**Natural Selection Lab: Jelly Bean Hunters**

**Question**: Can natural selection change the frequency of traits in a population in only a few generations?

**Lab Overview:** In this investigation you and your classmates will use a simulation exercise to explore how the frequency of three different beak phenotypes changes over several generations in a population of birds on an island.

**Introduction**: In this lab there will be three different species of birds that are competing for food in their environment. Each bird species has a different beak phenotype. The three species of bird are:

1. Plasticus knifeus
2. Plasticus forkus
3. Plasticus spoonus

Each bird’s ability to acquire food will determine whether it dies, or whether it survives and reproduces. In your struggle to avoid extinction, you must gather a minimum of energy points. If you fail to gather enough food, your will not survive to the next round of competition.

All three species will obtain their daily energy from the beans located in their ecosystem.

**Rules of the Island:**

1. You may only use your beak (utensil) to collect food and put it in your digestive system (cup).
2. The feeding tool may only be held by the handle portion (with your mouth!) and the cup must be held upright at all times!
3. You may not push other birds or deliberately knock the food out of other bird’s beaks or digestive systems.
4. When time is up, stop where you are. You may place any food in your beak into your digestive system, but you can collect no more food.

**Procedure:**

When the feeding frenzy begins, you and your competitors will have two minutes in which to gather your food. At the end of this time you must report your total energy intake. Once the eliminations have been made, you should record the number of individuals of each species that survive to compete in the next round. Competition will continue until only one species remains or time runs out.

**Write Up:**

1. Create a table that shows the number of each species of bird for each round of competition. A sample table set-up us shown below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Generation** | **# Plasticus knifeus** | **# Plasticus forkus** | **# Plasticus spoonus** |
| 1 |  |  |  |
| 2 |  |  |  |
| 3 |  |  |  |
| etc. |  |  |  |

1. Create a graph that best shows the relationship for the data collected. Make sure your graph contains all of the essential components of a graph we talked about first semester (for example, title, legend, labeled axes)
2. A conclusion of the lab based upon your results. Your conclusion should be written in paragraph format and include the following:
   1. A summary of what happen and WHY you believe it happened. In other words you must explain both why one species was most successful AND why the other beak types were not as successful. Be sure to include the words adaptation, extinction, and natural selection in your summary.
   2. If all three species of birds were to migrate to another island where the primary food source was instead grapes and strawberries, do you think the results of this simulation might change? Explain!
   3. All three species from our simulation today are considered a yummy treat by a species of fox that lives in the area. If these birds live in the same green, grassy area where the seeds were located, how do you think the population might change over time based on the birds being hunted by the fox?