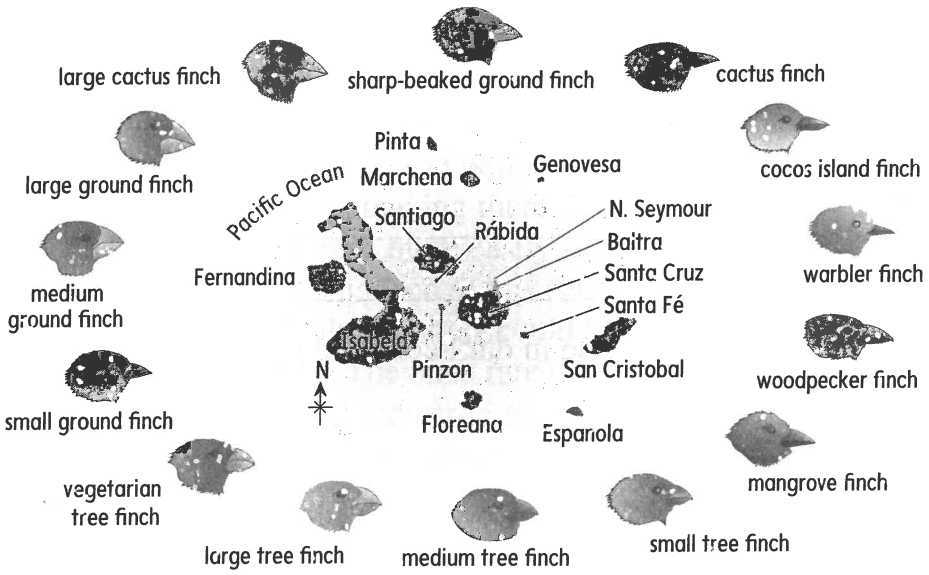
Adaptive Radiation

Use with textbook pages 50–53.

Use the following information about Darwin's finches to answer questions 1 to 13.



Darwin's finches evolved from a single common ancestral finch thousands of years ago. The original population of finches on the isolated Galapagos Islands experienced adaptive radiation, which allowed them to diversify to exploit resources on the different islands.

Darwin's finches	Diet
large cactus finch	cactus seeds and parts
cactus finch	insects
cocos island finch	insects
warbler finch	insects
woodpecker finch	insects
mangrove finch	insects
small tree finch	insects
medium tree finch	insects
large ground finch	mainly seeds
medium ground finch	mainly seeds
small ground finch	mainly seeds
sharp-beaked ground finch	mainly seeds

1. Name two selective pressures experienced by the ancestral population of finches.

2. What characteristic came about from the selective pressures on the islands?

3. List at least two factors that influenced variations in this characteristic.

4. What factor led to speciation on the Galapagos Islands?

5. Which finch would you expect to have a thick beak to break large, hard nuts?

6. What food source would you expect a finch to have if it had a thin sword-like beak for stabbing?

7. Suppose the large cactus finch is found on the same island as the cactus finch.

   a) Could these two species co-exist? Why or why not?

   b) Predict whether these two species of finches would mate. Explain.

8. Would you expect larger islands to support more or fewer species of finches than smaller islands? Explain.

9. Suppose a population of small tree finches is found on the same island as a population of small ground finches. Predict whether these two populations could co-exist. Explain why or why not.

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10. Suppose that a change in environmental conditions resulted in a drought for an extended period of time. Due to the dry conditions, the plants on the island produced larger seeds with harder outer coverings.

a) Of the four ground finches that live on the island, which finch would have the adaptive advantage during the drought?

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b) Predict what would happen to the frequency of all the ground finches.

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c) Predict what would happen to the average beak size due to natural selection over time. Explain why.

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11. Suppose that the environmental conditions changed again, producing a lot of rainfall. As a result, the plants on the island produced more small and medium size seeds. The larger seeds became scarce. Which finches would now have an adaptive advantage and become the prominent species on the island?

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12. Suggest some factors that could lead to the extinction of these finches.

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13. Come up with some questions that you might have about Darwin's finches and adaptive radiation. Do some research to find the answers to your questions.

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