

Beaks of Finches (State Lab)

Slide #1 Introduction:

Environmental conditions act as selecting agents because they select organisms with the most _____ traits to become the parents of the next generation. Within a species, individuals with _____ that make them better _____ to their environment will _____ and _____ in greater numbers than those without such adaptations. These offspring _____ their parents favorable _____.

Finches are small birds found in many locations throughout the world. Charles Darwin used the numerous finch species found on the Galapagos Islands as evidence of _____. The great variety of beak adaptations present of the Galapagos is thought to be due to the _____ of bird populations on the islands with different kinds and amounts of food. During Competition for _____, some finches are successful while others are not.

In this laboratory activity, you will work with different tools that will serve to model finch "beaks." The seeds provided represent finch _____ on a particular island. You will compete with other "finch" species to see which beak is best _____ for obtaining a specific food.

Slide #2 Motivation:

1. Examine the different tools ("beaks") and seeds provided. Predict which "beak" will be the most successful at picking up small seeds. Why?

2. Which "beak" will be the least successful at picking up small seeds? Why?

Slide #3 Round One: original island

3. Each beak picked up small seeds from the original island. Each Beak picked up seeds for 4 trials. Calculate the average # of seeds that each beak collected.
4. In order to "survive", the beeks needs to collect an **average of 13 seeds** per trial. If you achieved that goal, the bird remains healthy and continues to live on the original island and eat small seeds. If the birds collected an average fewer than 13 seeds per trial, that bird will "migrate" to a new island with a different food supply to avoid starvation This will be your island for round two. Perhaps your "beak will be better adapted for feeding success in a new environment.

	"Beak binder clip"	"Beak clothespin"	"Beak plyers"	"Beak Chopsticks"	"Beak Tongs"	"Beak Tweezers"
Trial #1	12	6	14	2	4	15
Trial #2	11	4	11	1	5	14
Trial #3	9	7	16	2	6	16
Trial #4	13	3	13	3	8	13
Average						

Slide #4 Round Two: Competition

5. In this round, the birds will be competing for food with other finches. If you were successful during Round One, the birds will be feeding on small seeds. If birds were not successful, they will be competing for large seeds.

	NEW ISLAND: Large seeds				ORIGINAL ISLAND: Small Seeds	
Beaks	Binder clips	Clothespin	Chopsticks	Tongs	Pliers	Tweezers
Trial #1	15	3	2	13	16	14
Trial #2	16	6	6	15	14	11
Trial #3	18	4	7	12	15	12
Trial #4	14	7	5	14	16	10
Average						

6. Calculate the average. If the bird collected an average of 13 seeds or more, the bird survive and reproduce. If the bird collected fewer than 13 seeds per trial, **the bird is now extinct**.

Slide #5: Who survived?

	Survived (was able to collect 13 or more seeds)	Became extinct (could not collect 13 or more seeds)
Binder clips		
Clothespin		
Pliers		
Chopsticks		
Tongs		
Tweezers		

Analysis Questions:

1. What characteristics of the “beaks” interfered with feeding success on original island?

2. Name two other traits other than beak characteristics that could contribute to the ability of a finch to compete successfully.

3. Explain how this activity simulates each of the concepts listed below as they are involved in the process of natural selection. Describe a specific example from this laboratory for each concept

Variation: _____

Competition: _____

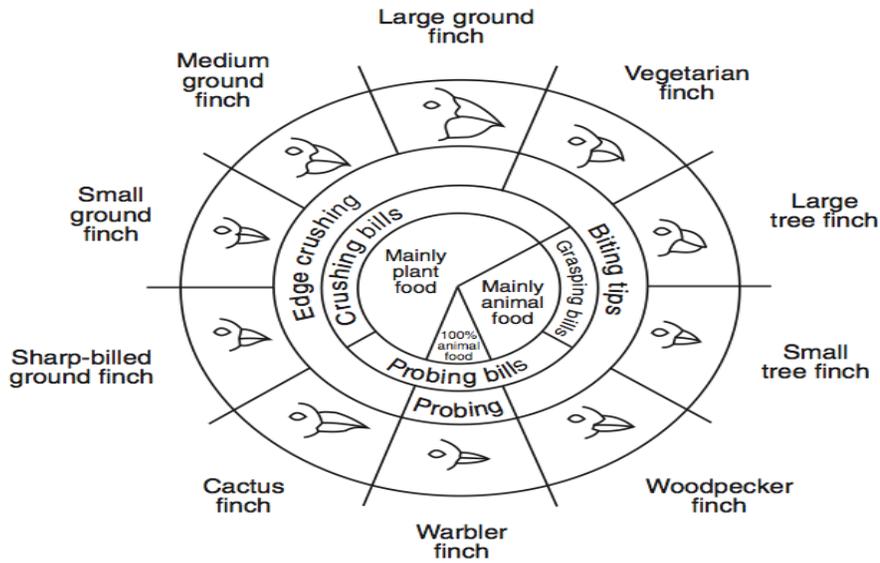
Struggle for survival: _____

Adaptation: _____

Environment: _____

Selecting Agent: _____

Base your answers to questions 5-7 on the figure below, which shows various finches found on the Galapagos Islands.



4. Predict which species of finch would be most likely to survive if the weather on the Galapagos Islands gradually changed and the seeds available to the finches became larger with heavier shells. Explain your answer.

5. One island is populated by two species- Ground Finches and Small Tree Finches.

a. What two types of food would you expect to be available on this island? Explain why.

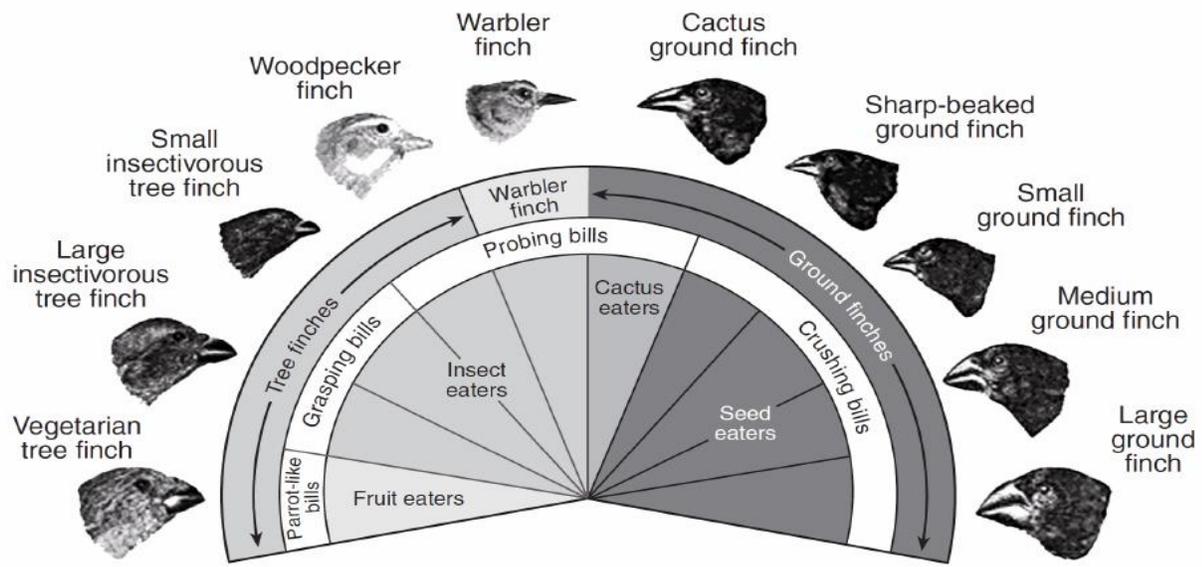
b. Would you expect the two species to compete for food on this island? Explain your answer.

c. How might the two finch populations be affected if several dozen Sharp-billed Ground Finches were to migrate to the island and survive? Support your answer with an explanation.

6. Explain how an island could support large populations of both Large Ground Finches and Small Ground Finches.

Base your answers to questions 1 through 3 on the diagram below and on your knowledge of biology.

The diagram shows variations in the beaks of finches in the Galapagos Islands.



1. In this diagram, the variety of beak sizes and shapes are adaptations directly related to successful
 a.) feeding b.) camouflage c.) defense d.) singing

2. State *one* reason why the large ground finch and the woodpecker finch can live successfully on the same island.

3. Identify *one* finch in the diagram that is *least* likely to compete with any of the other finches. Support your answer.
