

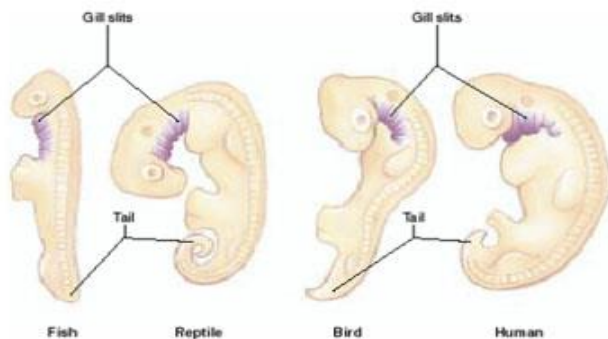
## Evolution Practice 2

### Evolution Problems

1. For each of the statements below, indicate whether it is worded correctly (C) or incorrectly (I). If a statement is worded incorrectly, please rewrite the statement so that it is correct.

- a. Equids (horse and relatives) developed hooves because they needed them to run faster when the forests changed to grasslands.
- b. The term "fittest" in "survival of the fittest" refers to the survivors, that is, the longest-lived individuals.
- c. Hypotheses can become theories, and then if there is enough evidence, a theory can become a law.
- d. Theories are more certain than hypotheses, but less certain than laws.
- e. Anteaters have long snouts because those individuals that continually used their snouts to reach into ant nests developed long snouts.

2. The diagram below shows 4 embryos. Each embryo has gill slits and a tail. Explain how these embryos provide evidence of evolution.



[http://www.lclark.edu/~seavey/genetics04/lecture%20outlines/outline\\_ap19.html](http://www.lclark.edu/~seavey/genetics04/lecture%20outlines/outline_ap19.html)

3. There are several mechanisms that can cause genetic changes in populations over time. These include, but are not limited to, the following: mutations, natural selection, gene flow, recombination, and genetic drift.

a) Which of these mechanisms increase genetic variability **within** a population over time and which decrease genetic variability? What about **among** populations (if applicable)? Give an example of each and explain your answer.

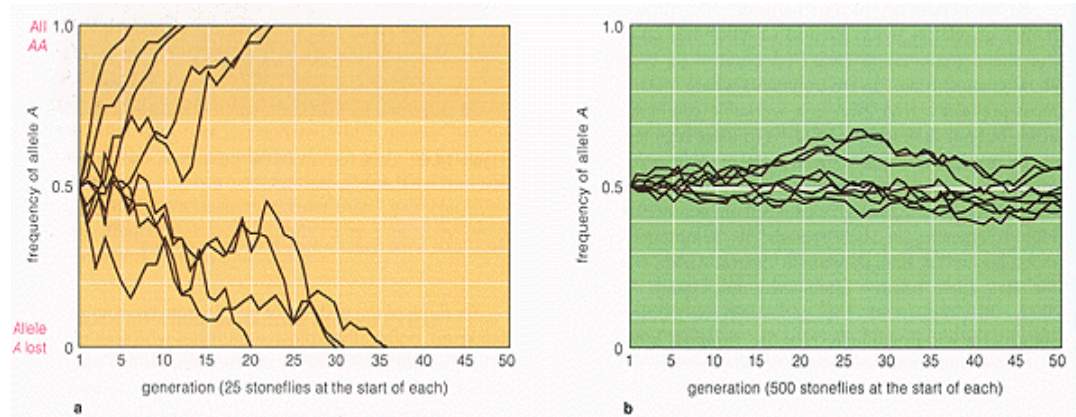
b) Which of these mechanisms are random, and which are non-random? Explain.

4. The eastern coral snake is poisonous, but the scarlet king snake is not. These two snakes belong to different families, but look remarkably similar to one another. They also coexist in some areas in the U.S. The ancestors to these two snakes only slightly resembled each other. Use your understanding of evolutionary mechanisms to explain the modern day similarities in these two species.



<http://marshscience7.blogspot.com/2013/12/natural-selection-adaptations.html>

5.



(<http://www.micro.utexas.edu/courses/levin/bio304/popgen/drift.html>)

Figure 1. The frequency of allele “A” over 50 generations in two groups of stoneflies with nine populations per group. Alleles “A” and “a” were found in equal numbers in all

populations at the start of this study. The three possible genotypes (AA, Aa, or aa) all have equal fitness. Graph a (left): In these nine populations of stoneflies, the size was maintained at 25 breeding individuals. Graph b (right): In these nine populations of stoneflies, the size was maintained at 500 breeding individuals.

a. Explain, describing the evolutionary mechanism, why either allele A or a was lost in all populations shown in Graph a.

b. Why was the allele frequency of both A and a maintained at equal numbers in all 9 populations in Graph b?

6. The table below shows amino acids #61-75 of  $\beta$ -hemoglobin for horse, human, and gorilla. Explain how these data provide evidence of evolution.

Human	Lys	Ala	His	Gly	Lys	Lys	Val	Leu	Gly	Ala	Phe	Ser	Asp	Gly	Leu
Gorilla:	Lys	Ala	His	Gly	Lys	Lys	Val	Leu	Gly	Ala	Phe	Ser	Asp	Gly	Leu
Horse:	Lys	Ala	His	Gly	Lys	Lys	Val	Leu	His	Ser	Phe	Gly	Glu	Gly	Val
Human:	Ala	His	Leu	Asp	Asp	Leu	Lys	Gly	Thr	Phe	Ala	Thr	Leu	Ser	Glu
Gorilla:	Ala	His	Leu	Asp	Asp	Leu	Lys	Gly	Thr	Phe	Ala	Ala	Leu	Ser	Glu
Horse:	His	His	Leu	Asp	Asp	Leu	Lys	Gly	Thr	Phe	Ala	Ala	Leu	Ser	Glu

**For thought: Are humans today subject to natural selection? Support your answer.**