**Unit 10: Diversity of Life and Biological Evolution**

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| **A. Charles Darwin and his Idea of Natural Selection** | **Mastery Reflection: What do I still need to master before the exam?** | **Resources for Mastery** |
| ***Students who demonstrate understanding can. . .***  1A Summarize who **Charles Darwin** was and why his work is so important to biology   * 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 – *Principles of Geology*, Malthus – *Essay on human population*, voyage on HMS *Beagle*, 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   2A Explain Darwin’s theory of evolution by means of natural selection using his 5 principles:  1. Variation exists within populations.  2. Some variations favor survival of an organism  3. Overpopulation leads to competition.  4. Survivors may pass down favorable traits.  5. Long periods of time allow for small changes to accumulate & contribute to  survival adaptations of the population    3A Compare and Contrast Darwin’s idea with Wallace’s  4A Construct an argument against an evolutionary skeptic’s claim that it is “just a theory”   * Distinguish between a **scientific theory** and a **hypothesis** |  | ***Textbook Sections:***   * 2.1 – 2.8 * 10.1   ***On website:***   * Darwin PPT * Darwin   /Wallace video  Bozeman videos |

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| **B. The Evidence for Evolution** | **Mastery Reflection: What do I still need to master before the exam?** | **Resources for Mastery** |
| ***Students who demonstrate understanding can. . .***  1B Utilize the **fossil record** as evidence to support the theory of evolution  2B Explain how early embryonic development (**embryology**)of organisms provides evidence  for evolution  3B Utilize **comparative morphology** as evidence to support the theory of evolution   * 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   4B Analyze the **biochemistry** of organisms as evidence to support the theory of evolution   * Compare biochemical substances between different species (*ex. DNA & proteins*) * Interpret graphical data to determine degree of relatedness between species   5B Explain how the **geographical distribution** of organisms provides evidence of evolution  6B Explain how **artificial selection** is evidence that evolution occurs |  | ***Textbook Sections:***   * 2.2, 2.4-2.9 * 10.1 – 10.5   ***On website:***   * Evidence of Evolution PPT   Bozeman videos |

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| **C. How populations evolve** | **Mastery Reflection: What do I still need to master before the exam?** | **Resources for Mastery** |
| ***Students who demonstrate understanding can. . .***  1C Distinguish between microevolution and macroevolution. Be able to explain how  microevolution leads to macroevolution.  2C Describe the conditions necessary to maintain **genetic equilibrium** (i.e. no evolution)   * No mutation, no input of new alleles, large population size, random mating, no natural selection * Apply the **Hardy-Weinberg Rul**e to predict allele frequencies within a population that is at genetic equilibrium: *if* ***p + q = 1*** *, then* ***(p + q)2 = p2 + 2pq + q2***   3C Describe the conditions that disrupt genetic equilibrium and lead to evolution   * **Mutation** * **Migration** (*immigration & emigration*) * **Genetic drift** in small populations (*ex. Founder effect, bottleneck effect*) * **Nonrandom mating** * **Natural selection**   4C Distinguish between the different forms of selection and provide examples of how each  contributes to the evolution of populations.   * **Disruptive Selection, Stabilizing Selection,** and **Directional Selection**   5C Construct an explanation of how a new species may form (*a.k.a.* ***speciation***)   * Create a set of standards to define a **species** * Describe **prezygotic isolating mechanisms** (*geographic, ecological, behavioral, temporal, mechanical, gamete incompatibility*) * Describe **postzygotic isolating mechanisms** (*developmental problems, reduced fitness, reduced fertility*)   6C Explain how closely connected species in a community are the product of **coevolution**   * Describe relationships such as; *commensalism, mutualism, predation, & parasitism* |  | ***Textbook Sections:***   * 10.6-10.10 * 29.9-29.12   ***On website:***   * Conditions for Evolution PPT |

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| **D. Human Evolution** | **Mastery Reflection: What do I still need to master before the exam?** | **Resources for Mastery** |
| ***Students who demonstrate understanding can. . .***  1D Explain the **common ancestor** concept, provide an **intelligent rebuttal** to the claim that  humans evolved from apes (ie. gorillas or chimps)  2D Differentiate between Hominin (human-like) and Pongid (ape-like) characteristics.  3D Create a timeline of human evolution from earliest hominin forms through modern  *Homo sapiens*.  4D Explain how the evidences such as fossil record, anatomy (skin pigmentation, facial  structures) and mitochondrial DNA support the current model of human migration out of  Africa  5D Identify causes of human migration out of Africa  6D Explain how migration patterns may have been shaped by global climate changes.  7D Explain how migration and isolation may have led to recent variations in superficial traits (epidermal melanin production, facial structures, or hair texture). |  | ***Textbook Sections:***   * Chapter 20 (2nd ed) or Chpt. 21 (3rd ed)   ***On website:***  ***Becoming Human Video***  **Skull lab** |

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| **E. Taxonomy and Classification** | **Mastery Reflection: What do I still need to master before the exam?** | **Resources for Mastery** |
| ***Students who demonstrate understanding can. . .***  1E Interpret phyologenetic trees in order to conclude evolutionary relationships  2E Interpret taxonomic classification in order to derive evolutionary relationships |  | ***Textbook Sections:*** |