Name : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
 Block : \_\_\_\_\_

Survival of the Fittest Through : Natural Selection

Background : The Marblebills are a species of duck that feed on Seasnails (marbles), due to sexual reproduction along with mutation a population of Marblebills exhibit slightly different shaped beaks. Some have a spoon-shaped bill, others have a forked-bill while the remainder have a sticked-bill. Every mating season the Marblebills compete for food to ensure that they have enough to raise their young so that they may grow into healthy adults.

Purpose : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
  
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Hypothesis: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
  
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Table of Observations

|  |  |  |
| --- | --- | --- |
| TRAIT (Phenotype) | NEST # | # Of Marbles |
|  | 1 |  |
|  | 2 |  |
|  | 3 |  |
|  | 4 |  |
|  | 5 |  |
|  | 6 |  |
|  | 7 |  |
|  | 8 |  |
|  | 9 |  |
|  | 10 |  |
|  | 11 |  |
|  | 12 |  |
|  | 13 |  |

Analysis:

1. Figure out the average number of marbles collected by all members of the species with spooned-bills. \_\_\_\_\_\_\_\_\_\_\_\_  
2. Figure out the average number of marbles collected by all members of the species with forked-bills. \_\_\_\_\_\_\_\_\_\_\_\_

3. Figure out the average number of marbles collected by all members of the species with the sticked-bills. \_\_\_\_\_\_\_\_\_\_\_\_

DISCUSSION QUESTIONS

On a separate piece of paper (lab write-up) write down the following title : Survival Of The Fittest :Through Natural Selection – Discussion Questions. Answer the following questions in full sentence answers.  
1. Which phenotype was favored during natural selection.

2. Were there any nesting couples that performed well even though they had one of the less desirable phenotypes? If so which nest # (#’s).  
3. Suggest some reasons why success was varied even within one phenotype. In other words, how could some sticked-bills be so much better than other sticked-bills, or for that matter why were some spoon-bills be so much better than other spoon-bills, even though they had the same structural adaptation?

4. Although we used marbles, try to think of a couple of food (other) items that could turn the other phenotypes from being unfavored to being more favored.  
5. If marbles remain the only food source for this species what will happen to the types of bill adaptations and the percentage of the allele that codes for that Phenotype, within this population of marble-bills over a substantial period of time.

6. At the beginning of this first harvesting and mating season each phenotype made up approximately 33% of the total population. If \_\_\_\_\_\_\_ marbles are needed each season for a nesting couple to survive, what would the approximate percentage of each phenotype be going into the second year of survival? (Take number of Marblebills of that given phenotype that survived divide by the total number of surviving Marblebills).  
7. Assume that Marblebills nest in the upper branches of tall Seamaple trees. If they build their nest out of straw, which beak phenotype would most likely build the strongest nests, and therefore would provide solid nests that could hold up to the strong sea winds. Describe how this single factor of survival could completely alter the frequency of each allele that you worked out in question #5.

8. Let's think about another organism that was introduced to an island beach and how it may evolve over millions of years. What if that introduced animal was a population of Housecats. If these housecats could only feed off of Seagulls and they were left to live on sandy beaches and fed off of these Seagulls, what structural, behavioural and physiological adaptations might we see after a few million years? Describe what this new favored “Beachcat” phenotype might look and act like after millions of years of Natural Selection.

CONCLUSION

- After completing the questions above write the subtitle : Conclusion on your lab write-up, then write a brief conclusion summing up what the results of the lab activity were and whether or not your data supported your hypothesis.