Lab: Natural Selection

(modified from Sepup: Science & Global Issues – Natural Selection)

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 time periods in various environments on other areas on the island.

Activity: Begin by visiting http://sepuplhs.org/high/sgi/teachers/evolution_act11_sim.html 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. 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 are best suited for each of the conditions.**

Table 1: Environmental Conditions and Bird Phenotype

Environmental Condition	Bird Phenotype Best Suited
Seeds	
Edible Insects	
Nectar	
Predators	
Foliage Color	

Watch the animation and record the changes occur in each bird population over time. **Not every box will be filled in – only when changes occur do you fill in a box.**

Table 2: Changes in Bird Populations Over Time

Years	Bird Population One		Bird Population Two		Bird Population Three	
	# of Birds	Mutation	# of Birds	Mutation	# of Birds	Mutation
50,000						
100,000						
150,000						
200,000						
250,000						
300,000						
350,000						
400,000						
450,000						
500,000						

1. Discuss how the bird populations changed over the course of the 500,000 years. For example, what types of mutations occurred? Under what circumstances were the offspring more or less 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 Compare how the bird populations changed compared to the bird populations of another group of students. Their simulation should have yielded different results. Record the similarities and differences you notice.

A hurricane has hit the island and some of the birds have been blown to three new areas! You will select unique environmental parameters for one area, then the other two will be generated automatically.

4. Describe the environment that exists in each of the three new areas.
   Northeast:

   Northwest:

   Southeast:

5. 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.