

Title: Natural selection Lab

Name _____

Problem: To what extent does coloration affect survival rate in white, red, and natural colored beans? To what extent does a food gathering "adaptation" (spoon, knife, or fork) predict survival of lab participants?

Research: (4 pts) What were **Charles Darwin's ideas** about evolution? Look up the 4 basic steps of natural selection

1. _____
2. _____
3. _____
4. _____

Hypotheses: (4 pts) **H₁:** It is hypothesized that the _____ bean will survive better than the others because...

H₂: It is hypothesized that the _____ adaptation will gather food best because...

Experiment:

Materials: Red, Natural Colored, and White Beans; Plastic knives, forks, and spoons; Dixie cups

Procedure: 1) Find a plot of grass that is approximately 30 ft by 30 ft. The instructor scatters 100 natural beans, 100 red beans, and 100 white beans randomly over the plot while the students face away from the plot. 2) All students are given either a single plastic knife, fork, or spoon (approximately even numbers to begin with). The number of students with each type of utensil is entered in data table 2.

3) Students "forage" for beans on the plot and use only their utensil to pick the bean up, stand up, and put it in the cup (**you cannot put beans in the cup except in the standing position**).

4) After several minutes, the instructor stops students from foraging. The students count their beans and line up in the order of the number of beans they have collected.

5) 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 the instructor 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 students with each tool in data table 2 for "year 2".

6) Count the number of each type of bean that the students gathered and enter them in data table 1 row B. Do the calculations for row C, D, & E. The instructor should gather the correct number of offspring (**row D**) to scatter for the next round.

7) Steps 3 through 6 should be repeated and the numbers calculated to project what the new population would be for year 3.

8) Graph the data results making a line graph with 3 colors of pencils. **Please use a scale that will spread your graph over 2/3 of the way up the vertical axis and over the x axis.**

Answer these questions (21 pts)

1) What was the most successful (survived the best) color of bean? _____

Why? _____

2) What was the least successful (died) color of bean? _____

Why? _____

3) Give 2 examples of natural populations this may be occurring in for organisms that you have seen in your yard or on school property. _____

Explain why the ones you observed were successful. _____

4) Which of the collecting tools (adaptations) were the most and least successful?

Most _____ **Why?** _____

Least _____ **why?** _____

5) Give 2 examples of what these "tools" might represent in real predator populations