

Appendix 1. Samples questions for the Conceptual Inventory of Natural Selection-Abbreviated

Scientists have long believed that the 14 species of finches on the Galapagos Islands evolved from a single species of finch that migrated to the islands one to five million years ago (Lack, 1940). Recent research (Burns, et al. 2002) suggests that the original finches came from the Caribbean Islands. Different species live on different islands. For example, the medium ground finch and the cactus finch live on one island. The large cactus finch occupies another island. Among the major differences in finch species are their beak sizes and shapes. Evolutionary changes occur by many processes, one of which is natural selection.

Choose the answer that best reflects how an evolutionary biologist would answer the following questions with natural selection in mind.

What is the best way to characterize the evolutionary changes that occur in a finch population over time?

- a. The traits of each individual finch in a population change over time.
- b. *The proportions of finches with different traits in a population change over time.*
- c. Mutations occur to meet the changing needs of the finches.
- d. The environment causes specific mutations in individual finches to help them survive and reproduce.

What caused populations of finches having different beak shapes and sizes to become distinct species distributed on the various islands?

- a. *The finches were quite variable, and those whose features were best suited to the available food supply on each island reproduced most successfully.*
- b. All finches are essentially alike and there are not really fourteen different species.
- c. Different foods are available on different islands and for that reason, the finches that colonized each island developed the beaks they needed before they reproduced.
- d. The environment on each island gradually molded beak shape in the new species because that particular shape was needed to obtain the available food.