

Unit 7: Diversity of Life and Biological Evolution

A. Charles Darwin and his Idea of Natural Selection	Mastery Reflection: What do I still need to master before the exam?	Resources for Mastery
<p>Students who demonstrate understanding can. . .</p> <p>1A Summarize who Charles Darwin was and why his work is so important to biology</p> <ul style="list-style-type: none"> - Explain the groundbreaking ideas he proposed about life on this planet - Identify the major influences on Darwin that helped him create his idea of evolution (Lyell – <i>Principles of Geology</i>, Malthus – <i>Essay on human population</i>, voyage on HMS <i>Beagle</i>, fossils and collected specimens, domestic breeding –ex. dogs & pigeons) - Compare Darwin’s ideas with the common beliefs of the time (1800s) - Explain why Darwin was so apprehensive about publishing his ideas <p>2A Construct an explanation for the evolution of an organism (current or extinct) or a specific adaptation via Darwin’s mechanism of Natural Selection</p> <ul style="list-style-type: none"> - Address each component of natural selection in the example used <ul style="list-style-type: none"> • Variation exists within a population • Not every individual can survive • Favorable variations (adaptations) lead to better chance for survival • Survival leads to reproduction • As frequency of characteristics increase the nature of a population changes over time - Provide specific examples that display evolution through natural selection <p>3A Compare and Contrast Darwin’s idea with Lamarck’s idea of evolution</p> <ul style="list-style-type: none"> - Summarize Lamarck’s idea of the inheritance of acquired characteristics through the principle of use and disuse <p>4A Construct an argument against an evolutionary skeptic’s claim that it is “just a theory”</p> <ul style="list-style-type: none"> - Distinguish between a scientific theory and a hypothesis 		<p>Textbook Sections:</p> <ul style="list-style-type: none"> • 2.1 – 2.8 • 10.1 <p>On Edline:</p> <ul style="list-style-type: none"> • Darwin PPT • Darwin’s Dangerous Idea Video

B. The Evidence for Evolution	Mastery Reflection: What do I still need to master before the exam?	Resources for Mastery
<p>Students who demonstrate understanding can. . .</p> <p>1B Distinguish between microevolution and macroevolution and provide examples of each</p> <p>2B Utilize the fossil record as evidence to support the theory of evolution</p> <p>3B Explain how the geographical distribution of organisms provides evidence of evolution</p>		<p>Textbook Sections:</p> <ul style="list-style-type: none"> • 2.2, 2.4-2.9 • 10.1 – 10.5

<p>4B Utilize comparative morphology as evidence to support the theory of evolution</p> <ul style="list-style-type: none"> - Explain how homologous structures are evidence of divergent evolution - Explain how analogous structures are evidence of convergent evolution - Explain how vestigial structures act as evidence for evolution - Compare developmental stages as evidence of evolution (<i>ex. vertebrate embryology</i>) <p>6B Analyze the biochemistry of organisms as evidence to support the theory of evolution</p> <ul style="list-style-type: none"> - Compare biochemical substances between different species (<i>ex. DNA & proteins</i>) - Interpret graphical data to determine degree of relatedness between species <p>7B Explain how artificial selection is evidence that evolution occurs</p>		<p>On Edline:</p> <ul style="list-style-type: none"> • Evidence of Evolution PPT
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C. The Conditions for Evolution	Mastery Reflection: What do I still need to master before the exam?	Resources for Mastery
<p>Students who demonstrate understanding can. . .</p> <p>1C Describe the conditions necessary to maintain genetic equilibrium (i.e. no evolution)</p> <ul style="list-style-type: none"> - No mutation, no input of new alleles, large population size, random mating, no natural selection - Apply the Hardy-Weinberg Rule to predict allele frequencies within a population that is at genetic equilibrium: <i>if $p + q = 1$, then $(p + q)^2 = p^2 + 2pq + q^2$</i> <p>2C Describe the conditions that disrupt genetic equilibrium and lead to evolution</p> <ul style="list-style-type: none"> - Mutation - Migration (<i>immigration & emigration</i>) - Genetic drift in small populations (<i>ex. Founder effect, bottleneck effect</i>) - Nonrandom mating - Natural selection <p>3C Distinguish between the different forms of selection and provide examples of each</p> <ul style="list-style-type: none"> - Disruptive Selection, Stabilizing Selection, and Directional Selection <p>4C Construct an explanation of how a new species may form (<i>a.k.a. speciation</i>)</p> <ul style="list-style-type: none"> - Create a set of standards to define a species - Describe prezygotic isolating mechanisms (<i>geographic, ecological, behavioral, temporal, mechanical, gamete incompatibility</i>) - Describe postzygotic isolating mechanisms (<i>developmental problems, reduced fitness, reduced fertility</i>) <p>5C Explain how closely connected species in a community are the product of coevolution</p> <ul style="list-style-type: none"> - Describe relationships such as; <i>commensalism, mutualism, predation, & parasitism</i> 		<p>Textbook Sections:</p> <ul style="list-style-type: none"> • 10.6-10.10 • 29.9-29.12 <p>On Edline:</p> <ul style="list-style-type: none"> • Conditions for Evolution PPT

