Name:_____ Date:_____ Per:_____

Chapter 22 Review: Descent with Modification

1. Using page 441 and on, briefly explain Darwin's research and voyage.

2. Why was understanding adaptation essential to understanding evolution for Darwin?

3. What were Darwin's 2 main ideas? (Be sure to mention descent with modification and natural selection in your discussion.) Provide examples of each.

4. Walk through Mayr's 3 inferences and 5 observations.

5. Compare contrast artificial/natural selection. Connect selection and adaptation.

6. Explain either the evolution of the guppies or of drug-resistant HIV. Use sketches to help your explanations.

7. Define and illustrate the 2 types of homologies. How are these related to the tree of life?

8. Briefly discuss biogeography and the fossil record (isn't that little *Basilosaurus* cute?) and how they are connected to Darwin's theory.

9. MAIN IDEA: Why is evolution not "just a theory"?

Chapter 23 Review: The Evolution of Populations

1. Why can't individuals evolve?

2. Connect Mendel's work with Darwin's.

3. Define, using examples, the following:
   • Population

   • Gene pool

   • Allele frequencies

   • Hardy-Weinberg Theorem

4. Explain the conditions required for H-W Equilibrium.

5. Suppose a population of organisms with 600 gene loci is fixed at half of these loci and has 2 alleles at each of the other loci. How many alleles are found within its gene pool?

6. Answer questions 2 and 3 on page 471. Give justifications for your answers.

7. Explain the precursors to variation. Give examples.

8. Choose a biome (forest, ocean, etc) and create an example of natural selection within a population. Be sure to mention all three precursors to the selection. I dare you to draw it!

9. What is genetic drift and what two situations increase it? Explain these two.

10. What is the new term for migration give on p. 462? Give an example of this.

11. Ok, so remind me again…what are the four main mechanisms for a population's evolution?

12. Why is natural selection the primary mechanism of adaptive evolution?

13. Talk about the types of variation (polymorphism, geographic variation, etc) within a population. Are they all heritable? How is this variation measured? How similar are we humans in terms of nucleotide variation?

14. Give examples of the following:
   • Fitness

   • Relative fitness

   • Directional selection

   • Disruptive selection

   • Stabilizing selection

   • Sexual selection

15. On which does natural selection act? Genotypes or phenotypes? Explain.

16. Explain the 3 mechanisms for the preservation of genetic variation, diploidy, balancing selection (including heterozygote advantage and frequency-dependent selection), and neutral variation.

17. Walk through the malaria/sickle-cell "advantage".

18. Why are males considered to be the "reproductive handicap" of sex? (Ouch btw!) But if this is true, why hasn't sexual reproduction been selected against? What are the current explanations for the advantage of sexual reproduction?

19. Why aren't we perfect (even though we may think we are)?