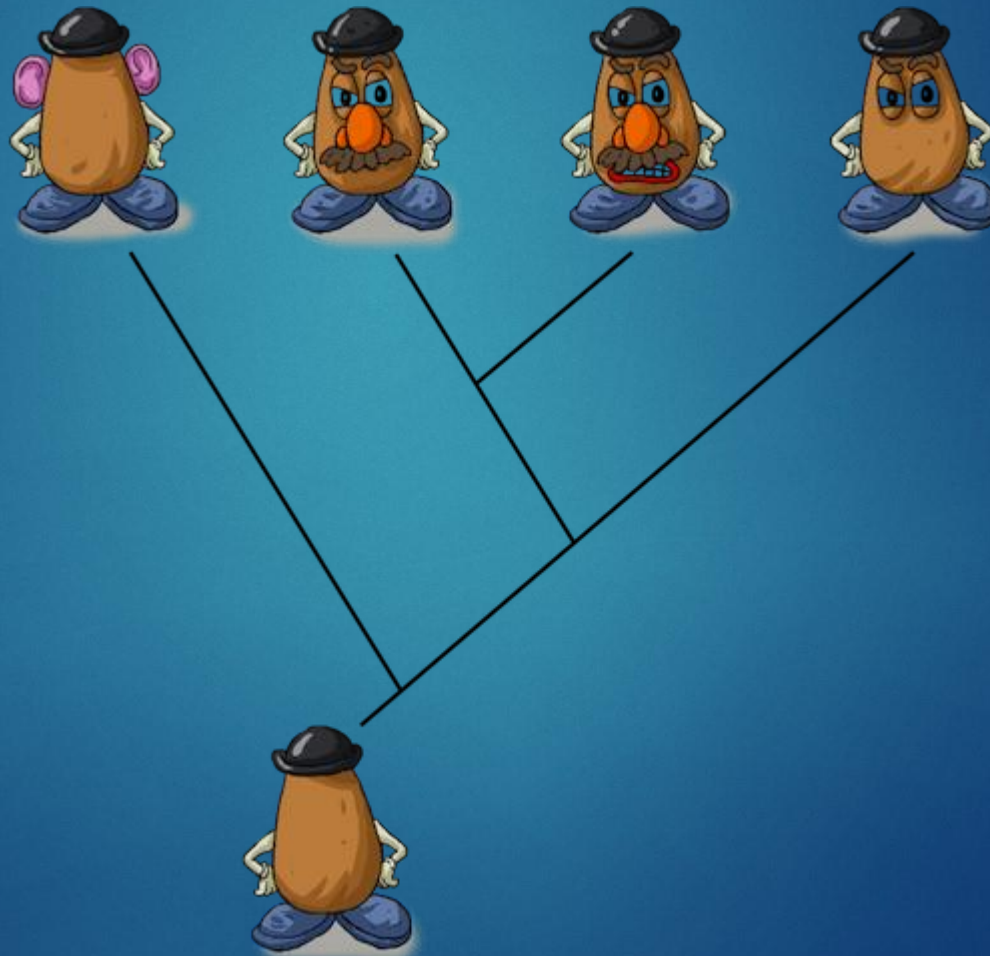
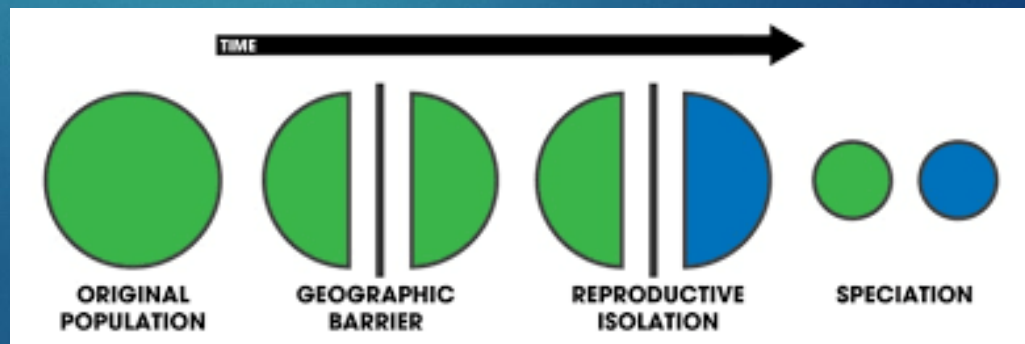


Speciation



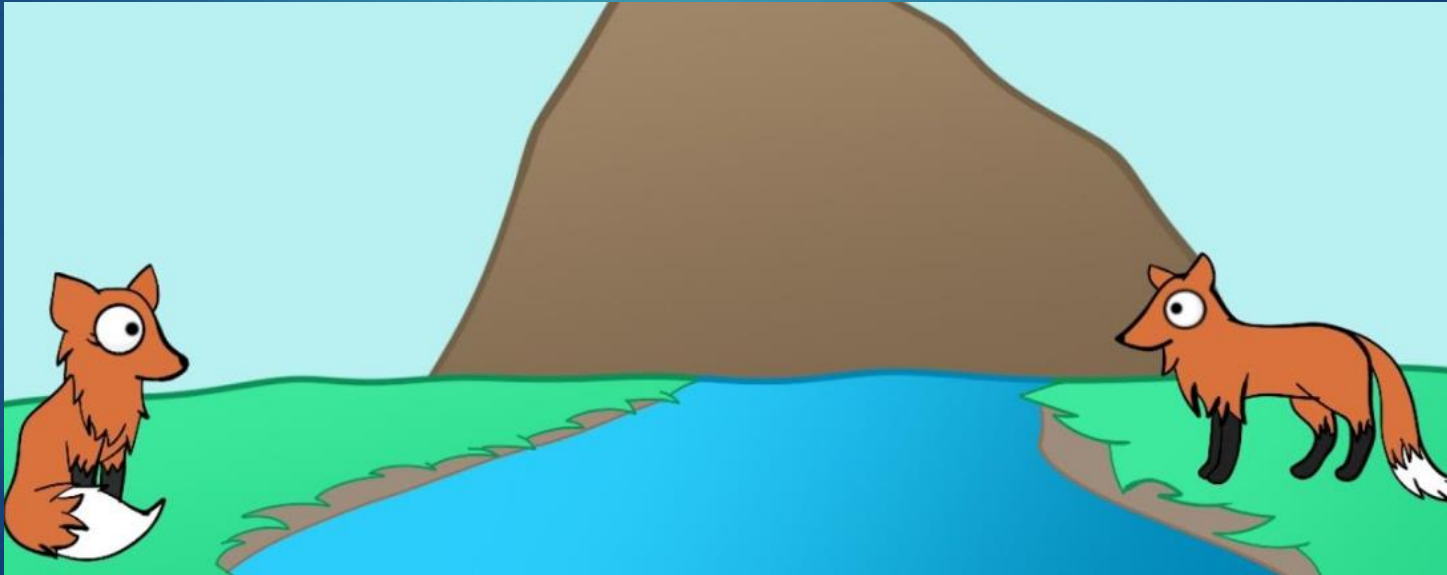
Natural selection can lead to the formation of new species

- Individuals of the same species can interbreed to produce fertile offspring.
- Sometimes members of a population change so much that they are no longer able to produce fertile offspring with members of the original population.
- This leads to **speciation**, where new species are formed.



How Speciation can occur

- Geographic barriers can isolate a population, resulting in new species that are unable to interbreed.
- Examples of geographic barriers include a glacier, a lava flow, and an island.



Speciation continued

- ▶ Over time, natural selection and other factors act on each of the populations.
- ▶ Mutations that result in new traits that are advantageous to individuals in their environment are passed from one generation to the next
- ▶ After a long geological timeframe, the populations are so different from each other that they can no longer reproduce together and therefore are not the same species



One Type of Speciation: Adaptive Radiation

- **Adaptive radiation:** the diversification of a common ancestral species into a variety of differently adapted species
- Finches on the Galapagos Islands have different beak shapes due to their diverse diets.

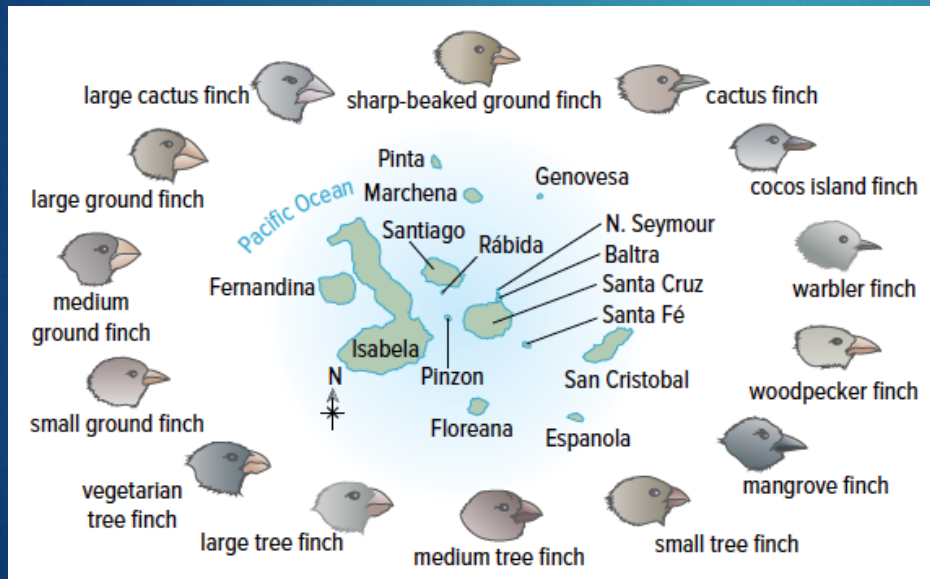


Figure 1.25: One common example of new species forming from a common ancestor are finches on the Galapagos Islands. The Galapagos Islands are located on the equator in the Pacific Ocean. The islands are volcanic in origin and contain a number of ecosystems, ranging from dry and desert-like to humid forests. Notice the difference in the shape and size of the birds' beaks.

Time out:

- ▶ Turn to page 51
- ▶ Answer the following questions:
 - ▶ How did the finch species originally get to the islands?
 - ▶ Why were the finches successful in their new environment?
 - ▶ What is the major physical difference among the species illustrated?
 - ▶ Hypothesize what might explain the differences in this physical difference?

Adaptive Radiation: Another Example

- ▶ Tortoises on the Galapagos Islands are all different due to mutations, natural selection, and adaptive radiation.

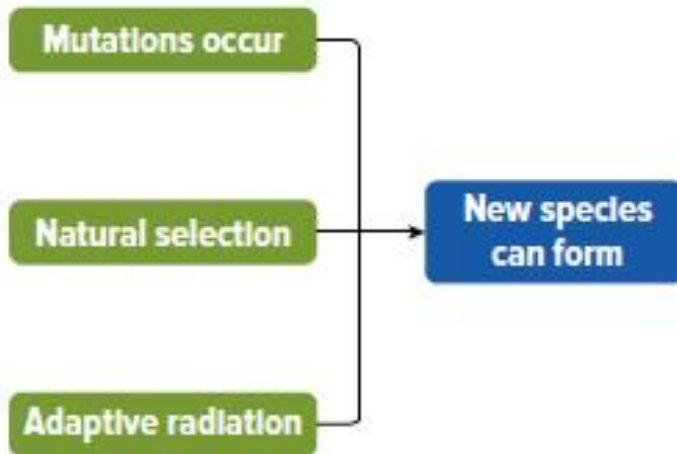


Figure 1.26: This figure illustrates how the various factors interact to form a new species.

Investigation 1-H: Islands and Species

- ▶ Pg 68-69 in Textbook
- ▶ Complete in partners
- ▶ I will give you a number between 1-4
- ▶ 1=A, 2=B, 3=C, 4=D



Extinction and Selective Pressure

- ▶ **Extinction:** occurs when a species completely disappears from Earth
 - ▶ Affected by environmental pressures
- ▶ Mass extinctions result in a decline in the number of species.
- ▶ Examples: Dinosaurs
 - ▶ 65 mya
 - ▶ Research suggests it was triggered by an asteroid impact
 - ▶ Caused major forest fires
 - ▶ Soot in air
 - ▶ Sun blocked out for months
 - ▶ During this time more than half the existing marine and many terrestrial plants and animals became extinct
 - ▶ Gave rise to mammals

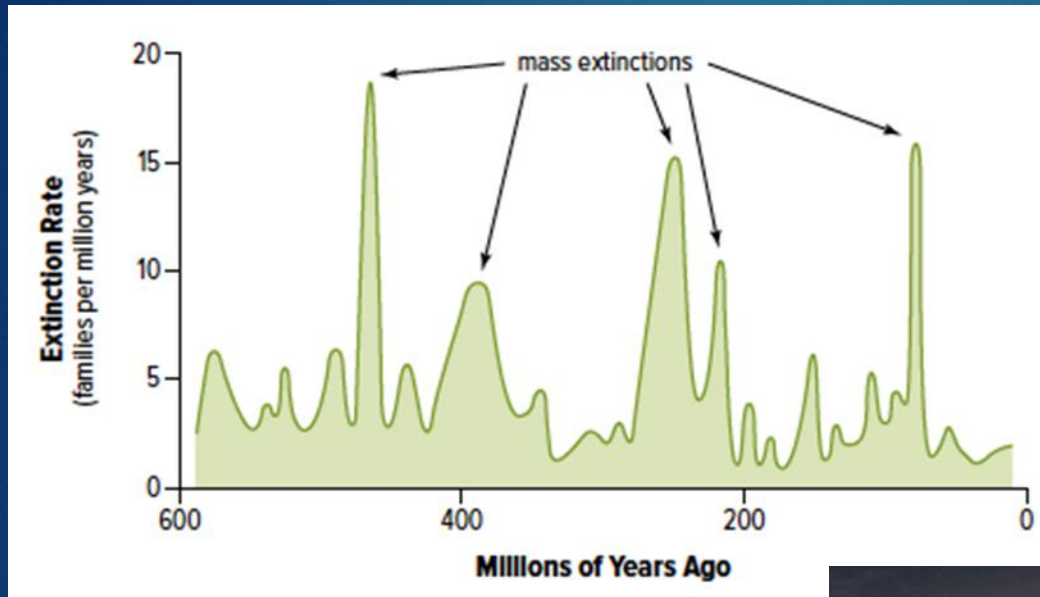


Figure 1.28: The five major mass extinction events.



Discussion Questions

1. What is adaptive radiation?
2. Explain why it would have been possible for an ancestral finch species, having arrived on one of the Galapagos Islands, to have diversified and evolved into other species over time.
3. How is extinction related to selective pressure?