

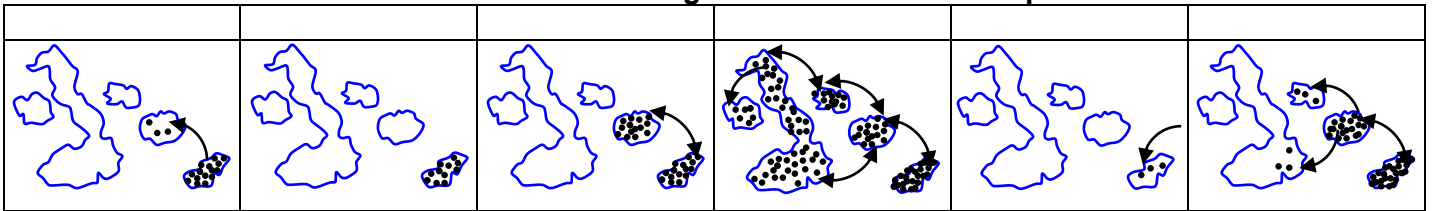
SPECIATION IN GALAPAGOS ISLAND FINCHES

Learning Targets: I can explain how variation, over-reproduction, and competition contribute to different organisms being more likely to pass on genes than others. I can evaluate the relationship of natural selection to adaptation and the diversity among species.

While visiting the Galapagos Islands located about 600 miles off the northwest coast of South America, Charles Darwin counted 13 species of finch. In addition to size and other characteristics, he noticed that each had a slightly different shaped beak. Darwin observed that the birds on the Galapagos Islands had some similarities to the finches on the South American mainland. Darwin hypothesized that perhaps there was a common ancestor that came over to the Galapagos Islands from the mainland for all of the different species of finches on the islands. Darwin's observations of the various finches and of the environment of the islands, helped him formulate his theory of natural selection. The adaptive radiation (*evolutionary diversification of a single species into an array of species differentially adapted to diverse niches*) and speciation of the Galapagos Island finches also shows the effects the geographic isolation mechanisms operating in the islands.

1. Define species. _____
2. Define speciation. _____
3. Define reproductive isolation. _____
4. Table #1 contains diagrams representing the events of finch migration through the Galapagos Islands. Sequence the diagrams to show in the correct order of finch migration. Table #1 also contains statements that describe the events of finch migration through the Galapagos Islands. Sequence the statements to describe the correct order of finch migration.

TABLE #1: Number the Diagrams in the Correct Sequence








Number the Statements in the Correct Sequence

The finches increased in numbers and, under influence of natural selection, gradually became adapted to the local environment.	Some managed to fly back to the first island but reproductive isolation had occurred between them and the existing population.	Originally, there were no finches on the islands. Some finches from the mainland managed to fly across to them.	Some of the finches managed to fly to a second island where the environment was different. Gradually they adapted to the conditions on the second island.	This process was repeated over and over again as the finches colonized more of the islands.	Some finches managed to fly to other islands where the environment was different. Adaptation to the new conditions gradually took place
--	--	---	---	---	---

5. Describe speciation of the Galapagos Island finches in terms of **geographic isolation**. _____






Table #2 has a picture and description of the function of the beaks of five of Darwin's Galapagos Island finches.

TABLE #2: Beak Functions in Five Galapagos Island Finches

I. Large Ground Finch	II. Large Tree Finch	III. Warbler Finch	IV. Small Ground Finch	V. Cactus Finch
				
large strong crushing beak	strong sharp beak for grabbing and cutting	small pointed beak for probing into cracks	strong crushing beak	long tough beak for probing

6. Match the finch beak with the tool that most closely resembles the beak function.






- I. ___ large ground finch - large strong crushing beak
- II. ___ large tree finch - strong sharp beak for grabbing and cutting
- III. ___ warbler finch - small pointed beak for probing into cracks
- IV. ___ small ground finch - strong crushing beak
- V. ___ cactus finch - long tough beak for probing

				
A. tweezers	B. small nutcrackers	C. long-nosed pliers	D. large nutcrackers	E. metal cutters

7. The shape and size of a bird's beak would most likely be affected by what environmental limiting factor? _____

8. Match the finch with the food it is best adapted to eat.

- I. Large Ground Finch
- II. Large Tree Finch
- III. Warbler Finch
- IV. Small Ground Finch
- V. Cactus Finch

A. Small insects in cracks and crevices. 	B. Large hard seeds. 	C. Cactus seeds and nectar. 	D. Large insects such as beetles. 	E. Small hard seeds. 
---	---	--	---	---

9. Describe the role of variations in the adaptation and speciation of the Galapagos Island finches.

10. Describe how competition and limited resources aided speciation in the Galapagos Island finches.

11. Use a separate sheet of paper to write a paragraph describing speciation in the Galapagos Island finches in terms of the five concepts of natural selection.