

CA State Standard 8a: Students know how natural selection determines the differential survival of groups of organisms. 8b: Students know a great diversity of species increases the chance that at least some organisms survive major changes in the environment. 8d: Students know reproductive or geographic isolation affects speciation.

Natural selection is an evolution-causing mechanism that is based on 4 principals: Overproduction and competition, Variation, Adaptations, and Descent with modification

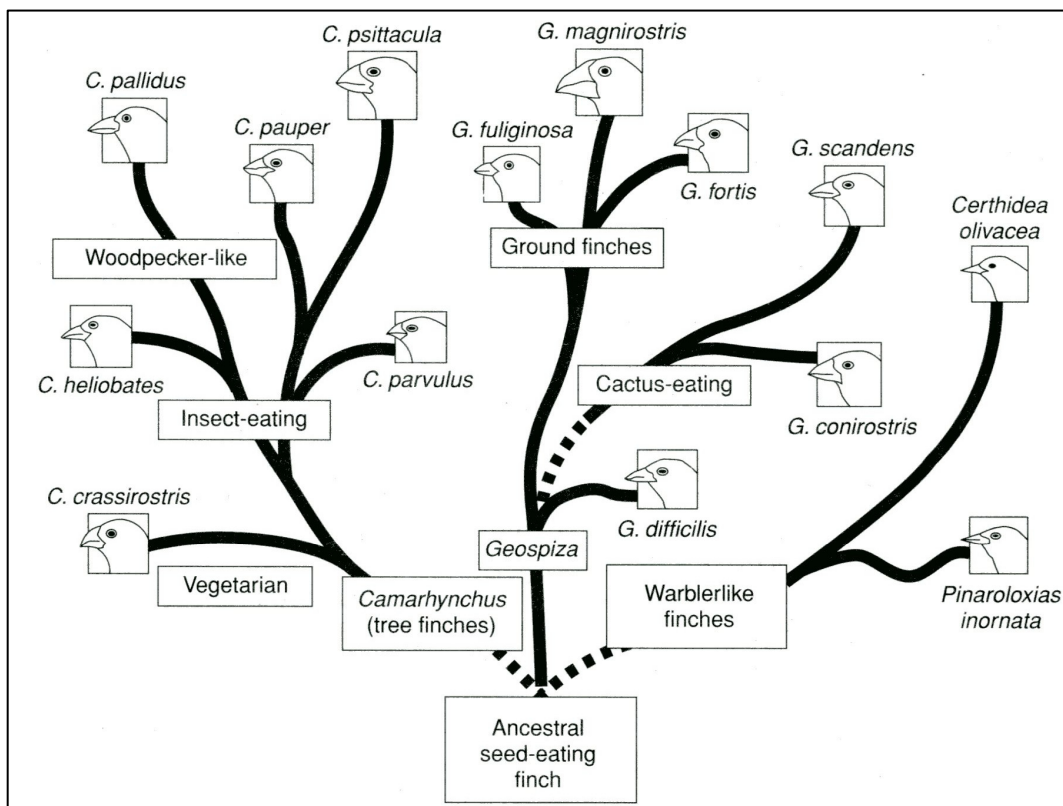
Speciation is the evolutionary process by which new biological species arise, caused by Natural Selection pressures. A **species** is often defined as a group of organisms capable of interbreeding and producing fertile offspring. In order for **speciation** to occur, members of one species have to form separate populations and stop mating with one another. Several kinds of **barriers** can isolate populations and prevent mating such as 1) Behavioral isolation 2) Temporal isolation 3) Geographic isolation

A Close Look at Darwin's Finches

When Charles Darwin traveled to the Galapagos Islands, he found a variety of species of finches. Although each species was slightly different from the others, all the species were related. None of the finch species he found were similar to finches on the mainland of South America. When Darwin saw such extensive diversity of species in a single group of birds, he hypothesized that they all could have descended from a common ancestor. His observations of these finches helped him formulate his concept of evolution.

The **phylogenetic tree** below shows the relationships Darwin proposed among the species of finches. The tree is based on a comparison of the anatomy, behavior, and location on the island of each finch species. Look carefully at each species, and notice the dramatic difference among the beaks. Each type of finch has a beak adapted to its diet.

Darwin's finches are an example of adaptive radiation. **Adaptive radiation** is the emergence of many species from a common ancestor that was introduced to various new environments. For adaptive radiation to occur, the new environments must offer new opportunities and pose new problems of survival for the species.



1. Which of the ground finches illustrated above would be able to eat the largest, toughest nuts and seeds? Explain your answer.

2. Study the insect-eating finches shown in the diagram. What can you infer about the **insects** of the Galapagos Islands?

3. Explain what a **species** is:

4. Explain **how** a new species can form:

5. What are 2 examples of **barriers** to reproduction between populations?

6. Describe a **situation** that would result in the sudden geographic isolation of a few members of a population (what happened to the finch ancestor?)

7. In the diagram on the right, bird A thrives on a diet of large, thick-shelled nuts. Bird B feeds exclusively on insects. Which **feature** could most likely be considered an adaptation of these birds to their diet?

A) skull shape B) beak size C) visual keenness D) toe length

8. Overproduction is a reproductive strategy in which some animals have many offspring. With more offspring, it's more likely that some will survive to reproduce. Overproduction is a principle of

A) adaptation B) evolution C) natural selection D) mutation.

9. A storm destroys the tall shade trees in a hypothetical forest. In the following days, increased sunlight reaches the forest's floor. Although individuals of shade-intolerant plant population die, some individuals survive. Which of the following best explains this?

A) A trait that already existed in the population became favorable when the environment changed.

B) The loss of shade caused a mutation in some individuals.

C) Individuals that preferred the light outcompeted individuals that preferred shade.

D) Individuals that survived the loss of shade were healthier than the individuals that died.

