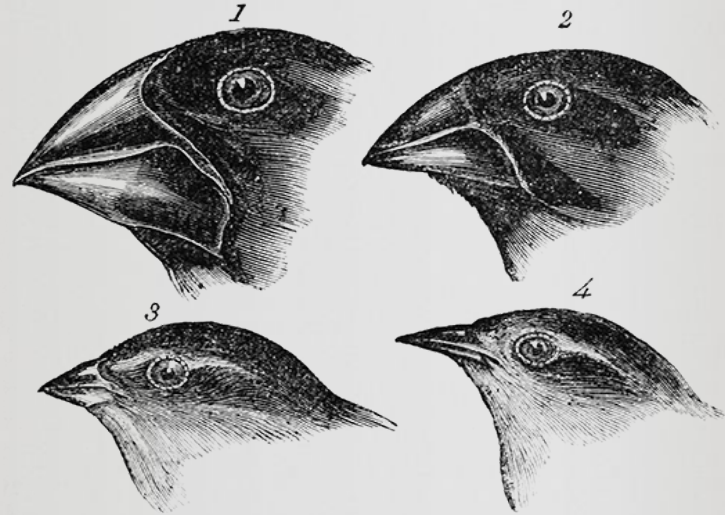


Biodiversity, Speciation, and Isolating Mechanisms



1. *Geospiza magnirostris*.
3. *Geospiza parvula*.

2. *Geospiza fortis*.
4. *Certhidea olivacea*.

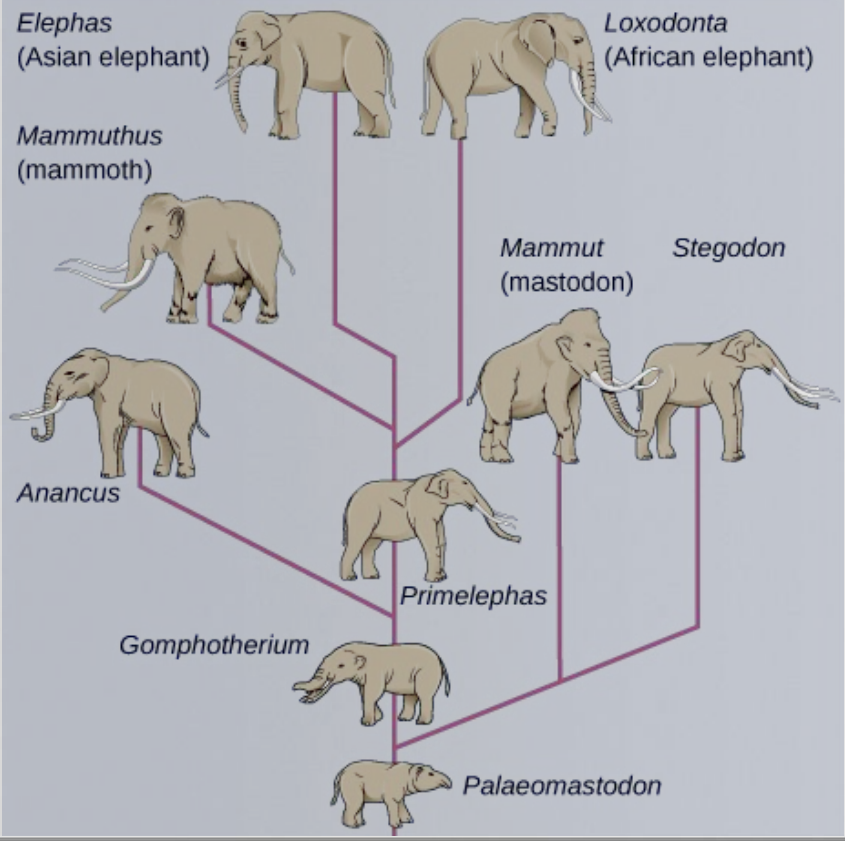
What is a species?

- ◆ **Species** - a group of similar organisms that can mate and produce fertile offspring.
- ◆ There are approximately 8.7 million different species on Earth. Why?



Speciation

- ◆ Over the course of many generations, species often diverge to produce new species
- ◆ **Speciation** - the process of a new species being created when a species diverges (separates) into two or more species that can no longer reproduce or share genes.



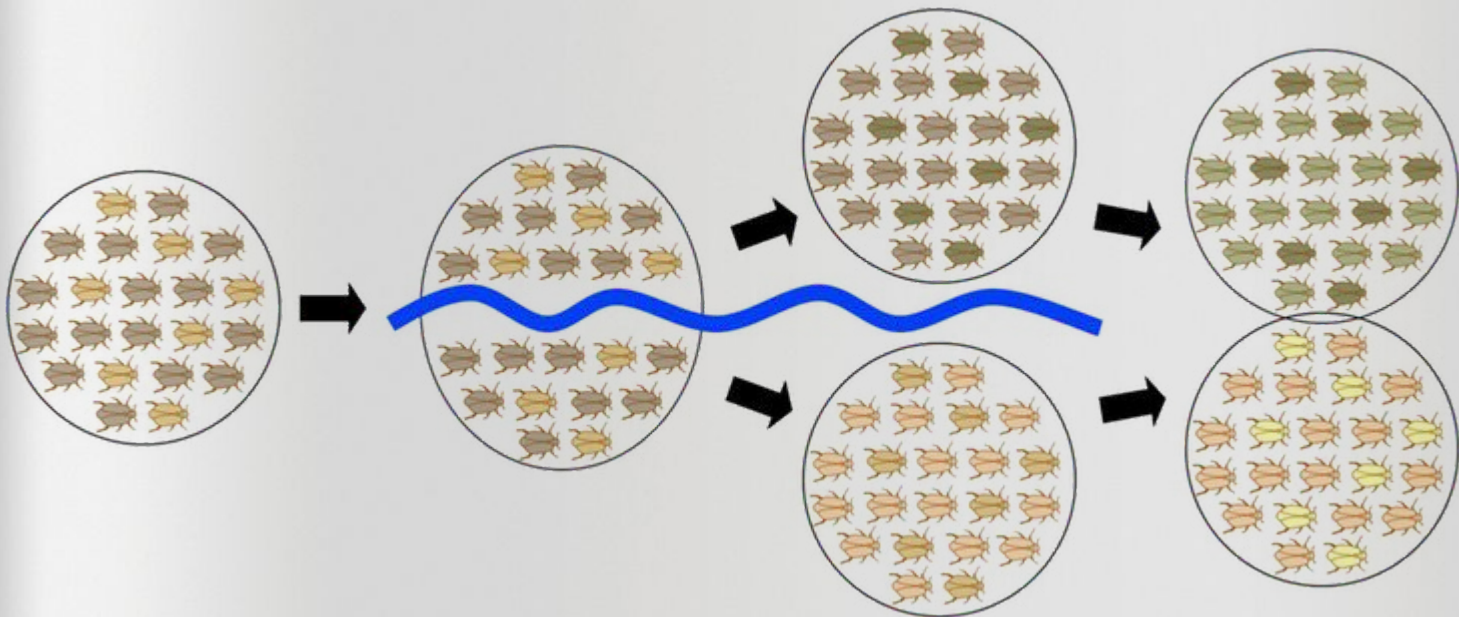
What Causes Speciation to Occur?

- ◆ Speciation occurs when members of a species become reproductively isolated from one another.
- ◆ Speciation can be either
 - ◆ Allopatric
 - ◆ Sympatric

Allopatric Speciation

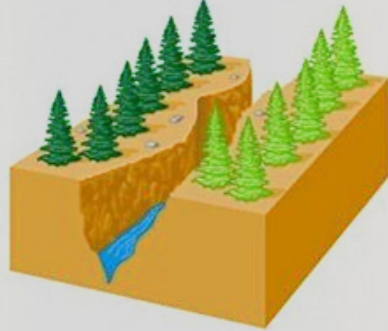
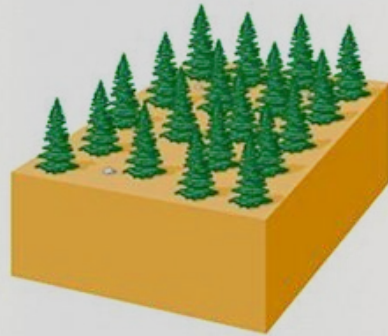
- ◆ Speciation that occurs because of geographic isolation.
- ◆ **Geographic isolation** is when a population is split into two by a geographic barrier so that its members no longer inhabit the same area and therefore can no longer exchange genes or reproduce.

Allopatric Speciation

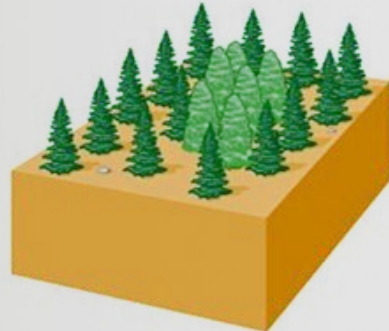
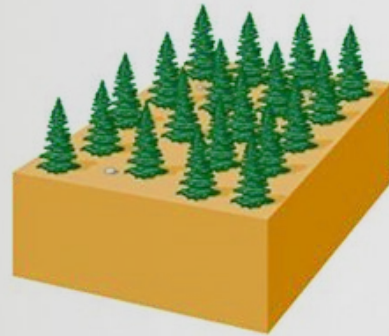


Sympatric Speciation

- ◆ When two species diverge from a single species while continuing to live in the same geographic area.
- ◆ This type of speciation is much more rare.



(a) Allopatric speciation



(b) Sympatric speciation

--PAUSE--
Time to Practice

Reproductive Isolation

- ◇ After being initially separated, new species may also become *reproductively isolated* (unable to breed) in the following ways:
 - ◆ Mechanical Isolation
 - ◆ Temporal Isolation
 - ◆ Behavioral Isolation
 - ◆ Ecological Isolation
 - ◆ Reproductive Failure

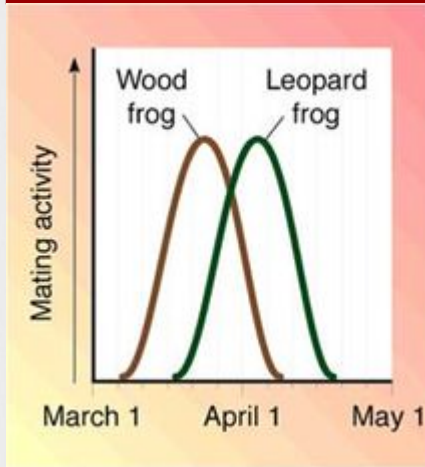
Mechanical Isolation

- ◆ Physical differences prevent populations from mating or pollination



Temporal Isolation

- ◆ Populations reproduce during different breeding seasons



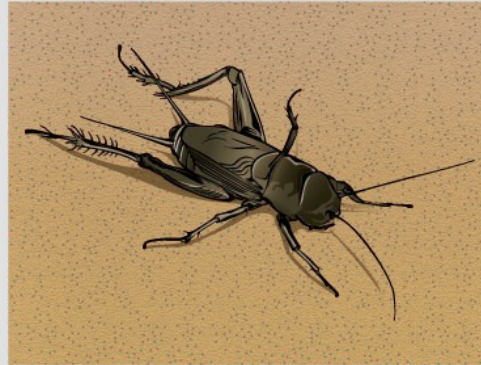
Behavioral Isolation

- ◆ Different populations have different courtship rituals or breeding strategies which prevent them from reproducing

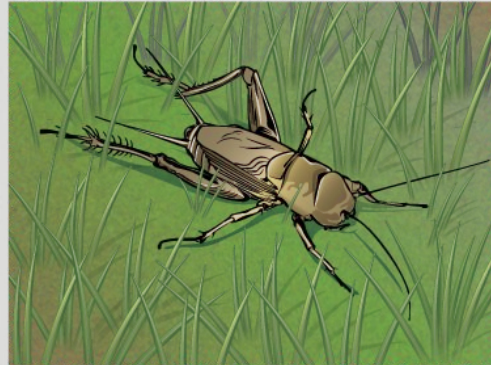


Ecological Isolation

- ◆ Different populations breed in different habitats within the same geographic area



(a) *Gryllus pennsylvanicus* prefers sandy soil.



(b) *Gryllus firmus* prefers loamy soil.

Reproductive Failure

- ◆ Sometimes, populations can breed with one another but they produce inviable or sterile offspring

