**Natural Selection Lab**

**Introduction:**

Natural selection is an important process underlying the theory of evolution as proposed by Charles Darwin. It is sometimes called, “survival of the fittest”, which is fairly easy to understand. Individuals whose characteristics are not well suited to their constantly changing environment either die or leave fewer offspring. This lab will help you appreciate the effects of natural selection within a population over time.

**Objective:**

The purpose of this lab is to set up a simple simulation of natural selection in a predator-prey system. Students will play the role of predators and see natural selection at work.

**Materials**:

* Three prey types (rice, liquorice, smarties)
* Four feeding structures (spoon, fork, knife, chopsticks)
* Cups (paper or plastic)
* Eager hungry predators (students)
* Stopwatch (for timing of trials)

**Procedures**:

(Students will feed individually)

1. As predator, each student will be assigned one of four feeding structures: spoon, fork, knife or chopsticks. (Assign these evenly amongst the class) These variations represent genetic and phenotypic differences in the population. All individuals have identical mouths (cups).
2. Give each group of students a habitat (ice-cream container) containing a variety of prey types (liquorice, smarties, rice)
3. Students will be given 30 seconds for every trial, which represents each generation, to capture as much food as possible with their assigned feeding structure.

* Students can only pick up beads with their spoon, fork, knife or chopsticks.
* Students’ cups cannot touch the ground
* Students must move beads from the ground to their stomach using their spoon, fork, knife or chopsticks. They cannot lay the cup sideways and scoop or flip beads into it.
* Any competitors’ prey is fair game until it is in its cup. Once in the cup, students cannot go after it.
* Students must not feed until instructed to do so by their teacher.

1. After each 30 second feeding session, students will count the number of prey items captured and line up in order of the numbers of prey they have collected.
2. The 5 students with the lowest bean count "die" and hand in their utensil. The 5 top bean collectors have the privilege of reproducing by coming to their teacher to get another utensil like theirs. They then hand it to one of the "dead" students who become foragers again with a new utensil. Enter the new count of student predators with each tool in data table 1 for "generation 2".
3. Steps 3 through 5 should be repeated and the numbers calculated to project what the new populations would be for another 3 generations.

**Pre-lab Questions:**

1. Which predator will have the best chance of surviving? Why?
2. Make a prediction by ranking the predators according to which will survive the longest. (1=best, 3=worst)

**Predators**

Fork:

Knife:

Spoon:

Chopstick

Class Data:

Table 1: Population of predators in each generation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Predators | Number in each Generation | | | | |
| 1 | 2 | 3 | 4 | Final |
| Spoons |  |  |  |  |  |
| Forks |  |  |  |  |  |
| Knives |  |  |  |  |  |
| Chopsticks |  |  |  |  |  |

1. Draw a suitable graph of the class results.

**Conclusion Questions:**

1. Which of the collecting tools (adaptations) were the most and least successful? Why?
2. Give 2 examples of what these "tools" might represent in real predator populations.