**AP BIOLOGY (WHEATLEY)**

**EVOLUTION UNIT GUIDE 2015**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **MONDAY** | **TUESDAY** | **WEDNESDAY** | **THURSDAY** | **FRIDAY** |
|  |  |  |  | **9/25**\*Evolution video |
| **9/28** \*Chi-squared lab – **DUE**  **9/30** | **9/29**\* Stickleback lab activity  – **DUE 10/1** | **9/30**\*Natural selection and  history notes and  discussion | **10/1**\*Natural selection lab  activity - **DUE 10/5** | **10/2**\*Evidence for evolution  notes and discussion |
| **10/5**\*Hardy-Weinberg notes  and discussion \*H-W practice problems  – **DUE 10/8** | **10/6**\*Selection and speciation  POGIL | **10/7**\*Selection and speciation  POGIL – **DUE END OF**  **PERIOD** | **10/8**\*Evolution Quiz\*Systematics notes and discussion | **10/9****NO SCHOOL****PARENT TEACHER CONFERENCES** |
| **10/12**\*Phylogenetic trees  POGIL | **10/13** \*Phylogenetic trees POGIL – **DUE END OF PERIOD** | **10/14**\*Cladogram lab  | **10/15**\*Cladogram lab – **DUE**  **END OF PERIOD** | **10/16** \*Blast Lab  |
| **10/19**\*Blast Lab – **DUE 10/20** | **10/20**\*An antipodal mystery  case study – **DUE END**  **OF PERIOD** | **10/21**\*Trouble in paradise - **DUE 10/22** | **10/22****TEST REVIEW** | **10/23****EVOLUTION AND DIVERSITY TEST** |

Supplemental Resources:

A. Bozeman Science Videos

1. Natural Selection
2. Examples of Natural Selection
3. Genetic Drift
4. Evolution Evidence
5. Phylogenetics
6. Speciation
7. Speciation and Extinction
8. Hardy Weinbery
9. Origin of Life
10. Cladograms
11. Crash Course Videos

1. #14 through #20

Reading: Read Chapters 13, 14 and 15 and answer the prompts below.

 A. Darwin’s Theory of Evolution

 13.1 Briefly summarize the history of evolutionary thought by characterizing the views of early Lamarck, Darwin, and Greek philosophers.

 13.1 Explain how Darwin’s voyage on the Beagle influenced his thinking.

 13.2 Explain how the work of Thomas Malthus and the process of artificial selection influenced Darwin’s development of the idea of natural selection.

 13.2 Describe Darwin’s observations and inferences in developing the concept of natural selection.

 13.2 Explain why individuals cannot evolve and why evolution does not lead to
perfectly adapted organisms.

 13.3 Describe two examples of natural selection known to occur in nature. Note two key points about how natural selection works.

 13.4 Explain how the fossil record provides some of the strongest evidence of
evolution.

 13.5 Explain how biogeography, comparative anatomy, and molecular biology
support evolution.

 13.6 Explain how evolutionary trees are constructed and used to represent ancestral relationships.

 B. The Evolution of Populations

 13.7 Define the gene pool, a population, and microevolution.

 13.8 Explain how mutation and sexual reproduction produce genetic variation.

 13.8 Explain why prokaryotes can evolve more quickly than eukaryotes.

 13.9 Describe the five conditions required for the Hardy-Weinberg equilibrium.

 13.9–13.10 Explain the significance of the Hardy-Weinberg equilibrium to natural populations and to public health science.

 C. Mechanisms of Microevolution

 13.11 Define genetic drift and gene flow. Explain how the bottleneck effect and the founder effect influence microevolution.

 13.11 Explain how genetic bottlenecks threaten the survival of certain species.

 13.12 Explain why natural selection is the only mechanism that consistently leads to adaptive evolution.

 13.13 Distinguish between stabilizing selection, directional selection, and disruptive selection. Describe an example of each.

 13.15 Explain how antibiotic resistance has evolved.

 13.16 Explain how genetic variation is maintained in populations.

 13.17 Explain why natural selection cannot produce perfection.

 D. Defining Species

 14.1 Distinguish between microevolution and speciation.

 14.2 Compare the definitions, advantages, and disadvantages of the different species concepts.

 14.3 Describe five types of prezygotic barriers and three types of postzygotic barriers that prevent populations of closely related species from interbreeding.

 E. Mechanisms of Speciation

 14.4 Explain how geologic processes can fragment populations and lead to
speciation.

 14.6 Explain how sympatric speciation can occur, noting examples in plants and
animals.

 14.7 Explain why polyploidy is important to modern agriculture. Explain how modern wheat evolved.

 14.11 Compare the gradual model and the punctuated equilibrium model of evolution. Explain how each model applies to the fossil record.

 F. Early Earth and the Origin of Life

 15.1 Describe the conditions on the surface of the early Earth. Describe the evidence that life on Earth existed at least 3.5 billion years ago.

 15.1 Describe the four stages that might have produced the first cells on Earth.

 15.2 Describe the experiments of Stanley Miller and others in understanding how life might have first evolved on Earth.

 **G. Mechanisms of Macroevolution**

 15.10 Explain how and why adaptive radiations occur.

 15.11 Explain how genes that program development function in the evolution of life.

 15.13 Explain why evolutionary trends do not reflect “directions” or “goals.”

 H. Phylogeny and the Tree of Life

 15.14 Distinguish between homologous and analogous structures and provide examples of each. Describe the process of convergent evolution.

 15.15 Describe the goals of systematics. List the progressively broader categories of classification used in systematics in order, from most specific to most general.

 15.16 Define the terms clade, monophyletic groups, shared derived characters, shared ancestral characters, ingroup, outgroup, phylogenetic trees, and parsimony.

 15.17 Explain how molecular biology is used as a tool in systematics. Describe examples used to study panda and human evolution. Explain why some studies use DNA coding for ribosomal RNA (rRNA) and other studies use mitochondrial DNA (mtDNA).