

Name: _____

Introduction

Consider the long legs of wading birds such as herons and egrets, birds that are common around rivers and marshes. How could such a bird evolve such long legs? Read the two scenarios and discuss each with your partner. Once you have read and discussed both scenarios, answer the questions that follow.

Great Blue Heron



Snowy Egret



Assume that the species ancestral to these birds had short legs, and could only wade into very shallow water along the shoreline, eating snails and small fish.

Scenario A

A change in the environment increased competition between the birds, and resulted in a depletion of the food supply in the shallow waters. This created a need for the short-legged birds to wade into deeper water in order to survive, which forced them to stretch their legs, because they didn't want to get knocked over by the little waves. This stretching caused their legs to get a little longer.

When these birds produced hatchlings, the baby birds grew up with slightly longer legs inherited from their parents. These offspring birds needed to wade out even farther, so they stretched their legs even more, and made them a little bit longer yet. In turn, their hatchlings grew up with even longer legs inherited from their parents, and so on...

Eventually, after many generations of this process, the legs of these birds were so much longer than the ancestral birds that the new birds could be described as a new species.

Scenario B

Within the species of ancestral short-legged shore birds, there is a range of leg lengths, from a bit shorter to a little bit longer than the average leg length. These leg lengths tended to run in the families (i.e., leg length was hereditary).

A change in the environment increases competition between the birds, depleting the food supply in the shallow waters. The birds with the slightly longer legs could wade out a little farther. As a result, they obtained more food, lived a little longer, and therefore produced more hatchlings. Those with the shorter legs would tend to starve to death. Since the tendency for leg length was already inheritable, the surviving long-legged birds tended to have more long-legged hatchlings, which likewise tended to get more food and produce more hatchlings and so on...

Eventually, after many generations of this process, the average leg length of these birds was so much longer than the ancestral birds that the new birds could be described as a new species.

Comparing Mechanisms of Evolution: A Sample Study

Lesson Title: Comparing Theories: Lamarck and Darwin

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Answer these questions based on the scenarios presented.

- Which scenario sounds like an explanation that Darwin might give? Why?

- Which scenario sounds like an explanation that Lamarck might give? Why?

- What are the specific clues that most clearly distinguish a Darwinian explanation from a Lamarckian explanation?

- Go back to the two scenarios. Underline the specific terms and phrases that distinguish the Lamarckian explanation from the Darwinian one.

- Which explanation is most likely correct given the evidence for Darwin's and Lamarck's theories?