Unit 7 : Bird Evolution and Adaptation Virtual Lab Instructions

Bird Evolution and Adaptation Virtual Lab

Background: In this simulation, you will investigate populations of birds living on an island. You will begin by selecting three birds that represent phenotypes for several traits in one population that lives in the southwest portion of the island. You will explore how this population changes over time in the southwest. Then you will explore how the population evolves over long periods in various environments on other areas of the island.

PART A PREDICTIONS ACTIVITY (Document 1)

Begin by visiting: Bird Evolution Simulation to open the simulation. The first simulation represents 500,000 years. During this time, mutations may alter the ability of some birds and their descendants to thrive in the environment. Birds with traits that enhance their fitness are more likely to survive and reproduce.

1. Read and discuss the adaptations described for birds along the right side of the simulation page (dark green column on page 2 of the simulation). Select the phenotype for each of the three birds. *Consider good experimental design and change only **ONE** independent variable between each of the three birds; leave the other two variables the same.*

2. In the southwest, your birds will encounter the environmental conditions listed in the table below. **Fill in the second column of the chart with the bird phenotypes that you predict would be best suited for each of the conditions.** Be honest; this section is for inquiry and prediction and will not negatively impact your grade.

Table 1: Environmental Conditions and Bird Phenotype Environmental

Environmental Condition	**Bird Phenotype (Appearance) Best Suited**
Foliage Color	
Edible Insects	
Nectar	
Predators	
Seeds	

Part B SIMULATION ACTIVITY AND ANALYSIS (Document 1)

Now watch the animation (click START) and record the changes that occur in each bird population over time. Record the changes that occur in each bird population over time on their worksheet. **For mutations, not every box will be filled in - only when changes occur do you fill in a box. For mutations, describe the mutation and whether the effect was neutral, negative, or positive. If there was no mutation, list NONE.**

	Bird population One	**Bird Population Two**	**Bird Population Three**
Years			
50,000			
100,000			
150,000			
200,000			
250,000			
300,000			
350,000			
400,000			
450,000			
500,000			

Now that you've completed your data collection, answer the following analysis questions:

1. Discuss how the bird populations changed over the course of 500,000 years. For example, what types of mutations occurred? Under what circumstances were the offspring fit as a result of the mutation?

2. Were your ideas about the fitness of each phenotype you selected correct? Explain why or why not.

3. Describe the environment that exists in each of the three new areas.

Northeast:

Northwest:

Southeast:

4. Discuss which birds you think will be most fit in each new environment and which will be less fit. Record your ideas and explain your reasoning.

6. Record the changes that occurred in each of the three new areas over 500,000 years.
Northeast:

Northwest:

Southeast:

7. Explain how much the recent birds vary from the original birds after 1 million years of natural selection. How does evolution explain the changes? Use the following terms or phrases in your explanation: natural selection, random mutation, selection of favorable traits, reproduction, and genetic variation.

PART C LAB REPORT (Document 2)

Use the information you have gathered in the simulation to complete your Lab report. *Make sure you review Unit 7 Project Procedures for all required details.*