species-pair relationship as mutualistic, commensal, parasitic, predatory, or competitive. • To identify and/or hypothesize how the coevolutionary relationship maintained by this pair of species has shaped the adaptations typical of each species. 	NO

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11	Macroevolution	<ol style="list-style-type: none"> 1. Why do extinctions occur? How common is extinction? 2. What causes evolutionary radiations? 3. What are “mass extinctions” and how have they influenced the evolutionary history of the earth? 4. How does the current rate of extinction compare with the past? 	Zimmer Chapter 11	<ul style="list-style-type: none"> → Weekly Quiz → Follow-Up Questions due @ 5 pm EST 5 days after your class section meets 	<p>Group Activity: Do we need to prevent a human-caused mass extinction event?</p> <ul style="list-style-type: none"> • Consider the question “Do we need to prevent a human-caused mass extinction event?”. • Based on the position assigned to your group, devise a series of arguments to support your position. • Identify which of your arguments are scientific and which are normative. 	NO
12	Selection Beyond the Individual	<ol style="list-style-type: none"> 1. Can selection occur at levels above the individual? 2. How is kin selection different from other forms of natural selection? 3. What is group selection and how is it different from other forms of natural selection? 4. Can cooperation be a product of natural selection? 	<ul style="list-style-type: none"> ▶ Zimmer p. 347-352 ▶ <i>Evolution for Everyone</i> Chapters 18-20 	<ul style="list-style-type: none"> → Weekly Quiz → Follow-Up Questions due @ 5 pm EST 5 days after your class section meets 	<p>Group Activity: The evolution of multicellularity</p> <ul style="list-style-type: none"> • Consider what pre-adaptations had to be gained by single-celled organisms in order to foster the evolution of multicellularity. • Outline the adaptive advantages that multicellular organisms enjoy over single-celled organisms. • Describe why “cooperation” is a pre-requisite to for success as a multi-cellular organism. • Describe how “cheating” by individual cells can undermine successful cooperation. • Create a diagram depicting the process by which multicellularity may have evolved. 	NO
13	Humans & Cultural Evolution	<ol style="list-style-type: none"> 1. How did humans evolve? 2. How does our evolutionary history compare with other organisms? 3. What is “cultural evolution” and how does it compare with biological evolution? 	<ul style="list-style-type: none"> ▶ Zimmer Chapter 14 & p. 352-357 ▶ <i>TED Talks</i> “Joshua Klein: The amazing intelligence of crows” ▶ <i>National Public Radio</i> “As The Crow Flies, Tokyo Battles Avian Pest” 	<ul style="list-style-type: none"> → Class visits a computer lab: remember to bring your Pratt ID!! → Weekly Quiz → Follow-Up Questions due @ 5 pm EST 5 days after your class section meets 	<p>Group Activity: Does culture evolve?</p> <ul style="list-style-type: none"> • Consider whether our understanding of how biological evolution works could be used to explain how and why culture changes. • Compare and contrast the processes of biological and cultural evolution in a concept map. • Present your concept map to the class. 	YES

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14	Prospects for Evolution	1. How can evolutionary knowledge serve humanity? 2. What are some ways that technology may affect the future path of evolution?	Zimmer Chapter 15	<ul style="list-style-type: none"> → Weekly Quiz → Course Evaluations → Bring any questions you have in preparation for the Final Exam → Follow-Up Questions due @ 5 pm EST 5 days after your class section meets 	Group Activity: Future evolution <ul style="list-style-type: none"> • Predict how particular traits in particular species may evolve in the future. • Analyze the predictions of your classmates, determining whether each prediction is evolutionarily feasible. 	NO
<i>Studio Days, No Class</i>					<i>n/a</i>	<i>n/a</i>
15	Final Exam taken <u>in class</u> on the LMS.			<ul style="list-style-type: none"> → Class visits a computer lab: remember to bring your Pratt ID!! 	<i>n/a</i>	YES

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