Simulating natural selection bean lab answers

Activity Questions: In Part A, did a bean phenotype survive better? Why? What characteristics or qualities did it have that helped you survive in this environment? In Part A, how did the dam population change over the four generations? Did the percentage of each type of bean eaten over time change? In Part A, was there any variation in the efficiency of predators (the number of prey eaten in 60 seconds) among the group members? What causes this variation? The simulation in Part A ended after four generations. What do you think would happen if the simulation continued for another four generations? In Part A, you were instructed not to preferably select one grain of color or another. However, have you ever found yourself looking for one color over another? Why? How did a different type of environment affect the natural selection of the dam population? What happened when the dams lived in the environment composed of the darkest wild rice compared to the white rice environment? What if a non-visual predator moved, like one who hunts at night using smell? Would some types of beans still have an advantage? In this simulation, black or white beans were different variations within the prey population. What would be necessary to consider them separate species? How realistic is the model for simulating predators and prey in Part A? Explain your reasoning. In Part B, what affected the efficiency of predators? Where are there variations in predator efficiency among group members when they were all of a predator type (all chopsticks or all forceps)? What causes this variation? Do you think the predator type affects the selection of prey? Why or why not? In Part B, why were you asked to replicate your predator tests? How is this different from Part A multiple tests? For both Parts A and B, how was the number of another group compared to the number of your group? Were the same patterns found? How realistic is the model for simulating the efficiency of predators in Part B? Explain your reasoning. Hypothetical factors that affect variations in prey and predators. Each round of this game has three steps: Step 1: Predators hunt down their prey, and hunting data is collected Step 2: Predator groups adjust for size, representing the relative success of each Pass Type 3 predator: Prey groups adjust for size, representing the relative survival rate of each type of prey Each one-minute game round represents a reproductive generation for predators and prey. After the first round, they are held adjustments are made and subsequent rounds are played. Ideally, participants must play at least three rounds before examining the final results. Let the hunt begin! Start with the predators gathered, standing on your back to the habitat. The designated timer then extends the initial 400 beans randomly habitat, and then call GO! Predators turn around, enter the territory and collect as many prey as possible, while following the rules. After one minute, the timer calls STOP! All predators stop hunting and participants meet with their group outside the habitat. If any predators are caught violating the rules, they and the beans they have caught are removed from the group. Collect data and adjust group sizes for each additional generation step 1: Collect data for each group: Have members count the number of captures for each type of bean and add them together. For example, if the five members of the Hand Group captured 10, 8, 4, 7 and 3 red dams, respectively, their group captured 32 red prey in total. Enter the data for each group in the Generation 1 table, filling in the rest of the chart as shown. When all data is recorded, add the total number of prey captured by all groups and divide them by the number of groups to calculate the average number of prey caught. Step 2: Adjust for the number of surviving predators: Before playing the next round (Generation 2), use the average number of prey captured to adjust the group sizes, a change that represents the relative success of each predator type. Groups that captured more than the average number of prey gain one member; those who captured less than the average number of prey lose a limb. For example, if the Chopsticks Group captures less than the average number of prey, and the Hand Group captures more than the average number of prey, a member of the Chopsticks Group becomes a member of the Hand Group for the next round. Step 3: Adjust for the number of surviving prey: Similarly, use the generated data to adjust the size of the dam groups to represent the survival rate of each type. Find the number of each remaining type of prey in the habitat at the end of the round. Since each type of prey (bean color) started with 100 individuals, the remaining number for the first round will be the original 100, minus the total number of prey types captured. For example, if all the predators together caught a total of 11 black bean prey, 89 would remain. Suppose each remaining prey member will reproduce an individual. So, for this example, we would count 89 additional black beans and put them in the bowl. Repeat this process for each of the remaining dam types. Click here to download a sample dataset and calculations. Play next-generation rounds and evaluate the Results Complete as many rounds as time allows, ideally, three generations or more. Be sure to adjust the numbers of predators and prey after each and scatter additional prey beans randomly around the habitat before the start of each new round of hunting. When you're done, examine the results. Do you see any trends in population numbers? What explanation(s)